MASTER PLAN TRANSPORTATION IMPACT STUDY

NORTH CORNWALL TOWNSHIP
LEBANON COUNTY, PENNSYLVANIA

APRIL 24, 2012

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MASTER PLAN
TRANSPORTATION IMPACT STUDY

North Cornwall Township, Lebanon County, PA

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EXECUTIVE SUMMARY

The purpose of this Master Plan Transportation Impact Study (TIS) is to examine the potential traffic impact associated with development of three (3) parcels totaling ±148 acres on the roadway network in North Cornwall Township, Lebanon County, PA. Based on this evaluation, the following conclusions were reached:

1. The scope of and methodologies used to prepare this Master Plan TIS were confirmed with representatives of North Cornwall Township, the Lebanon County Planning Department and PennDOT. The study area intersections included in this TIS are as follows:

   - Quentin Road (SR 0072) and Rocherty Road.
   - Quentin Road (SR 0072) and Lowe's/Cedar Crest Square/Tractor Supply Driveways.
   - Quentin Road (SR 0072) and Lowe's/K-Mart/Cedar Crest Square Driveways.
   - Quentin Road (SR 0072) and Isabel Drive.
   - Quentin Road (SR 0072) and York Street/Lebanon Plaza Mall Driveway.
   - Quentin Road (SR 0072) and Colebrook Road (SR 0241).
   - Cornwall Road (SR 2001) and Rocherty Road (SR 2002).
   - Cornwall Road (SR 2001) and Isabel Drive/Norman Drive.
   - Cornwall Road (SR 2001) and York Street.
   - Cornwall Road (SR 2001) and Wilhelm Avenue.
   - Rocherty Road/Evergreen Road (SR 2002) and Lincoln Avenue.

2. The assumed development for each of the parcels was based upon the court-approved Settlement Agreement between the Board of Supervisors of North Cornwall Township and Springwood Development Partners, L.P. (Springwood), dated April 20, 2010. The specific land uses for each parcel are as follows:

   <u>81+/- Acre Parcel on the Eastern Side of Cornwall Road (SR 2001)</u>

   - 433,200 square foot Office Park consisting of an integrated mix of office building and support services, including an 11,400 square foot pharmacy, two (2) 6,000 square foot sit-down restaurants, and a 4,000 square foot drive-in bank.
   - 100 room hotel.
   - 160 luxury townhomes.

   <u>27+/- Acre Tract on the Western Side of Cornwall Road (SR 2001)</u>

   - 322,150 square foot Shopping Center consisting of an integrated mix of big box retail, strip retail, and pad sites.

   <u>40+/- Acre Parcel on the Western Side of Cornwall Road (SR 2001)</u>

   - 278,450 foot Shopping Center consisting of an integrated mix of big box retail, strip retail, and pad sites.

Please note that this subject parcel is currently owned by Carol J. & Richard C. Kreider. The parcel was included in the previously referenced Settlement Agreement in order to allow for the potential for Springwood to purchase the property and integrate it with the 27± acre parcel, thus creating a coordinated and unified shopping center. If Springwood chooses not to purchase the Kreider parcel, future development of the parcel will revert to the applicable zoning requirements at that time. Therefore, this Master Plan TIS has been prepared to consider future conditions both with and without development of the 40+/- acre parcel.

The subject parcels will be constructed in five (5) phases, as described below:

Phase 1 (southern portion of 81+/- Acre Parcel located generally adjacent to Rocherty Road):

- 56,400 square feet of the Office Park, including the two (2) 6,000 square foot sit-down restaurants.
- 100 room hotel.
- 52 luxury townhomes.

Phase 1A (southern portion of 81+/- Acre Parcel located generally adjacent to Rocherty Road):

- 108 luxury townhomes.

Phase 2 (northeast portion of 81+/- Acre Parcel located adjacent to the Tuck Business Park):

- 160,600 square feet of the Office Park.

Phase 3 (northwest portion of 81+/- Acre Parcel located generally adjacent to Cornwall Road):

- 216,200 square feet of the Office Park, including the 11,400 square foot pharmacy and the 4,000 square foot drive-in bank.

Phase 4 (27+/- Acre Parcel on southern side of proposed Township Roadway):

- 322,150 square foot Shopping Center.

Phase 5 (40+/- Acre Parcel on northern side of proposed Township Roadway):

- 278,450 square foot Shopping Center.

Based upon the proposed phasing for development of the subject parcels, TPD has prepared a phased TIS. The phased TIS includes an analysis of the following conditions:

- Existing Conditions.
- 2025 Future Conditions (Build-Out of Phases 1, 1A, and 50% of 2).
- 2035 Future Conditions (Build-Out of Phases 1 through 4).
- 2035 Future Conditions (Build-Out of Phases 1 through 5).

3. Access to the subject parcels is proposed as follows:

   81+/- Acre Parcel on the Eastern Side of Cornwall Road (SR 2011)

   This parcel will be served via five (5) driveways to the external roadway network, comprised of the following:

   - A full-access driveway to Cornwall Road (SR 2001), opposite the proposed Township Roadway through the 27+/- Acre and 40+/- Acre Parcels.
   - A left-in/right-in/right-out driveway to Cornwall Road (SR 2001).
   - A full-access driveway to Rocherty Road (SR 2002), opposite the existing eastern driveway to the Lebanon Valley Expo Center.
   - A right-in/right-out driveway to Rocherty Road (SR 2002), opposite the existing western driveway to the Lebanon Valley Expo Center.
   - A full-access connection to Norman Drive.

   27+/- Acre Tract on the Western Side of Cornwall Road (SR 2001)

   - Per the Settlement Agreement, a new east-west Township Roadway will be constructed that will connect Cornwall Road (SR 2001) to Quentin Road (SR 0072) via the existing access the serves the Tractor Supply and Cedar Crest Square. This parcel will be served via three (3) driveways to the proposed Township Roadway. In addition, there will be a right-in/right-out driveway to Cornwall Road (SR 2001) to the south of the proposed Township Roadway.

   40+/- Acre Parcel on the Western Side of Cornwall Road (SR 2001)

   - Per the Settlement Agreement, a new east-west Township Roadway will be constructed that will connect Cornwall Road (SR 2001) to Quentin Road (SR 0072) via the existing access that serves the Tractor Supply and Cedar Crest Square. This parcel will be served via three (3) driveways to the proposed Township Roadway. In addition, there will a right-in/right-out driveway to Cornwall Road (SR 2001) to the north of the proposed Township Roadway.

4. Under the 2025 conditions (Phases 1, 1A, and 50% of 2), the subject parcels will generate 349 new vehicle-trips during the weekday A.M. peak hour, 332 new vehicle-trips during the weekday P.M. peak hour, and 166 new vehicle-trips during the Saturday midday peak hour.

5. Under the 2035 conditions (Phases 1-4), the subject parcels will generate 1,022 new vehicle-trips during the weekday A.M. peak hour, 1,768 new vehicle-trips during the weekday P.M. peak hour, and 1,560 new vehicle-trips during the Saturday midday peak hour.

6. Under the 2035 conditions (Phases 1-5), the subject parcels will generate 1,211 new vehicle-trips during the weekday A.M. peak hour, 2,671 new vehicle-trips during the weekday P.M. peak hour, and 2,732 new vehicle-trips during the Saturday midday peak hour.

7. Capacity analyses were conducted to determine the quality of operation (LOS) at the study area intersections for the following conditions:

   - Existing Conditions.
   - 2025 Base Conditions (10-year build-out without development).
   - 2025 Projected Conditions (10-year build-out with development).
   - 2035 Base Conditions (20-year build-out without development).
   - 2035 Projected Conditions (20-year build-out with development of Phases 1-4).
   - 2035 Projected Conditions (20-year build-out with development of Phases 1-5).

   For purposes of this Master Plan TIS, the capacity analyses were completed for two sets operational guidelines (i.e. level of service). The two sets of operational guidelines are as follows:

   - PennDOT Guidelines – Compares the overall intersection levels of service pre and post-development for the future conditions. These guidelines suggest that the resultant overall intersection level of service remain the same, or if a drop in level of service occurs, that the resultant increase in delay for the intersection be no greater than 10-seconds.

   - Township Master Plan Guidelines – These guidelines suggest that the resultant levels of service for all lane groups at the study area intersections be LOS D or better for the future conditions.

   As noted in the matrices contained within the appendices of this Master Plan TIS, roadway improvements have been identified for all future build conditions such that the above noted operational guidelines are satisfied.

8. A summary of the roadway improvements required to satisfy the identified operational guidelines for each of the study area intersections is included below in **Table i**. In addition to the identified roadway improvements, the following multi-model improvements should also be considered:

   - All future roadway improvements in an around the subject parcels should be designed and constructed in full compliance with ADA requirements unless otherwise directed or approved by the local municipality and/or PennDOT.

   - All future roadway improvements in an around the subject parcels should consider the recommendations of the North Cornwall Township Master Plan for Non-Motorized Trail Connections, and where feasible implement said recommendations.

   - In conjunction with development of the subject 81+/- Acre Parcel, a Trailhead connection should be constructed to the Lebanon Valley Rail-Trail.

   - In conjunction with development of the subject parcels, coordination should occur with Lebanon Transit in order to evaluate expansion of the existing bus service to include scheduled stops within the subject parcels.

TABLE i
ROADWAY IMPROVEMENT SUMMARY

Intersection	Improvement	Condition When Improvement Is Required?				
		2025 PennDOT Guidelines	2035 PennDOT Guidelines (Phases 1-4)	2025 Master Plan Guidelines	2035 Master Plan Guidelines (Phases 1-4)	2035 Master Plan Guidelines (Phases 1-5)
Quentin Road (Route 72) & Rocherty Road	WB Rocherty Road Dual Left Turn Lanes				✓	✓
	WB Rocherty Road Right Turn Lane		✓		✓	✓
	NB Route 72 Right Turn Lane	✓	✓		✓	✓
	Additional NB Route 72 Through Lane			✓	✓	✓
	Additional SB Route 72 Through Lane			✓	✓	✓
	Optimization of Traffic Signal Operations	✓	✓	✓	✓	✓
Quentin Road (Route 72) & Lowes/Cedar Crest Square/Tractor Supply	WB Township Road Dual Left Turn Lanes					✓
	Additional NB Route 72 Through Lane				✓	✓
	Additional SB Route 72 Through Lane				✓	✓
	Optimization of Traffic Signal Operations	✓	✓	✓	✓	✓
Quentin Road (Route 72) & Lowes/K-Mart/ Cedar Crest Square	Additional NB Route 72 Through Lane				✓	✓
	Additional SB Route 72 Through Lane				✓	✓
	Optimization of Traffic Signal Operations	✓	✓	✓	✓	✓
Quentin Road (Route 72) & Isabel Drive	Install Traffic Signal	✓	✓	✓	✓	✓
	Additional SB Route 72 Left Turn Lane	✓	✓	✓	✓	✓
	Additional NB Route 72 Through Lane				✓	✓
	Additional SB Route 72 Through Lane				✓	✓
	Optimization of Traffic Signal Operations	✓	✓	✓	✓	✓

TABLE i (CONTINUED)
ROADWAY IMPROVEMENT SUMMARY

Intersection	Improvement	Condition When Improvement Is Required?				
		2025 PennDOT Guidelines	2035 PennDOT Guidelines (Phases 1-4)	2025 Master Plan Guidelines	2035 Master Plan Guidelines (Phases 1-4)	2035 Master Plan Guidelines (Phases 1-5)
Quentin Road (Route 72) & York Street/ Lebanon Plaza	Additional NB Route 72 Through Lane				✓	✓
	Additional SB Route 72 Through Lane				✓	✓
	Optimization of Traffic Signal Operations		✓		✓	✓
Quentin Road (Route 72) & Colebrook Road (Route 241)	Additional NB Route 72 Through Lane				✓	✓
	Additional SB Route 72 Through Lane				✓	✓
	Optimization of Traffic Signal Operations	✓	✓	✓	✓	✓
Cornwall Road & Rocherty Road	EB Rocherty Road Left Turn Lane	✓	✓	✓	✓	✓
	EB Rocherty Road Right Turn Lane				✓	✓
	WB Rocherty Road Left Turn Lane	✓	✓	✓	✓	✓
	WB Rocherty Road Right Turn Lane	✓	✓	✓	✓	✓
	NB Cornwall Road Left Turn Lane	✓	✓	✓	✓	✓
	NB Cornwall Road Right Turn Lane	✓	✓	✓	✓	✓
	SB Cornwall Road Left Turn Lane	✓	✓	✓	✓	✓
	Optimization of Traffic Signal Operations	✓	✓	✓	✓	✓
Cornwall Road & Isabel Drive/ Norman Drive	NB Cornwall Road Left Turn Lane					✓
	SB Cornwall Road Left Turn Lane					✓
	Optimization of Traffic Signal Operations	✓	✓	✓	✓	✓

TABLE i (CONTINUED)
ROADWAY IMPROVEMENT SUMMARY

Intersection	Improvement	Condition When Improvement Is Required?				
		2025 PennDOT Guidelines	2035 PennDOT Guidelines (Phases 1-4)	2025 Master Plan Guidelines	2035 Master Plan Guidelines (Phases 1-4)	2035 Master Plan Guidelines (Phases 1-5)
Cornwall Road & York Street	Install Traffic Signal	✓	✓	✓	✓	✓
	EB York Street Left Turn Lane					✓
Cornwall Road & Wilhelm Avenue	Install Traffic Signal	✓	✓	✓	✓	✓
	WB Wilhelm Left Turn Lane					✓
	WB Wilhelm Avenue Right Turn Lane		✓			
	NB Cornwall Road Left Turn Lane				✓	✓
	NB Cornwall Road Right Turn Lane		✓		✓	✓
	SB Cornwall Road Left Turn Lane				✓	✓
	Re-alignment of Wilhelm Avenue Opposite York Street				✓	✓
	Optimization of Traffic Signal Operations	✓	✓	✓	✓	✓
Rocherty Road/ Evergreen Road & Lincoln Avenue	WB Evergreen Road Right Turn Lane			✓	✓	✓
	SB Lincoln Avenue Right Turn Lane				✓	✓
	Optimization of Traffic Signal Operations		✓	✓	✓	✓
Cornwall Road & Proposed Township Roadway	Install Traffic Signal		✓		✓	✓
	EB Township Road Left Turn Lane		✓		✓	✓
	EB Township Road Right Turn Lane					✓
	WB Township Road Left Turn Lane		✓		✓	✓
	WB Township Road Right Turn Lane		✓		✓	✓
	NB Cornwall Road Left Turn Lane		✓		✓	✓
	SB Cornwall Road Left Turn Lane		✓		✓	✓
	SB Cornwall Road Right Turn Lane		✓		✓	✓
	Optimization of Traffic Signal Operations		✓	✓	✓	✓

TABLE i (CONTINUED)
ROADWAY IMPROVEMENT SUMMARY

Intersection	Improvement	Condition When Improvement Is Required?				
		2025 PennDOT Guidelines	2035 PennDOT Guidelines (Phases 1-4)	2025 Master Plan Guidelines	2035 Master Plan Guidelines (Phases 1-4)	2035 Master Plan Guidelines (Phases 1-5)
Cornwall Road & Right-In/Right-Out Driveway to 40± Acre Parcel	Install STOP-Sign Exiting Driveway					✓
	SB Cornwall Road Right Turn Lane					✓
Cornwall Road & Right-In/Right-Out Driveway to 27± Acre Parcel	Install STOP-Sign Exiting Driveway		✓		✓	✓
	SB Cornwall Road Right Turn Lane		✓		✓	✓
Cornwall Road & Driveway to 81± Acre Parcel	Install STOP-Sign Exiting Driveway	✓	✓	✓	✓	✓
	NB Cornwall Road Right Turn Lane	✓	✓	✓	✓	✓
	Restrict Exiting Left Turn		✓		✓	✓
Rocherty Road & Driveway to 81± Acre Parcel/ LVEC Driveway	Install STOP-Sign Exiting Driveway[1]	✓	✓	✓	✓	✓
	Install Traffic Signal[2]	✓	✓	✓	✓	✓
	EB Rocherty Road Left Turn Lane	✓	✓	✓	✓	✓
	WB Rocherty Road Left Turn Lane	✓	✓	✓	✓	✓
Norman Drive & Driveway to 81± Acre Parcel	Install STOP-Sign Exiting Driveway	✓	✓	✓	✓	✓
	Modify Existing Lebanon Cardiology Parking Lot	✓	✓	✓	✓	✓
Rocherty Road & Right-In/Right-Out Driveway to 81± Acre Parcel/ LVEC Driveway	Install STOP-Sign Exiting Driveway	✓	✓	✓	✓	✓
	WB Rocherty Road Left Turn Lane	✓	✓	✓	✓	✓

LVEC = Lebanon Valley Expo Center
1 = Remove upon installation of traffic signal
2 = Upon satisfying applicable volume based warrants

TABLE i (CONTINUED)
ROADWAY IMPROVEMENT SUMMARY

Intersection	Improvement	Condition When Improvement Is Required?				
		2025 PennDOT Guidelines	2035 PennDOT Guidelines (Phases 1-4)	2025 Master Plan Guidelines	2035 Master Plan Guidelines (Phases 1-4)	2035 Master Plan Guidelines (Phases 1-5)
Township Roadway & Eastern Driveway to 27± Acre Parcel	Install STOP-Sign Exiting Driveway		✓		✓	✓
	WB Township Road Left Turn Lane		✓		✓	
	Restrict to Right-In/Right-Out					✓
Township Roadway & Middle Driveway to 27± Acre Parcel	Install STOP-Sign Exiting Driveway		✓		✓	
	Install Traffic Signal					✓
	EB Township Road Right Turn Lane		✓		✓	✓
	WB Township Road Left Turn Lane		✓		✓	✓
	NB Driveway Left Turn lane					✓
	Optimization of Traffic Signal Operations					✓
Township Roadway & Western Driveway to 27± Acre Parcel	Install STOP-Sign Exiting Driveway		✓		✓	✓
	WB Township Road Left Turn Lane		✓		✓	✓
Township Roadway & Eastern Driveway to 40± Acre Parcel	Install STOP-Sign Exiting Driveway					✓
	WB Township Road Right Turn Lane					✓
	Restrict to Right-In/Right-Out					✓
Township Roadway & Middle Driveway to 40± Acre Parcel	Install Traffic Signal					✓
	EB Township Road Left Turn Lane					✓
	WB Township Road Right Turn Lane					✓
	SB Driveway Left Turn Lane					✓
	Optimization of Traffic Signal Operations					✓
Township Roadway & Western Driveway to 40± Acre Parcel	Install STOP-Sign Exiting Driveway					✓
	EB Township Road Left Turn Lane					✓

INTRODUCTION

Traffic Planning and Design, Inc. (TPD) has completed a Master Plan Transportation Impact Study (TIS) which considers development of three (3) parcels totaling ±148 acres in North Cornwall Township, Lebanon County, Pennsylvania. The study is intended to provide an overall evaluation of the future transportation needs of the studied portions of the roadway corridors located within North Cornwall Township, South Lebanon Township and Lebanon City.

The subject parcels are located along Cornwall Road (SR 2011), to the north of Rocherty Road (SR 2002), as shown in **Figure 1**. The assumed development for each of the parcels was based upon the court-approved Settlement Agreement between the Board of Supervisors of North Cornwall Township and Springwood Development Partners, L.P. (Springwood), dated April 20, 2010. As shown in **Figures 2A and 2B**, the specific land uses for each parcel are as follows:

81+/- Acre Parcel on the Eastern Side of Cornwall Road (SR 2001)

- 433,200 square foot Office Park consisting of an integrated mix of office building and support services, including an 11,400 square foot pharmacy, two (2) 6,000 square foot sit-down restaurants, and a 4,000 square foot drive-in bank.
- 100 room hotel.
- 160 luxury townhomes.

27+/- Acre Tract on the Western Side of Cornwall Road (SR 2001)

- 322,150 square foot Shopping Center consisting of an integrated mix of big box retail, strip retail, and pad sites.

40+/- Acre Parcel on the Western Side of Cornwall Road (SR 2001)

- 278,450 foot Shopping Center consisting of an integrated mix of big box retail, strip retail, and pad sites.

  Please note that this subject parcel is currently owned by Carol J. & Richard C. Kreider. The parcel was included in the previously referenced Settlement Agreement in order to allow for the potential for Springwood to purchase the property and integrate it with the 27± acre parcel, thus creating a coordinated and unified shopping center. If Springwood chooses not to purchase the Kreider parcel, future development of the parcel will revert to the applicable zoning requirements at that time. Therefore, this Master Plan TIS has been prepared to consider future conditions both with and without development of the 40+/- acre parcel.

The subject parcels will be constructed in five (5) phases, as described below:

Phase 1 (southern portion of 81+/- Acre Parcel located generally adjacent to Rocherty Road):

- 56,400 square feet of the Office Park, including the two (2) 6,000 square foot sit-down restaurants.
- 100 room hotel.
- 52 luxury townhomes.

Phase 1A (southern portion of 81+/- Acre Parcel located generally adjacent to Rocherty Road):

- 108 luxury townhomes.

Phase 2 (northeast portion of 81+/- Acre Parcel located adjacent to the Tuck Business Park):

- 160,600 square feet of the Office Park.

Phase 3 (northwest portion of 81+/- Acre Parcel located generally adjacent to Cornwall Road):

- 216,200 square feet of the Office Park, including the 11,400 square foot pharmacy and the 4,000 square foot drive-in bank.

Phase 4 (27+/- Acre Parcel on southern side of proposed Township Roadway):

- 322,150 square foot Shopping Center.

Phase 5 (40+/- Acre Parcel on northern side of proposed Township Roadway):

- 278,450 square foot Shopping Center.

Based upon the proposed phasing for development of the subject parcels, TPD has prepared a phased TIS. The phased TIS includes an analysis of the following conditions:

- Existing Conditions.
- 2025 Future Conditions (Build-Out of Phases 1, 1A, and 50% of 2).
- 2035 Future Conditions (Build-Out of Phases 1 through 4).
- 2035 Future Conditions (Build-Out of Phases 1 through 5).

The scope of and methodologies used to prepare this Master Plan TIS were confirmed with representatives of North Cornwall Township, the Lebanon County Planning Department and PennDOT. The applicable correspondence regarding the proposed scope is included in **Appendix A**.

EXISTING ROADWAY NETWORK

A field review of the existing roadway system in the study area was conducted. The existing roadway characteristics within the study area are summarized in **Table 1**. The existing lane configuration and intersection controls for the study area intersections, as well as the PennDOT state routes and Average Daily Traffic (ADT) volumes are shown in **Figure 3**. Photographs of the study area intersections are included in **Appendix B**.

TABLE 1
ROADWAY CHARACTERISTICS WITHIN STUDY AREA

Roadway	Roadway Jurisdiction	Roadway Classification	Posted Speed Limit	Roadway Material Type	Travel Lane Width	Shoulder Width
Quentin Road (N/S) and Rocherty Road (E/W)						
Quentin Road (Route 72)	State (S.R. 0072)	Principal Arterial	45 mph	Bituminous Pavement	11-12’	5-8’
Rocherty Road	Township	Collector/ Local	40 mph	Bituminous Pavement	11-13’	Curbed-2’
Quentin Road (N/S) and Lowe’s/Cedar Crest Square/Tractor Supply Driveways (E/W)						
Quentin Road (Route 72)	State (S.R. 0072)	Principal Arterial	45 mph	Bituminous Pavement	12-13’	Curbed-11’
Driveways	Private	Access	Not Posted	Bituminous Pavement	11-12’	Curbed
Quentin Road (N/S) and Lowe’s/K-Mart/Cedar Crest Square Driveways (E/W)						
Quentin Road (Route 72)	State (S.R. 0072)	Principal Arterial	45 mph	Bituminous Pavement	12-13’	Curbed
Driveways	Private	Access	Not Posted	Bituminous Pavement	12-14’	Curbed
Quentin Road (N/S) and Isabel Drive (E/W)						
Quentin Road (Route 72)	State (S.R. 0072)	Principal Arterial	45 mph	Bituminous Pavement	11’	Curbed-14’
Isabel Drive	Township	Local	Not Posted	Bituminous Pavement	16’	0’
Quentin Road (N/S) and York Street/Lebanon Plaza Mall Driveway (E/W)						
Quentin Road (Route 72)	State (S.R. 0072)	Principal Arterial	40 mph	Bituminous Pavement	11’	Curbed-2’
York Street	Township	Minor Arterial	25 mph	Bituminous Pavement	12-20’	Curbed[1]
Driveway	Private	Access	Not Posted	Bituminous Pavement	11’	Curbed
Quentin Road (N/S) and Colebrook Road (E/W)						
Quentin Road (Route 72)	State (S.R. 0072)	Principal Arterial	25 mph	Bituminous Pavement	14-19’	Curbed
Colebrook Road (Route 241)	State (S.R. 0241)	Collector	25 mph	Bituminous Pavement	13-14’	Curbed
Cornwall Road (N/S) and Rocherty Road (E/W)						
Cornwall Road	State (S.R. 2001)	Minor Arterial/ Collector	45 mph	Bituminous Pavement	10-11’	8-9’
Rocherty Road	Township/State (S.R. 2002)	Collector	40 mph	Bituminous Pavement	10-11’	4-7’
Cornwall Road (N/S) and Isabel Drive/Norman Drive (E/W)						
Cornwall Road	State (S.R. 2001)	Minor Arterial	45 mph	Bituminous Pavement	10’	7-8’
Isabel Drive/ Norman Drive	Township	Local	Not Posted	Bituminous Pavement	17’	0’

1 = On-Street Parking Available

TABLE 1 - CONTINUED

Roadway	Roadway Jurisdiction	Roadway Classification	Posted Speed Limit	Roadway Material Type	Travel Lane Width	Shoulder Width
Cornwall Road (N/S) and York Street (E/W)						
Cornwall Road	State (S.R. 2001)	Minor Arterial	40 mph	Bituminous Pavement	10-19’	Curbed-9’
York Street	Township	Minor Arterial	25 mph	Bituminous Pavement	12-20’	Curbed[1]
Cornwall Road (N/S) and Wilhelm Avenue (E/W)						
Cornwall Road	State (S.R. 2001)	Minor Arterial/ Collector	40 mph	Bituminous Pavement	10-19’	Curbed-9’
Wilhelm Avenue	Township	Minor Arterial	25 mph	Bituminous Pavement	12’	0’
Lincoln Avenue (N/S) and Rocherty Road/Evergreen Road (E/W)						
Lincoln Avenue	Township	Collector/ Local	25 mph	Bituminous Pavement	12’	0’
Rocherty Road/ Evergreen Road	State (S.R. 2002)	Collector	40 mph	Bituminous Pavement	11’	5’

Land Use Context

In Chapter 4 of the Smart Transportation Guidebook, dated March 2008, there is guidance pertaining to defining the land use context(s) for a given area. Based upon review of this information, the existing/future land uses surrounding the subject parcels best fits the Suburban Center designation, as described below:

Suburban Center, *“Often a mixed use, cohesive collection of land uses that may include residential, office, retail, and restaurant uses where commercial uses serve surrounding neighborhoods. These areas are typically designed to be accessible by car, and may include large parking areas and garages. They are less accommodating to pedestrians than town centers, and opportunities to cross the primary roadway can be limited. On-street parking may or may not be provided.”*

Roadway Type

In Chapter 5 of the Smart Transportation Guidebook, there is guidance pertaining to defining the transportation context(s) for a given area. Comparing the existing condition roadway characteristics to the various options presented in Table 5.1 of the Smart Transportation Guidebook, the study area roadways best fit the following categories, as described below:

Regional Arterial, traffic volumes of 10,000 to 40,000 vehicles per day, intersection spacing of 660 to 1,320 feet, a desired operating speed of 30-55 mph, and a description as follows: “*Roadways in this category would be considered “Principal Arterial” in traditional functional classification.”*

- Quentin Road (SR 0072)

Community Arterial, traffic volumes of 5,000 to 25,000 vehicles per day, intersection spacing of 300 to 1,320 feet, a desired operating speed of 25-55 mph, and a description as follows: "*often classified as Minor Arterial in traditional classification but may include road segments classified as Principal Arterial.*"

- Cornwall Road (SR 2011)

Community Collector, traffic volumes of 5,000 to 15,000 vehicles per day, intersection spacing of 300 to 660 feet, a desired operating speed of 25-55 mph, and a description as follows: "*often similar in appearance to a community arterial. Typically classified as Major Collector.*"

- Rocherty Road (SR 2002)
- Colebrook Road (SR 0241)

Neighborhood Collector, traffic volumes of <6,000 vehicles per day, intersection spacing of 300 to 660 feet, a desired operating speed of 25-35 mph, and a description as follows: "*similar in appearance to local roadways. Typically classified as Minor Collector.*"

- Wilhelm Avenue
- York Street
- Lincoln Avenue

Local Road, traffic volumes of <3,000 vehicles per day, intersection spacing of 200 to 660 feet, a desired operating speed of 20-30 mph.

- Isabel Drive
- Norman Drive

The applicable excerpts from the Smart Transportation Guidebook related to land use contexts, roadway types, and the associated design criteria are included in **Appendix C.**

Multi-Modal Facilities

Based on field observations at the study area intersections, sidewalks, crosswalks and/or paved shoulders currently accommodate pedestrian and bicycle traffic in the vicinity of the proposed development. The traffic signals at the Quentin Road (SR 0072) intersections with Rocherty Road, the Lowe's/Cedar Crest Square/Tractor Supply Driveways and the Lowe's/K-Mart/Cedar Crest Square Driveways are all equipped with pedestrian push buttons, hand/man signals and pedestrian crosswalks. The traffic signal at the Rocherty Road (SR 2002) intersections with Cornwall Road (SR 2001) and Lincoln Avenue are both equipped with pedestrian signals heads only. The traffic signal at the intersection of Quentin Road (SR 0072) and York Street/Lebanon Plaza Mall Driveway has no electronic pedestrian accommodations.

Lebanon County is provided with public transportation by Lebanon Transit. Public transportation is available in the vicinity of the subject parcels via Route 1 (Lebanon Valley Mall, Weis Market, Lebanon Plaza, K-Mart, Foodland, Manor Care, Quentin Circle, Norman Drive). Scheduled stops within the study area include K-Mart/Lowes (stop 5), Foodland (stop 6), Russell Drive/Isabel Drive (stop 9) and Norman Drive (stop 10). The scheduled stops occur at half hour intervals between 6:30 A.M. and 5:30 P.M. Saturday service begins at 8:00 A.M.

The Lebanon Valley Rail-Trail (LVRT) is an approximately 14 mile long recreation path that extends from downtown Lebanon to the Lancaster County line where it connects to the approximately 5 mile long Conewago Recreation Trail, which travels to Elizabethtown. The path was the line of the former Cornwall-Lebanon Railroad. As noted in subsequent sections of this study, future extensions of the LVRT are included on PennDOT's Twelve Year Transportation Program.

North Cornwall Township prepared a Master Plan for Non-Motorized Trail Connections dated August 3, 2010. As noted on page 1 of the plan, *"The purpose of the North Cornwall Township Master Plan for Non-Motorized Trail Connections is to lay the foundation for a network of greenways, trails, and on-road designated routes in the Township that provide safe and direct connections for non-motorized transportation, and opportunities for passive recreation and the conservation of natural resources. This plan and accompanying maps represent the Township's intent to improve and enhance the Township's non-motorized transportation network"*. The applicable excerpts from the North Cornwall Township Master Plan for Non-Motorized Trail Connections are included in **Appendix D**.

EXISTING TRAFFIC CONDITIONS

Manual Turning Movement Counts

Manual traffic counts were conducted in 15-minute intervals during the during the weekday morning (7:00 to 9:00 A.M.), weekday evening (2:30 to 6:00 P.M.) and Saturday midday (10:45 A.M.-12:45 P.M.) peak periods. Data pertaining to heavy vehicles, pedestrians and transit vehicles were observed during the manual counts. Peak hours and count dates for the study area intersections are identified in **Table 2**.

TABLE 2
MANUAL TRAFFIC COUNT INFORMATION

Intersection	Date of Traffic Counts	Time Period	Intersection Peak Hour[1]
Quentin Road (Route 72) & Rocherty Road	Wednesday, May 27, 2009	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:30 to 5:30 P.M.
	Saturday, May 30, 2009	Saturday Midday	11:30 A.M. to 12:30 P.M.
Quentin Road (Route 72) & Lowes/Cedar Crest Square/Tractor Supply	Wednesday, April 27, 2011	Weekday A.M.	7:30 to 8:30 A.M.
		Weekday P.M.	4:15 to 5:15 P.M.
	Saturday, April 30, 2011	Saturday Midday	11:15 A.M. to 12:15 P.M.
Quentin Road (Route 72) & Lowes/K-Mart/ Cedar Crest Square	Wednesday, May 27, 2009	Weekday A.M.	8:00 to 9:00 A.M.
		Weekday P.M.	4:30 to 5:30 P.M.
	Saturday, May 30, 2009	Saturday Midday	11:00 A.M. to 12:00 P.M.

1 = Peak Hour consists of the four consecutive 15-minute intervals where the highest traffic volumes occur.

TABLE 2 (CONTINUED)
MANUAL TRAFFIC COUNT INFORMATION

Intersection	Date of Traffic Counts	Time Period	Intersection Peak Hour[1]
Quentin Road (Route 72) & Isabel Drive	Tuesday, November 18, 2008	Weekday A.M.	7:45 to 8:45 A.M.
		Weekday P.M.	4:30 to 5:30 P.M.
	Saturday, November 15, 2008	Saturday Midday	11:30 A.M. to 12:30 P.M.
Quentin Road (Route 72) & York Street/ Lebanon Plaza	Thursday, October 21, 2010	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.
	Saturday, October 16, 2010	Saturday Midday	10:45 to 11:45 A.M.
Quentin Road (Route 72) & Colebrook Road (Route 241)	Thursday, October 21, 2010	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:30 to 5:30 P.M.
	Saturday, October 16, 2010	Saturday Midday	11:00 A.M. to 12:00 P.M.
Cornwall Road & Rocherty Road	Wednesday, May 27, 2009	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	3:45 to 4:45 P.M.
	Saturday, May 30, 2009	Saturday Midday	11:15 A.M. to 12:15 P.M.
Cornwall Road & Isabel Drive/ Norman Drive	Tuesday, November 18, 2008	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:00 to 5:00 P.M.
	Saturday, November 15, 2008	Saturday Midday	11:15 A.M. to 12:15 P.M.
Cornwall Road & York Street	Wednesday, May 27, 2009	Weekday A.M.	7:30 to 8:30 A.M.
		Weekday P.M.	3:45 to 4:45 P.M.
	Saturday, May 30, 2009	Saturday Midday	10:45 to 11:45 A.M.
Cornwall Road & Wilhelm Avenue	Wednesday, May 27, 2009	Weekday A.M.	7:00 to 8:00 A.M.
		Weekday P.M.	4:00 to 5:00 P.M.
	Saturday, May 30, 2009	Saturday Midday	11:45 A.M. to 12:45 P.M.
Rocherty Road/ Evergreen Road & Lincoln Avenue	Wednesday, May 27, 2009	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	3:45 to 4:45 P.M.
	Saturday, May 30, 2009	Saturday Midday	11:15 A.M. to 12:15 P.M.

1 = Peak Hour consists of the four consecutive 15-minute intervals where the highest traffic volumes occur.

The counts were increased by a growth factor of 1.16% per year compounded annually to depict existing condition traffic volumes. Existing condition traffic volumes for the weekday A.M., weekday P.M., and Saturday midday peak hours are illustrated in **Figures 5-7**, respectively. Manual traffic count data sheets are provided in **Appendix E**.

Average Daily Traffic

The existing Average Daily Traffic (ADT) volumes are based on the ATR data and data obtained from PennDOT's Internet Traffic Monitoring System (iTMS) website. The traffic volume map

contained on the PennDOT iTMS website was reviewed in February 2012 to determine the Average Daily Traffic (ADT) for a typical weekday along the State-maintained roadways in the vicinity of the proposed site. The existing ADT volumes are shown on **Figure 3**.

BASE (NO-BUILD) CONDITIONS

TPD developed the base (no-build) condition traffic volumes utilizing the "Build-Up Method, Using Specific Developments" as outlined in Chapter 4 "Non-Site Transportation Forecast" contained in the ITE publication Transportation Impact Analyses for Site Development.

Per the approved methodology, TPD assigned traffic from each of the five (5) known nearby planned developments to the study area intersections based upon information contained in their respective TIS's. TPD then evaluated each individual movement at the study area intersections and assigned additional traffic from unknown future development in order to ensure that each individual movement experienced a minimum total background growth consistent with that recommended by the PennDOT Bureau of Planning and Research (BPR). For the subject site, the PennDOT BPR recommends using a background growth factor of 1.16% per year in Lebanon County for urban non-interstate roadways. Therefore, under the proposed methodology each individual movement at the study area intersections experienced minimum total background growth percentages of 17.5% (1.16% per year, compounded over 14 years) for the 2025 conditions and 31.9% (1.16% per year, compounded over 24 years) for the 2035 conditions.

The five (5) known nearby planned developments specifically included are as follows:

- **BTKD Development (aka Sheetz Outparcels)**, located in North Cornwall Township on the northeast quadrant of the intersection of Quentin Road (SR 0072) and Rocherty Road. Based upon feedback from Township staff, the remaining build-out consists of 30,813 s.f. of specialty retail space.
- **Tractor Supply Outparcels**, located in North Cornwall Township on the eastern side of Quentin Road (SR 0072), north of Rocherty Road. For purposes of this Master Plan TIS the two (2) remaining outparcels were assumed to consist of a 13,000 s.f. pharmacy with drive-thru window and a 6,000 s.f. high-turnover (sit-down) restaurant.
- **Veteran's Administration Medical Center Expansion**, located in South Lebanon Township between Lincoln Avenue and State Drive, north of Rocherty Road. The proposed expansion will consist of adding 504 employees at the existing facility.
- **Alden Place**, located in Cornwall Borough on the eastern side of Quentin Road (SR 0072), between Route 419 and Ironmaster Road. The proposed age-restricted development will be constructed in five (5) phases, with full build-out consisting of 505 residential dwelling units (445 single homes/villas in the Cornwall neighborhood and 60 single homes in the Northgate neighborhood). Based upon feedback from Borough staff, 100 of the units in the Cornwall neighborhood are built and occupied and 3 of the units in the Northgate neighborhood are built and occupied.

- **The Preserve at Historic Cornwall Village**, located in Cornwall Borough between Route 322 and Route 419 in the vicinity of Burd Coleman Village and Minersvillage. Phase 1 of the proposed development will consist of 137 residential dwelling units (98 age-targeted units and 39 market-rate units), a hotel with 250 conventional rooms and 60 cottages, and a 60,000 square foot (s.f.) indoor water park. Full build-out of the proposed development will consist of 590 residential dwelling units (390 age-targeted units and 200 market-rate units), a hotel with 250 conventional rooms and 60 cottages, a 60,000 square foot (s.f.) indoor water park, a village commercial area with 150,000 s.f. of total space, and 12,000 s.f. of restaurant space. For purposes of this Master Plan TIS, build-out of Phase 1 was assumed under the 2025 conditions and full build-out was assumed under the 2035 conditions.

The additional traffic volumes due to background growth and the background developments were added to the existing traffic data to produce 2025 and 2035 base (no-build) condition traffic volumes. Base condition volumes for the weekday A.M., weekday P.M., and Saturday midday peak hours are illustrated in **Figures 8-10** for the 2025 conditions and **Figures 11-13** for the 2035 conditions. Trip distributions for the background developments are provided in **Appendix F**.

SCHEDULED ROADWAY IMPROVEMENTS

Programmed Improvements

Based upon a review of PennDOT's 2011 Twelve Year Transportation Program, there are programmed roadway improvements in the vicinity of the proposed site. The programmed improvements are as follows:

Lebanon Valley Rail-Trail Phase 5 (MPMS #: 88546), is a transportation enhancement project located in the City of Lebanon. The project consists of construction of a trail between 9th Street and Chestnut Street. The utility changes for the project are to be completed within the first period (October 2010-September 2014), and is anticipated to cost $432,001.

Rocherty Road Bridge PM (MPMS #: 81008), is a bridge preservation project located in South Lebanon Township. The project consists of rehabilitation of the bridge along Rocherty Road (SR 2002) over the Lebanon Valley Rail-Trail. The final design, utility changes and construction for the project are to be completed within the first period (October 2010-September 2014), and is anticipated to cost $595,152.

PA 72 Congested Corridor Study (MPMS #: 88741), is a transportation study evaluating operations in the Borough of Cornwall, North Cornwall Township, and the City of Lebanon. The study consists of an analysis of Quentin Road (SR 0072) and Cornwall Road (SR 2001) from Main Street/Freeman Drive/Schaeffer Road (SR 0419) to Poplar Street. The study is to be completed within the first period (October 2010-September 2014), and is anticipated to cost $300,000.

PA 72 Over Snitz Creek (MPMS #: 78735), is a bridge replacement located in the Borough of Cornwall. The project consists of replacement of the bridge along Quentin Road (SR 0072) over the Snitz Creek. The preliminary engineering for the project is to be completed within the first period (October 2010-September 2014), and is anticipated to cost $150,000.

Additionally, there are candidate projects in the vicinity of the proposed site. The candidate projects are as follows:

Wilhelm Avenue/Cornwall Road Intersection (MPMS #: 93089), would be an intersection improvement project located in North Cornwall Township and the City of Lebanon.

West Crestview Drive/72 Intersection (MPMS #: 76932), would be a safety improvement project located in North Cornwall Township.

Improvements By Others

In conjunction with the Development Agreement for the Tuck Trust Development located in North Cornwall Township, a traffic signal is to be installed at the intersection of Cornwall Road (SR 2001) and Isabel Drive/Norman Drive. It is TPD's understanding that the funds for installation of the traffic signal are being held in escrow, and that the traffic signal will be installed when the applicable volume based warrants are satisfied. This roadway improvement has been included in all future condition capacity analyses (base and projected conditions).

PROPOSED ACCESS

Access to the subject parcels is proposed as follows:

81+/- Acre Parcel on the Eastern Side of Cornwall Road (SR 2011)

This parcel will be served via five (5) driveways to the external roadway network, comprised of the following:

- A full-access driveway to Cornwall Road (SR 2001), opposite the proposed Township Roadway through the 27+/- Acre and 40+/- Acre Parcels.
- A left-in/right-in/right-out driveway to Cornwall Road (SR 2001).
- A full-access driveway to Rocherty Road (SR 2002), opposite the existing eastern driveway to the Lebanon Valley Expo Center.
- A right-in/right-out driveway to Rocherty Road (SR 2002), opposite the existing western driveway to the Lebanon Valley Expo Center.
- A full-access connection to Norman Drive.

27+/- Acre Tract on the Western Side of Cornwall Road (SR 2001)

- Per the Settlement Agreement, a new east-west Township Roadway will be constructed that will connect Cornwall Road (SR 2001) to Quentin Road (SR 0072) via the existing access the serves the Tractor Supply and Cedar Crest Square. This parcel will be served via three (3) driveways to the proposed Township Roadway. In addition, there will be a right-in/right-out driveway to Cornwall Road (SR 2001) to the south of the proposed Township Roadway.

40+/- Acre Parcel on the Western Side of Cornwall Road (SR 2001)

- Per the Settlement Agreement, a new east-west Township Roadway will be constructed that will connect Cornwall Road (SR 2001) to Quentin Road (SR 0072) via the existing access that serves the Tractor Supply and Cedar Crest Square. This parcel will be served via three

(3) driveways to the proposed Township Roadway. In addition, there will a right-in/right-out driveway to Cornwall Road (SR 2001) to the north of the proposed Township Roadway.

TRIP GENERATION

The trip generation equations for the subject parcels were obtained from the manual Trip Generation, Eighth Edition, 2008, an Institute of Transportation Engineers (ITE) Informational Report. The statistics in Trip Generation are empirical data based on more than 4,800 trip generation studies. The data are categorized by Land Use Codes, with total vehicular trips for a given land use estimated using an independent variable and statistically generated rates or equations.

Table 3 shows the trip generation equations and directional splits for an average weekday and the weekday A.M., weekday P.M., and Saturday midday peak hours.

TABLE 3
TRIP GENERATION DATA

Land Use	Time Period	Trip Generation Equations	Directional Split	
			Entering	Exiting
Residential Condominium/ Townhouse (#230)	Average Weekday	Ln(**T**) = 0.87 Ln(**X**) + 2.46	50%	50%
	A.M. Peak Hour	Ln(**T**) = 0.80 Ln(**X**) + 0.26	17%	83%
	P.M. Peak Hour	Ln(**T**) = 0.82 Ln(**X**) + 0.32	67%	33%
	Saturday Peak Hour	**T** = 0.29(**X**) + 42.63	54%	46%
Hotel (#310)	Average Weekday	**T** = 8.17(**X**)	50%	50%
	A.M. Peak Hour	**T** = 0.56(**X**)	61%	39%
	P.M. Peak Hour	**T** = 0.59(**X**)	53%	47%
	Saturday Peak Hour	**T** = 0.72(**X**)	56%	44%
Office Park (#750)	Average Weekday	**T** = 11.42(**X**)	50%	50%
	A.M. Peak Hour	**T** = 1.71(**X**)	89%	11%
	P.M. Peak Hour	**T** = 1.48(**X**)	14%	86%
	Saturday Peak Hour	**T** = 0.14(**X**)	74%	26%
Shopping Center (#820)	Average Weekday	Ln(**T**) = 0.65 Ln(**X**) + 5.83	50%	50%
	A.M. Peak Hour	Ln(**T**) = 0.59 Ln(**X**) + 2.32	61%	39%
	P.M. Peak Hour	Ln(**T**) = 0.67 Ln(**X**) + 3.37	49%	51%
	Saturday Peak Hour	Ln(**T**) = 0.65 Ln(**X**) + 3.76	52%	48%

T = Total Trips, **X** = Independent Variable (Dwelling Units, Rooms, 1,000 Square Feet Gross Floor/Leasable Area)

Based on the information provided in the Trip Generation Manual, an Institute of Transportation Engineers (ITE) Informational Report, not all trips generated by the site are trips that are "new" to the roadway system. In addition to the new trips generated, there are pass-by trips, which are trips that are drawn from the passing traffic stream and do not add trips to the adjacent roadways. Pass-

by trip percentages for the subject parcels were utilized as specified in the ITE Trip Generation Handbook, June 2004 edition. The pass-by percentages utilized are shown in **Table 4**.

TABLE 4
PASS-BY PERCENTAGES

Land Use	Pass-by Percentage		
	A.M. Peak Hour	P.M. Peak Hour	Saturday Peak Hour
Residential Condominium/ Townhouse	0%	0%	0%
Hotel	0%	0%	0%
Office Park	0%	0%	0%
Shopping Center	0%	34%	26%

The PennDOT Policies and Procedures for Transportation Impact Studies, January 28, 2009, recognizes the potential for non-vehicular trips and offers standard assumptions for the modal split of alternative trips provided that pedestrian, bike, and transit-friendly characteristics present. Based upon a review of Table 2 on page 21 of the document, TPD utilized modal trip reductions of 4%, 1%, and 3% to account for alternative trips made by pedestrians, bikes, and transit vehicles, respectively.

The **2025 conditions** were assumed to consist of build-out of Phases 1, 1A and 2 (50%), which include:

- 160 Condominium/Townhome dwelling units (ITE Land Use Code #230).
- 100 room hotel (ITE Land Use Code #310).
- 144,600 square foot office park (ITE Land Use Code #750).

The **2035 conditions** were assumed to consist of two scenarios. The first scenario considered build-out of Phases 1-4, which include:

- 160 Condominium/Townhome dwelling units (ITE Land Use Code #230).
- 100 room hotel (ITE Land Use Code #310).
- 433,200 square foot office park (ITE Land Use Code #750).
- 322,150 square foot Shopping Center (ITE Land Use Code #820).

The second scenario considered build-out of Phases 1-5, which include:

- 160 Condominium/Townhome dwelling units (ITE Land Use Code #230).
- 100 room hotel (ITE Land Use Code #310).
- 433,200 square foot office park (ITE Land Use Code #750).
- 600,600 square foot Shopping Center (ITE Land Use Code #820).

Tables 5, 6, 7 and 8 summarize the trip generation for the proposed development for an average weekday and the weekday A.M., P.M., and Saturday midday peak hours, respectively.

TABLE 5
TRIP GENERATION – AVERAGE WEEKDAY

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Phase 1												
Eastern Tract												
Office Park	735	-59	0	676	338	338	0	0	0	676	338	338
Townhomes	315	-25	0	290	145	145	0	0	0	290	145	145
Hotel	818	-64	0	754	377	377	0	0	0	754	377	377
Subtotal	1868	-148	0	1720	860	860	0	0	0	1720	860	860
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Total	**1868**	**-148**	**0**	**1720**	**860**	**860**	**0**	**0**	**0**	**1720**	**860**	**860**
Phase 1A												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	655	-53	0	602	301	301	0	0	0	602	301	301
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	655	-53	0	602	301	301	0	0	0	602	301	301
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1A Total	**655**	**-53**	**0**	**602**	**301**	**301**	**0**	**0**	**0**	**602**	**301**	**301**
Phase 2												
Eastern Tract												
Office Park	1834	-146	0	1688	844	844	0	0	0	1688	844	844
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	1834	-146	0	1688	844	844	0	0	0	1688	844	844
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Total	**1834**	**-146**	**0**	**1688**	**844**	**844**	**0**	**0**	**0**	**1688**	**844**	**844**
Phase 3												
Eastern Tract												
Office Park	2379	-191	0	2188	1094	1094	0	0	0	2188	1094	1094
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	2379	-191	0	2188	1094	1094	0	0	0	2188	1094	1094
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 3 Total	**2379**	**-191**	**0**	**2188**	**1094**	**1094**	**0**	**0**	**0**	**2188**	**1094**	**1094**

TABLE 5 (CONTINUED)
TRIP GENERATION – AVERAGE WEEKDAY

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Phase 4												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0
Western Tract												
Shopping Center	11681	-935	0	10746	5373	5373	0	0	0	10746	5373	5373
Phase 4 Total	11681	-935	0	10746	5373	5373	0	0	0	10746	5373	5373
Phase 5												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0
Western Tract												
Shopping Center	10097	-807	0	9290	4645	4645	0	0	0	9290	4645	4645
Phase 5 Total	10097	-807	0	9290	4645	4645	0	0	0	9290	4645	4645
Full Build-Out (Phases 1-4)												
Eastern Tract												
Office Park	4948	-396	0	4552	2276	2276	0	0	0	4552	2276	2276
Townhomes	970	-78	0	892	446	446	0	0	0	892	446	446
Hotel	818	-64	0	754	377	377	0	0	0	754	377	377
Subtotal	6736	-538	0	6198	3099	3099	0	0	0	6198	3099	3099
Western Tract												
Shopping Center	11681	-935	0	10746	5373	5373	0	0	0	10746	5373	5373
Phases 1-4 Total	**18417**	**-1473**	**0**	**16944**	**8472**	**8472**	**0**	**0**	**0**	**16944**	**8472**	**8472**
Full Build-Out (Phases 1-5)												
Eastern Tract												
Office Park	4948	-396	0	4552	2276	2276	0	0	0	4552	2276	2276
Townhomes	970	-78	0	892	446	446	0	0	0	892	446	446
Hotel	818	-64	0	754	377	377	0	0	0	754	377	377
Subtotal	6736	-538	0	6198	3099	3099	0	0	0	6198	3099	3099
Western Tract												
Shopping Center	21778	-1742	0	20036	10018	10018	0	0	0	20036	10018	10018
Phases 1-5 Total	**28514**	**-2280**	**0**	**26234**	**13117**	**13117**	**0**	**0**	**0**	**26234**	**13117**	**13117**

TABLE 6
TRIP GENERATION – WEEKDAY A.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Phase 1												
Eastern Tract												
Office Park	110	-9	0	101	90	11	0	0	0	101	90	11
Townhomes	24	-2	0	22	4	19	0	0	0	22	4	19
Hotel	56	-4	0	52	32	20	0	0	0	52	32	20
Subtotal	190	-15	0	175	126	50	0	0	0	175	126	50
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Total	**190**	**-15**	**0**	**175**	**126**	**50**	**0**	**0**	**0**	**175**	**126**	**50**
Phase 1A												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	51	-4	0	47	8	38	0	0	0	47	8	38
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	51	-4	0	47	8	38	0	0	0	47	8	38
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1A Total	**51**	**-4**	**0**	**47**	**8**	**38**	**0**	**0**	**0**	**47**	**8**	**38**
Phase 2												
Eastern Tract												
Office Park	275	-22	0	253	225	28	0	0	0	253	225	28
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	275	-22	0	253	225	28	0	0	0	253	225	28
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Total	**275**	**-22**	**0**	**253**	**225**	**28**	**0**	**0**	**0**	**253**	**225**	**28**
Phase 3												
Eastern Tract												
Office Park	356	-28	0	328	292	36	0	0	0	328	292	36
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	356	-28	0	328	292	36	0	0	0	328	292	36
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 3 Total	**356**	**-28**	**0**	**328**	**292**	**36**	**0**	**0**	**0**	**328**	**292**	**36**

TABLE 6 (CONTINUED)
TRIP GENERATION – WEEKDAY A.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Phase 4												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0
Western Tract												
Shopping Center	238	-19	0	219	134	85	0	0	0	219	134	85
Phase 4 Total	**238**	**-19**	**0**	**219**	**134**	**85**	**0**	**0**	**0**	**219**	**134**	**85**
Phase 5												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0
Western Tract												
Shopping Center	206	-17	0	189	115	74	0	0	0	189	115	74
Phase 5 Total	**206**	**-17**	**0**	**189**	**115**	**74**	**0**	**0**	**0**	**189**	**115**	**74**
Full Build-Out (Phases 1-4)												
Eastern Tract												
Office Park	741	-59	0	682	607	75	0	0	0	682	607	75
Townhomes	75	-6	0	69	12	57	0	0	0	69	12	57
Hotel	56	-4	0	52	32	20	0	0	0	52	32	20
Subtotal	872	-69	0	803	651	152	0	0	0	803	651	152
Western Tract												
Shopping Center	238	-19	0	219	134	85	0	0	0	219	134	85
Phases 1-4 Total	**1110**	**-88**	**0**	**1022**	**785**	**237**	**0**	**0**	**0**	**1022**	**785**	**237**
Full Build-Out (Phases 1-5)												
Eastern Tract												
Office Park	741	-59	0	682	607	75	0	0	0	682	607	75
Townhomes	75	-6	0	69	12	57	0	0	0	69	12	57
Hotel	56	-4	0	52	32	20	0	0	0	52	32	20
Subtotal	872	-69	0	803	651	152	0	0	0	803	651	152
Western Tract												
Shopping Center	444	-36	0	408	249	159	0	0	0	408	249	159
Phases 1-5 Total	**1316**	**-105**	**0**	**1211**	**900**	**311**	**0**	**0**	**0**	**1211**	**900**	**311**

TABLE 7
TRIP GENERATION – WEEKDAY P.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Phase 1												
Eastern Tract												
Office Park	95	-8	0	87	12	75	0	0	0	87	12	75
Townhomes	29	-2	0	27	18	9	0	0	0	27	18	9
Hotel	59	-5	0	54	29	25	0	0	0	54	29	25
Subtotal	183	-15	0	168	59	109	0	0	0	168	59	109
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Total	**183**	**-15**	**0**	**168**	**59**	**109**	**0**	**0**	**0**	**168**	**59**	**109**
Phase 1A												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	59	-5	0	54	36	18	0	0	0	54	36	18
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	59	-5	0	54	36	18	0	0	0	54	36	18
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1A Total	**59**	**-5**	**0**	**54**	**36**	**18**	**0**	**0**	**0**	**54**	**36**	**18**
Phase 2												
Eastern Tract												
Office Park	238	-19	0	219	31	188	0	0	0	219	31	188
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	238	-19	0	219	31	188	0	0	0	219	31	188
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Total	**238**	**-19**	**0**	**219**	**31**	**188**	**0**	**0**	**0**	**219**	**31**	**188**
Phase 3												
Eastern Tract												
Office Park	308	-24	0	284	40	244	0	0	0	284	40	244
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	308	-24	0	284	40	244	0	0	0	284	40	244
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 3 Total	**308**	**-24**	**0**	**284**	**40**	**244**	**0**	**0**	**0**	**284**	**40**	**244**

TABLE 7 (CONTINUED)
TRIP GENERATION – WEEKDAY P.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Phase 4												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0
Western Tract												
Shopping Center	1134	-91	0	1043	511	532	356	178	178	687	333	354
Phase 4 Total	**1134**	**-91**	**0**	**1043**	**511**	**532**	**356**	**178**	**178**	**687**	**333**	**354**
Phase 5												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0
Western Tract												
Shopping Center	981	-78	0	903	443	460	306	153	153	597	290	307
Phase 5 Total	**981**	**-78**	**0**	**903**	**443**	**460**	**306**	**153**	**153**	**597**	**290**	**307**
Full Build-Out (Phases 1-4)												
Eastern Tract												
Office Park	641	-51	0	590	83	507	0	0	0	590	83	507
Townhomes	88	-7	0	81	54	27	0	0	0	81	54	27
Hotel	59	-5	0	54	29	25	0	0	0	54	29	25
Subtotal	788	-63	0	725	166	559	0	0	0	725	166	559
Western Tract												
Shopping Center	1134	-91	0	1043	511	532	356	178	178	687	333	354
Phases 1-4 Total	**1922**	**-154**	**0**	**1768**	**677**	**1091**	**356**	**178**	**178**	**1412**	**499**	**913**
Full Build-Out (Phases 1-5)												
Eastern Tract												
Office Park	641	-51	0	590	83	507	0	0	0	590	83	507
Townhomes	88	-7	0	81	54	27	0	0	0	81	54	27
Hotel	59	-5	0	54	29	25	0	0	0	54	29	25
Subtotal	788	-63	0	725	166	559	0	0	0	725	166	559
Western Tract												
Shopping Center	2115	-169	0	1946	954	992	662	331	331	1284	623	661
Phases 1-5 Total	**2903**	**-232**	**0**	**2671**	**1120**	**1551**	**662**	**331**	**331**	**2009**	**789**	**1220**

TABLE 8
TRIP GENERATION – SATURDAY MIDDAY PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Phase 1												
Eastern Tract												
Office Park	9	-1	0	8	6	2	0	0	0	8	6	2
Townhomes	29	-2	0	27	15	12	0	0	0	27	15	12
Hotel	72	-6	0	66	37	29	0	0	0	66	37	29
Subtotal	110	-9	0	101	58	43	0	0	0	101	58	43
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1 Total	**110**	**-9**	**0**	**101**	**58**	**43**	**0**	**0**	**0**	**101**	**58**	**43**
Phase 1A												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	60	-5	0	55	29	26	0	0	0	55	29	26
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	60	-5	0	55	29	26	0	0	0	55	29	26
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 1A Total	**60**	**-5**	**0**	**55**	**29**	**26**	**0**	**0**	**0**	**55**	**29**	**26**
Phase 2												
Eastern Tract												
Office Park	23	-2	0	21	15	6	0	0	0	21	15	6
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	23	-2	0	21	15	6	0	0	0	21	15	6
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 2 Total	**23**	**-2**	**0**	**21**	**15**	**6**	**0**	**0**	**0**	**21**	**15**	**6**
Phase 3												
Eastern Tract												
Office Park	29	-2	0	27	20	7	0	0	0	27	20	7
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	29	-2	0	27	20	7	0	0	0	27	20	7
Western Tract												
Shopping Center	0	0	0	0	0	0	0	0	0	0	0	0
Phase 3 Total	**29**	**-2**	**0**	**27**	**20**	**7**	**0**	**0**	**0**	**27**	**20**	**7**

TABLE 8 (CONTINUED)
TRIP GENERATION – SATURDAY MIDDAY PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Phase 4												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0
Western Tract												
Shopping Center	1474	-118	0	1356	705	651	352	176	176	1004	529	475
Phase 4 Total	**1474**	**-118**	**0**	**1356**	**705**	**651**	**352**	**176**	**176**	**1004**	**529**	**475**
Phase 5												
Eastern Tract												
Office Park	0	0	0	0	0	0	0	0	0	0	0	0
Townhomes	0	0	0	0	0	0	0	0	0	0	0	0
Hotel	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0
Western Tract												
Shopping Center	1274	-102	0	1172	610	562	306	153	153	866	457	409
Phase 5 Total	**1274**	**-102**	**0**	**1172**	**610**	**562**	**306**	**153**	**153**	**866**	**457**	**409**
Full Build-Out (Phases 1-4)												
Eastern Tract												
Office Park	61	-5	0	56	41	15	0	0	0	56	41	15
Townhomes	89	-7	0	82	44	38	0	0	0	82	44	38
Hotel	72	-6	0	66	37	29	0	0	0	66	37	29
Subtotal	222	-18	0	204	122	82	0	0	0	204	122	82
Western Tract												
Shopping Center	1474	-118	0	1356	705	651	352	176	176	1004	529	475
Phases 1-4 Total	**1696**	**-136**	**0**	**1560**	**827**	**733**	**352**	**176**	**176**	**1208**	**651**	**557**
Full Build-Out (Phases 1-5)												
Eastern Tract												
Office Park	61	-5	0	56	41	15	0	0	0	56	41	15
Townhomes	89	-7	0	82	44	38	0	0	0	82	44	38
Hotel	72	-6	0	66	37	29	0	0	0	66	37	29
Subtotal	222	-18	0	204	122	82	0	0	0	204	122	82
Western Tract												
Shopping Center	2748	-220	0	2528	1315	1213	658	329	329	1870	986	884
Phases 1-5 Total	**2970**	**-238**	**0**	**2732**	**1437**	**1295**	**658**	**329**	**329**	**2074**	**1108**	**966**

TRIP DISTRIBUTION

New Trips

The distribution and assignment of site-generated new trips was based upon an analysis of the following: (1) existing traffic patterns and distributions within the study area; (2) available routes for travel; and (3) the proposed site driveway locations.

For the office/residential land uses, a modified gravity model analysis was performed using the 2000 census journey to work figures for North Cornwall Township. The 2000 census journey to work figures summarize the number of people that travel to North Cornwall Township to work from seventy-one surrounding municipalities in Berks, Chester, Cumberland, Dauphin, Juniata, Lancaster, Lebanon, Northumberland, Schuylkill, Westmoreland and York Counties. Based on the results of the gravity model, the new office/residential trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 9**.

TABLE 9
NEW TRIP DISTRIBUTION PERCENTAGES
OFFICE/RESIDENTIAL LAND USES

Distribution	Destination	Assignment (To/From)	Percentage
To/From North	Route 72, Route 343, Route 934 and Route 422	North via Route 72	17%
		North via Cornwall Road	32%
To/From South	Route 72, Route 322 and Route 419	South via Route 72	18%
		South via Cornwall Road	6%
To/From East	Route 422, Route 501 and Route 897	East via Evergreen Road	6%
		East via Wilhelm Avenue	12%
To/From West	Route 241, Route 322 and Route 934	West via Rocherty Road	6%
		West via Route 241	3%

For the retail land uses, a gravity model analysis was performed using the 2000 census population figures for North Cornwall Township and the twelve (12) neighboring municipalities (approximately 10 mile radius). Based on the results of the gravity model, the new retail trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 10**.

TABLE 10
NEW TRIP DISTRIBUTION PERCENTAGES
RETAIL LAND USES

Distribution	Destination	Assignment (To/From)	Percentage
To/From North	Route 72, Route 343, Route 934 and Route 422	North via Route 72	19%
		North via Cornwall Road	27%
To/From South	Route 72, Route 322 and Route 419	South via Route 72	14%
		South via Cornwall Road	5%
		South via Lincoln Avenue	1%
To/From East	Route 422, Route 501 and Route 897	East via Evergreen Road	10%
		East via Wilhelm Avenue	10%
To/From West	Route 241, Route 322 and Route 934	West via Rocherty Road	11%
		West via Route 241	3%

It should be noted that under the 2035 conditions a portion of the new trips were assigned to/from the eastern and western tracts (defined as shared trips). For purposes of the Master Plan TIS, the proportion of shared trips assigned to/from the eastern and western tracts was calculated to be the minimum of 10% of the entering and exiting trips to/from the eastern and western tracts. This methodology was approved during the Master TIS scoping process.

Pass-By Trips

Pass-by trips for the development were established based on the existing traffic patterns in the vicinity of the site and the location and configuration of the proposed site driveways. The percentages used for the distribution of pass-by trips to the proposed development are shown below in **Table 11**.

TABLE 11
PASS-BY TRIP DISTRIBUTION PERCENTAGES

Direction To	Pass-By Trip Distribution Rate		
	Weekday A.M. Peak Hour	Weekday P.M. Peak Hour	Saturday Midday Peak Hour
North via Route 72	0%	34%	40%
South via Route 72	0%	30%	35%
North via Cornwall Road	0%	15%	11%
South via Cornwall Road	0%	21%	14%

Redistributed Trips

Per the Settlement Agreement, a new east-west Township Roadway will be constructed that will connect Cornwall Road (SR 2001) to Quentin Road (SR 0072) via the existing access that serves the Tractor Supply and Cedar Crest Square. This roadway will provide patrons of the Tractor

Supply and Cedar Crest Square an alternate route to access Cornwall Road (SR 2001). Therefore, in order to account for patrons that may utilize the Township Roadway as an alternate route to access Cornwall Road (SR 2001), 20% of the entering/exiting movements at the Quentin Road (SR 0072) intersection with the existing access to the Tractor Supply and Cedar Crest Square were redistributed to utilize the Township Roadway to access Cornwall Road (SR 2001) under the 2035 conditions.

The assignment of trips generated by the subject parcels under the 2025 conditions are illustrated in **Figures 14-16** for the weekday A.M., weekday P.M., and Saturday midday peak hours, respectively. The assignment of trips generated by the subject parcels under the 2035 conditions (Build-Out of Phases 1-4) are illustrated in **Figures 17-19** for the weekday A.M., weekday P.M., and Saturday midday peak hours, respectively. The assignment of trips generated by the subject parcels under the 2035 conditions (Build-Out of Phases 1-5) are illustrated in **Figures 20-22** for the weekday A.M., weekday P.M., and Saturday midday peak hours, respectively.

The results of the gravity model analyses and assumed assignment of trips for each phase (i.e. 1-5) of development under the 2035 conditions are included in **Appendix G**.

PROJECTED (BUILD) CONDITION TRAFFIC VOLUMES

The 2025 conditions site-generated trips were added to the 2025 Base Condition traffic volumes to develop the 2025 Projected Condition traffic volumes for the weekday A.M., weekday P.M., and Saturday midday peak hours. Likewise, the 2035 conditions site-generated trips and redistributed Township Roadway trips were added to the 2035 Base Condition traffic volumes to develop the 2035 Projected Condition traffic volumes for the weekday A.M., weekday P.M., and Saturday midday peak hours. These volumes include existing traffic, traffic due to five (5) nearby planned developments, future "background" traffic growth, and all traffic due to the construction of the subject parcels.

Projected condition traffic volumes for the 2025 conditions for the weekday A.M., weekday P.M., and Saturday midday peak hours are shown in **Figures 23-25**, respectively. Projected condition traffic volumes for the 2035 conditions (Build-Out of Phases 1-4) for the weekday A.M., weekday P.M., and Saturday midday peak hours are shown in **Figures 26-28**, respectively. Projected condition traffic volumes for the 2035 conditions (Build-Out of Phases 1-5) for the weekday A.M., weekday P.M., and Saturday midday peak hours are shown in **Figures 29-31**, respectively. Traffic volume development worksheets are contained in **Appendix H**.

LEVELS OF SERVICE FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS criteria is stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in **Table 12**. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio

for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

TABLE 12
LEVEL OF SERVICE CRITERIA
UNSIGNALIZED AND SIGNALIZED INTERSECTIONS [1]

Level of Service	Control Delay Per Vehicle (Seconds)	
	Signalized	Unsignalized
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

1 = Obtained from Exhibits 16-2 and 17-2 of the Transportation Research Board's *Highway Capacity Manual*, 2000 Edition

CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday A.M., weekday P.M., and Saturday midday peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the 2000 *Highway Capacity Manual* (HCM) using *Synchro 7* software, a Trafficware product, as well as the discussions with representatives of North Cornwall Township, the Lebanon County Planning Department and PennDOT during the TIS Scoping Application. The PennDOT-approved signal plans at the applicable study area intersections are included in **Appendix I**.

For purposes of this Master Plan TIS, the capacity analyses were completed for two sets operational guidelines (i.e. level of service). The two sets of operational guidelines are as follows:

PennDOT Guidelines

PennDOT's Transportation Impact Study Guidelines outlined in Strike-Off Letter 470-09-4, dated February 12, 2009 contain the following criteria regarding levels of service:

- Page 29 of the Guidelines state that if evaluation of the With Development Horizon Year Scenario to the Without Development Horizon Year Scenario indicates that the overall intersection level of service has dropped, the applicant will be required to mitigate the level of service if the increase in overall intersection delay is greater than 10-seconds. If the overall intersection delay increase is less than or equal to 10-seconds, mitigation of the intersection will not be required.
- Page 29 of the Guidelines state that for mitigation scenarios, applicants are expected to mitigate the overall intersection LOS to the original Without Development LOS; the 10-second delay variance is not applied to mitigation scenarios. Applicants may be required to

address available storage and queue lengths at critical movements or approaches even if the overall LOS requirements are met.

- Page 31 of the Guidelines state that if signalization is the preferred alternative for mitigation, overall intersection LOS C in rural areas and LOS D in urban areas is acceptable.
- Page 31 of the Guidelines states new signalized or unsignalized intersections established to serve as access to the development shall be designed to operate at minimum LOS C for rural areas, and minimum LOS D for urban areas.

The following conditions were analyzed in accordance with the PennDOT guidelines:

- Existing Conditions.
- 2025 Base Conditions (10-year build-out without development).
- 2025 Projected Conditions (10-year build-out with development).
- 2035 Base Conditions (20-year build-out without development).
- 2035 Projected Conditions (20-year build-out with development of Phases 1-4).

Please note that the capacity analyses conducted in accordance with the PennDOT guidelines did not consider development of the 40+/- Acre Kreider Parcel (Phase 5). As previously noted, the Kreider Parcel was included in the Settlement Agreement in order to allow for the potential for Springwood to purchase the property and integrate it with the 27± acre parcel, thus creating a coordinated and unified shopping center. If Springwood chooses not to purchase the Kreider parcel, future development of the parcel will revert to the applicable zoning requirements at that time. Therefore, if the Kreider Parcel is developed in the future, by Springwood or any other developer, a traffic study will need to be conducted at that time to analyze the potential impacts of the proposed use on the surrounding roadway network in accordance with the applicable PennDOT guidelines.

The capacity analysis worksheets for the PennDOT guidelines are included in **Appendix J**.

Township Master Plan Guidelines

Per the directive of Township staff, the Master Plan guidelines were defined to be future conditions which result in LOS D or better for all lane groups at the study area intersections.

The following conditions were analyzed in accordance with the Township Master Plan guidelines:

- 2025 Projected Conditions (10-year build-out with development).
- 2035 Projected Conditions (20-year build-out with development of Phases 1-4).
- 2035 Projected Conditions (20-year build-out with development of Phases 1-5).

The capacity analysis worksheets for the Township master Plan guidelines are included in **Appendix K**.

LEVELS OF SERVICE IN THE STUDY AREA

PennDOT Guidelines

Levels of service (LOS) at the study area intersections for the weekday A.M., weekday P.M., and Saturday midday peak hours are summarized in **Figures 32 through 46** for existing conditions**,** 2025 Base Conditions, 2035 Base Conditions, 2025 Projected Conditions, and 2035 Projected Conditions (Build-Out of Phases 1-4). Level of service (LOS) matrices for the study area intersections are included in **Appendix J** in conjunction with the capacity analysis worksheets for the PennDOT guidelines.

As shown in **Figures 4A and 4B**, the following roadway improvements are required at the study area intersections in order to meet PennDOT's guidelines under the 2025 Projected Conditions and 2035 Projected Conditions (Build-Out of Phases 1-4), respectively.

Quentin Road (SR 0072) & Rocherty Road:

- Provide a 250-foot long separate right-turn lane on northbound Quentin Road. Identified under the 2025 conditions.
- Provide a 325-foot long separate right-turn lane on westbound Rocherty Road. Identified under the 2035 conditions.
- Modify the existing traffic signal equipment to accommodate the additional turn lanes. Identified under both the 2025 and 2035 conditions.
- Optimize the traffic signal operations and provide coordination via a new closed loop system along Quentin Road. Identified under the 2025 conditions and re-optimized under the 2035 conditions.

Quentin Road (SR 0072) & Lowe's/Tractor Supply/Township Roadway:

- Optimize the traffic signal operations and provide coordination via a new closed loop system along Quentin Road. Identified under the 2025 conditions and re-optimized under the 2035 conditions.

Quentin Road (SR 0072) & Lowe's/K-Mart/Cedar Crest Square Driveways:

- Optimize the traffic signal operations and provide coordination via a new closed loop system along Quentin Road. Identified under the 2025 conditions and re-optimized under the 2035 conditions.

Quentin Road (SR 0072) & Isabel Drive:

- Install a traffic signal at the intersection. Identified under the 2025 conditions.
- Provide a 275-foot long separate left-turn lane on southbound Quentin Road. Identified under the 2025 conditions.
- Optimize the traffic signal operations and provide coordination via a new closed loop system along Quentin Road. Identified under the 2025 conditions and re-optimized under the 2035 conditions.

Quentin Road (SR 0072) & York Street/Lebanon Plaza Mall Driveway:

- Optimize the traffic signal operations. Identified under the 2025 conditions.
- Optimize the traffic signal operations and provide coordination via a new closed loop system along Quentin Road. Identified under the 2035 conditions.

Quentin Road (SR 0072) & Colebrook Road (SR 0241):

- Optimize the traffic signal operations. Identified under the 2025 conditions.
- Optimize the traffic signal operations and provide coordination via a new closed loop system along Quentin Road. Identified under the 2035 conditions.

Cornwall Road (SR 2001) & Rocherty Road (SR 2002):

- Provide a 225-foot long separate left-turn lane on eastbound Rocherty Road. Identified under the 2025 conditions.
- Provide a separate left-turn lane on westbound Rocherty Road. This turn lane should be incorporated into the design of a two-way left-turn lane along Rocherty Road within the frontage for the 81± Acre Parcel. Identified under the 2025 conditions.
- Provide a 325-foot long separate right-turn lane on westbound Rocherty Road. Identified under the 2025 conditions.
- Provide a 150-foot long separate left-turn lane on northbound Cornwall Road. Identified under the 2025 conditions.
- Provide a 350-foot long separate right-turn lane on northbound Cornwall Road. Identified under the 2025 conditions.
- Provide a separate left-turn lane on southbound Cornwall Road. This turn lane should be incorporated into the design of a two-way left-turn lane along Cornwall Road within the frontage for the 81± and 27± Acre Parcels. Identified under the 2025 conditions.
- Replace the existing traffic signal at the intersection and optimize the traffic signal operations and provide coordination via a new closed loop system along Cornwall Road. Identified under the 2025 conditions and re-optimized under the 2035 conditions.

Cornwall Road (SR 2001) & Isabel Drive/Norman Drive:

- Optimize the traffic signal operations and provide coordination via a new closed loop system along Cornwall Road. Identified under the 2025 conditions and re-optimized under the 2035 conditions.

Cornwall Road (SR 2001) & York Street:

- Install a traffic signal at the intersection. Identified under the 2025 conditions.
- Optimize the traffic signal operations and provide coordination with the intersection of Cornwall Road & Wilhelm Avenue. Identified under the 2025 conditions and re-optimized under the 2035 conditions.

Cornwall Road (SR 2001) & Wilhelm Avenue:

- Install a traffic signal at the intersection. Identified under the 2025 conditions.
- Provide a 265-foot long separate right-turn lane on northbound Cornwall Road. The right-turn lane will be of a length such that the full lane width begins at the intersection of Cornwall Road & York Street. Identified under the 2035 conditions.
- Provide a 150-foot long separate right-turn lane on westbound Wilhelm Avenue. Identified under the 2035 conditions.
- Optimize the traffic signal operations and provide coordination with the intersection of Cornwall Road & York Street. Identified under the 2025 conditions and re-optimized under the 2035 conditions.

Rocherty Road/Evergreen Road (SR 2002) & Lincoln Avenue:

- Optimize the traffic signal operations. Identified under the 2025 conditions and re-optimized under the 2035 conditions.

Cornwall Road (SR 2001) & Proposed Township Roadway:

- Install a traffic signal at the intersection. Identified under the 2035 conditions.
- Provide the eastbound Township Roadway approach with a left-turn lane and a shared through/right-turn lane. Identified under the 2035 conditions.
- Provide the westbound Township Roadway approach with a left-turn lane, a through lane, and a right-turn lane. Identified under the 2035 conditions.
- Provide a separate left-turn lane on northbound Cornwall Road. This turn lane should be incorporated into the design of a two-way left-turn lane along Cornwall Road within the frontage for the 81± and 27± Acre Parcels. Identified under the 2035 conditions.
- Provide a 400-foot long separate left-turn lane on southbound Cornwall Road. Identified under the 2035 conditions
- Provide a 275-foot long separate right-turn lane on southbound Cornwall Road. Identified under the 2035 conditions.
- Optimize the traffic signal operations and provide coordination via a new closed loop system along Cornwall Road. Identified under the 2035 conditions.

Cornwall Road (SR 2001) & Right-In/Right-Out Site Driveway serving the 27+/- Acre Parcel:

- Provide a STOP-sign on the exiting approach to Cornwall Road. Identified under the 2035 conditions.
- Provide a 150-foot long separate right-turn lane on southbound Cornwall Road. Identified under the 2025 conditions.

Cornwall Road (SR 2001) & Site Driveway serving the 81+/- Acre Parcel:

- Provide a STOP-sign on the exiting approach to Cornwall Road. Identified under the 2025 conditions.
- Provide a 125-foot long separate right-turn lane on northbound Cornwall Road. Identified under the 2025 conditions.

- Provide a separate left-turn lane on southbound Cornwall Road. This turn lane should be incorporated into the design of a two-way left-turn lane along Cornwall Road within the frontage for the 81± and 27± Acre Parcels. Identified under the 2025 conditions.
- Restrict the exiting left-turn movement to Cornwall Road if and when any of the following occur:
  - The eastern leg of the Township Roadway intersection with Cornwall Road is constructed in conjunction with later phases of the development, thus creating alternative means of access to Cornwall Road for Phase 1 tenants, or;
  - The Township or PennDOT require the turn restriction as a result of a documented safety concern, or;
  - The result of an annual analysis of vehicle queues, to be funded by Springwood, indicates the need to require the turn restriction as a result of a safety concern created by vehicles queues along Cornwall Road.

Rocherty Road & Full-Movement Site Driveway serving the 81+/- Acre Parcel/Eastern Lebanon Valley Expo Center Driveway:

- Provide a STOP-sign on the exiting approach to Rocherty Road. Identified under the 2025 conditions.
- Provide a separate left-turn lane on eastbound Rocherty Road. This turn lane should be incorporated into the design of a two-way left-turn lane along Rocherty Road within the frontage for the 81± Acre Parcel. Identified under the 2025 conditions.
- Provide a 75-foot long separate left-turn lane on westbound Rocherty Road. Identified under the 2025 conditions.
- If and when applicable signal warrants are satisfied, install a traffic signal at the intersection. This includes the following tasks:
  - Monitor the intersection to determine if warrants are met for installation of a traffic signal.
  - Once a monitoring study of the intersection demonstrates that a traffic signal is warranted, prepare all documentation necessary for an application to PennDOT for a traffic signal permit.
  - Upon PennDOT's issuance of a traffic signal permit, install the traffic signal at the intersection.

Rocherty Road & Right-In/Right-Out Site Driveway serving the 81+/- Acre Parcel/ Western Lebanon Valley Expo Center Driveway:

- Provide a STOP-sign on the exiting approach to Rocherty Road. Identified under the 2025 conditions.
- Provide a separate left-turn lane on westbound Rocherty Road. This turn lane should be incorporated into the design of a two-way left-turn lane along Rocherty Road within the frontage for the 81± Acre Parcel. Identified under the 2025 conditions.

Norman Drive & Full-Movement Site Driveway serving the 81+/- Acre Parcel:

- Provide a STOP-sign on the exiting approach to Norman Drive. Identified under the 2025 conditions.
- Modify the existing parking lot to Lebanon Cardiology to connect the site with Norman Drive. Identified under the 2025 conditions.

Township Roadway between Quentin Road (SR 0072) and Cornwall Road (SR 2001):

- Provide the Township Roadway with a 40-foot wide curbed cross-section (14-foot wide travel lanes and 12-foot wide two-way left-turn lane). Identified under the 2035 conditions.
- Provide additional traffic signal equipment (as necessary) at the Cornwall Road intersection to accommodate the Township Roadway. Identified under the 2035 conditions.
- Tie the Township Roadway into the existing lane configuration for the Tractor Supply and Cedar Crest Square access intersection with Quentin Road (SR 0072). Identified under the 2035 conditions.

Township Roadway & Site Driveways serving the 27+/- Acre Parcel*:*

- Provide a STOP-sign on the exiting approaches from the site driveways. Identified under the 2035 conditions.
- Provide a 175-foot long separate right-turn lane on eastbound Township Roadway at the middle site driveway. Identified under the 2035 conditions.

Township Master Plan Guidelines

Levels of service (LOS) at the study area intersections for the weekday A.M., weekday P.M., and Saturday midday peak hours are summarized in **Figures 47 through 55** for 2025 Projected Conditions, 2035 Projected Conditions (Build-Out of Phases 1-4), and 2035 Projected Conditions (Build-Out of Phases 1-5). Level of service (LOS) matrices for the study area intersections are included in **Appendix K** in conjunction with the capacity analysis worksheets for the Township master Plan guidelines.

As shown in **Figures 4C, 4D, and 4E**, the following additional roadway improvements (beyond those identified to meet PennDOT's guidelines) would be required at the study area intersections in order to meet the Township Master Plan guidelines under the 2025 Projected Conditions, 2035 Projected Conditions (Build-Out of Phases 1-4) and 2035 Projected Conditions (Build-Out of Phases 1-4 and Phase 5), respectively.

Quentin Road (SR 0072) Corridor:

- Provide an additional through lane in both the northbound and southbound directions at all study area intersections. Identified under the 2035 conditions for build-out of Phases 1-4. *Please note that existing features along the Quentin Road corridor, including right-of-way, utilities, drainage basins, topography, business signage, driveways and parking lots, limit implantation of this improvement.*
- Re-optimize the traffic signal operations along the corridor. Identified under the 2035 conditions for build-out of Phases 1-4 and Phase 5.

Quentin Road (SR 0072) & Rocherty Road:

- Provide an additional through lane in both the northbound and southbound directions. Identified under the 2025 conditions. *Please note that existing features along Quentin Road, including right-of-way, utilities, topography on the southwest corner of the intersection and the proximity of a barn to Quentin Road (on the Hostetter Property), limit implantation of this improvement.*

- Provide dual left-turn lanes on westbound Rocherty Road. Identified under the 2035 conditions for build-out of Phases 1-4. *Please note that existing features at the intersection, including right-of-way, utilities, the proximity of the Sheetz parking lot to Rocherty Road, and lack of dual receiving lanes on southbound Quentin Road, limit implementation of this improvement.*

Quentin Road (SR 0072) & Lowe's/Tractor Supply/Township Roadway:

- Provide dual left-turn lanes on westbound Township Roadway. Identified under the 2035 conditions for build-out of Phase 5. *Please note that existing features at the intersection, including utilities, a drainage basin on the southeast corner of the intersection, drainage pipe under Quentin Road, topography on the southwest corner of the intersection, proximity of the existing building in the Cedar Crest Shopping Center to the Township Road and lack of dual receiving lanes on southbound Quentin Road, limit implementation of this improvement.*

Cornwall Road (SR 2001) & Rocherty Road (SR 2002):

- Provide a 175-foot long separate right-turn lane on eastbound Rocherty Road. Identified under the 2035 conditions for build-out of Phases 1-4.
- Re-optimize the traffic signal operations Identified under the 2035 conditions for build-out of Phases 1-4 and Phase 5.

Cornwall Road (SR 2001) & Isabel Drive/Norman Drive:

- Provide a 225-foot long separate left-turn lane on northbound Cornwall Road. Identified under the 2035 conditions for build-out of Phase 5.
- Provide a 275-foot long separate left-turn lane on southbound Cornwall Road. Identified under the 2035 conditions for build-out of Phase 5.
- Re-optimize the traffic signal operations Identified under the 2035 conditions for build-out of Phases 1-4 and Phase 5.

Cornwall Road (SR 2001) & York Street/Wilhelm Avenue:

- Re-align Wilhelm Avenue to intersect Cornwall Road opposite York Street, thus creating a 4-way intersection. Identified under the 2035 conditions for build-out of Phases 1-4.
- Provide a 225-foot long separate left-turn lane on northbound Cornwall Road. Identified under the 2035 conditions for build-out of Phases 1-4.
- Provide a 175-foot long separate left-turn lane on southbound Cornwall Road. Identified under the 2035 conditions for build-out of Phases 1-4.
- Provide a 150-foot long separate left-turn lane on eastbound York Street. Identified under the 2035 conditions for build-out of Phase 5.
- Provide a 250-foot long separate left-turn lane on eastbound York Street. Identified under the 2035 conditions for build-out of Phase 5.
- Optimize the traffic signal operations. Identified under the 2035 conditions for build-out of Phases 1-4 and Phase 5.

  Please note that existing features at the intersection, including right-of-way, utilities, acquisition of the Gaidos Property and access impacts to the Ruhl, Lindsey, Billman, Bemesderfer and Gettle Properties along Wilhelm Avenue, limit implementation of the above noted improvements.

Rocherty Road/Evergreen Road (SR 2002) & Lincoln Avenue:

- Provide a 275-foot long separate right-turn lane on westbound Evergreen Road. Identified under the 2025 conditions and the 2035 conditions for build-out of Phases 1-4.
- Provide a 325-foot long separate right-turn lane on southbound Lincoln Avenue. Identified under the 2035 conditions for build-out of Phases 1-4.
- Optimize the traffic signal operations. Identified under the 2035 conditions for build-out of both Phases 1-4 and Phase 5.

Cornwall Road (SR 2001) & Proposed Township Roadway:

- Provide the eastbound Township Roadway approach with a left-turn lane, a through lane, and a right-turn lane. Identified under the 2035 conditions for build-out of Phase 5.

Cornwall Road (SR 2001) & Right-In/Right-Out Site Driveway serving the 40+/- Acre Parcel:

- Provide a STOP-sign on the exiting approach to Cornwall Road. Identified under the 2035 conditions for build-out of Phase 5.
- Provide a 225-foot long separate right-turn lane on southbound Cornwall Road. Identified under the 2025 conditions for build-out of Phase 5.

Township Roadway & Site Driveways serving the 27+/- Acre Parcel*:*

- Restrict the eastern site driveway to right-in/right-out movements only. Identified under the 2035 conditions for build-out of Phase 5.

Township Roadway & Site Driveways serving the 40+/- Acre Parcel*:*

- Install a traffic signal at the middle site driveway. Identified under the 2035 conditions for build-out of Phases 5.
- Provide a STOP-sign on the exiting approaches from the eastern and western site driveways. Identified under the 2035 conditions for build-out of Phase 5.
- Restrict the eastern site driveway to right-in/right-out movements only. Identified under the 2035 conditions for build-out of Phase 5.
- Provide a 150-foot long separate right-turn lane on westbound Township Roadway at the eastern site driveway. Identified under the 2035 conditions for build-out of Phase 5.
- Provide a 100-foot long separate right-turn lane on westbound Township Roadway at the middle site driveway. Identified under the 2035 conditions for build-out of Phase 5.

Improvement Summary

The above noted roadway improvements are summarized in **Table i** of the Executive Summary. In addition to the identified roadway improvements, the following multi-model improvements should also be considered:

- All future roadway improvements in an around the subject parcels should be designed and constructed in full compliance with ADA requirements unless otherwise directed or approved by the local municipality and/or PennDOT.

- All future roadway improvements in an around the subject parcels should consider the recommendations of the North Cornwall Township Master Plan for Non-Motorized Trail Connections, and where feasible implement said recommendations.
- In conjunction with development of the subject 81+/- Acre Parcel, a Trailhead connection should be constructed to the Lebanon Valley Rail-Trail.
- In conjunction with development of the subject parcels, coordination should occur with Lebanon Transit in order to evaluate expansion of the existing bus service to include scheduled stops within the subject parcels.

95TH PERCENTILE QUEUE ANALYSIS

Queue analyses were conducted at the study area intersections using *Synchro 7* software. For this analysis, the 95th percentile queue is defined as the queue length that is exceeded in 5% of the signal cycles. As an example, for a signal with a 90-second cycle, this means that the 95th percentile queue length will be exceeded during 2 of the 40 signal cycles that occur during the peak hour.

PennDOT Guidelines

95th percentile queue matrices for the study area intersections are included in **Appendix J** in conjunction with the capacity analysis worksheets for the PennDOT guidelines.

Township Master Plan Guidelines

95th percentile queue matrices for the study area intersections are included in **Appendix K** in conjunction with the capacity analysis worksheets for the Township master Plan guidelines.

AUXILIARY TURN LANE ANALYSIS

Methodology

TPD evaluated auxiliary turn lane warrants at the applicable study area intersections in accordance with the capacity analyses and associated roadway improvements for the PennDOT guidelines. The warrant analysis was conducted according to the methodologies contained in Chapter 11 of PennDOT's *Publication 46* and Strike-Off Letter 470-08-07 utilizing the posted speed limit of 40 mph. Auxiliary turn lane warrant analysis worksheets are contained in **Appendix L**.

Findings

Table 13 summarizes the results of the auxiliary turn lane analysis at the applicable study area intersections for the 2025 conditions.

TABLE 13
AUXILIARY TURN LANE ANALYSIS SUMMARY: 2025 CONDITIONS

Intersection	Auxiliary Lane	Warrant Satisfied?	Calculated Lane Length	Recommended Lane Length[1]
Quentin Road (Route 72) & Rocherty Road	NB Right-Turn Lane	**Yes**	400’	250’
	WB Right-Turn Lane	**Yes**	325’	---
Quentin Road (Route 72) & Isabel Drive	SB Left-Turn Lane	**Yes**	225’	275’[2]
Cornwall Road & Rocherty Road	EB Left-Turn Lane	**Yes**	225’	225’
	WB Left-Turn Lane	**Yes**	175’	TWLTL
	WB Right-Turn Lane	**Yes**	275’	325’[2]
	NB Left-Turn Lane	**No**	---	150’[2]
	NB Right-Turn Lane	**Yes**	325’	350’[2]
	SB Left-Turn lane	**Yes**	325’	TWLTL
	SB Right-Turn Lane	**Yes**	250’	---
Cornwall Road & Driveway to 81± Acre Parcel	NB Right-Turn Lane	**Yes**	125’	125’
	SB Left-Turn Lane	**Yes**	150’	TWLTL
Rocherty Road & Driveway to 81± Acre Parcel	EB Left-Turn Lane	**Yes**	75’	TWLTL
	WB Right-Turn Lane	**No**	---	---
Rocherty Road & Right-In/Right-Out Driveway to 81± Acre Parcel	WB Right-Turn Lane	**No**	---	---

1 = Based Upon Consideration of Roadway Geometrics and Surrounding Property Impacts
2 = Additional Length Recommended to Accommodate Full Build-Out Conditions (2035), see Table 15
TWLTL = Two-Way Left-Turn Lane

Table 14 summarizes the results of the auxiliary turn lane analysis at the applicable study area intersections for the 2035 conditions (build-out of Phases 1-4).

TABLE 14
AUXILIARY TURN LANE ANALYSIS SUMMARY: 2035 CONDITIONS

Intersection	Auxiliary Lane	Warrant Satisfied?	Calculated Lane Length	Recommended Lane Length[1]
Quentin Road (Route 72) & Rocherty Road	WB Right-Turn Lane	**Yes**	325’	325’
	NB Right-Turn Lane	**Yes**	475’	250’
Quentin Road (Route 72) & Isabel Drive	SB Left-Turn Lane	**Yes**	275’	275’
Cornwall Road & Rocherty Road	EB Left-Turn Lane	**Yes**	225’	225’
	WB Left-Turn Lane	**Yes**	225’	TWLTL
	WB Right-Turn Lane	**Yes**	325’	325’
	NB Left-Turn Lane	**Yes**	150’	150’
	NB Right-Turn Lane	**Yes**	350’	350’
	SB Left-Turn lane	**Yes**	350’	TWLTL
	SB Right-Turn Lane	**Yes**	275’	---
Cornwall Road & Wilhelm Avenue	WB Right-Turn Lane	**No**	---	150’
	NB Right-Turn Lane	**Yes**	525’	265’
Cornwall Road & Proposed Township Roadway	NB Left-Turn Lane	**Yes**	225’	TWLTL
	NB Right-Turn Lane	**No**	---	---
	SB Left-Turn Lane	**Yes**	400’	400’
	SB Right-Turn Lane	**Yes**	275’	275’
Cornwall Road & Right-In/Right-Out Driveway to 27± Acre Parcel	SB Right-Turn Lane	**Yes**	150’	150’
Cornwall Road & Driveway to 81± Acre Parcel	NB Right-Turn Lane	**Yes**	125’	125’
	SB Left-Turn Lane	**Yes**	125’	TWLTL
Rocherty Road & Driveway to 81± Acre Parcel	EB Left-Turn Lane	**Yes**	75’	TWLTL
	WB Right-Turn Lane	**No**	---	---
Rocherty Road & Right-In/Right-Out Driveway to 81± Acre Parcel	WB Right-Turn Lane	**No**	---	---
Township Roadway & Eastern Driveway to 27± Acre Parcel	WB Left-Turn Lane	**Yes**	150’	TWLTL
	EB Right-Turn Lane	**No**	---	---
Township Roadway & Middle Driveway to 27± Acre Parcel	WB Left-Turn Lane	**Yes**	150’	TWLTL
	EB Right-Turn Lane	**Yes**	175’	175’
Township Roadway & Western Driveway to 27± Acre Parcel	WB Left-Turn Lane	**No**	75’[1]	TWLTL
	EB Right-Turn Lane	**No**	---	---

1 = Based Upon Consideration of Roadway Geometrics and Surrounding Property Impacts
2 = Additional Length Recommended to Accommodate Full Build-Out Conditions (2035), see Table 15
TWLTL = Two-Way Left-Turn Lane

SIGNAL WARRANT ANALYSIS

Per PennDOT Publication 212, Official Traffic Control Devices, a preliminary traffic signal warrant analysis was conducted in accordance with the guidelines contained in the 2009 Federal Manual on Uniform Traffic Control Devices (MUTCD), Section 4, "Highway Traffic Signals". The signal warrant analysis worksheets are included in **Appendix M**.

TPD examined traffic volumes at the following intersections to determine if Warrant 2, Four-Hour Vehicular Volume, is currently satisfied;

- Quentin Road (SR 0072) and Isabel Drive.
- Cornwall Road (SR 2001) and Isabel Drive/Norman Drive.
- Cornwall Road (SR 2001) and Wilhelm Avenue.

TPD also examined traffic volumes at the following intersections to determine if Warrant 3, Peak Hour, will be satisfied:

- Quentin Road (SR 0072) and Isabel Drive.
- Cornwall Road (SR 2001) and Isabel Drive/Norman Drive.
- Cornwall Road (SR 2001) and Wilhelm Avenue.
- Cornwall Road (SR 2001) and Proposed Township Road;
- Rocherty Road (SR 2002) and the Proposed Driveway Serving the 81+/- Acre Parcel.

It is important to note that PennDOT has jurisdiction over all traffic signalization in the state of Pennsylvania; and thus, PennDOT will need to review and approve the traffic signal plans. In addition, in Pennsylvania, municipalities own and maintain the signal equipment; and thus, the municipality must be the Applicant to PennDOT for the signalization.

It should be noted that PennDOT will require a full signal warrant analysis prior to approving a new traffic signal at the subject intersections; however, the Warrants 2 and 3 provide a basis for evaluating the need to investigate further warrants.

Warrant 2, Four-Hour Volume

Tables 15-17 show the hourly major street two-way traffic volumes and corresponding minor street threshold volume to satisfy Warrant 2, Four-Hour Vehicular Volume, based on either figure 4C-1 or 4C-2 in the MUTCD.

TABLE 15
WARRANT 2 (FOUR-HOUR VEHICULAR) ANALYSIS:
QUENTIN ROAD (SR 0072) AND ISABEL DRIVE

Condition	Time Period	Major Street	Minor Street	Threshold Volume	Warrant Satisfied?
		Quentin Road (SR 0072)[1]	Isabel Drive		
		Two-way	Westbound		
Existing	7:00-8:00 A.M.	878	30	60	No
	8:00-9:00 A.M.	945	56	60	No
	3:00-6:00 P.M.	1,446	103	60	**Yes**
	4:00-5:00 P.M.	1,539	117	60	**Yes**
	5:00-6:00 P.M.	1,469	93	60	**Yes**

1 = Travel Speed > 40 mph

TABLE 16
WARRANT 2 (FOUR-HOUR VEHICULAR) ANALYSIS:
CORNWALL ROAD (SR 2001) AND ISABEL DRIVE/NORMAN DRIVE

Condition	Time Period	Major Street	Minor Street	Threshold Volume	Warrant Satisfied?
		Cornwall Road (SR 2001)[1]	Isabel Drive/ Norman Drive		
		Two-way	Eastbound or Westbound		
Existing	7:00-8:00 A.M.	835	99	60	**Yes**
	8:00-9:00 A.M.	749	99	61	**Yes**
	3:00-6:00 P.M.	737	163	64	**Yes**
	4:00-5:00 P.M.	797	200	51	**Yes**
	5:00-6:00 P.M.	643	122	85	**Yes**

1 = Travel Speed > 40 mph

TABLE 17
WARRANT 2 (FOUR-HOUR VEHICULAR) ANALYSIS:
CORNWALL ROAD (SR 2001) AND WILHELM AVENUE

Condition	Time Period	Major Street	Minor Street	Threshold Volume	Warrant Satisfied?
		Cornwall Road (SR 2001)[1]	Wilhelm Avenue		
		Two-way	Westbound		
Existing	7:00-8:00 A.M.	815	122	60	**Yes**
	8:00-9:00 A.M.	778	117	55	**Yes**
	3:00-6:00 P.M.	967	186	60	**Yes**
	4:00-5:00 P.M.	988	206	60	**Yes**
	5:00-6:00 P.M.	872	191	60	**Yes**

1 = Assumed Travel Speed > 40 mph

Warrant 3, Peak Hour

Tables 18-22 show the peak hour major street two-way traffic volumes and corresponding minor street threshold volume to satisfy Warrant 3, Peak Hour, based on either figure 4C-3 or 4C-4 in the MUTCD.

TABLE 18
PEAK HOUR SIGNAL WARRANT ANALYSIS:
QUENTIN ROAD (SR 0072) AND ISABEL DRIVE

Condition	Time Period	Major Street	Minor Street	Threshold Volume	Warrant Satisfied?
		Quentin Road (SR 0072)[1]	Isabel Drive		
		Two-way	Westbound		
Existing	A.M. Peak	999	49	80	No
	P.M. Peak	1619	122	75	**Yes**
	Sat. Peak	1,871	78	75	**Yes**
2025 Base	A.M. Peak	1,218	58	75	No
	P.M. Peak	1,911	144	75	**Yes**
	Sat. Peak	2,208	92	75	**Yes**
2025 Projected	A.M. Peak	1,275	73	75	No
	P.M. Peak	1,948	177	75	**Yes**
	Sat. Peak	2,232	103	75	**Yes**

1 = Travel Speed > 40 mph

TABLE 19
PEAK HOUR SIGNAL WARRANT ANALYSIS:
CORNWALL ROAD (SR 2001) AND ISABEL DRIVE/NORMAN DRIVE

Condition	Time Period	Major Street	Minor Street	Threshold Volume	Warrant Satisfied?
		Cornwall Road (SR 2001)[1]	Isabel Drive/ Norman Drive		
		Two-way	Eastbound or Westbound		
Existing	A.M. Peak	924	98	91	**Yes**
	P.M. Peak	822	200	111	**Yes**
	Sat. Peak	573	75	189	No
2025 Base	A.M. Peak	1,052	98	75	**Yes**
	P.M. Peak	950	200	87	**Yes**
	Sat. Peak	672	88	153	No
2025 Projected	A.M. Peak	1,209	107	75	**Yes**
	P.M. Peak	1,065	258	75	**Yes**
	Sat. Peak	752	102	129	No

1 = Travel Speed > 40 mph

TABLE 20
PEAK HOUR SIGNAL WARRANT ANALYSIS:
CORNWALL ROAD (SR 2001) AND WILHELM AVENUE

Condition	Time Period	Major Street	Minor Street	Threshold Volume	Warrant Satisfied?
		Cornwall Road (SR 2001)[1]	Wilhelm Avenue		
		Two-way	Westbound		
Existing	A.M. Peak	834	125	108	**Yes**
	P.M. Peak	1,011	210	79	**Yes**
	Sat. Peak	618	168	172	No
2025 Base	A.M. Peak	981	147	83	**Yes**
	P.M. Peak	1,189	247	75	**Yes**
	Sat. Peak	730	197	135	**Yes**
2025 Projected	A.M. Peak	1,102	177	75	**Yes**
	P.M. Peak	1,318	260	75	**Yes**
	Sat. Peak	791	208	118	**Yes**

1 = Assumed Travel Speed > 40 mph

TABLE 21
PEAK HOUR SIGNAL WARRANT ANALYSIS:
CORNWALL ROAD (SR 2001) AND PROPOSED TOWNSHIP ROAD

Condition	Time Period	Major Street	Minor Street	Threshold Volume	Warrant Satisfied?
		Cornwall Road (SR 2002)[1]	Proposed Township Road		
		Two-way	Eastbound or Westbound		
2035 Projected	A.M. Peak	1,323	171	75	**Yes**
	P.M. Peak	1,295	382	75	**Yes**
	Sat. Peak	949	337	87	**Yes**

1 = Travel Speed > 40 mph

TABLE 22
PEAK HOUR SIGNAL WARRANT ANALYSIS:
ROCHERTY ROAD (SR 2002) AND THE PROPOSED DRIVEWAY

Condition	Time Period	Major Street	Minor Street	Threshold Volume	Warrant Satisfied?
		Rocherty Road (SR 2002)[1]	Proposed Driveway		
		Two-way	Southbound		
2025 Projected	A.M. Peak	1,477	26	75	No
	P.M. Peak	1,361	39	75	No
	Sat. Peak	850	13	105	No
2035 Projected	A.M. Peak	1,716	34	75	No
	P.M. Peak	1,577	87	75	**Yes**
	Sat. Peak	1,036	42	77	No

1 = Assumed Travel Speed > 40 mph

CONCLUSIONS

The conclusions for this Master Plan Transportation Impact Study are identified in the Executive Summary.

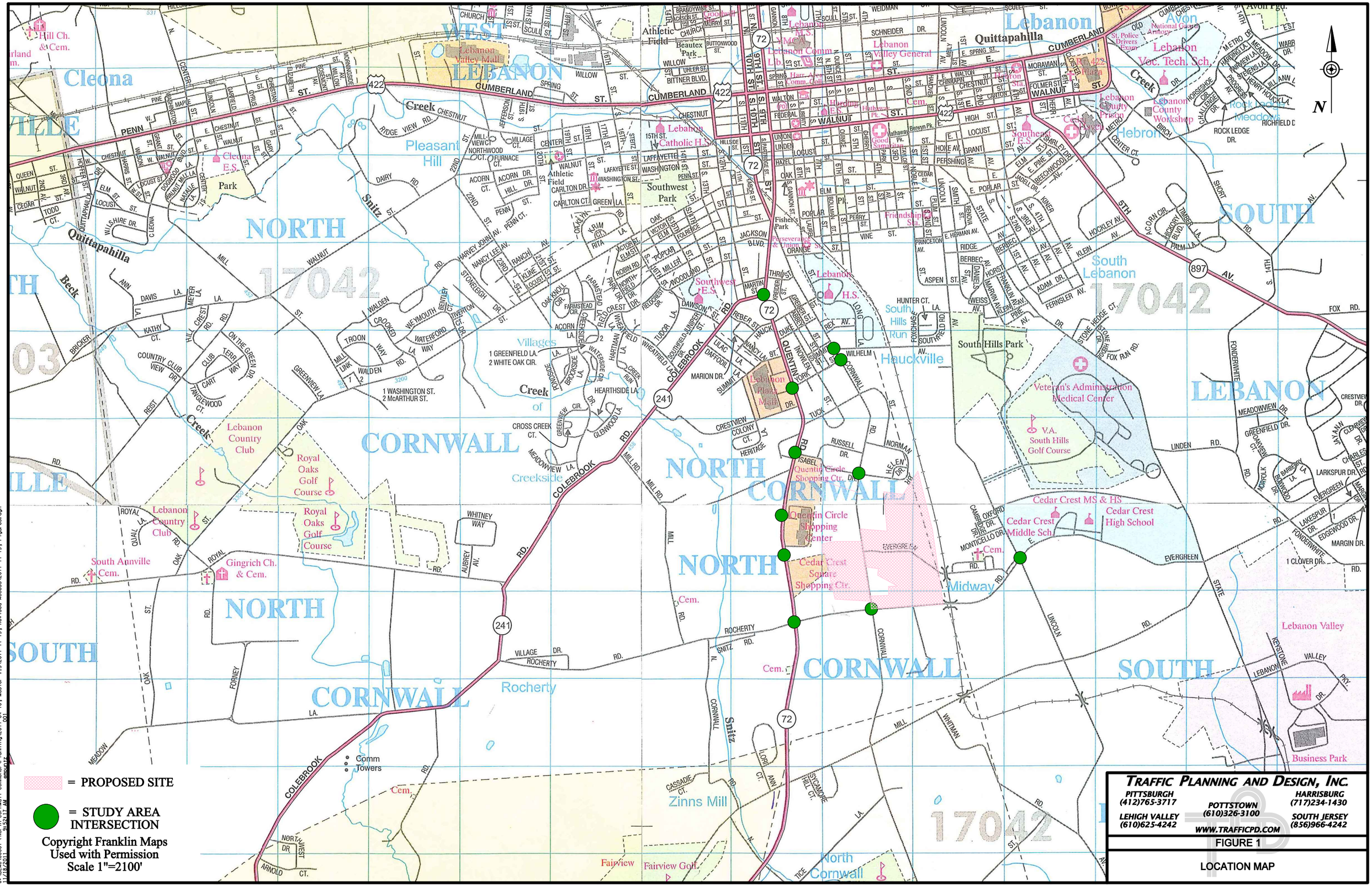
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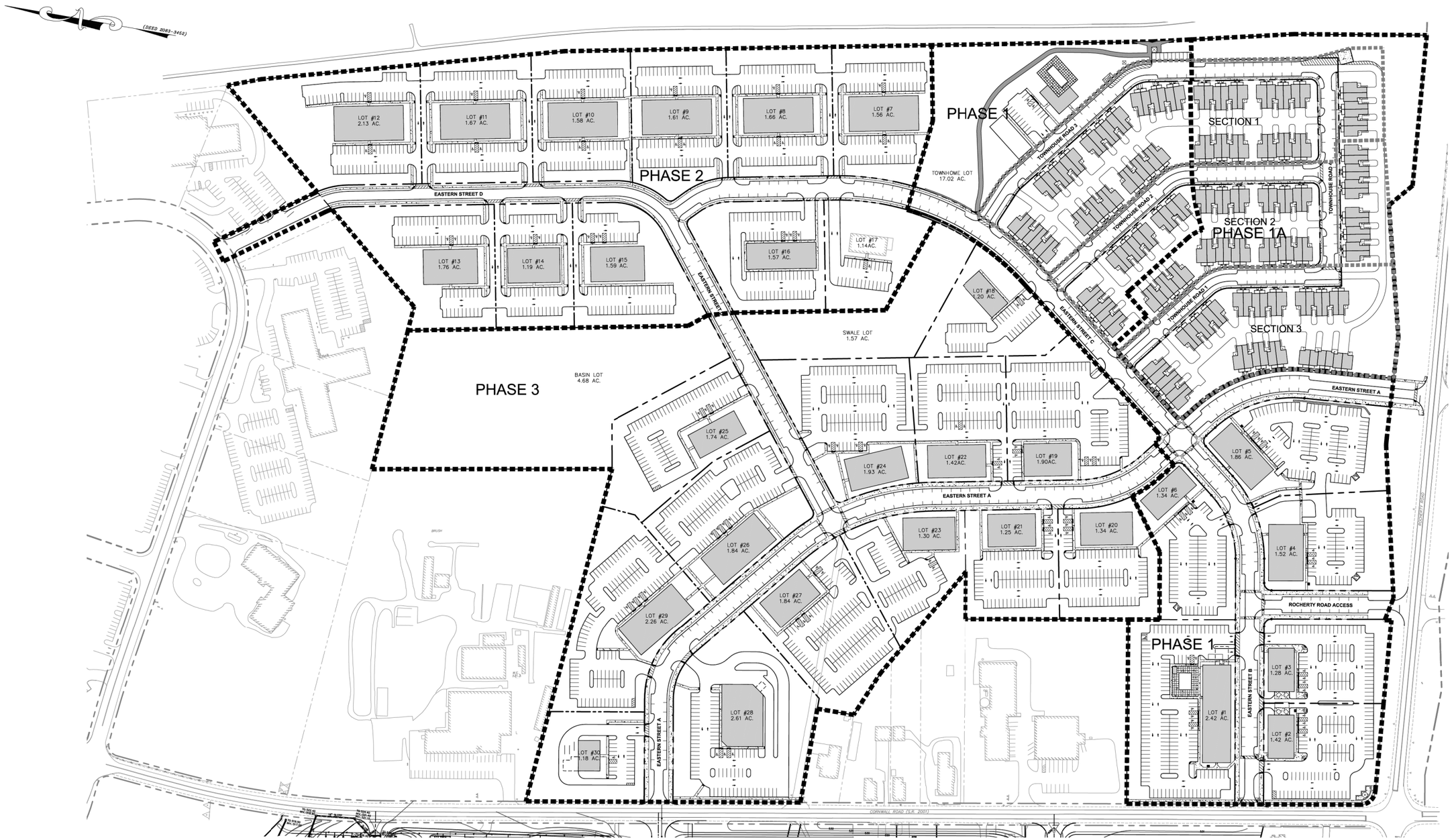
FIGURE 1
LOCATION MAP
N
Cleona
WEST LEBANON
Lebanon
NORTH
SOUTH
CORNWALL
South Lebanon
Hauckville
Avon
Hebron
Pleasant Hill
Southwest Park
Quittapahilla
Creek
Snitz
Beck
Colebrook
Quentin
Lebanon Valley Mall
Lebanon Valley General
Lebanon Catholic H.S.
Lebanon Country Club
Royal Oaks Golf Course
Veteran's Administration Medical Center
V.A. South Hills Golf Course
Quentin Circle Shopping Center
Cedar Crest Square Shopping Ctr.
Cedar Crest MS & HS
Cedar Crest High School
Cedar Crest Middle Sch.
Lebanon Valley
Business Park
Zinns Mill
Rocherty
Midway
Fairview
Fairview Golf
North Cornwall
South Annville Cem.
Gingrich Ch. & Cem.
Comm Towers
17042
241
72
422
897



REVISION	DATE	BY

PHASING AND GENERAL DEVELOPMENT PLAN - EASTERN SIDE

PRELIMINARY/FINAL PLAN
for
SPRINGWOOD DEVELOPMENT PARTNERS
located in
North Cornwall and South Lebanon Townships
Lebanon County, Pennsylvania

Steckbeck Engineering & Surveying Inc.
229 North Third Street, Suite A
Lebanon, Pennsylvania 17042
Phone: (717) 272-7110
Fax: (717) 272-7348

FIELD CREW:	JO/JH
BASE MAP:	M.P.O.
DRAWN:	JSE
DESIGN:	MAM
CHECKED:	MAM
DATE:	04/20/11
SCALE:	1"=100'
PROJECT #907-06-002	

1
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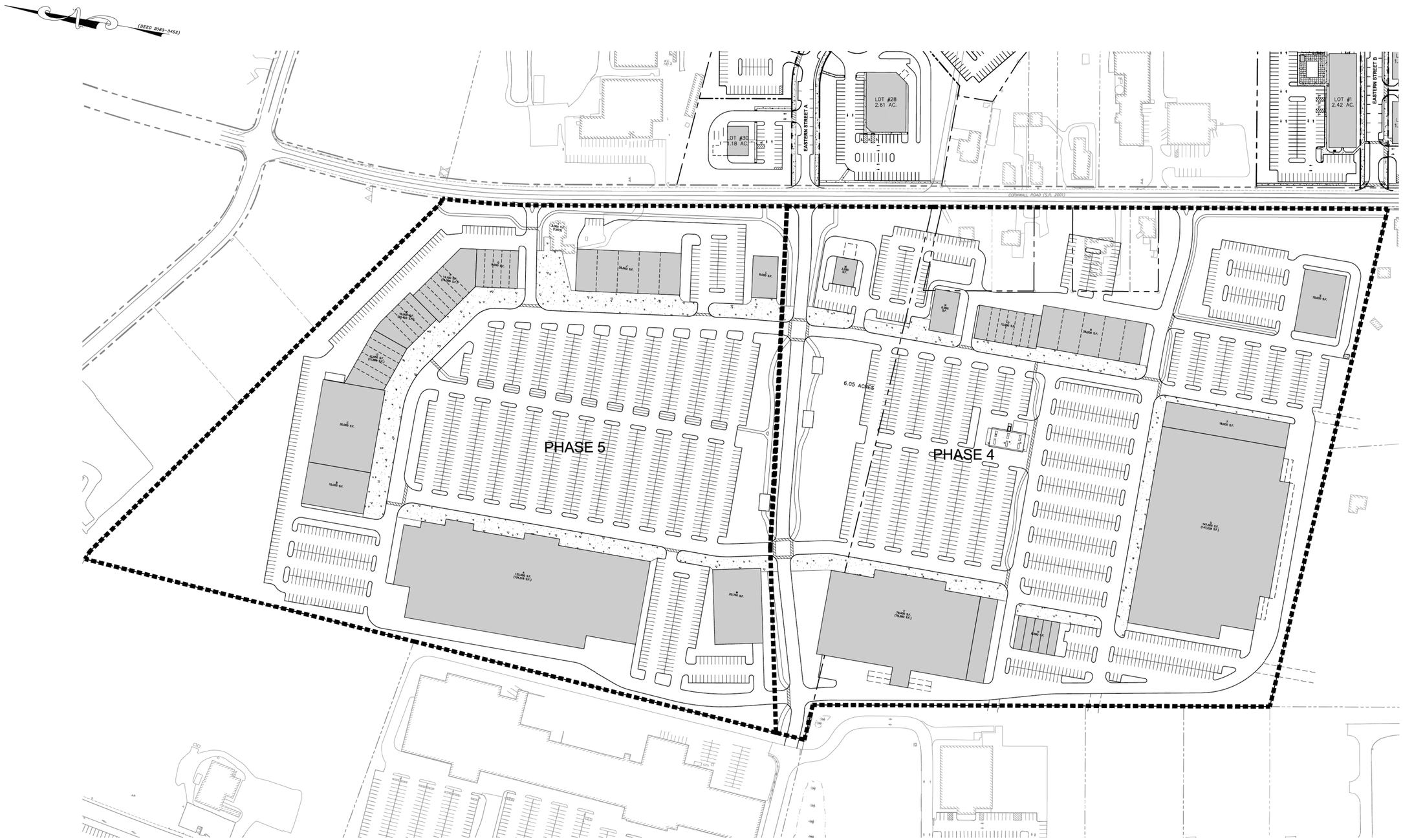
FIGURE 2A

SITE PLAN
81+/- ACRE PARCEL

$MODEL$
$USER$
$TIME$
$FILE$
$DATE$



REVISION	DATE	BY

PHASING AND GENERAL DEVELOPMENT PLAN - WESTERN SIDE

PRELIMINARY/FINAL PLAN

for

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located in

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219 Huth Road, Suite 100 Suite A
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Fax: (717) 272-7348

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BASE MAP:	M.P.O.
DRAWN:	JSE
DESIGN:	MAM
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PROJECT	#907-06-002

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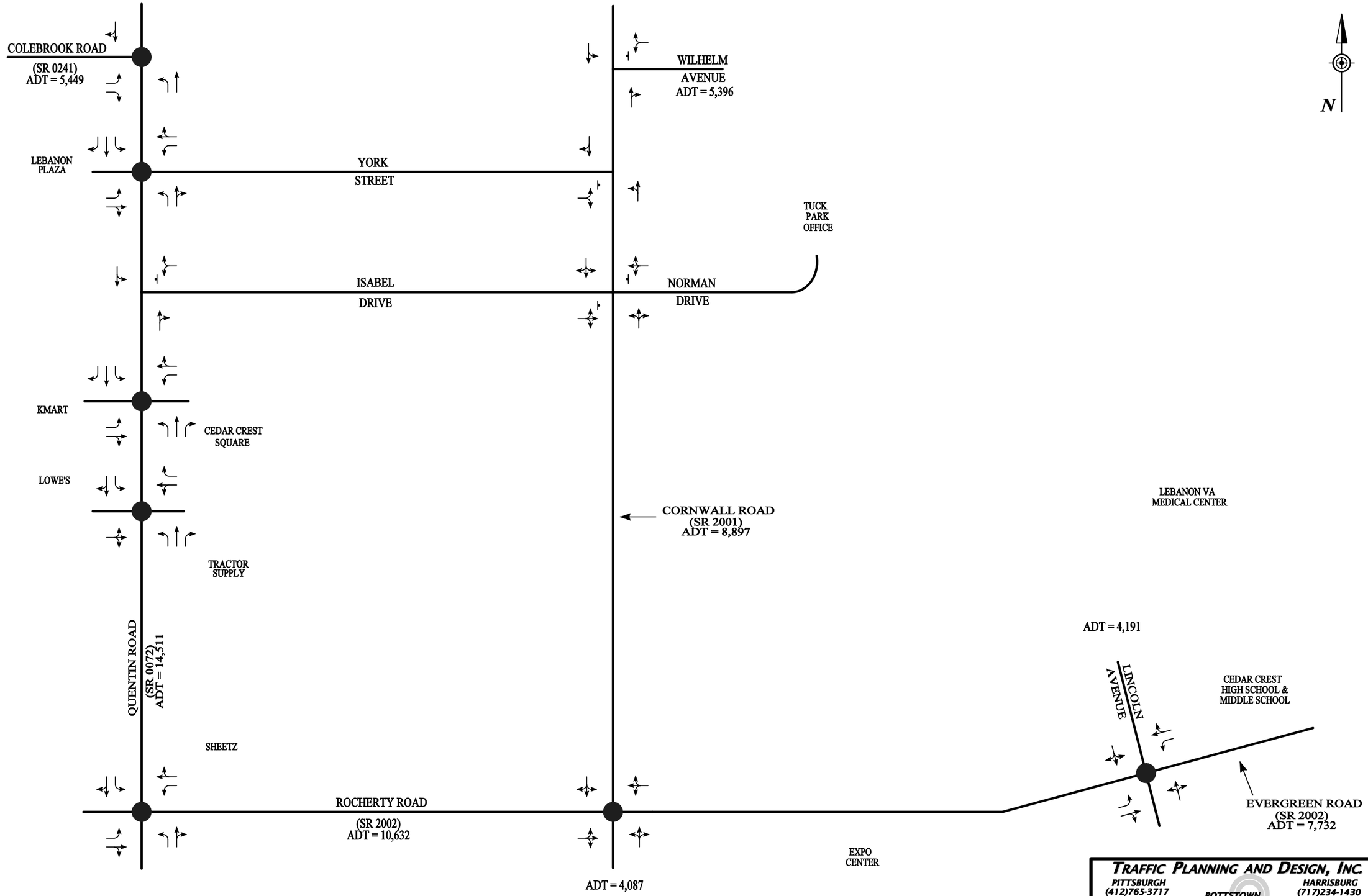
FIGURE 2B

SITE PLAN

27+/- AND 40+/- ACRE PARCELS

$FILE$
$DATE$
$TIME$
$USER$
$MODEL$



KEY:

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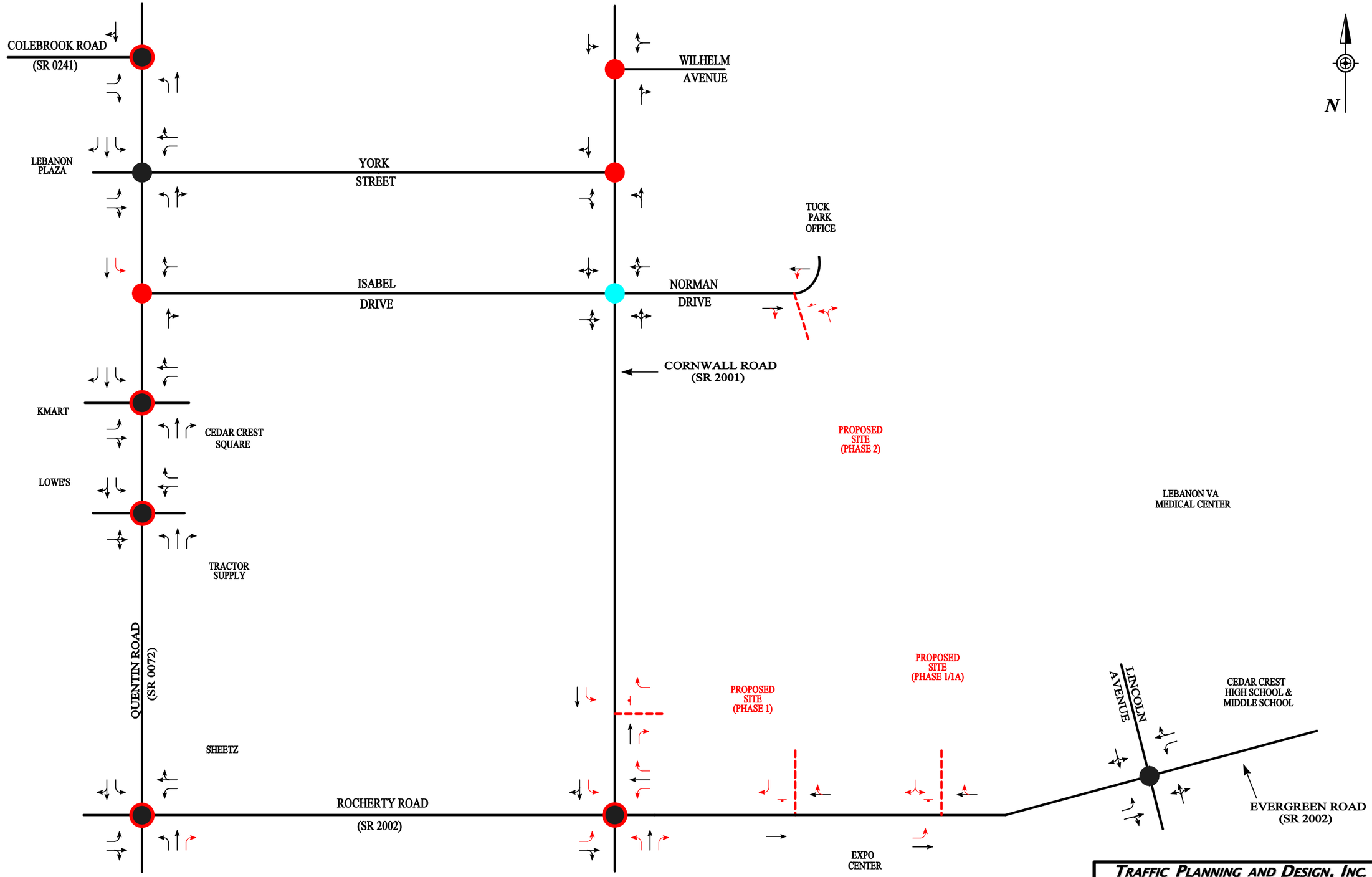
FIGURE 3

EXISTING LANE CONFIGURATIONS AND INTERSECTION CONTROLS



KEY:

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- PROPOSED DRIVEWAY
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- COMMITTED FUTURE IMPROVEMENT
- FUTURE IMPROVEMENT TO MEET PENNDOT GUIDELINES
- FUTURE SIGNAL TIMING MODIFICATION

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FIGURE 4A

FUTURE (2025) LANE CONFIGURATIONS
AND INTERSECTION CONTROLS
PENNDOT GUIDELINES

COLEBROOK ROAD
(SR 0241)

WILHELM
AVENUE

N

LEBANON
PLAZA

YORK
STREET

TUCK
PARK
OFFICE

ISABEL
DRIVE

NORMAN
DRIVE

CORNWALL ROAD
(SR 2001)

KMART

CEDAR CREST
SQUARE

PROPOSED
SITE
(PHASE 2)

LOWE'S

PROPOSED
SITE
(PHASE 3)

LEBANON VA
MEDICAL CENTER

TRACTOR
SUPPLY

QUENTIN ROAD
(SR 0072)

PROPOSED
SITE
(PHASE 4)

PROPOSED
SITE
(PHASE 1/1A)

PROPOSED
SITE
(PHASE 1)

LINCOLN
AVENUE

CEDAR CREST
HIGH SCHOOL &
MIDDLE SCHOOL

SHEETZ

ROCHERTY ROAD
(SR 2002)

EVERGREEN ROAD
(SR 2002)

EXPO
CENTER

KEY:

- STOP CONTROLLED
- SIGNALIZED INTERSECTION
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

- COMMITTED FUTURE IMPROVEMENT
- FUTURE IMPROVEMENT TO MEET PENNDOT GUIDELINES
- FUTURE SIGNAL TIMING MODIFICATION

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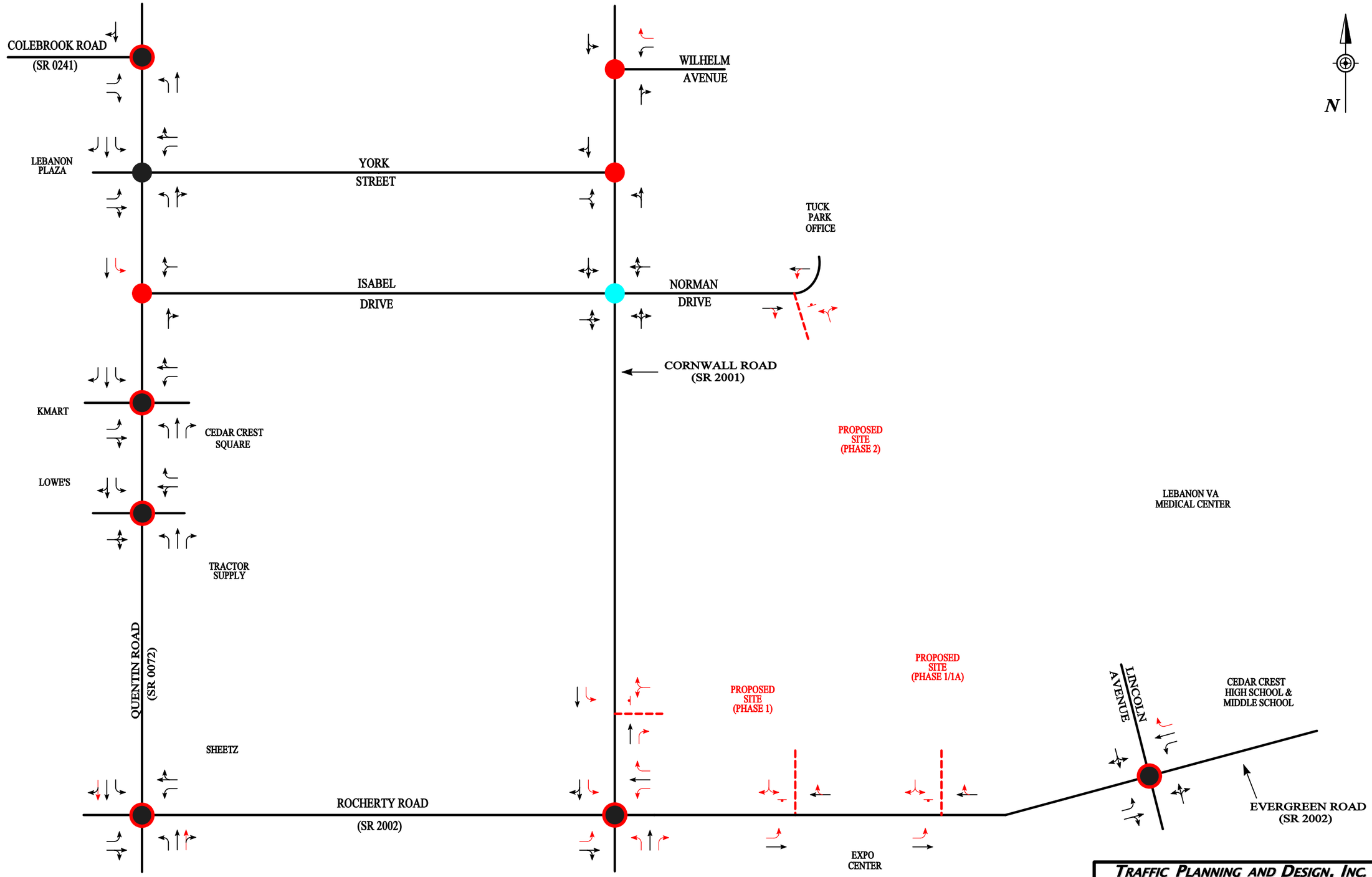
FIGURE 4B

FUTURE (2035) LANE CONFIGURATIONS
AND INTERSECTION CONTROLS
PENNDOT GUIDELINES

$MODEL$
$USER$
$TIME$
$FILE$
$DATE$



KEY:

- STOP CONTROLLED
- SIGNALIZED INTERSECTION
- PROPOSED DRIVEWAY
- SCHEMATIC DRAWING:NOT TO SCALE
- COMMITTED FUTURE IMPROVEMENT
- FUTURE IMPROVEMENT TO MEET TOWNSHIP MASTER PLAN GUIDELINES
- FUTURE SIGNAL TIMING MODIFICATION

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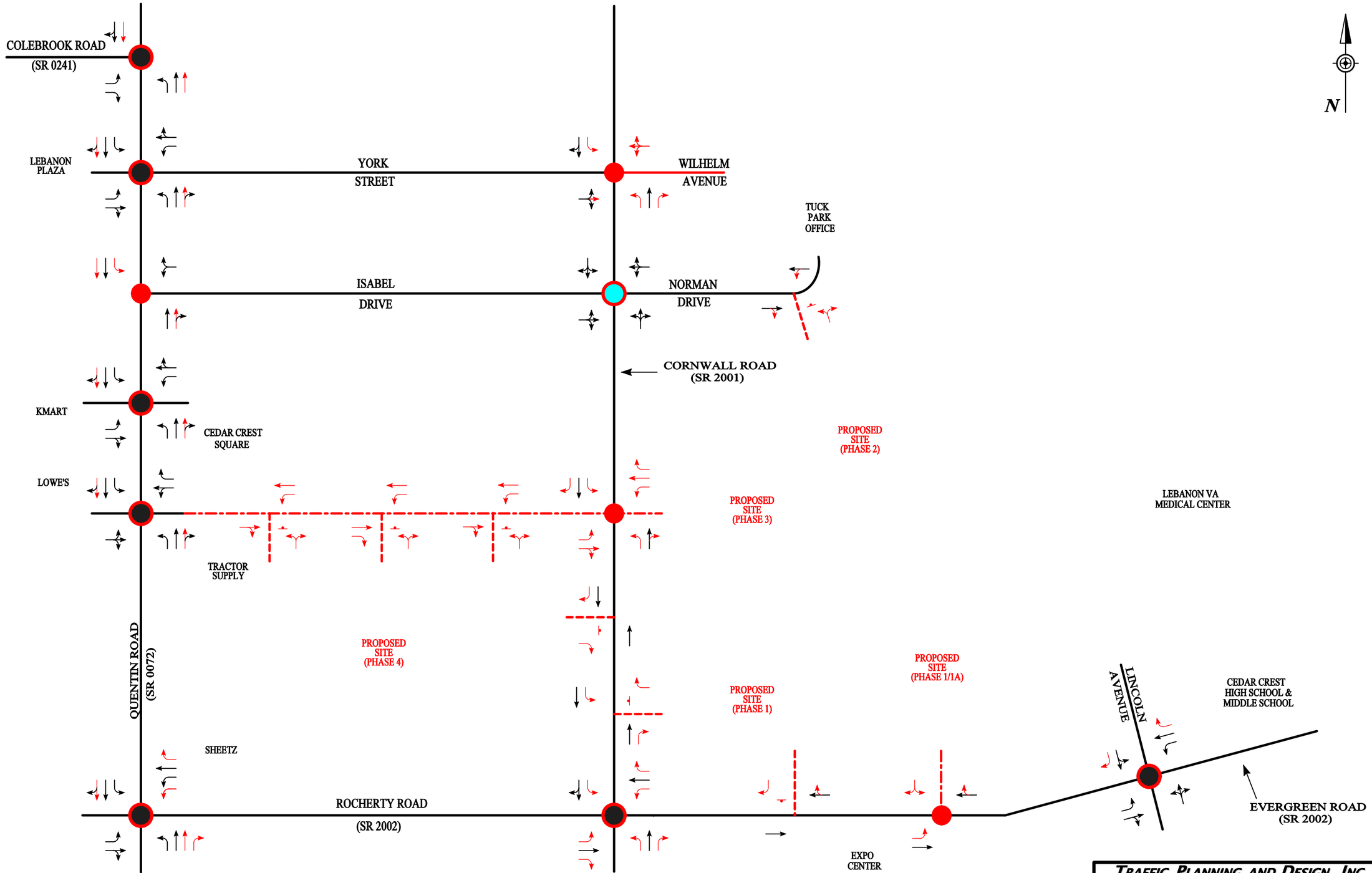
FIGURE 4C

FUTURE (2025) LANE CONFIGURATIONS
AND INTERSECTION CONTROLS
TOWNSHIP MASTER PLAN GUIDELINES



KEY:

- STOP CONTROLLED
- SIGNALIZED INTERSECTION
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- SCHEMATIC DRAWING:NOT TO SCALE
- COMMITTED FUTURE IMPROVEMENT
- FUTURE IMPROVEMENT TO MEET TOWNSHIP MASTER PLAN GUIDELINES
- FUTURE SIGNAL TIMING MODIFICATION

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FIGURE 4D

FUTURE (2035) LANE CONFIGURATIONS AND INTERSECTION CONTROLS TOWNSHIP MASTER PLAN GUIDELINES BUILD-OUT OF PHASES 1-4

$MODEL$
$USER$
$TIME$
$FILE$
$DATE$

COLEBROOK ROAD
(SR 0241)

LEBANON PLAZA

YORK STREET

WILHELM AVENUE

TUCK PARK OFFICE

ISABEL DRIVE

NORMAN DRIVE

CORNWALL ROAD
(SR 2001)

KMART

PROPOSED SITE (PHASE 5)

CEDAR CREST SQUARE

PROPOSED SITE (PHASE 2)

LOWE'S

PROPOSED SITE (PHASE 3)

LEBANON VA MEDICAL CENTER

TRACTOR SUPPLY

QUENTIN ROAD
(SR 0072)

PROPOSED SITE (PHASE 4)

PROPOSED SITE (PHASE 1/1A)

PROPOSED SITE (PHASE 1)

LINCOLN AVENUE

CEDAR CREST HIGH SCHOOL & MIDDLE SCHOOL

SHEETZ

ROCHERTY ROAD
(SR 2002)

EVERGREEN ROAD
(SR 2002)

EXPO CENTER

N

KEY:

- STOP CONTROLLED
- SIGNALIZED INTERSECTION
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY
- SCHEMATIC DRAWING:NOT TO SCALE
- COMMITTED FUTURE IMPROVEMENT
- FUTURE IMPROVEMENT TO MEET TOWNSHIP MASTER PLAN GUIDELINES
- FUTURE SIGNAL TIMING MODIFICATION

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FIGURE 4E

FUTURE (2035) LANE CONFIGURATIONS AND INTERSECTION CONTROLS TOWNSHIP MASTER PLAN GUIDELINES BUILD-OUT OF PHASES 1-5

$MODEL$
$USER$
$TIME$
$FILE$
$DATE$

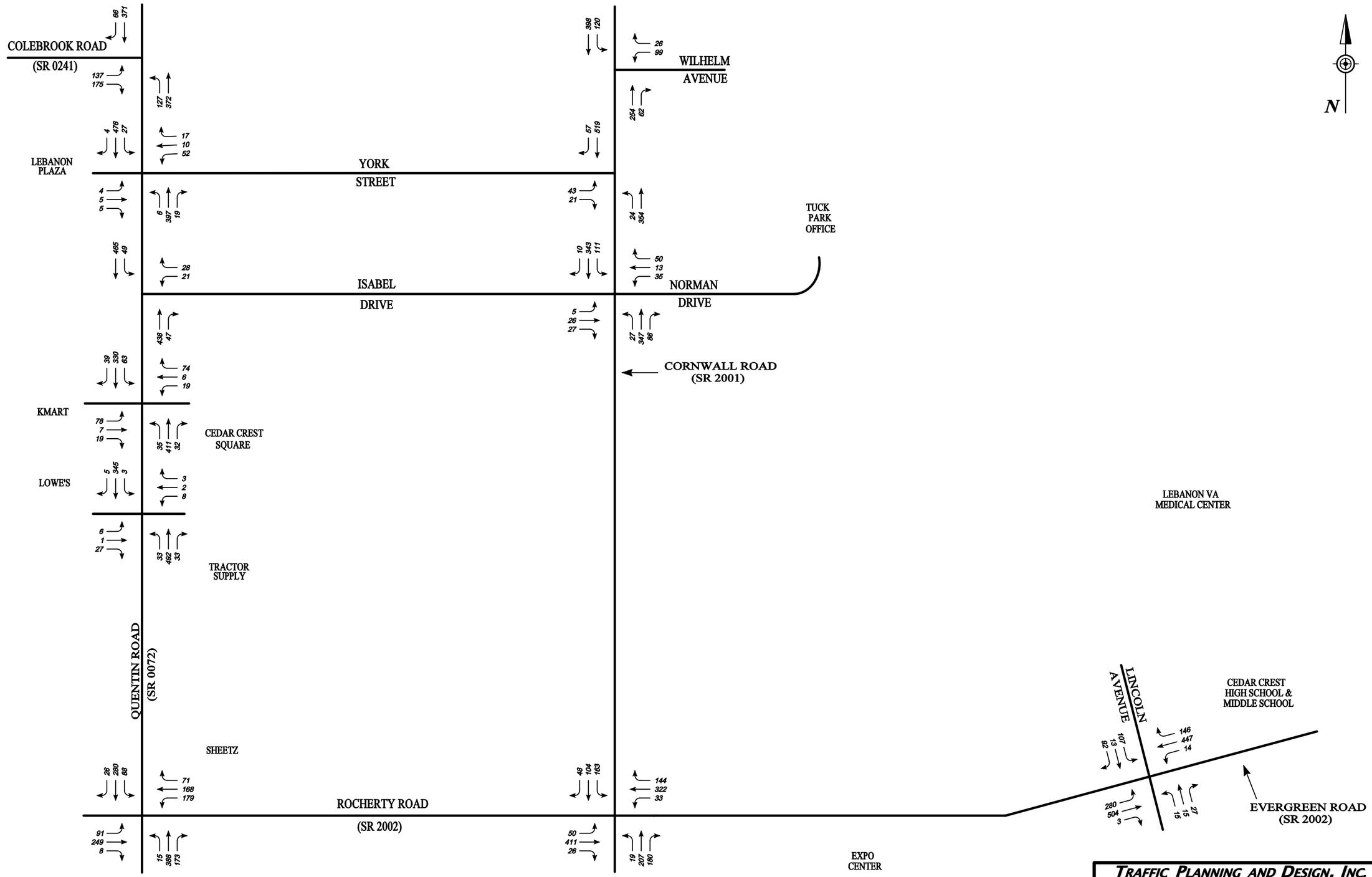

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FIGURE 5

EXISTING CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES

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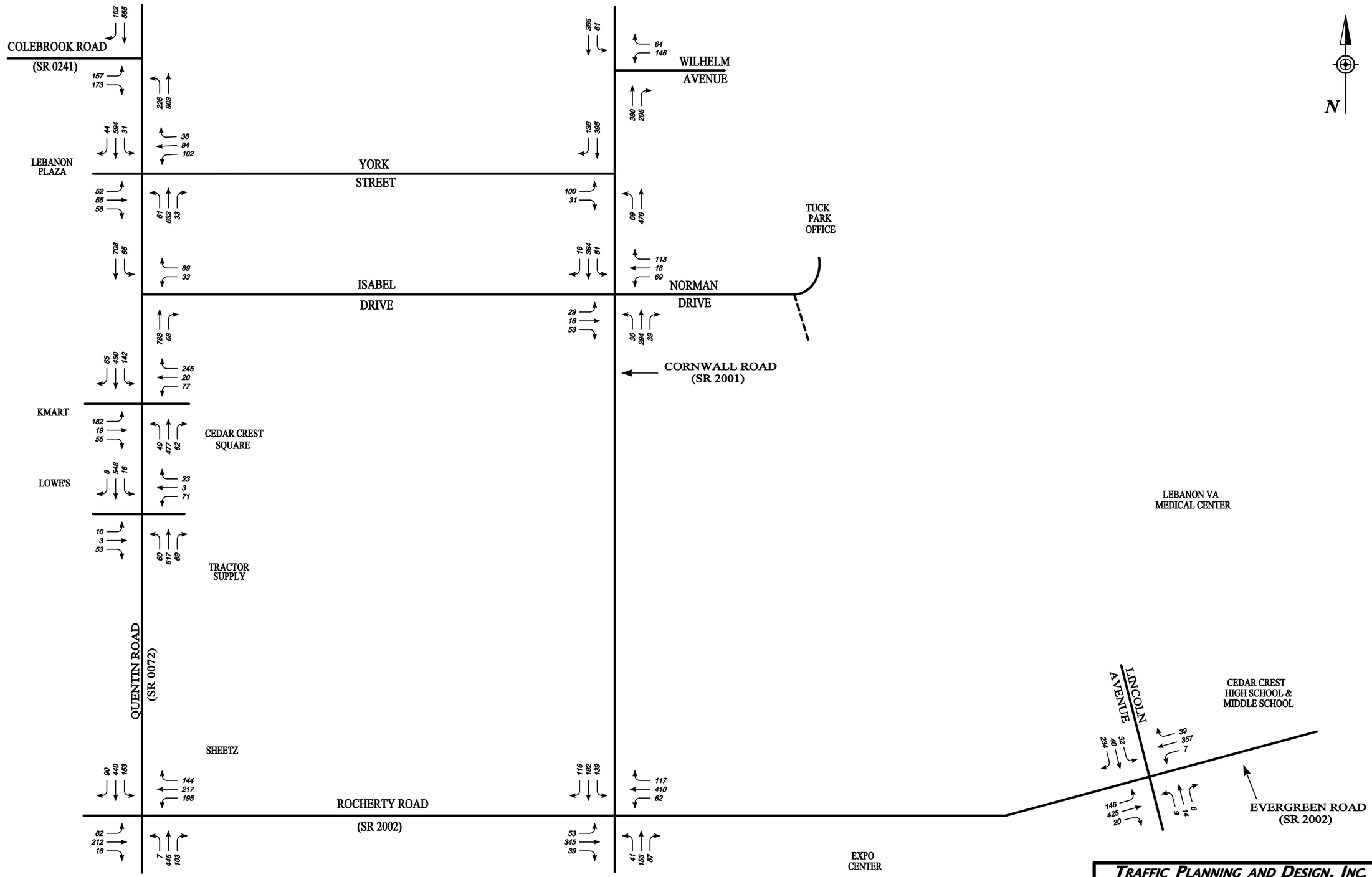

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FIGURE 6

EXISTING CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES

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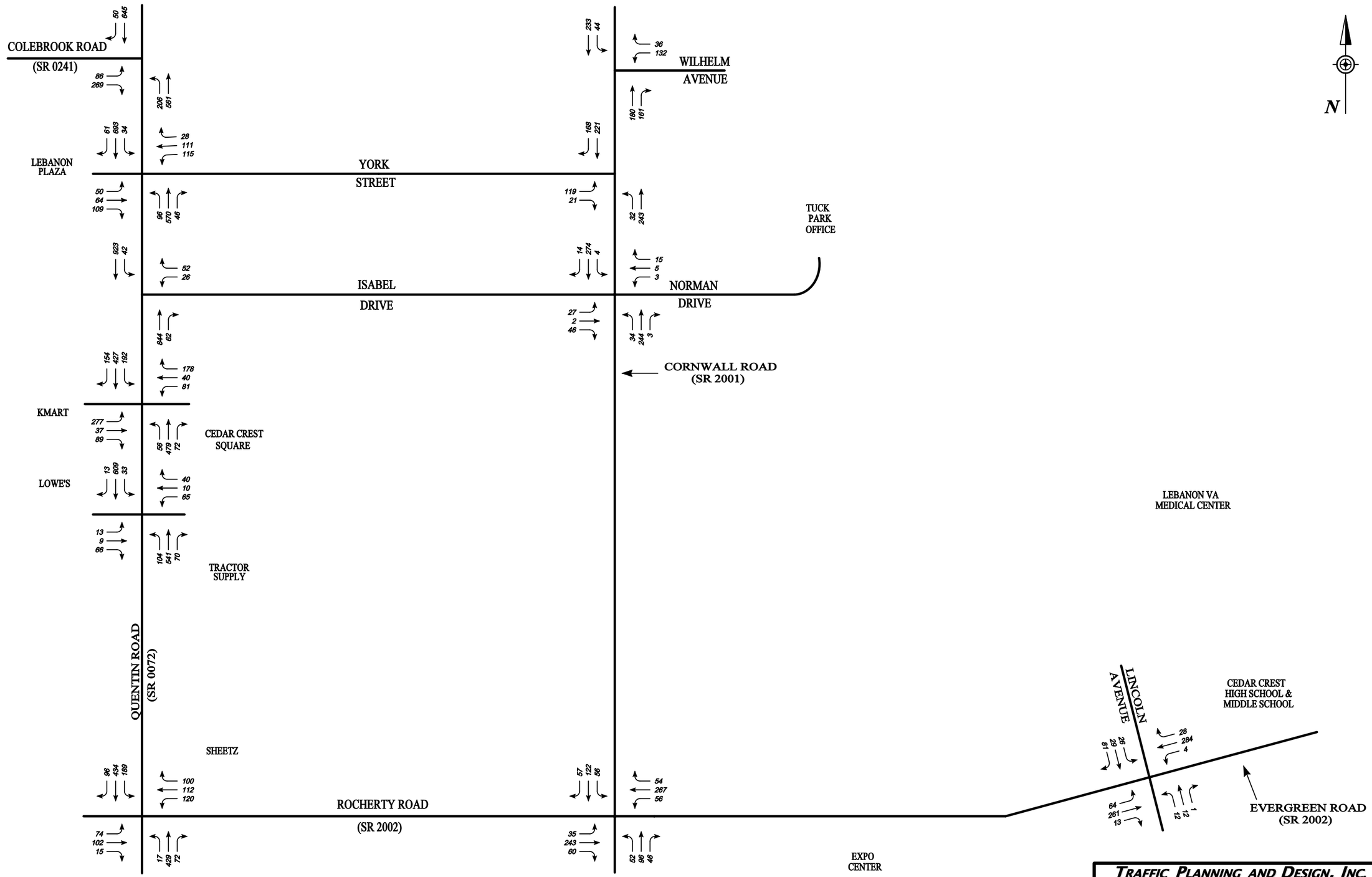

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FIGURE 7

EXISTING CONDITIONS
SATURDAY MIDDAY PEAK HOUR
TRAFFIC VOLUMES

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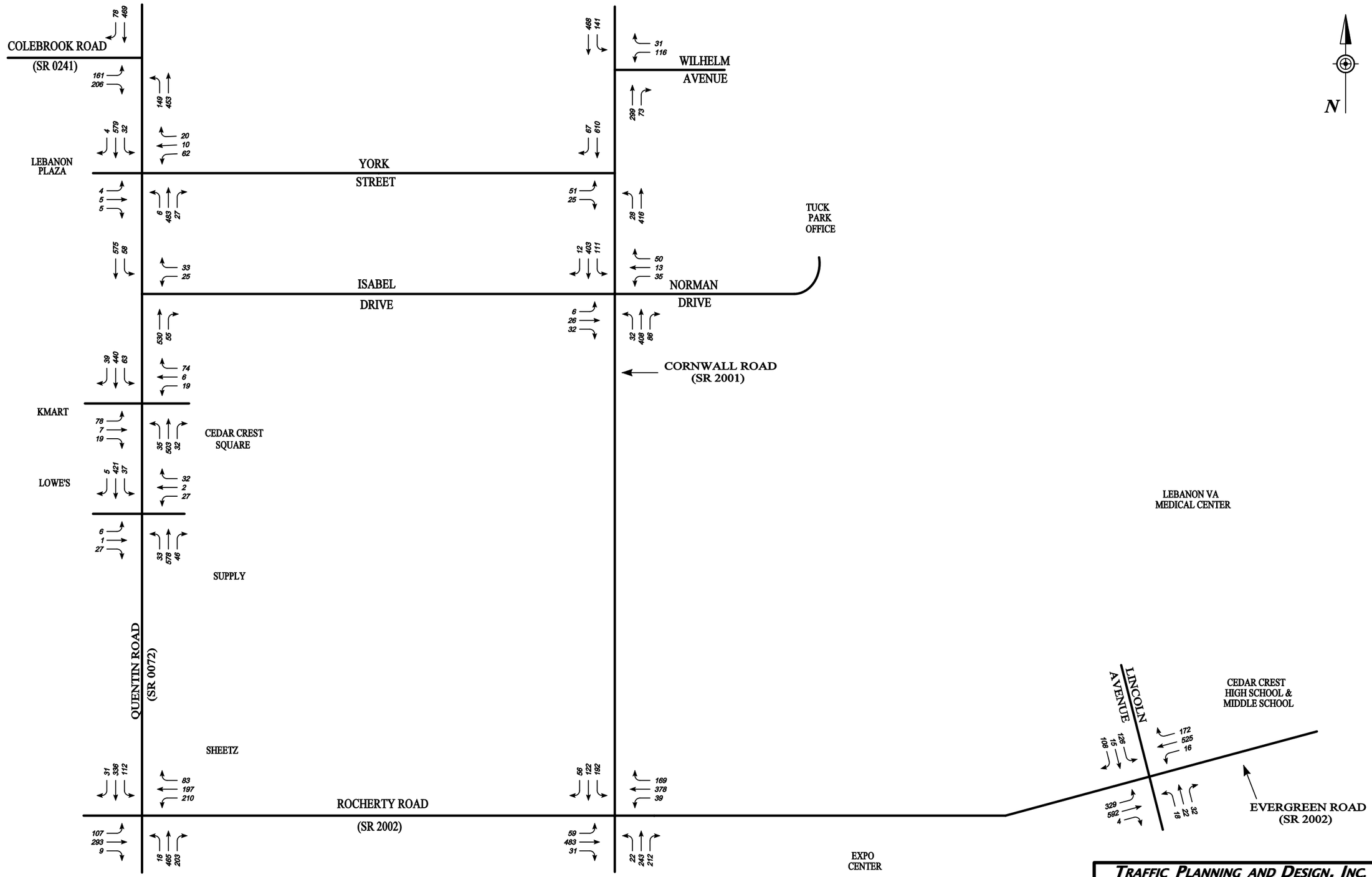

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FIGURE 8

2025 BASE CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES

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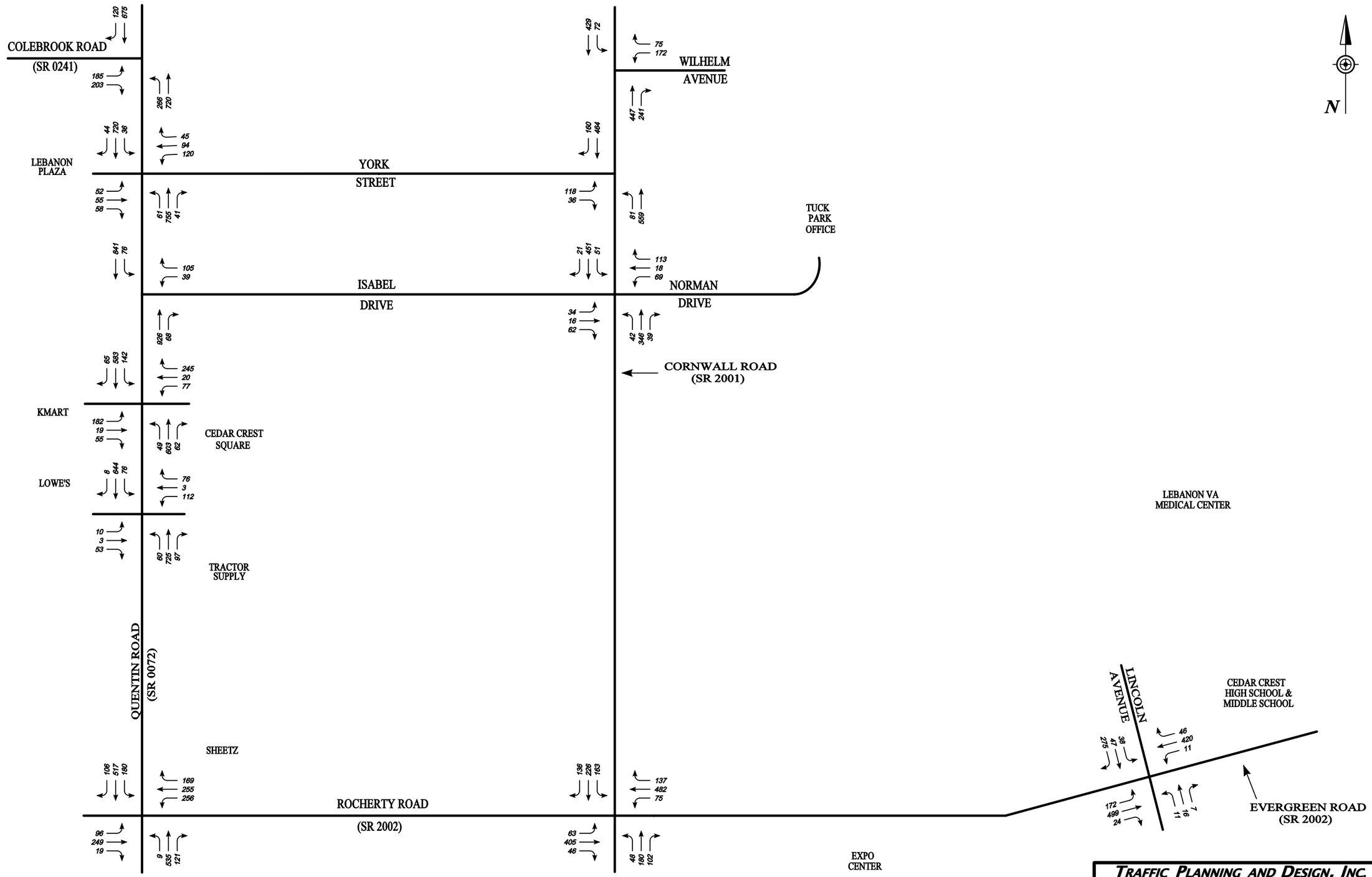

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FIGURE 9

2025 BASE CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES

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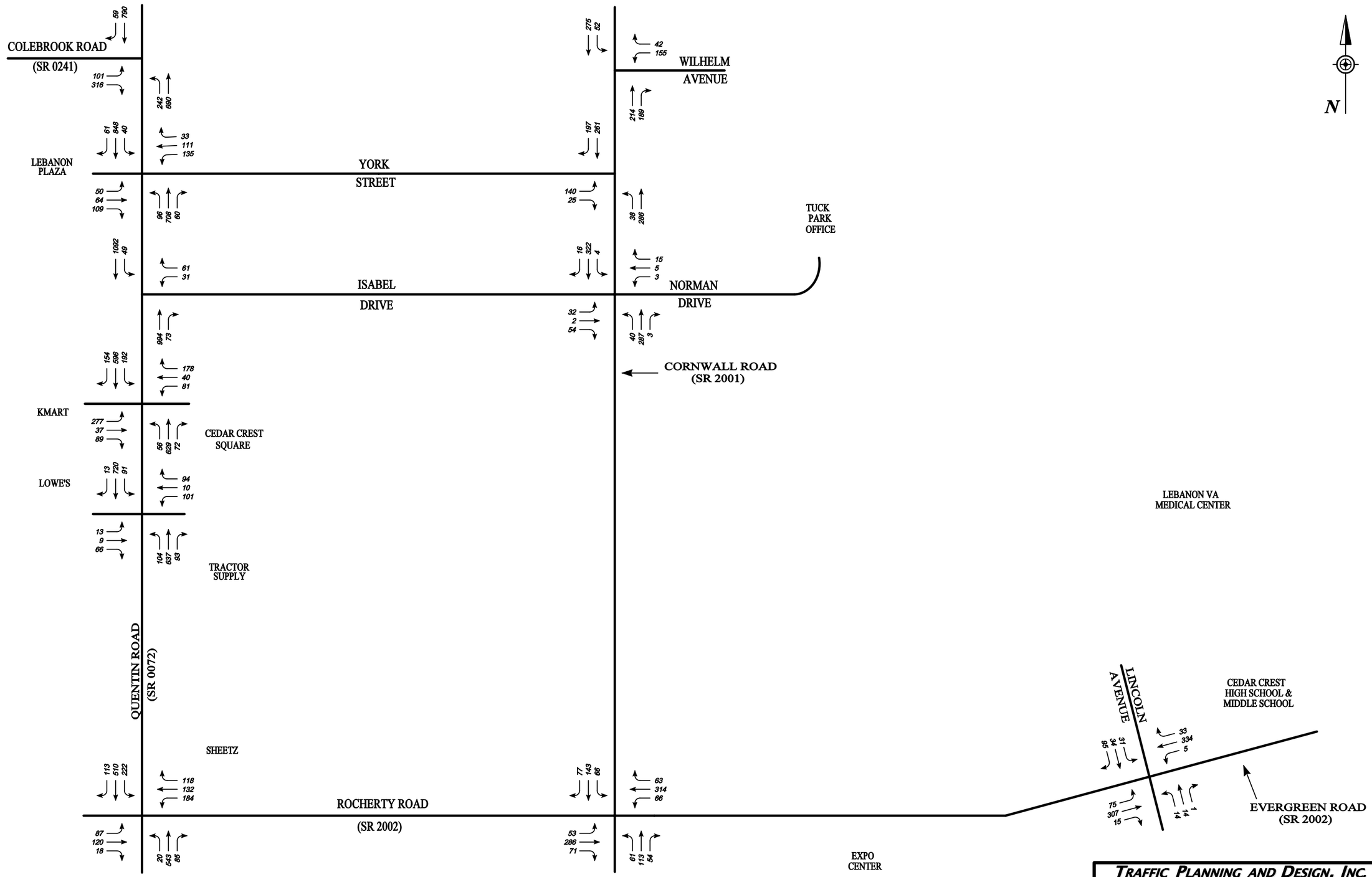

KEY:
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FIGURE 10

2025 BASE CONDITIONS
SATURDAY MIDDAY PEAK HOUR
TRAFFIC VOLUMES

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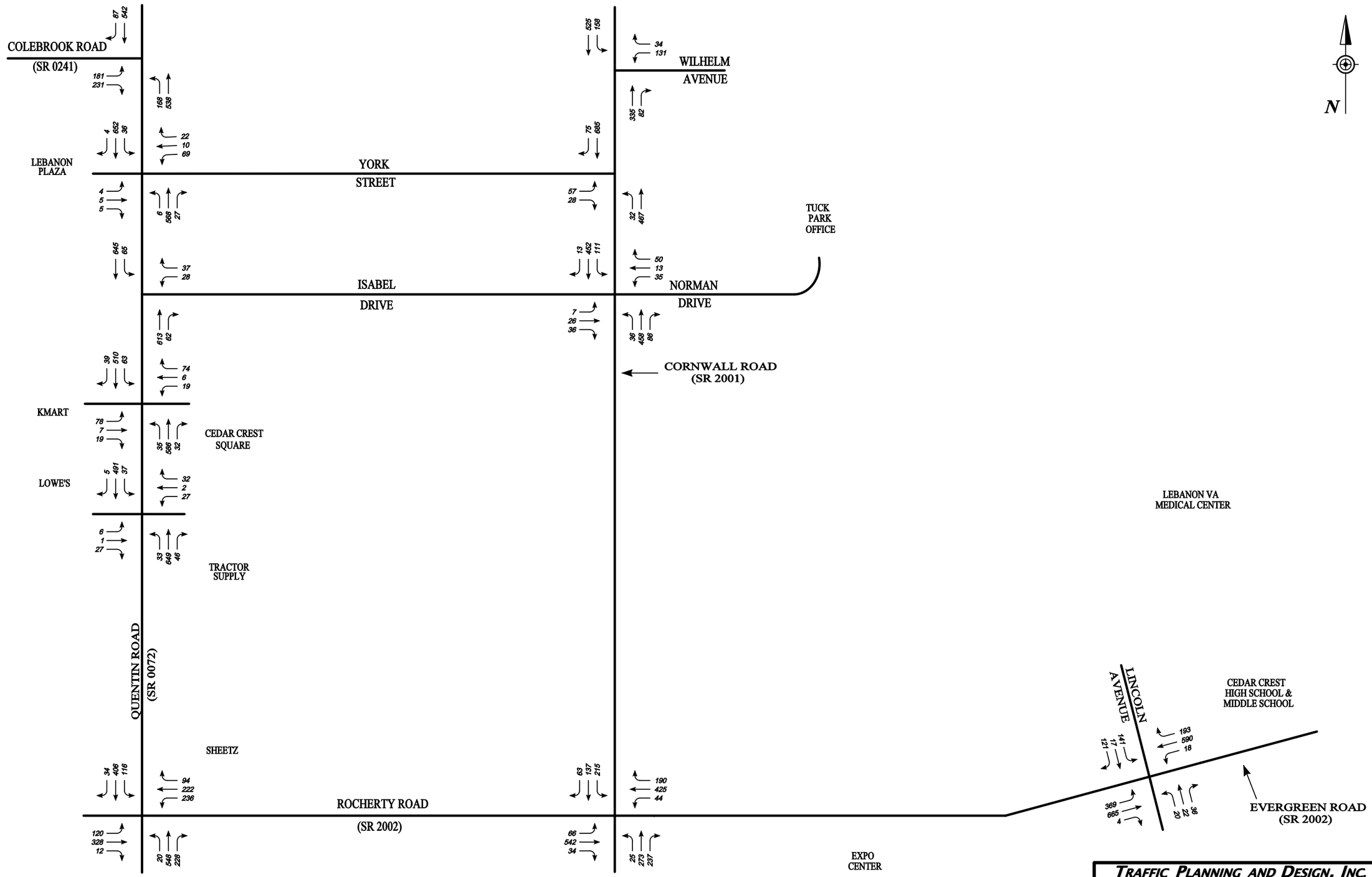

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FIGURE 11

2035 BASE CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES

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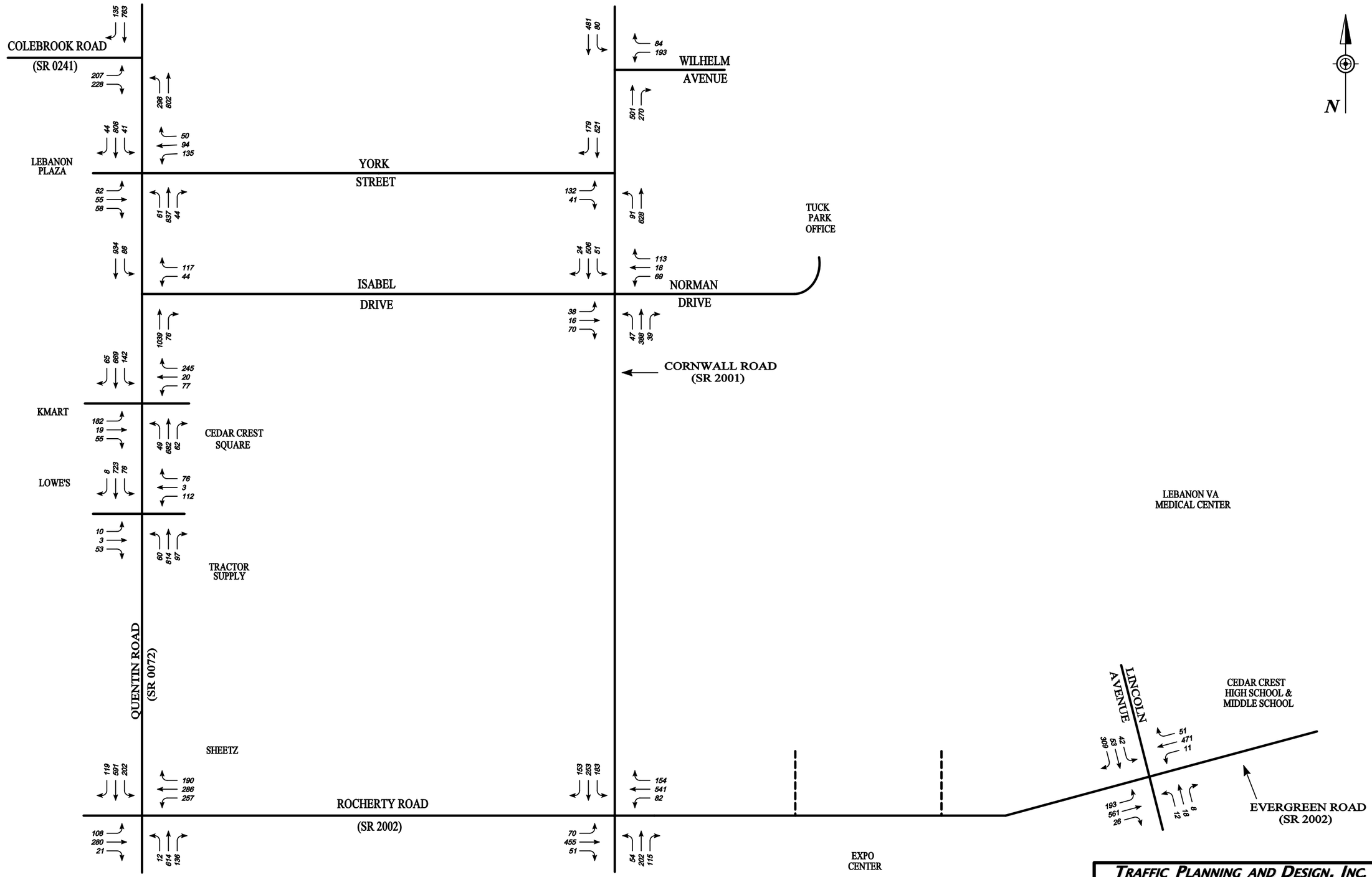

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FIGURE 12

2035 BASE CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES

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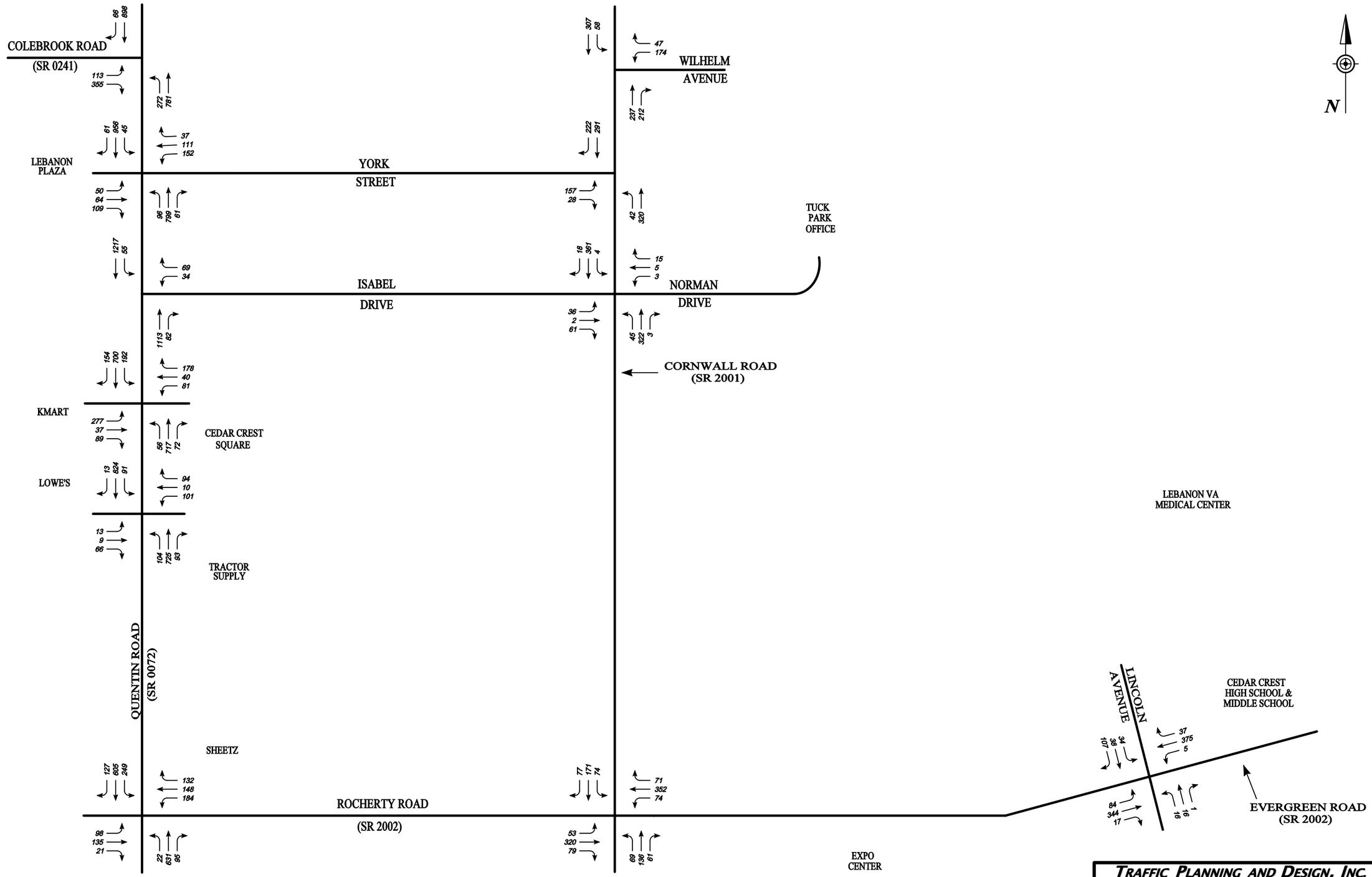

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FIGURE 13

2035 BASE CONDITIONS
SATURDAY MIDDAY PEAK HOUR
TRAFFIC VOLUMES

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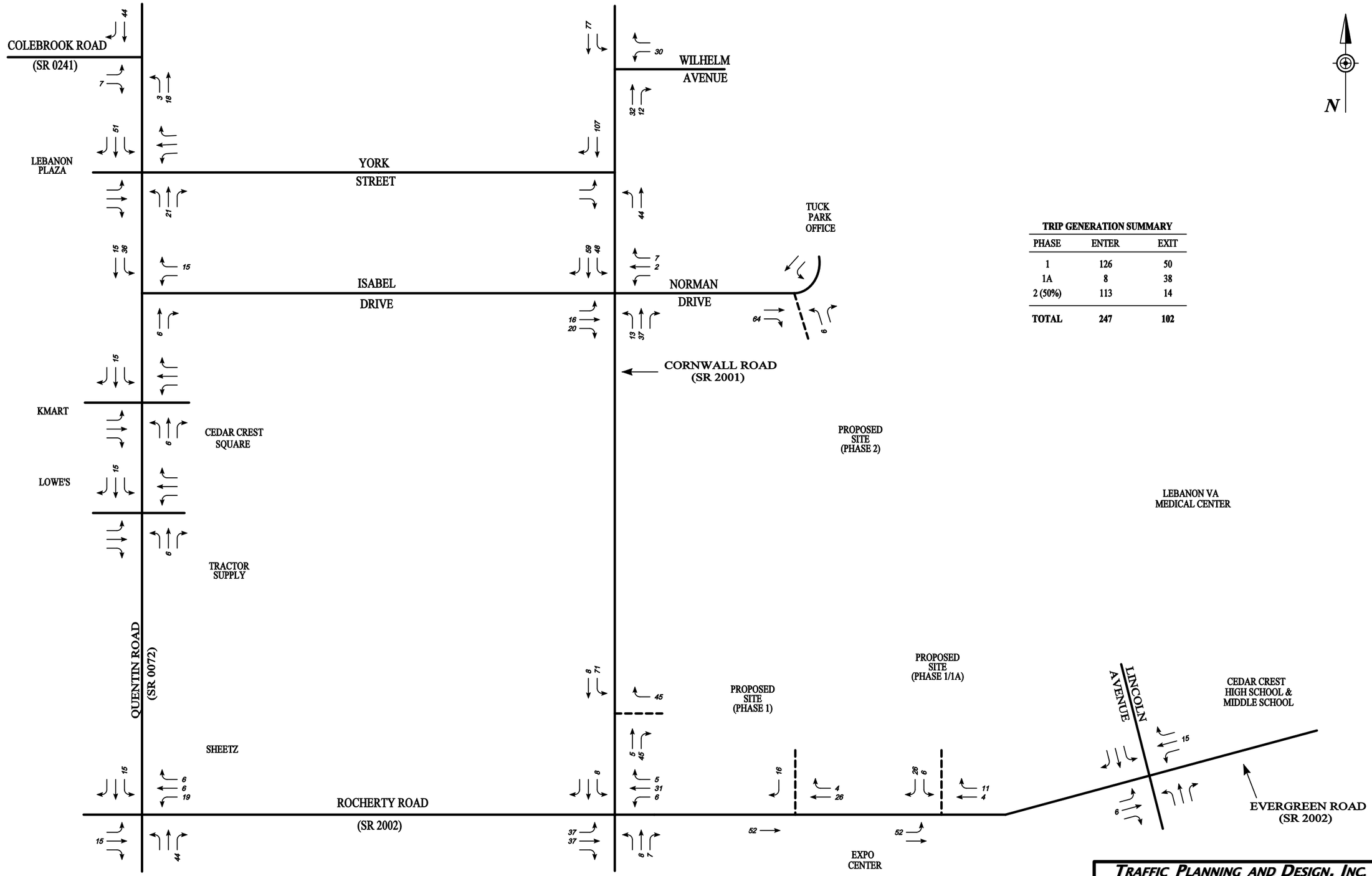

TRIP GENERATION SUMMARY

PHASE	ENTER	EXIT
1	126	50
1A	8	38
2 (50%)	113	14
TOTAL	**247**	**102**

KEY:

- - - - - - **PROPOSED DRIVEWAY**

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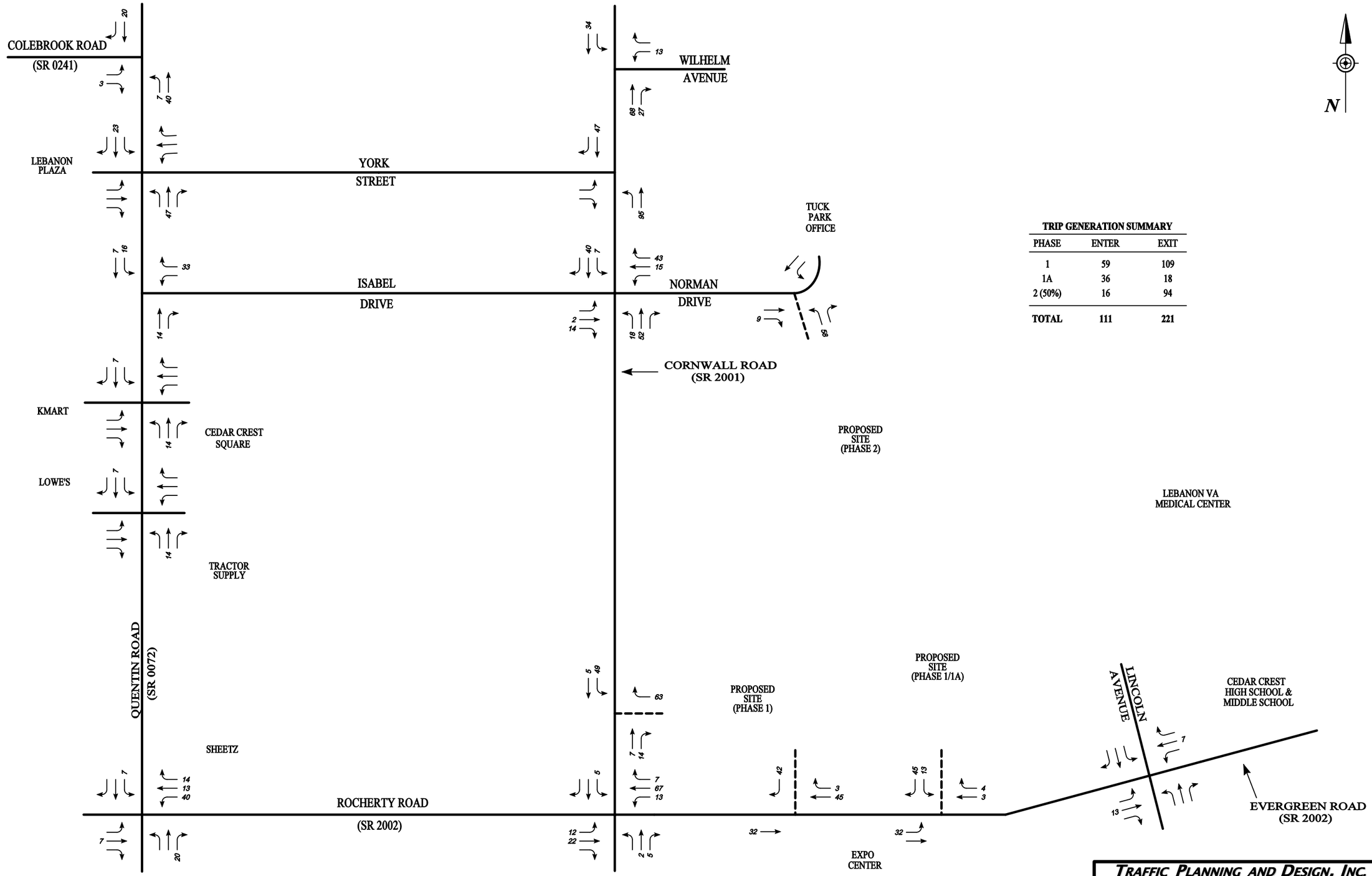
FIGURE 14

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2025 CONDITIONS
WEEKDAY AM PEAK HOUR



TRIP GENERATION SUMMARY

PHASE	ENTER	EXIT
1	59	109
1A	36	18
2 (50%)	16	94
TOTAL	**111**	**221**

KEY:

- - - - - - **PROPOSED DRIVEWAY**

SCHEMATIC DRAWING:NOT TO SCALE

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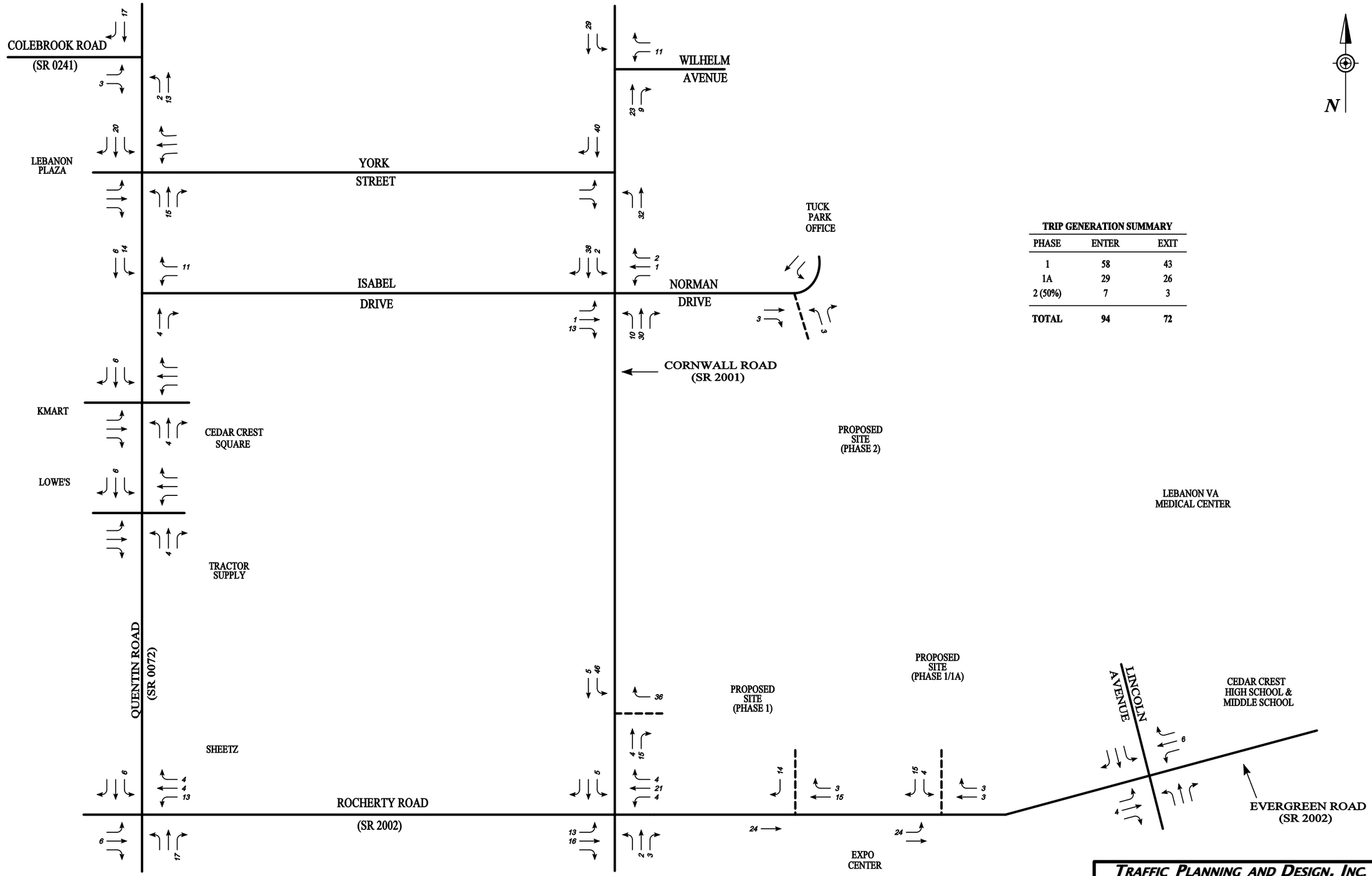
FIGURE 15

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2025 CONDITIONS
WEEKDAY PM PEAK HOUR



TRIP GENERATION SUMMARY

PHASE	ENTER	EXIT
1	58	43
1A	29	26
2 (50%)	7	3
TOTAL	**94**	**72**

KEY:

- - - - - - **PROPOSED DRIVEWAY**

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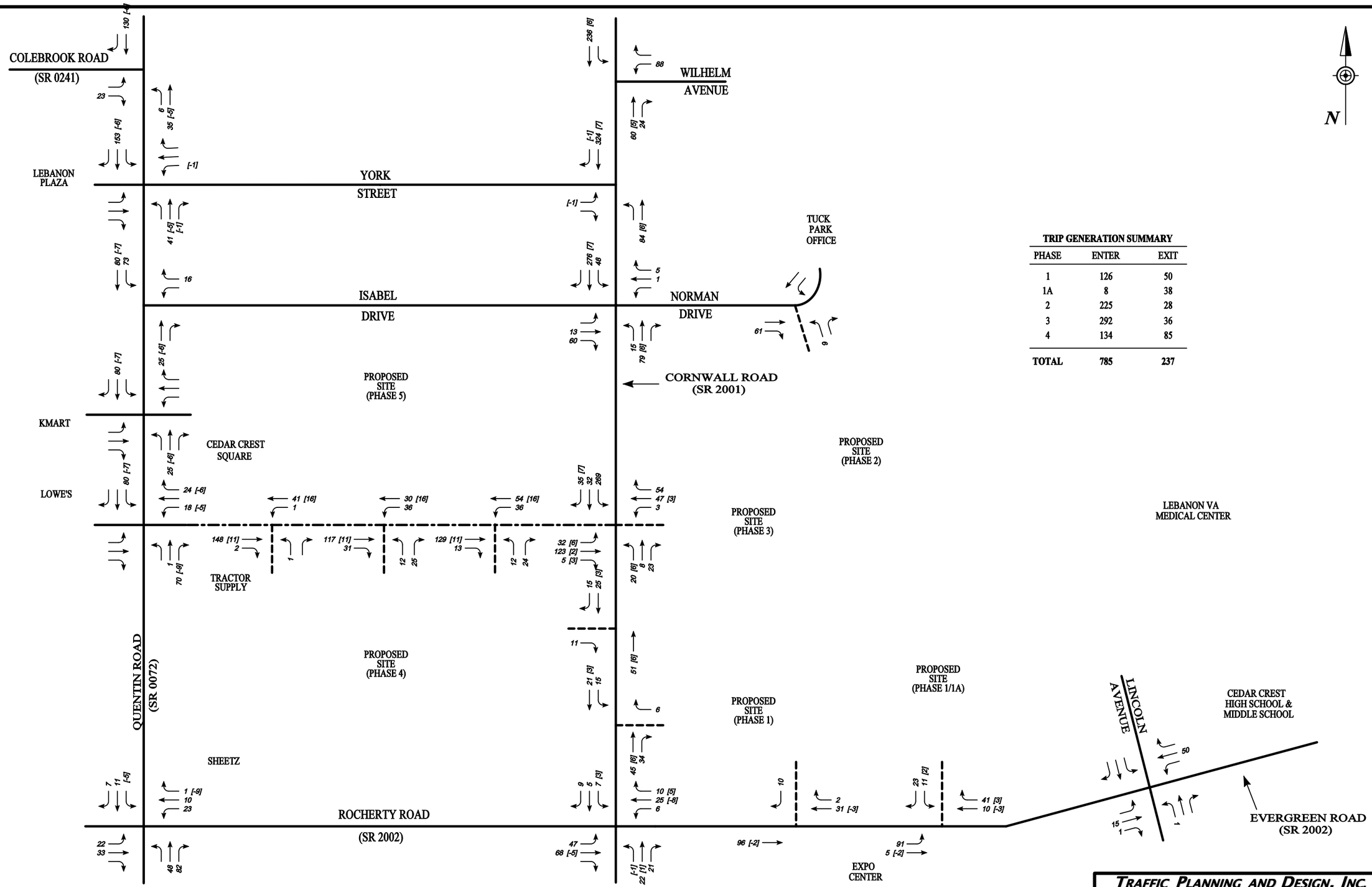
FIGURE 16

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2025 CONDITIONS
SATURDAY MIDDAY PEAK HOUR



TRIP GENERATION SUMMARY

PHASE	ENTER	EXIT
1	126	50
1A	8	38
2	225	28
3	292	36
4	134	85
TOTAL	**785**	**237**

KEY:

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

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FIGURE 17

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASES 1-4)
WEEKDAY AM PEAK HOUR

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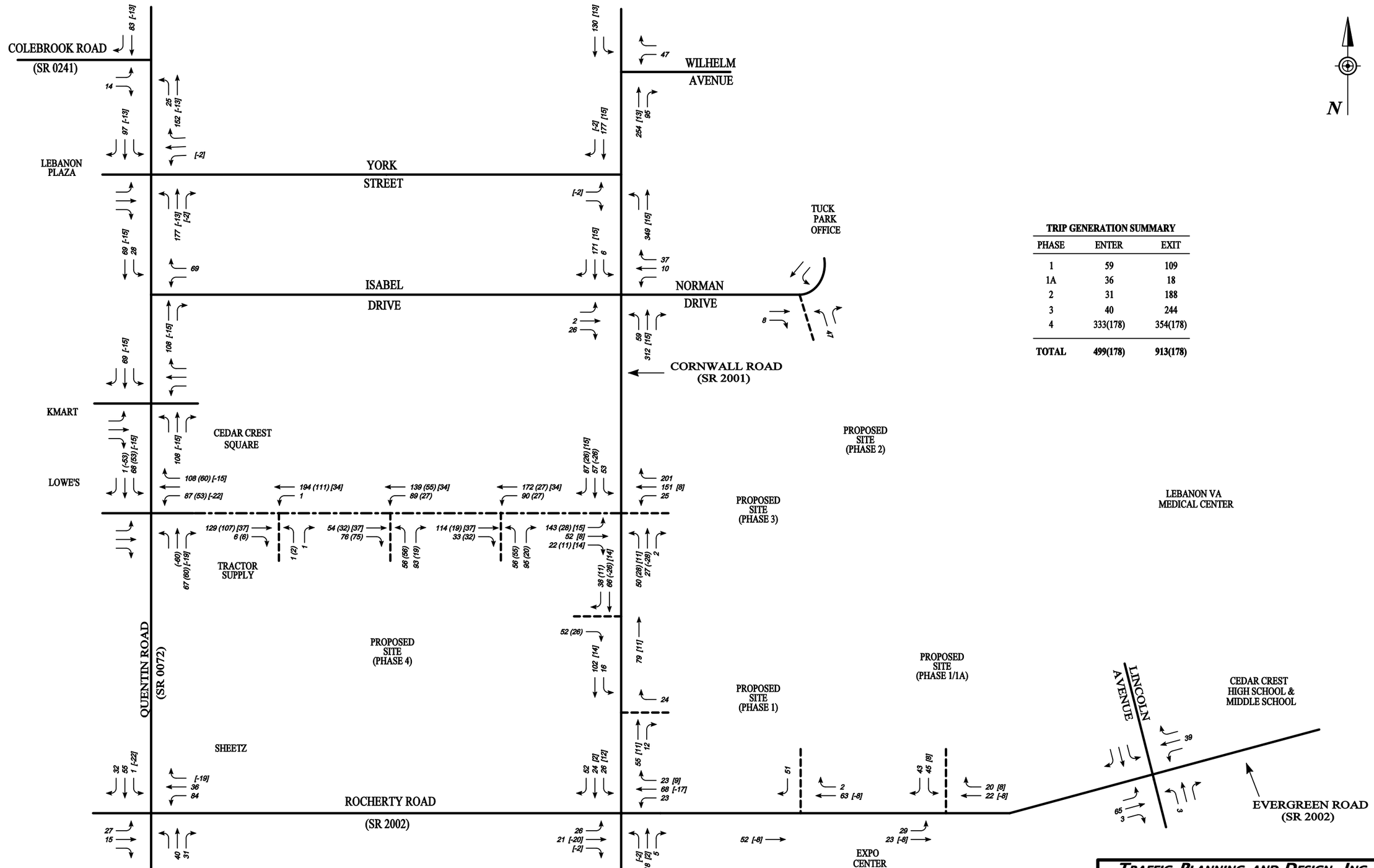

TRIP GENERATION SUMMARY

PHASE	ENTER	EXIT
1	59	109
1A	36	18
2	31	188
3	40	244
4	333(178)	354(178)
TOTAL	**499(178)**	**913(178)**

KEY:

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

NEW (PASS-BY) [REDISTRIBUTED] TRIPS

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FIGURE 18

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASES 1-4)
WEEKDAY PM PEAK HOUR

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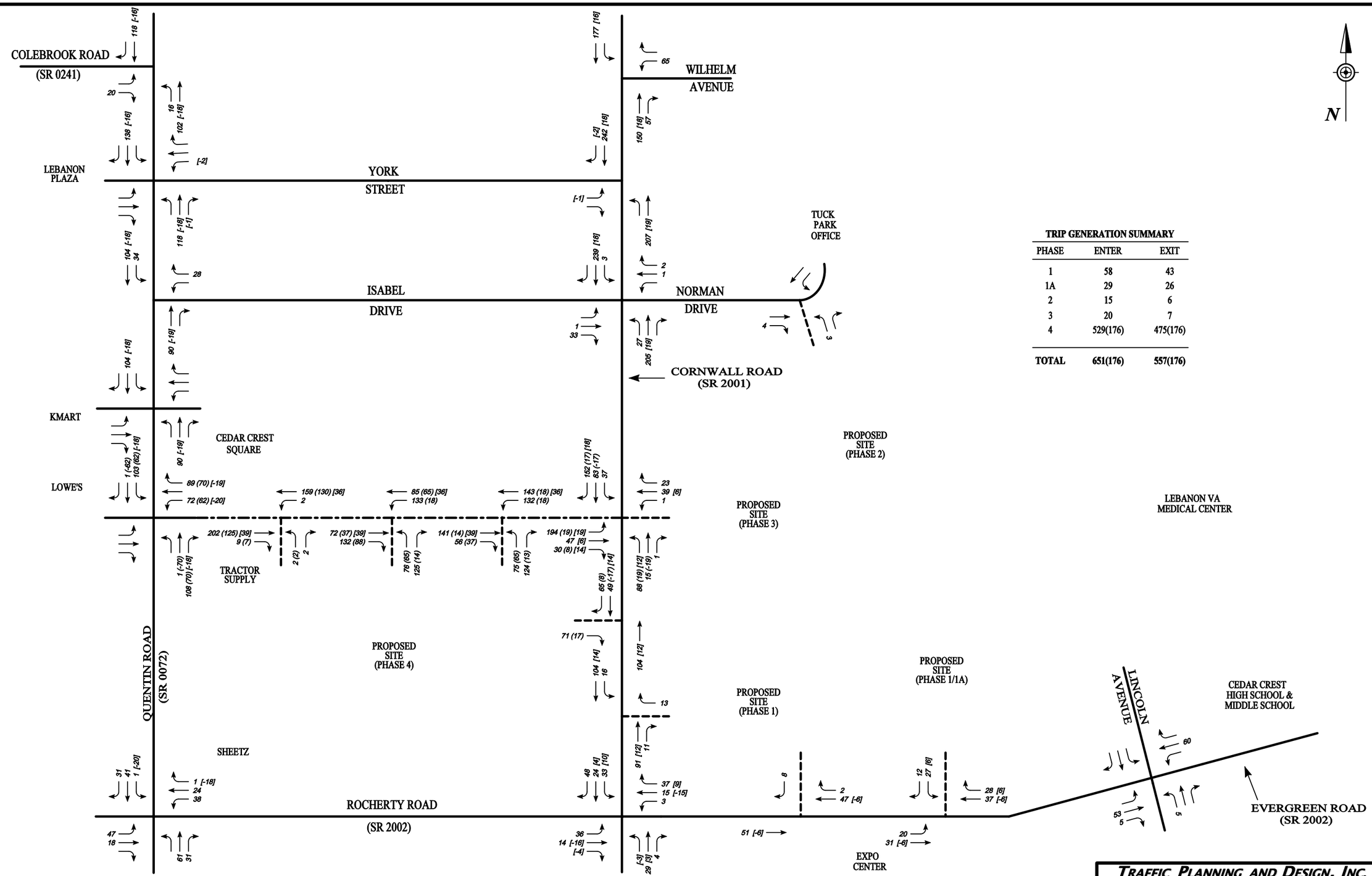

TRIP GENERATION SUMMARY

PHASE	ENTER	EXIT
1	58	43
1A	29	26
2	15	6
3	20	7
4	529(176)	475(176)
TOTAL	**651(176)**	**557(176)**

KEY:

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

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FIGURE 19

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASES 1-4)
SATURDAY MIDDAY PEAK HOUR

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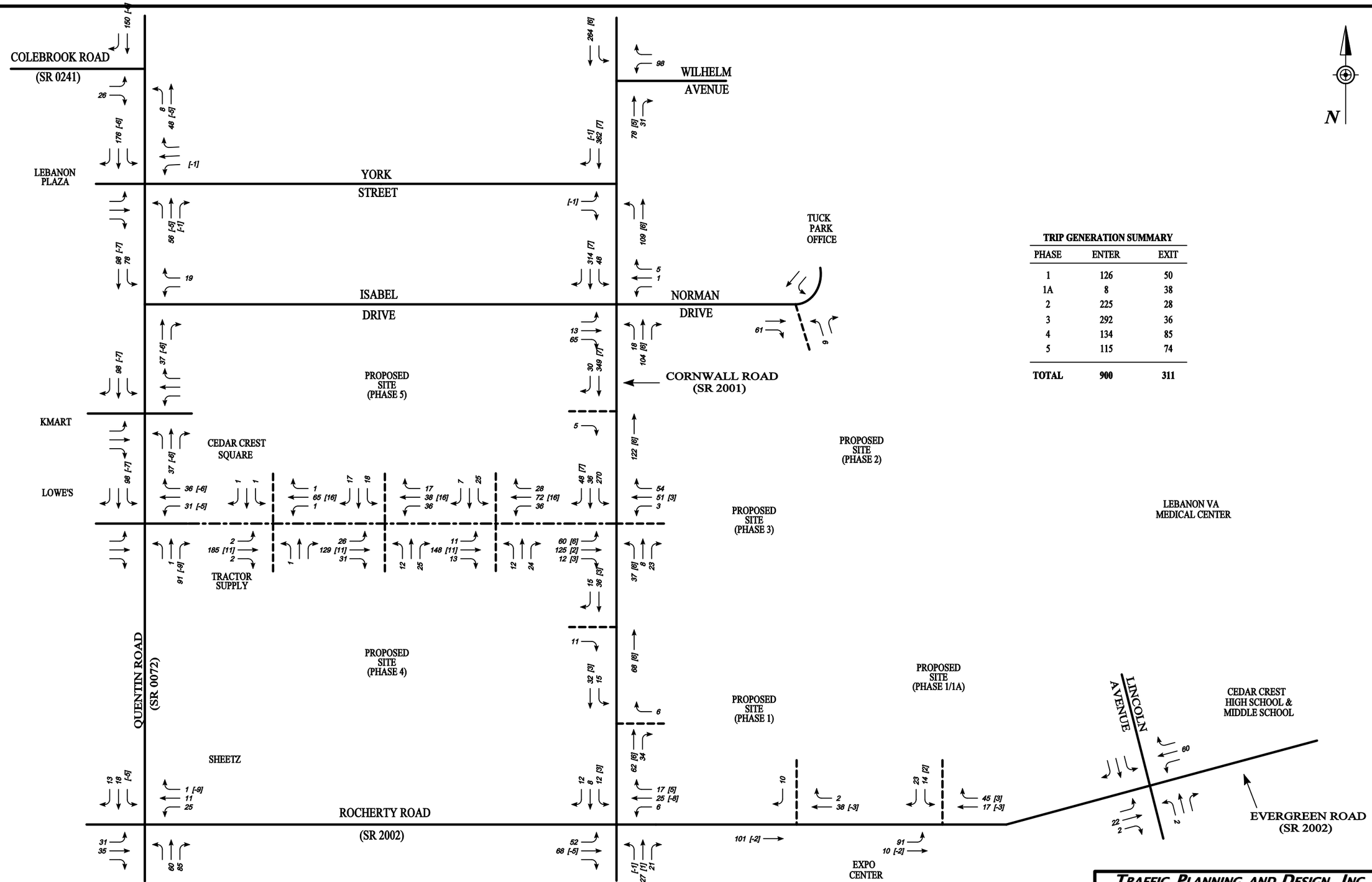

TRIP GENERATION SUMMARY

PHASE	ENTER	EXIT
1	126	50
1A	8	38
2	225	28
3	292	36
4	134	85
5	115	74
TOTAL	**900**	**311**

KEY:

PROPOSED ROADWAY

PROPOSED DRIVEWAY

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FIGURE 20

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASES 1-5)
WEEKDAY AM PEAK HOUR

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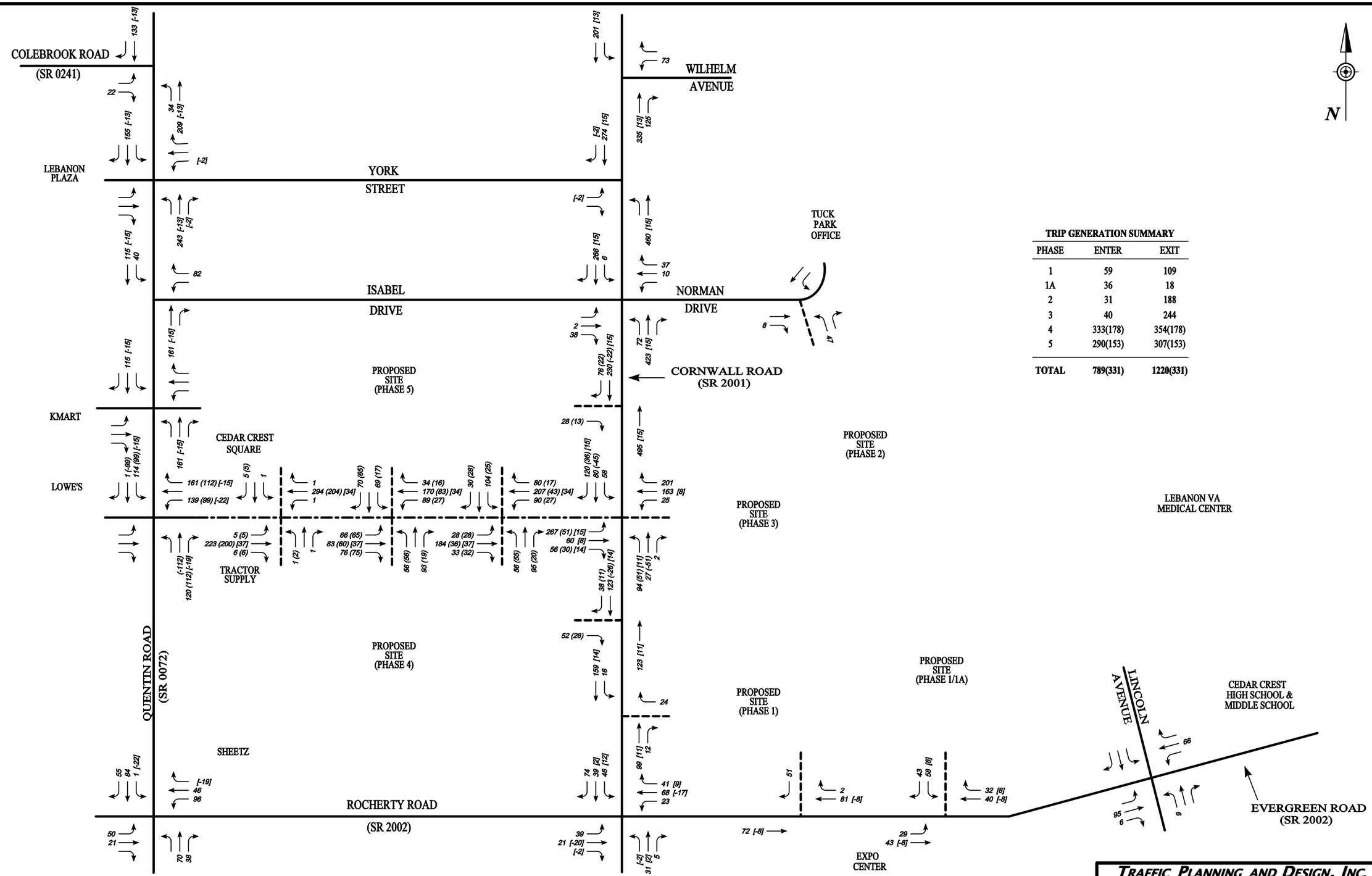

TRIP GENERATION SUMMARY

PHASE	ENTER	EXIT
1	59	109
1A	36	18
2	31	188
3	40	244
4	333(178)	354(178)
5	290(153)	307(153)
TOTAL	**789(331)**	**1220(331)**

KEY:

PROPOSED ROADWAY

PROPOSED DRIVEWAY

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FIGURE 21

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASES 1-5)
WEEKDAY PM PEAK HOUR

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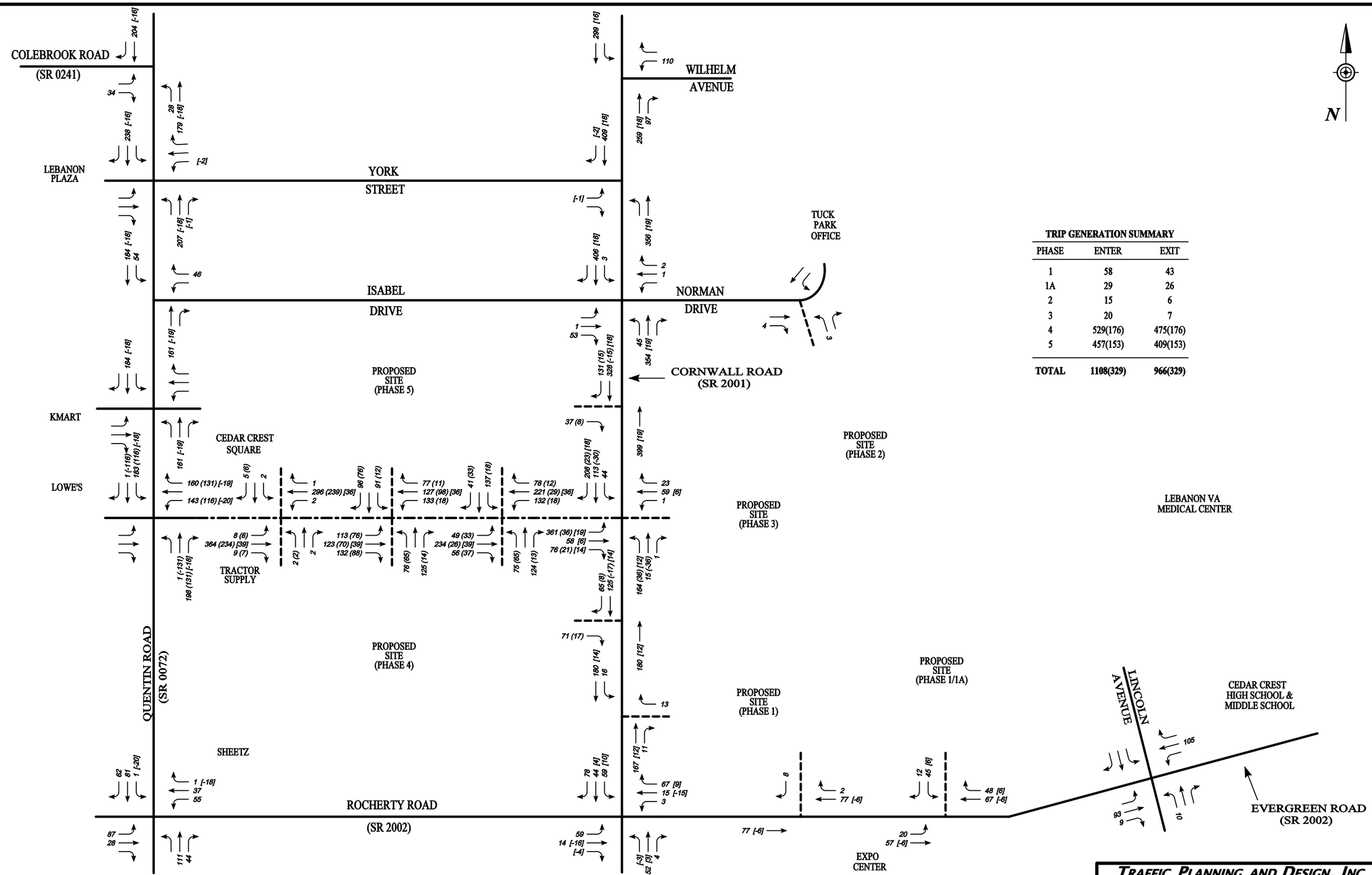

TRIP GENERATION SUMMARY

PHASE	ENTER	EXIT
1	58	43
1A	29	26
2	15	6
3	20	7
4	529(176)	475(176)
5	457(153)	409(153)
TOTAL	**1108(329)**	**966(329)**

KEY:

PROPOSED ROADWAY

PROPOSED DRIVEWAY

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FIGURE 22

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASES 1-5)
SATURDAY MIDDAY PEAK HOUR

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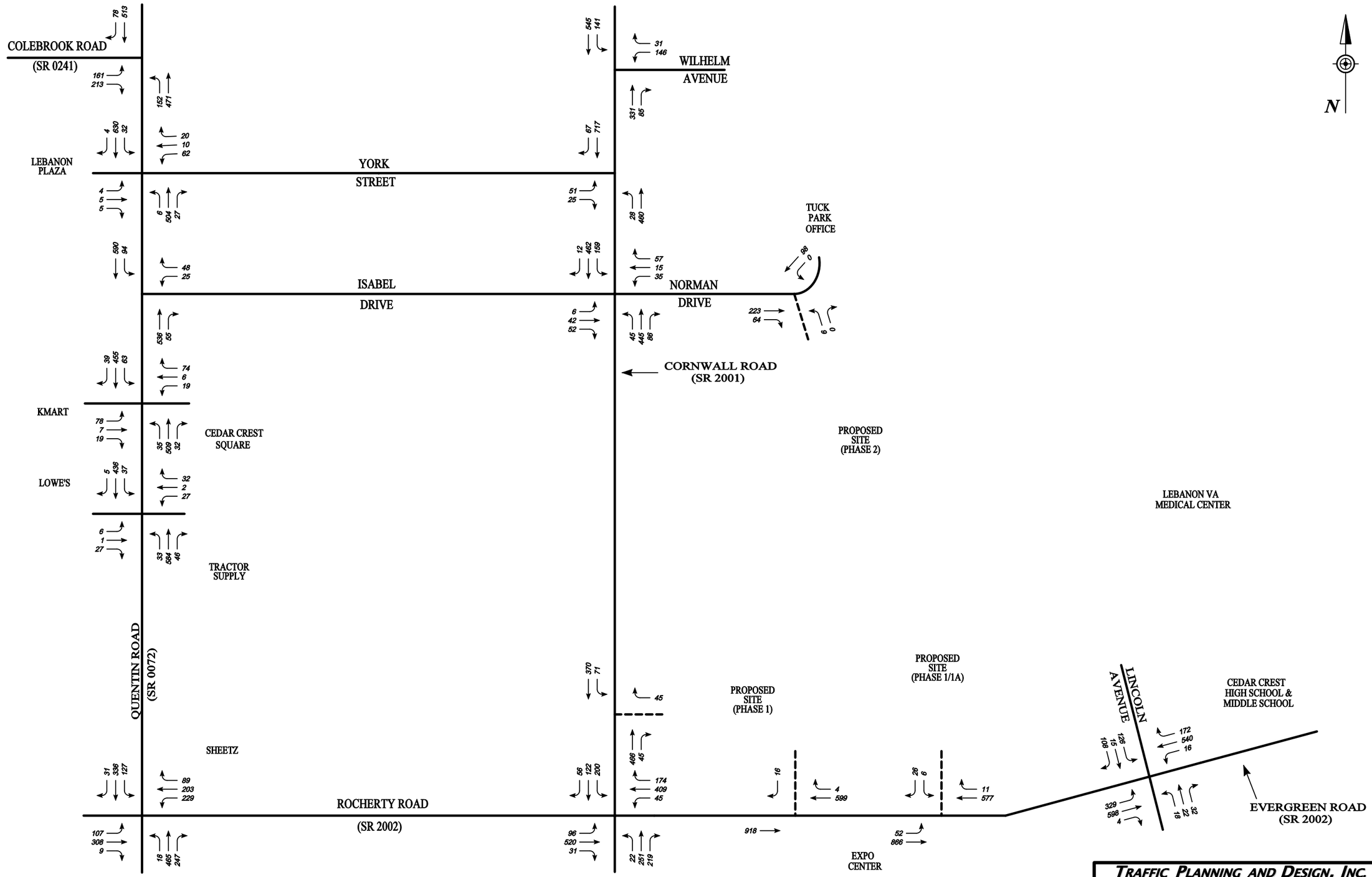

KEY:

– – – – – – **PROPOSED DRIVEWAY**

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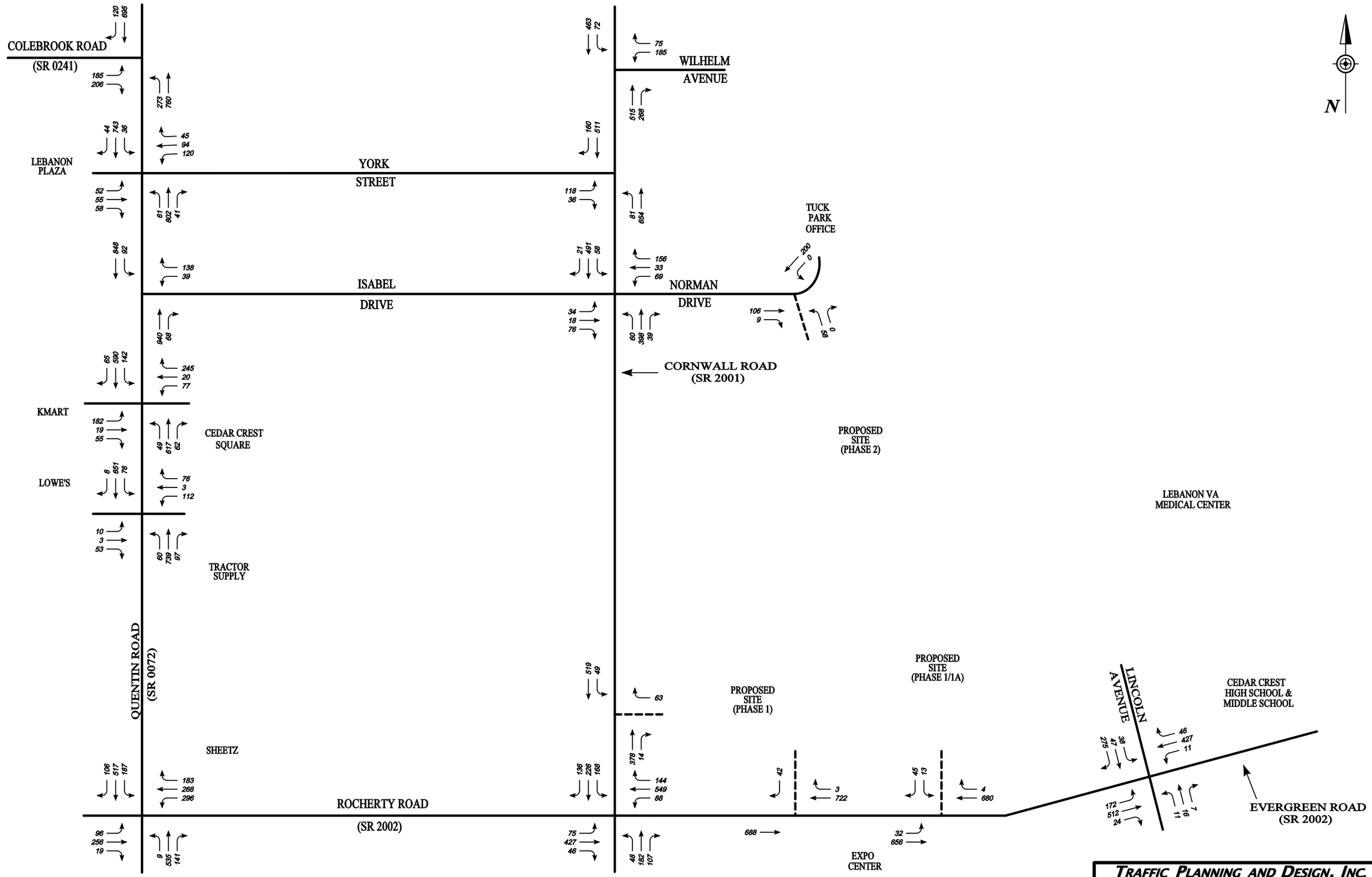
FIGURE 23

2025 PROJECTED CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES



KEY:

- - - - - - **PROPOSED DRIVEWAY**

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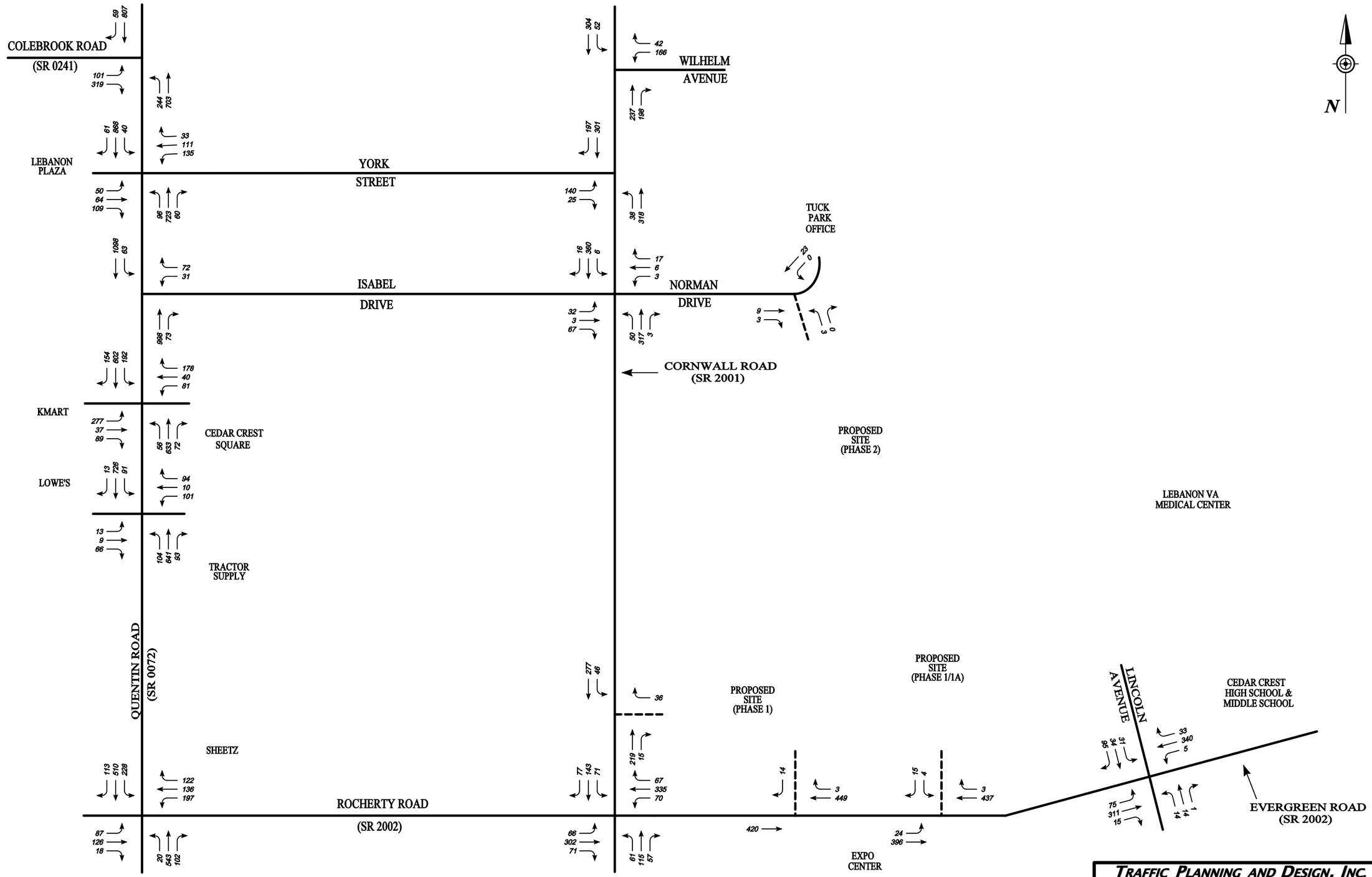
FIGURE 24

2025 PROJECTED CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES



KEY:

– – – – – – **PROPOSED DRIVEWAY**

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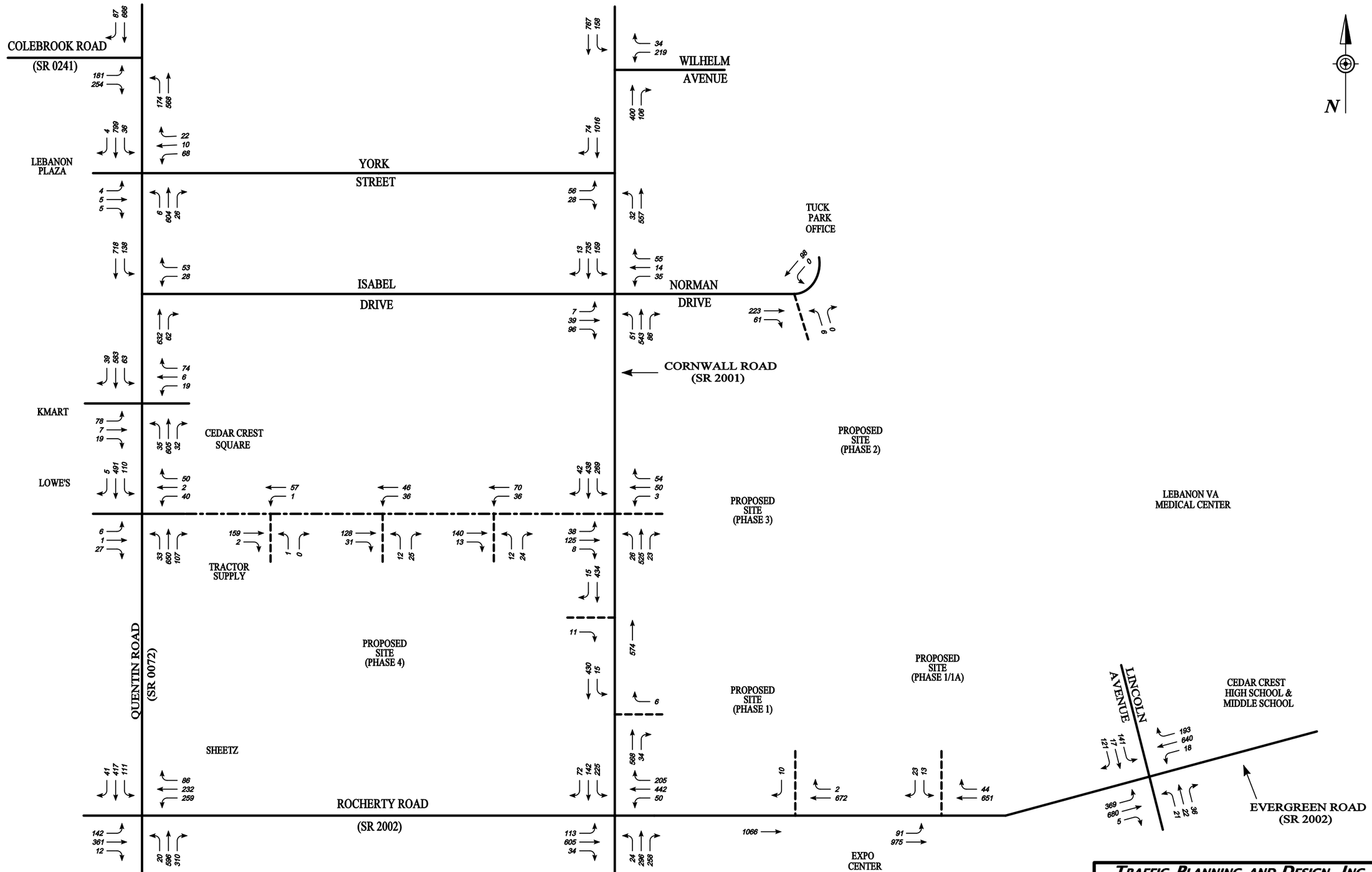
FIGURE 25

2025 PROJECTED CONDITIONS
SATURDAY MIDDAY PEAK HOUR
TRAFFIC VOLUMES



KEY:

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PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

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FIGURE 26

2035 PROJECTED CONDITIONS (PHASES 1-4)
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES

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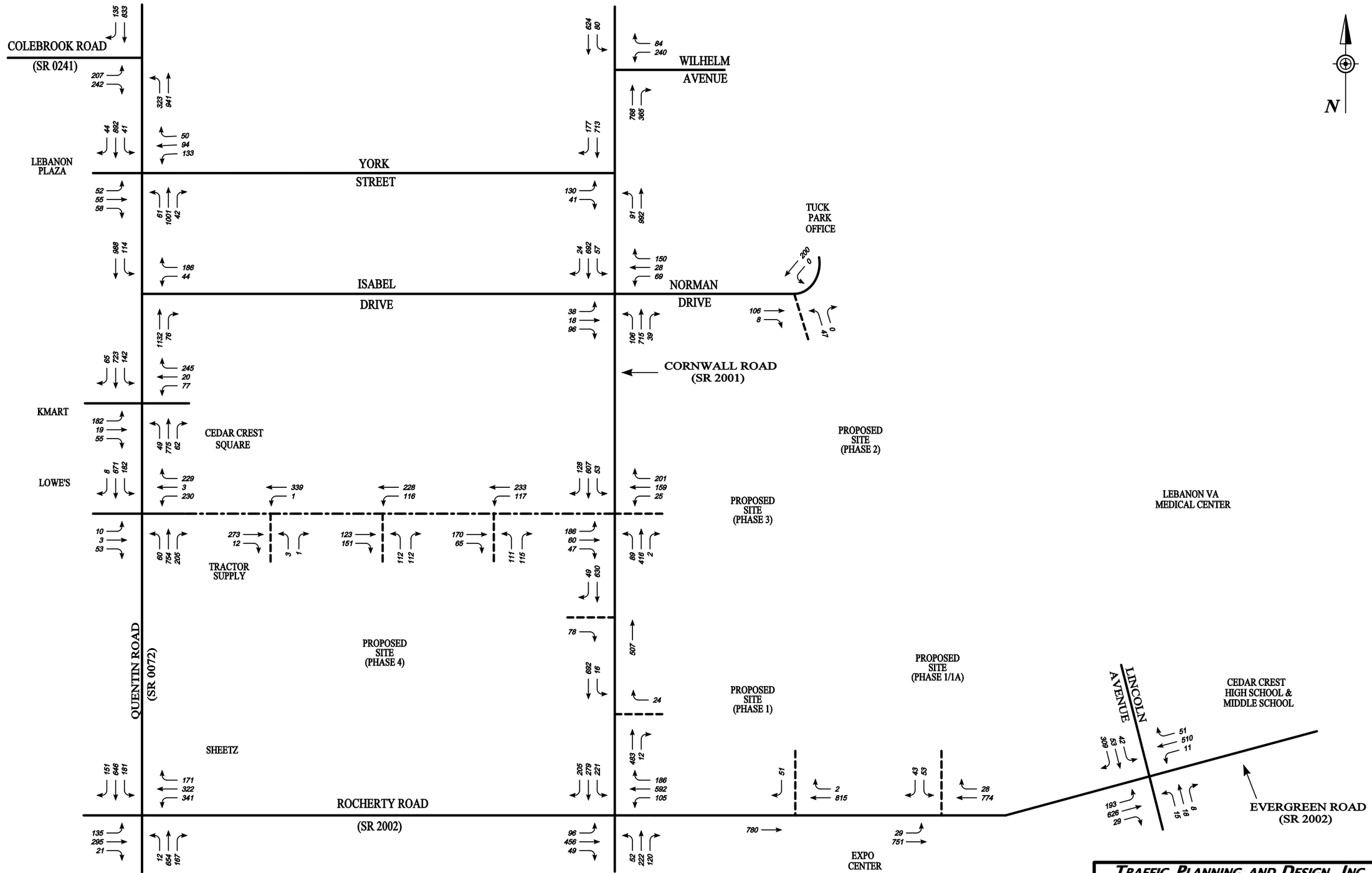

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FIGURE 27

2035 PROJECTED CONDITIONS (PHASES 1-4)
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES

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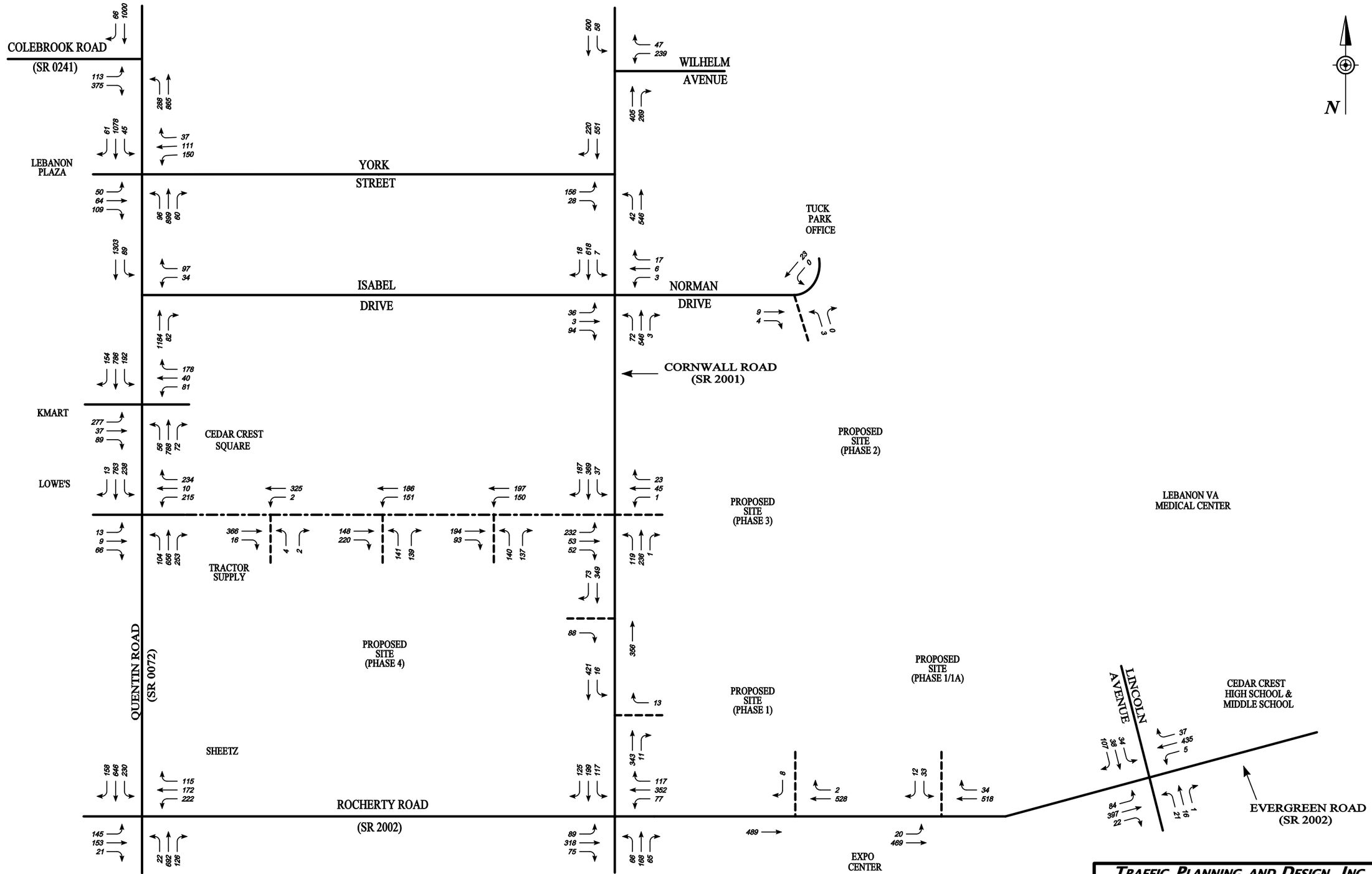

KEY:

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SCHEMATIC DRAWING:NOT TO SCALE

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FIGURE 28

2035 PROJECTED CONDITIONS (PHASES 1-4)
SATURDAY MIDDAY PEAK HOUR
TRAFFIC VOLUMES

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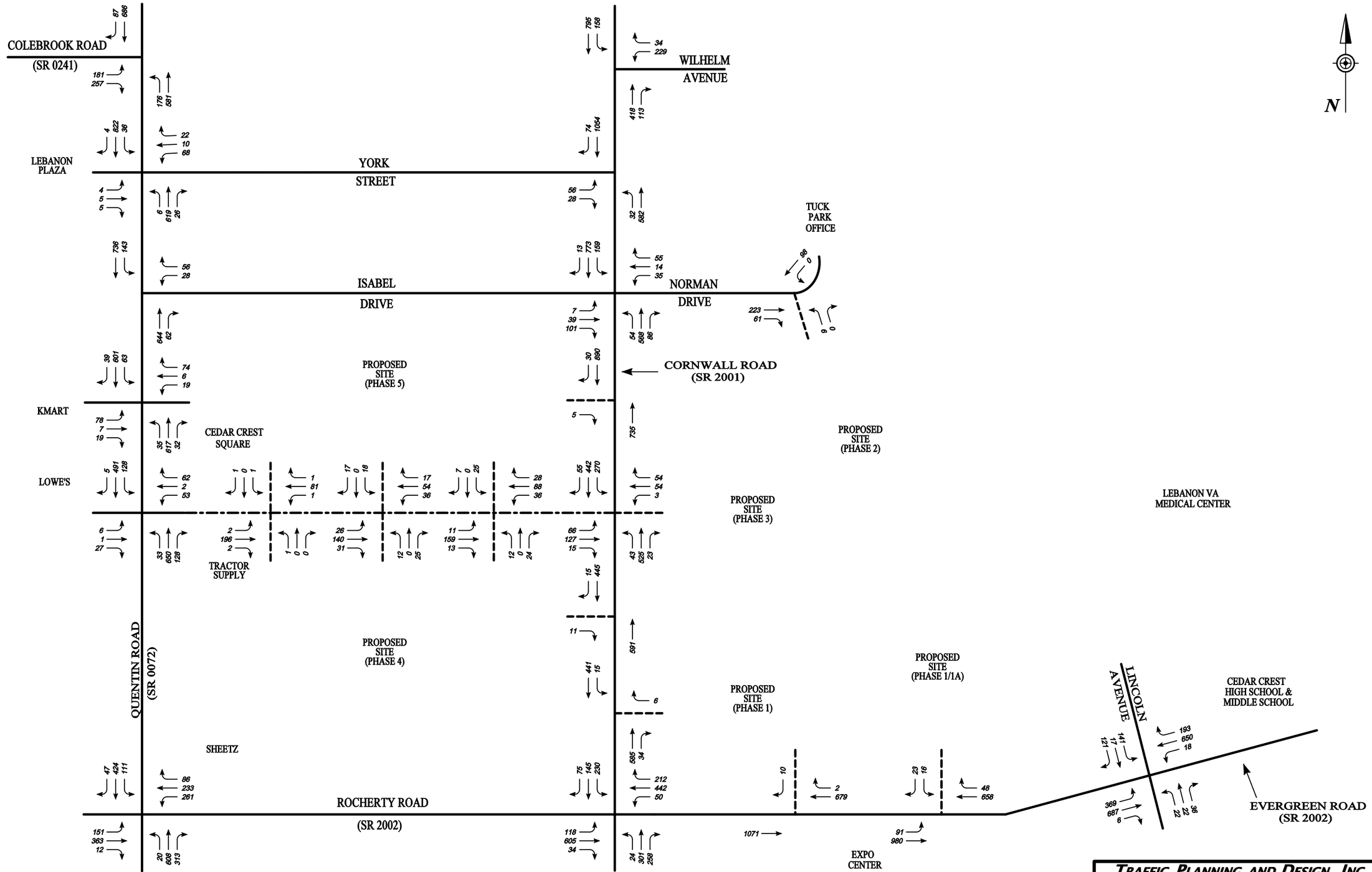

KEY:

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

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FIGURE 29

2035 PROJECTED CONDITIONS (PHASES 1-5)
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES

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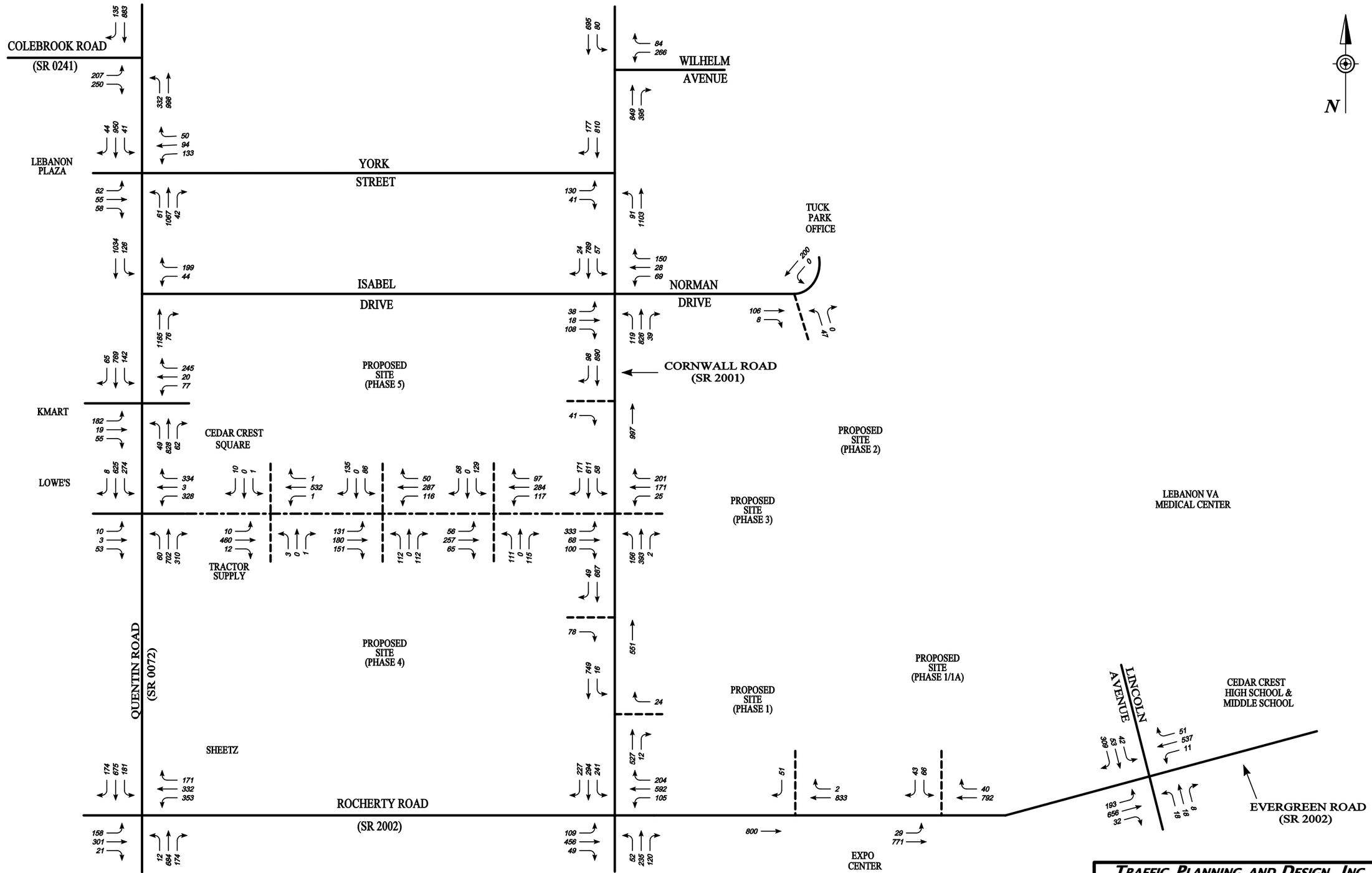

KEY:

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

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FIGURE 30

2035 PROJECTED CONDITIONS (PHASES 1-5)
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES

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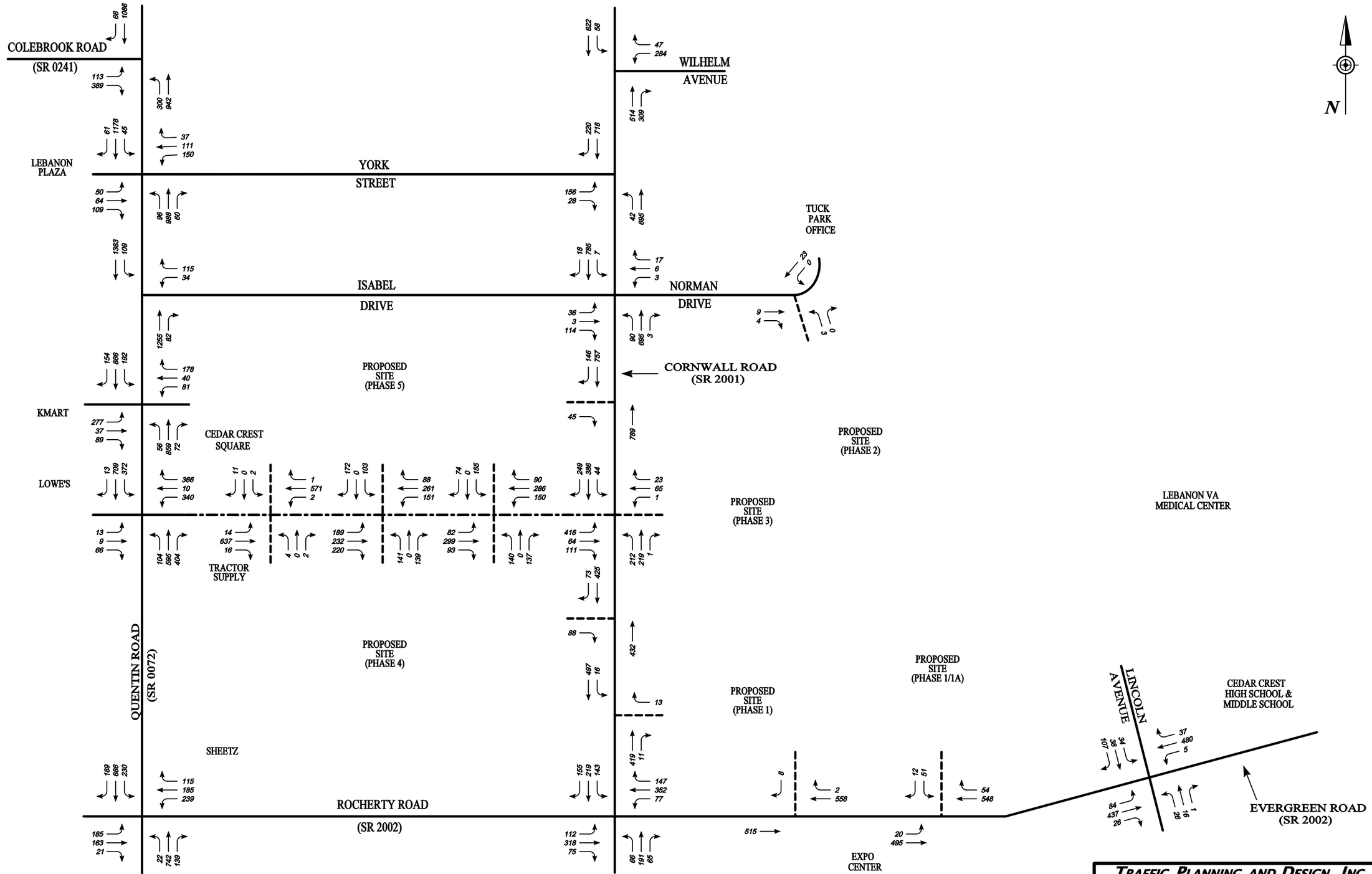

KEY:

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FIGURE 31

2035 PROJECTED CONDITIONS (PHASES 1-5)
SATURDAY MIDDAY PEAK HOUR
TRAFFIC VOLUMES

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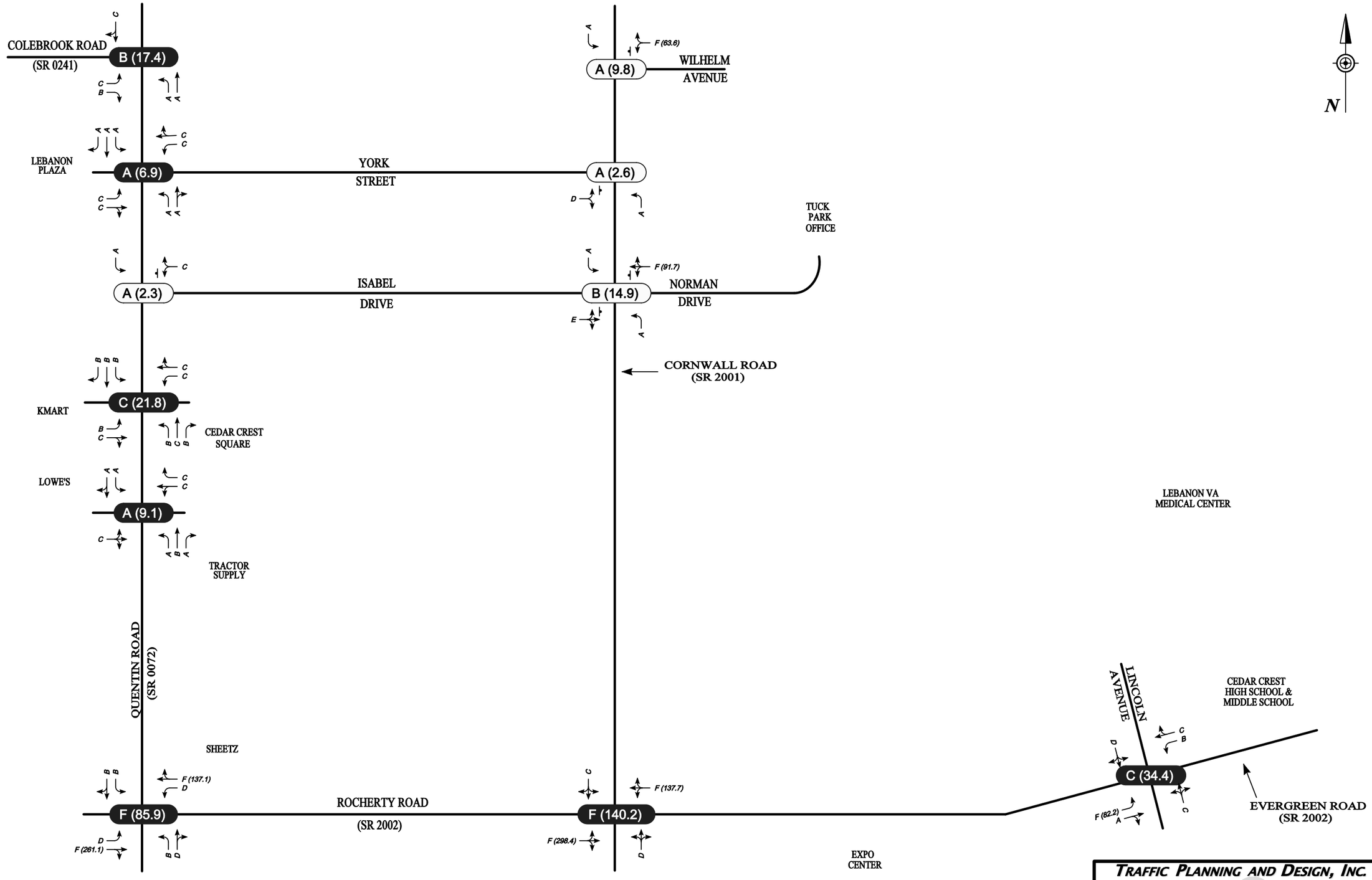

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SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 32

EXISTING CONDITIONS
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE

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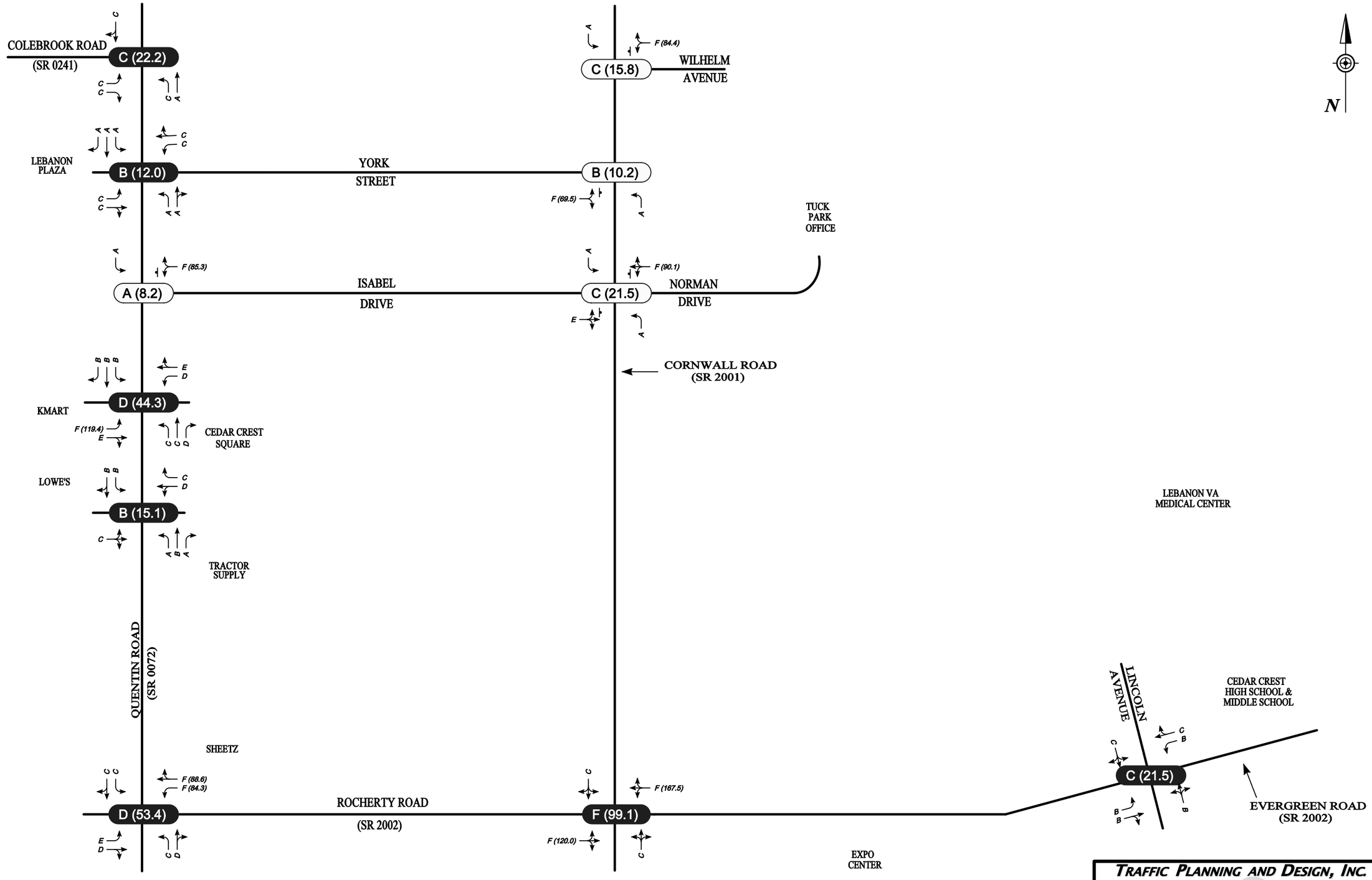

KEY:

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SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 33

EXISTING CONDITIONS
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE

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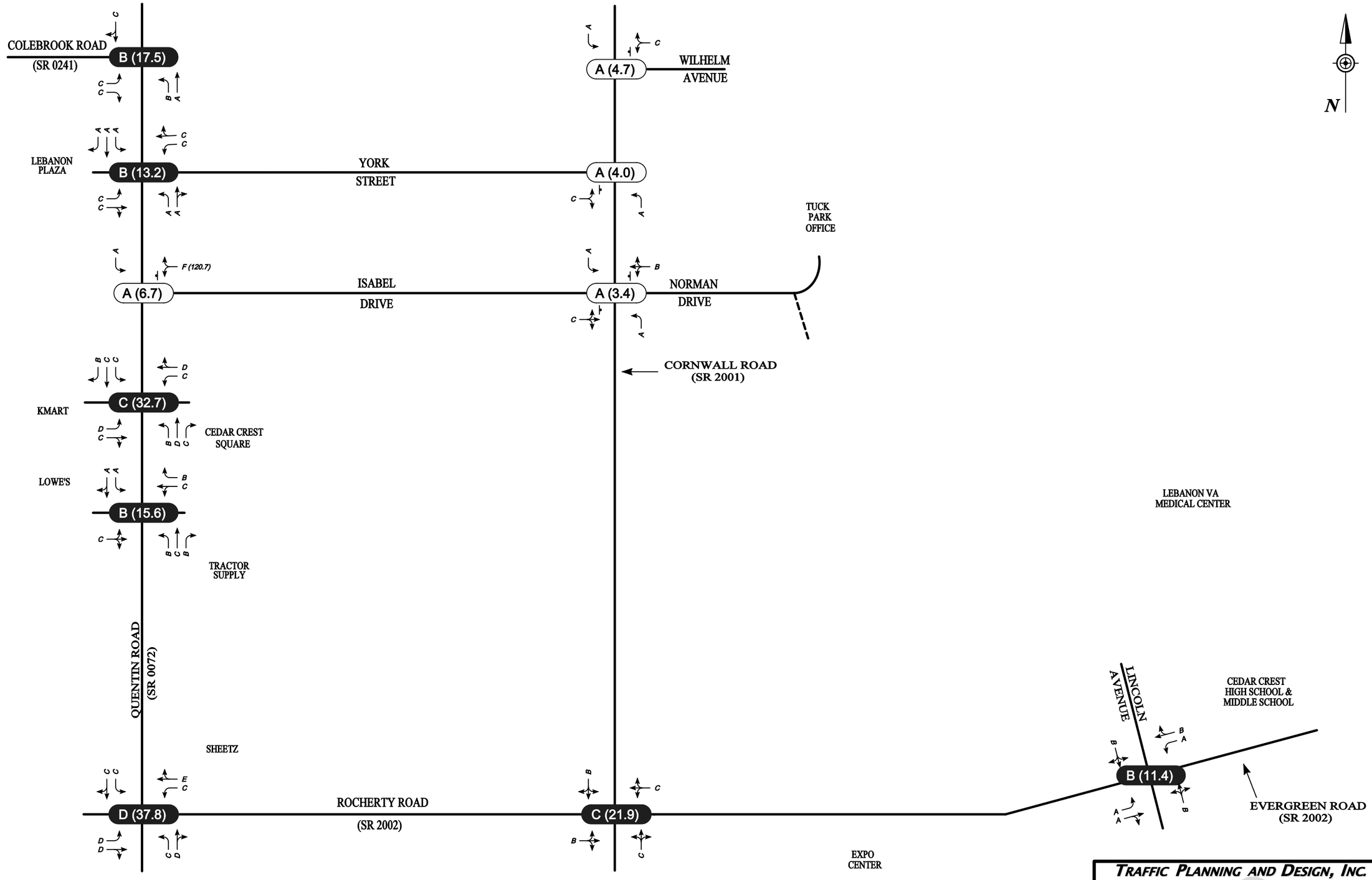

KEY:

STOP CONTROLLED

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 34

EXISTING CONDITIONS
SATURDAY MIDDAY PEAK HOUR
LEVELS OF SERVICE

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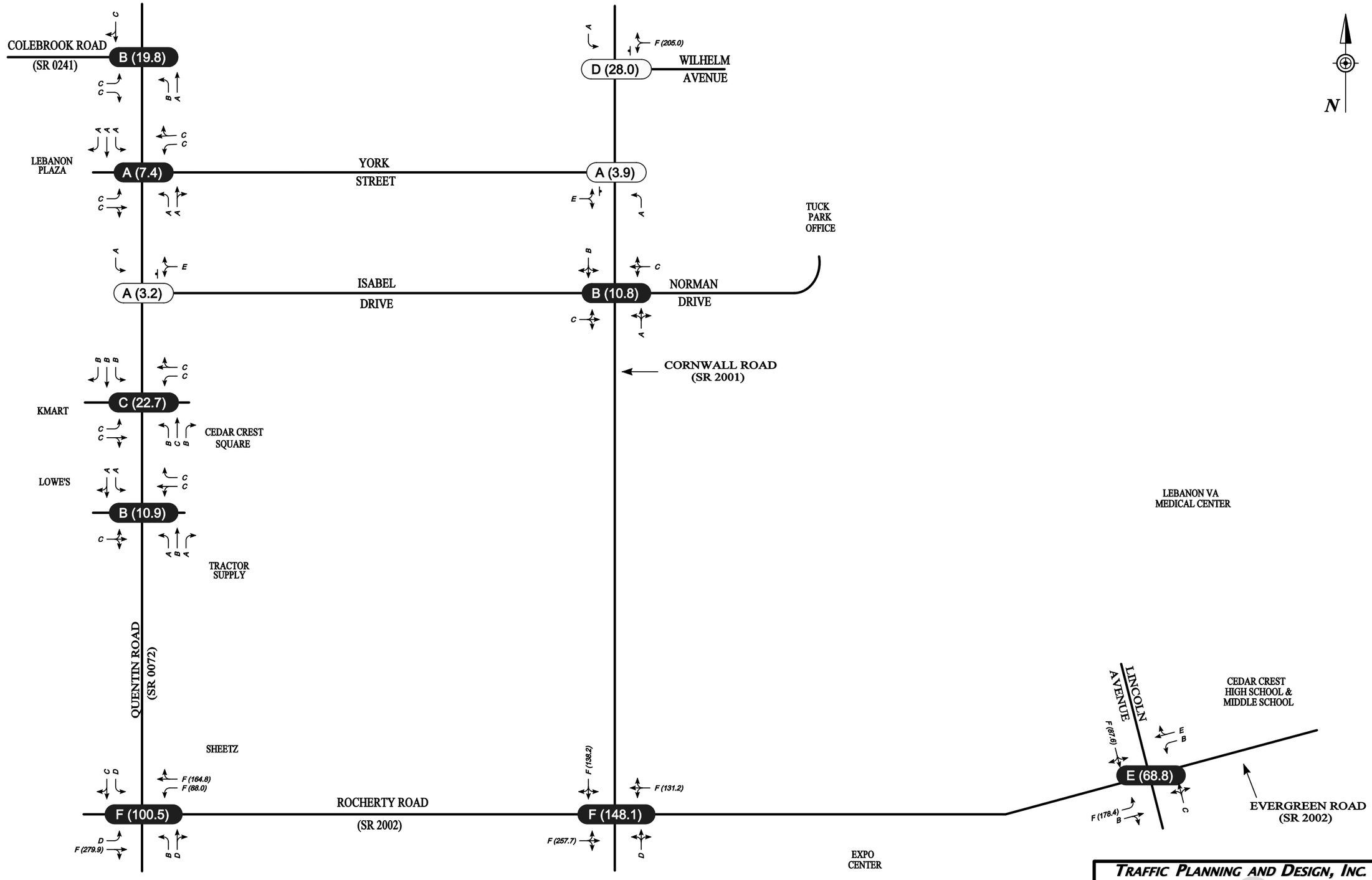

KEY:

STOP CONTROLLED

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 35

2025 BASE CONDITIONS
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE

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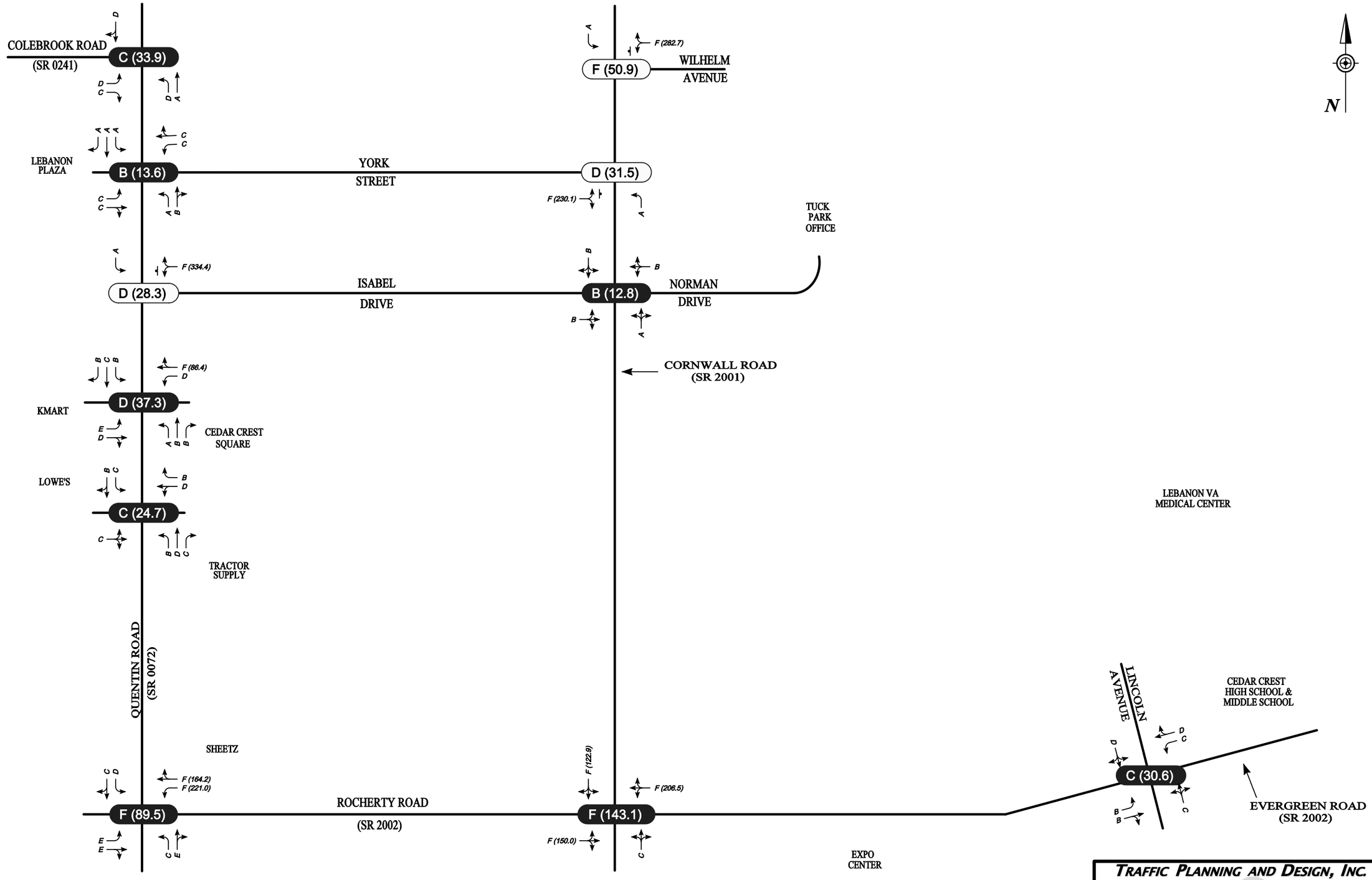

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B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 36

2025 BASE CONDITIONS
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE

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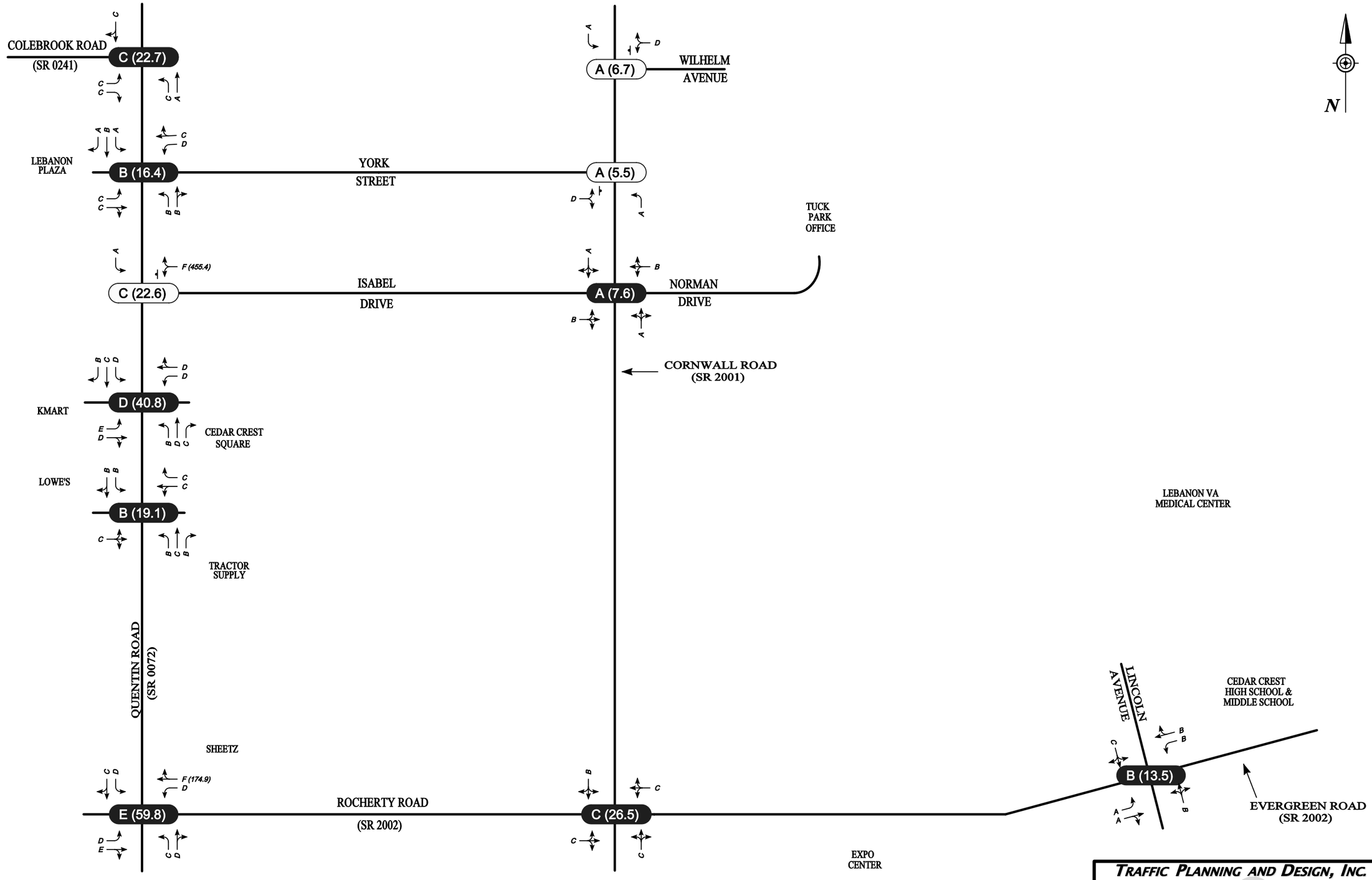

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B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

TRAFFIC PLANNING AND DESIGN, INC.

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FIGURE 37

2025 BASE CONDITIONS
SATURDAY MIDDAY PEAK HOUR
LEVELS OF SERVICE

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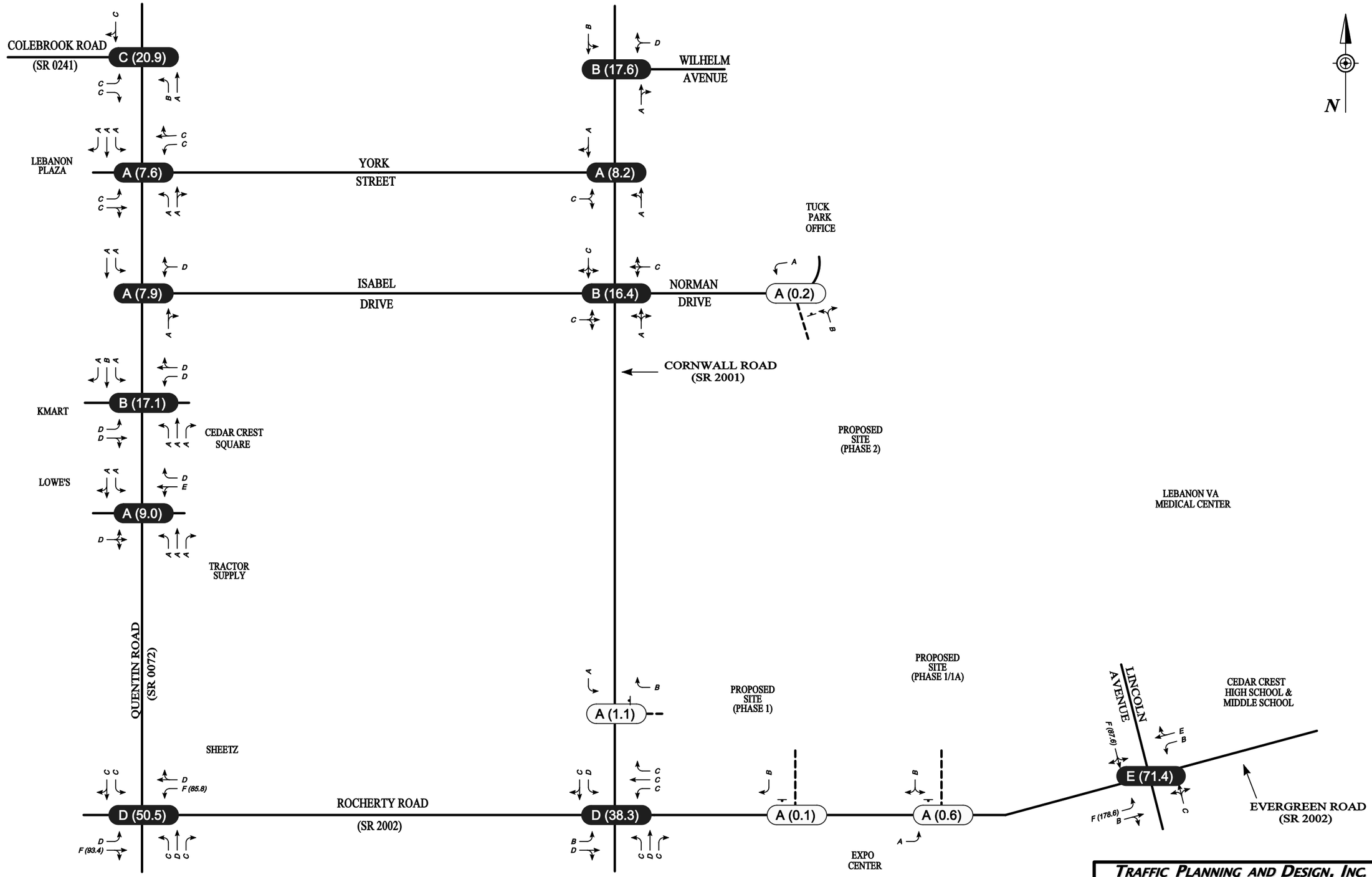

KEY:

STOP CONTROLLED

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) INTERSECTION LOS(DELAY)

B (13.5) UNSIGNALIZED INTERSECTION LOS(DELAY)

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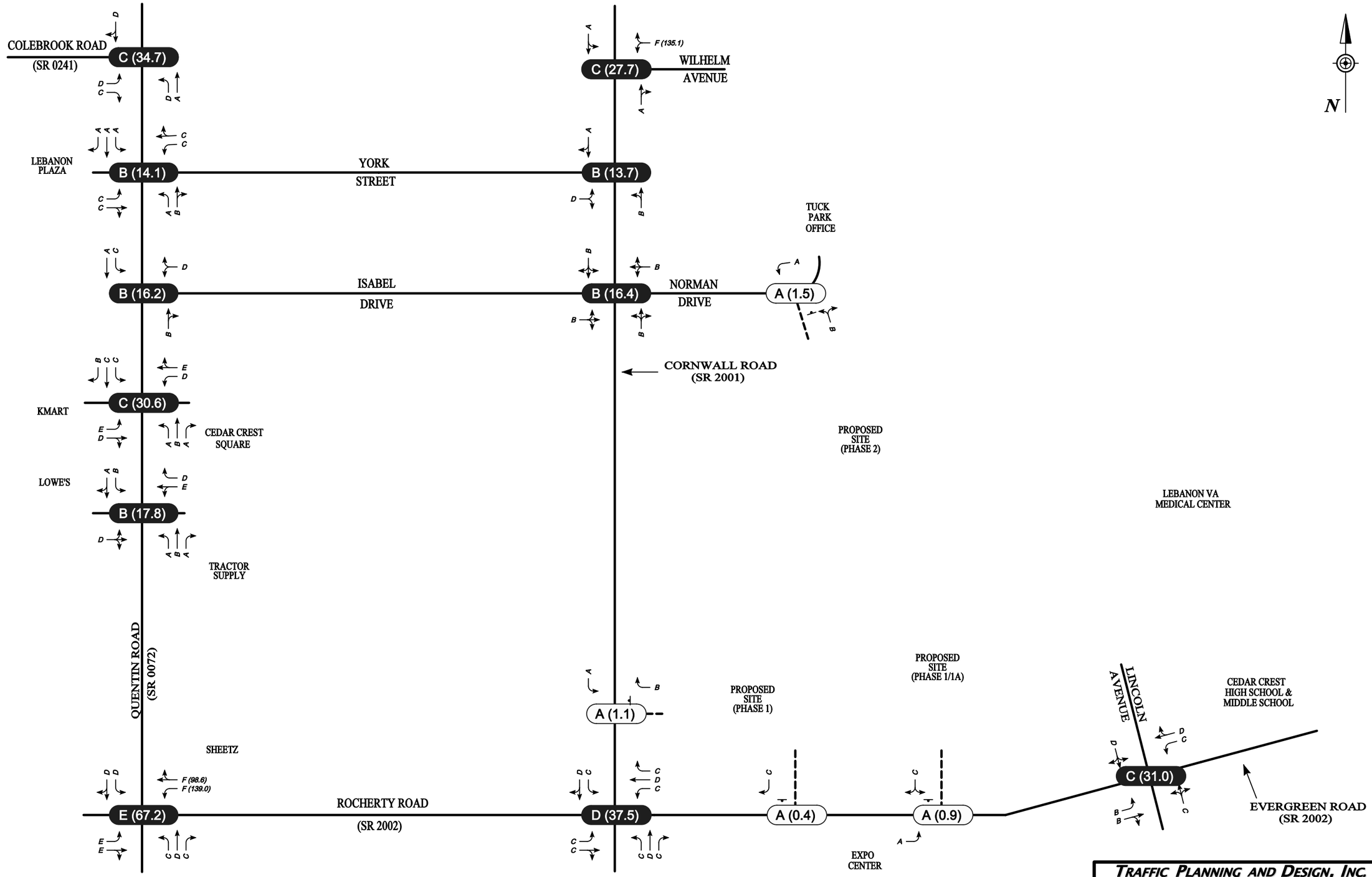
FIGURE 38

2025 PROJECTED CONDITIONS
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE
PENNDOT GUIDELINES



KEY:

STOP CONTROLLED

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) INTERSECTION LOS(DELAY)

B (13.5) UNSIGNALIZED INTERSECTION LOS(DELAY)

TRAFFIC PLANNING AND DESIGN, INC.

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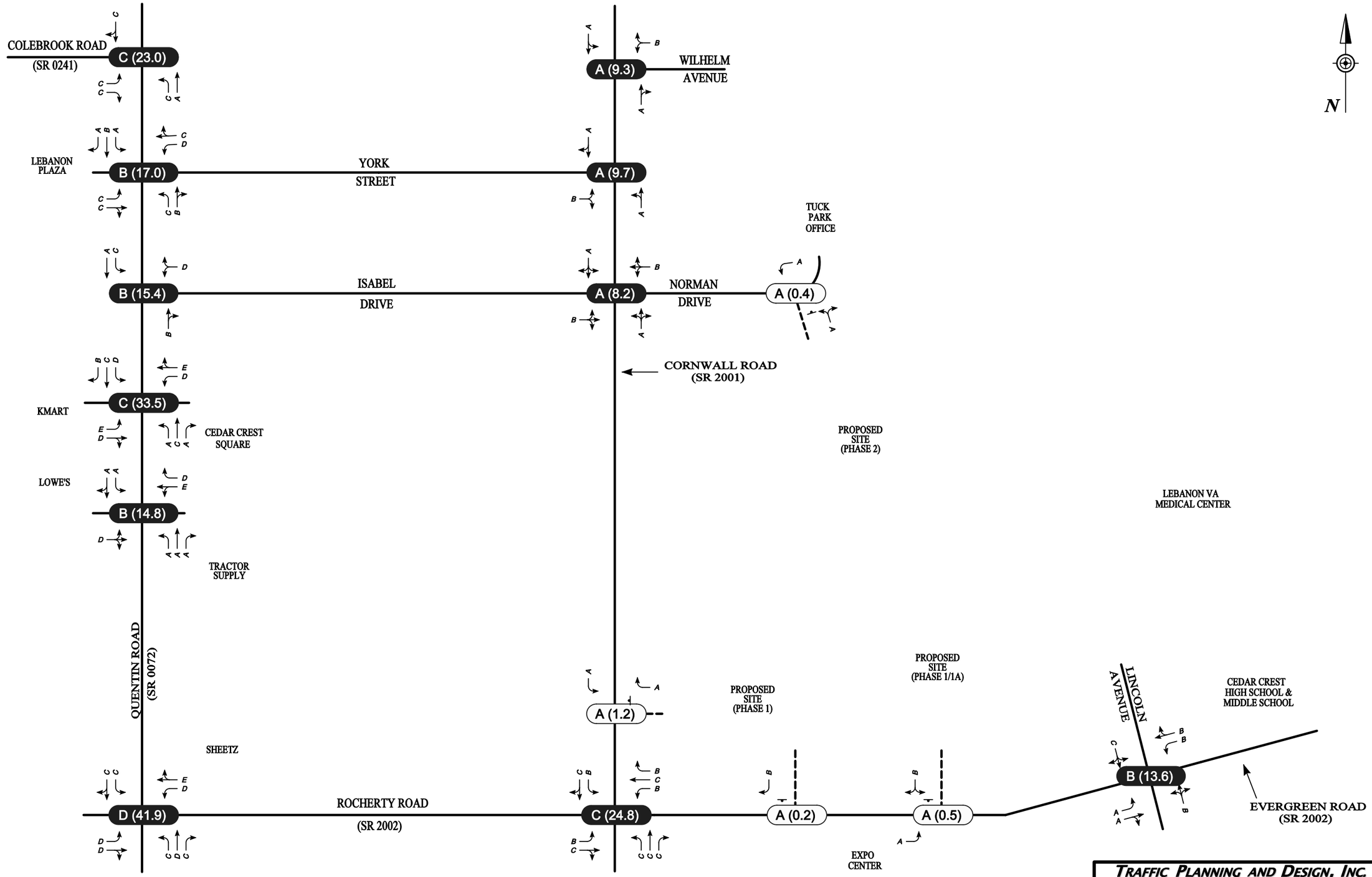
FIGURE 39

2025 PROJECTED CONDITIONS
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE
PENNDOT GUIDELINES



KEY:

STOP CONTROLLED

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) INTERSECTION LOS(DELAY)

B (13.5) UNSIGNALIZED INTERSECTION LOS(DELAY)

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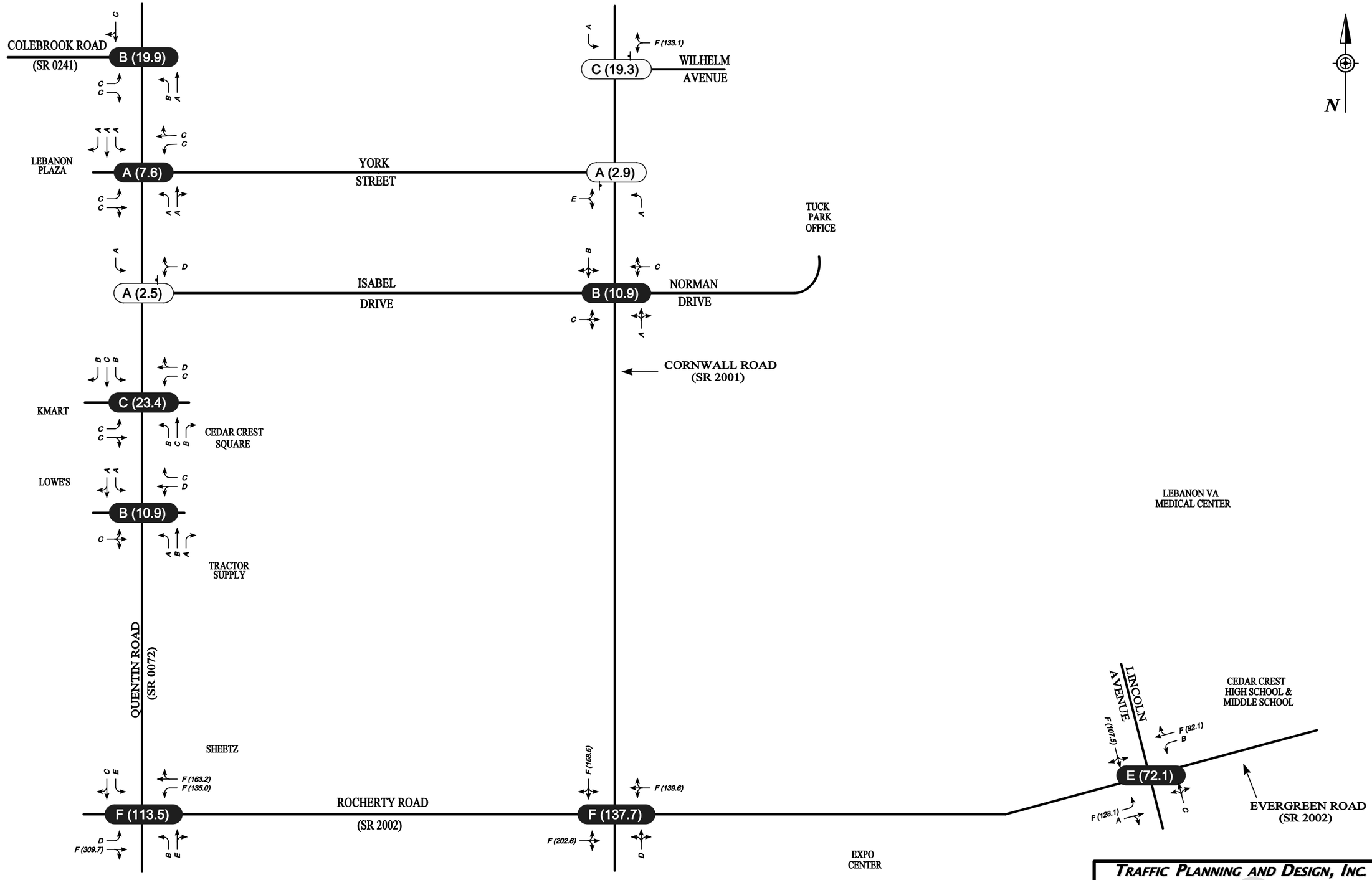
FIGURE 40

2025 PROJECTED CONDITIONS
SATURDAY MIDDAY PEAK HOUR
LEVELS OF SERVICE
PENNDOT GUIDELINES



KEY:

STOP CONTROLLED

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

TRAFFIC PLANNING AND DESIGN, INC.

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FIGURE 41

2035 BASE CONDITIONS
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE

J:\BLAC\00001 (North Cornwall Commons)\Planning\Sub 01\Figures\2012-02-22, Figures.dgn
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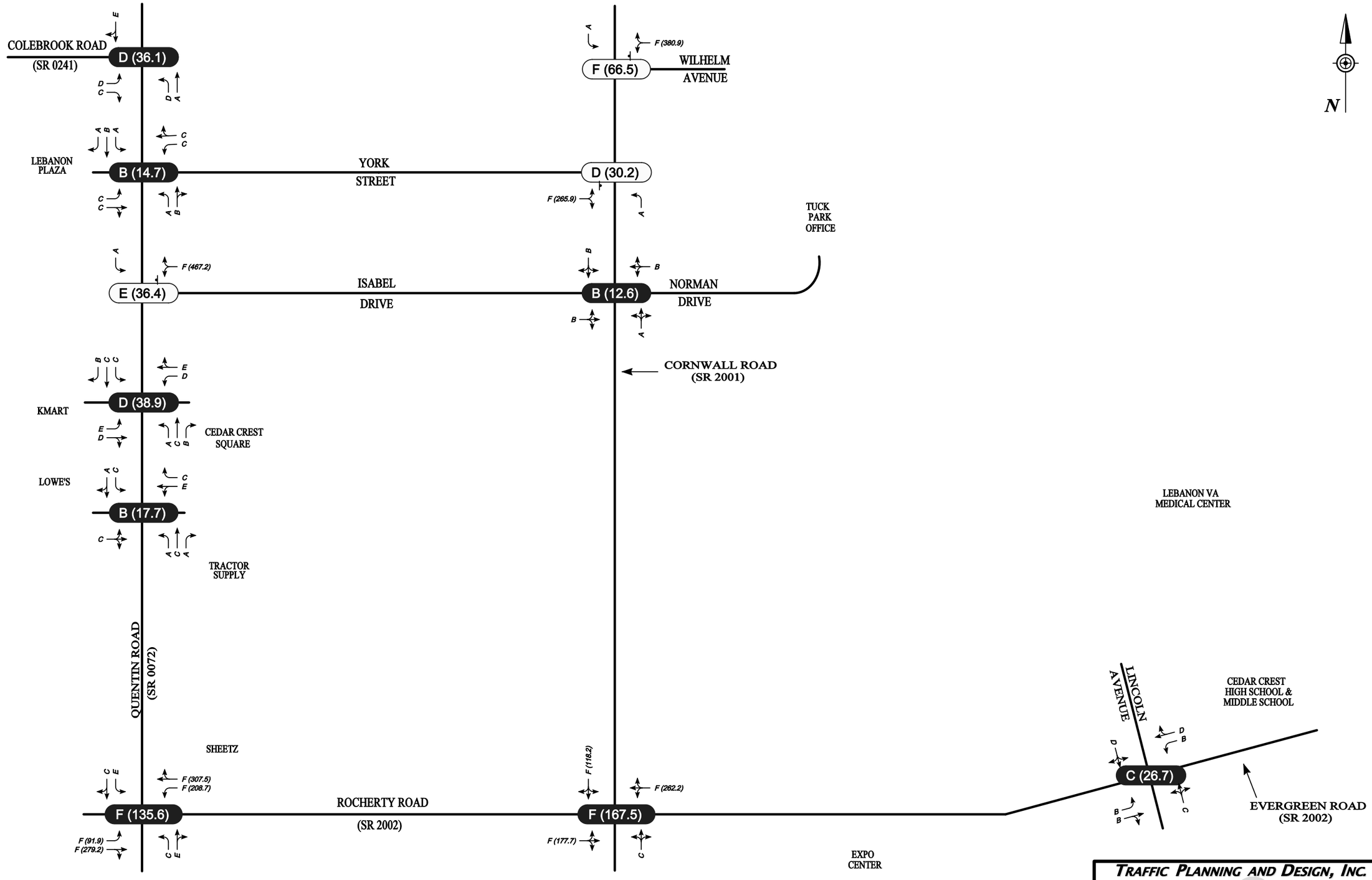

KEY:

STOP CONTROLLED

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

TRAFFIC PLANNING AND DESIGN, INC.

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FIGURE 42

2035 BASE CONDITIONS
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE

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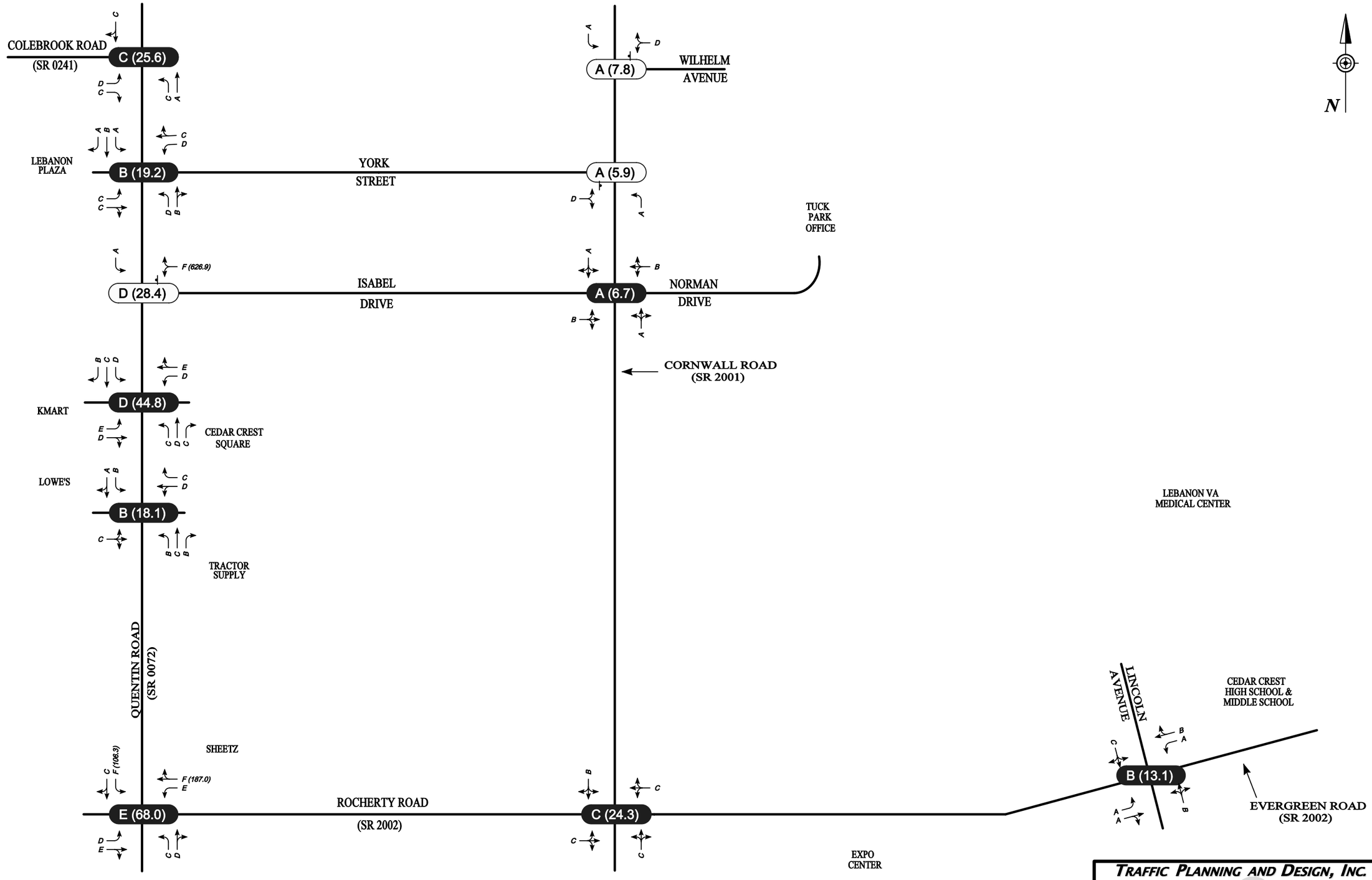

KEY:

STOP CONTROLLED

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

TRAFFIC PLANNING AND DESIGN, INC.

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FIGURE 43

2035 BASE CONDITIONS
SATURDAY MIDDAY PEAK HOUR
LEVELS OF SERVICE

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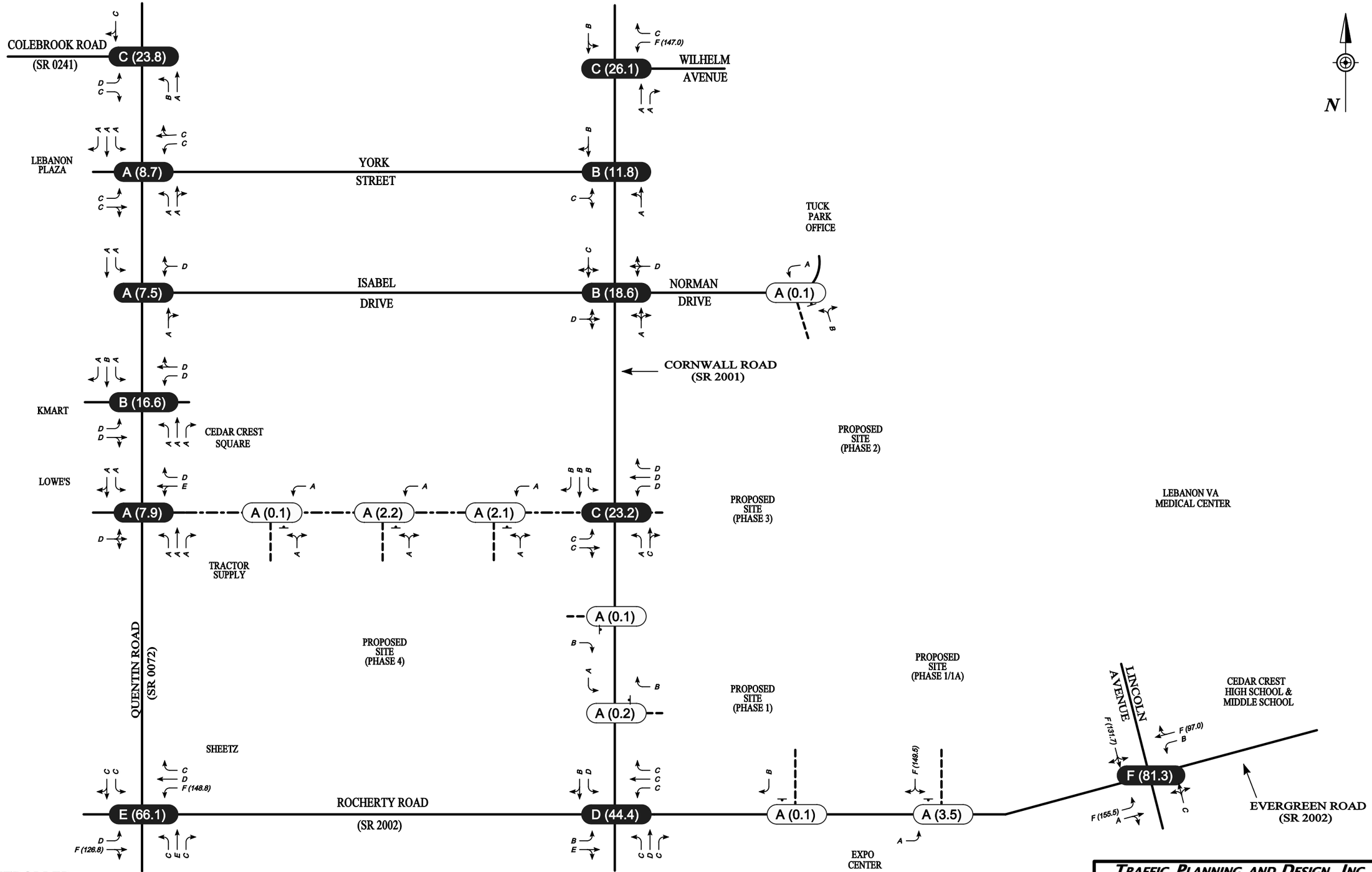

KEY:

- STOP CONTROLLED
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) INTERSECTION LOS(DELAY)

B (13.5) UNSIGNALIZED INTERSECTION LOS(DELAY)

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FIGURE 44

2035 PROJECTED CONDITIONS (PHASES 1-4)
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE
PENNDOT GUIDELINES

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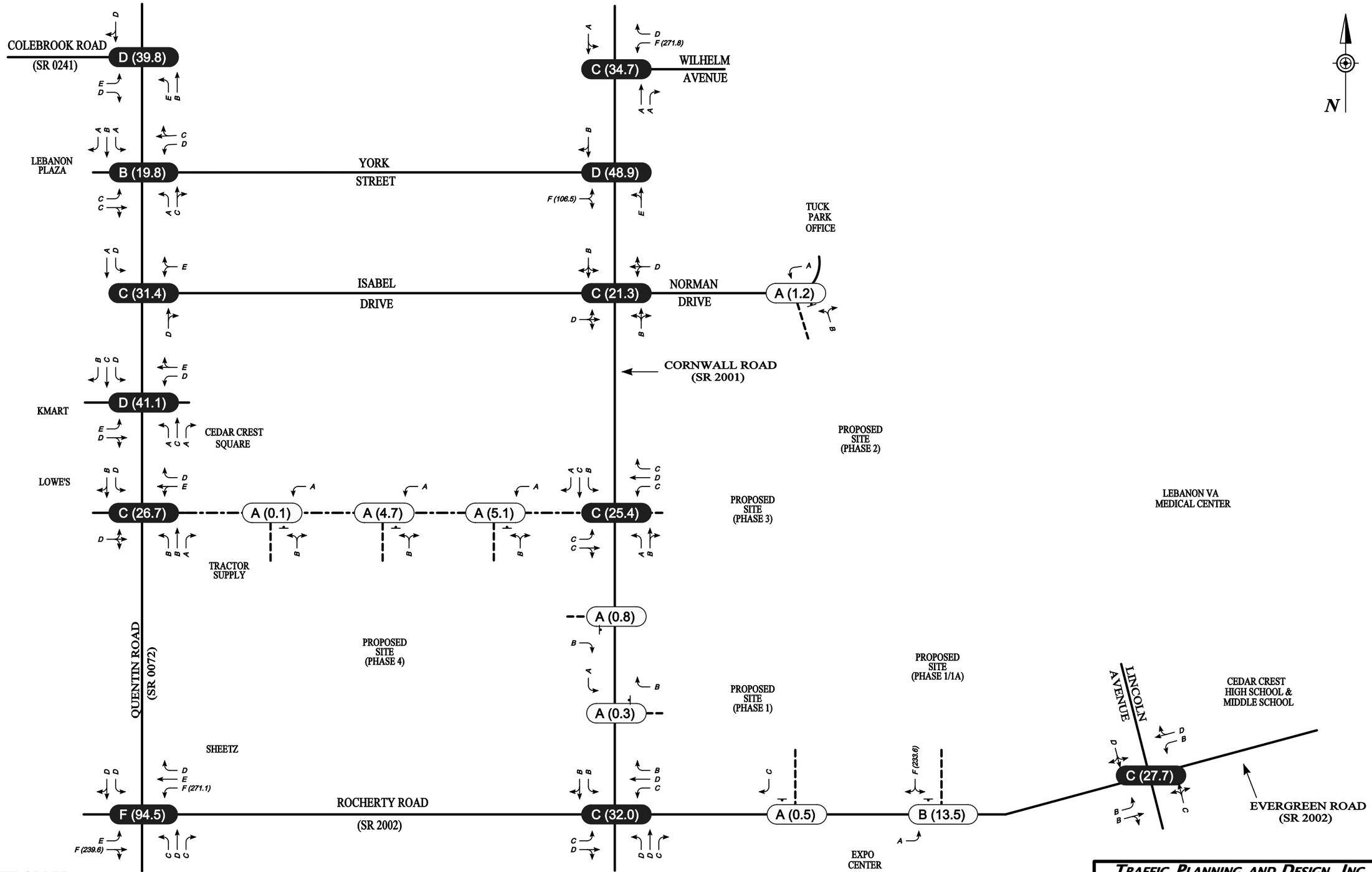

KEY:

STOP CONTROLLED

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 45

2035 PROJECTED CONDITIONS (PHASES 1-4)
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE
PENNDOT GUIDELINES

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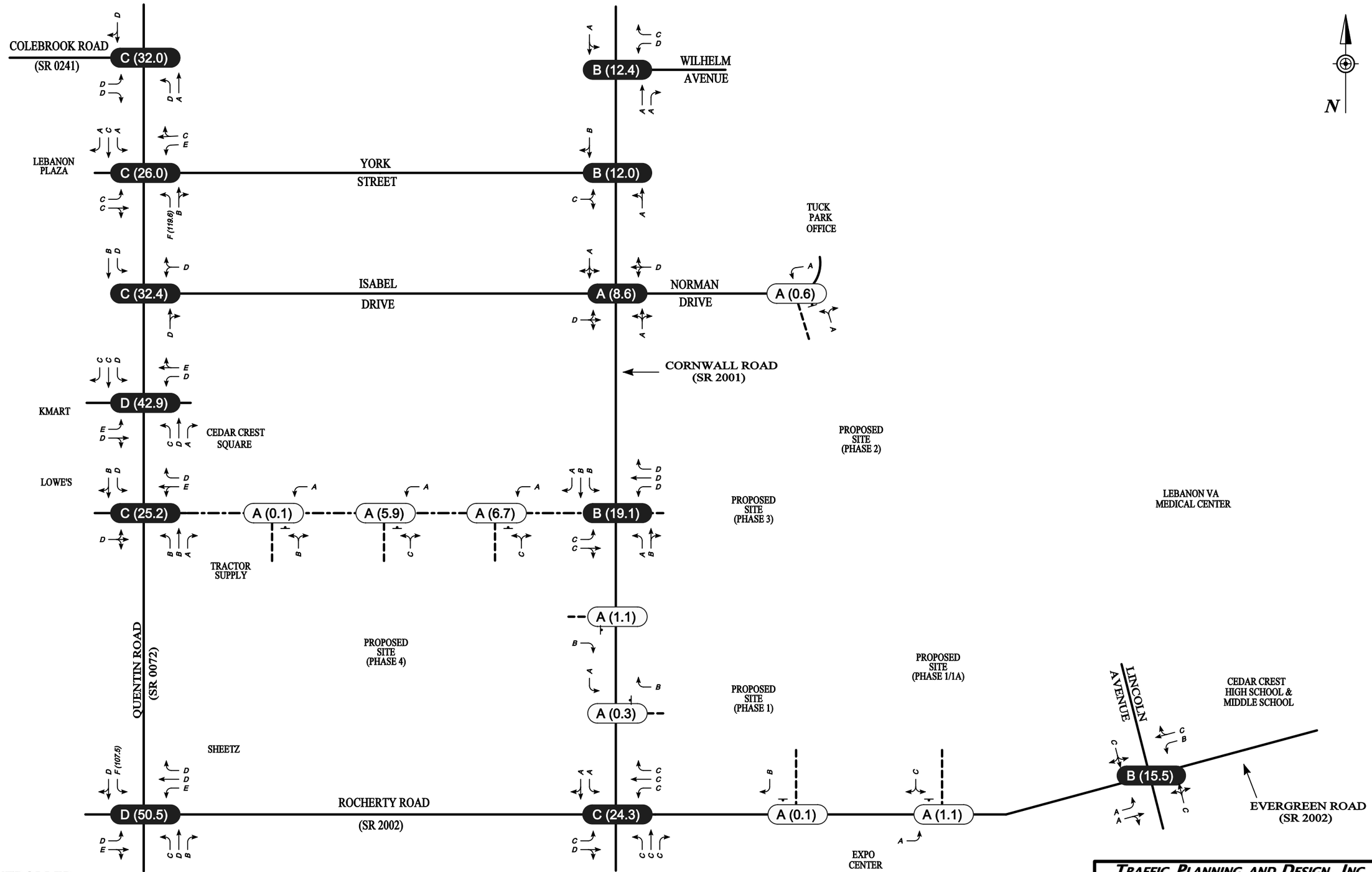

KEY:

- STOP CONTROLLED
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) INTERSECTION LOS(DELAY)

B (13.5) UNSIGNALIZED INTERSECTION LOS(DELAY)

TRAFFIC PLANNING AND DESIGN, INC.

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FIGURE 46

2035 PROJECTED CONDITIONS (PHASES 1-4)
SATURDAY MIDDAY PEAK HOUR
LEVELS OF SERVICE
PENNDOT GUIDELINES

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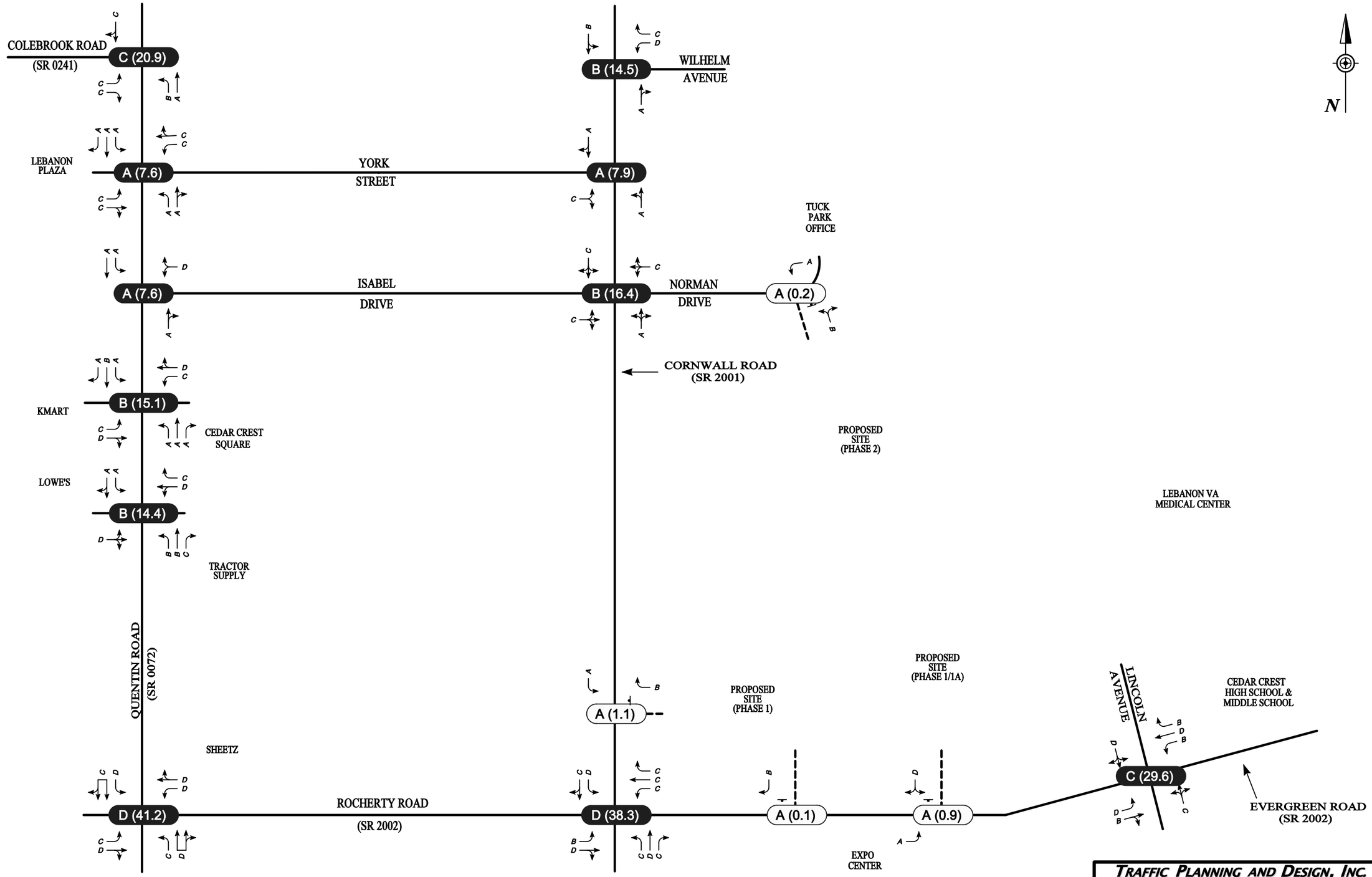

KEY:

STOP CONTROLLED

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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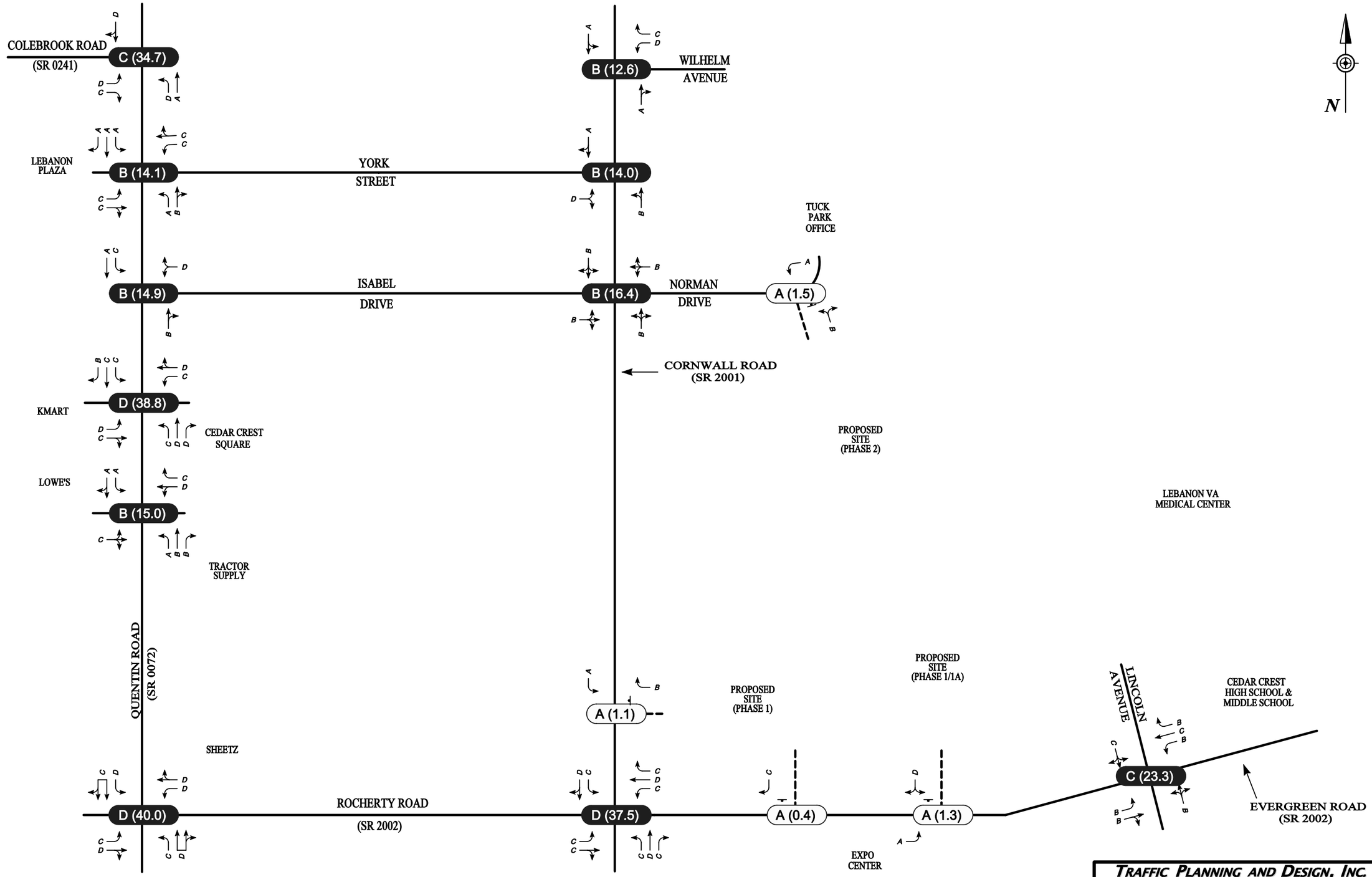
FIGURE 47

2025 PROJECTED CONDITIONS
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE
TOWNSHIP MASTER PLAN GUIDELINES



KEY:

STOP CONTROLLED

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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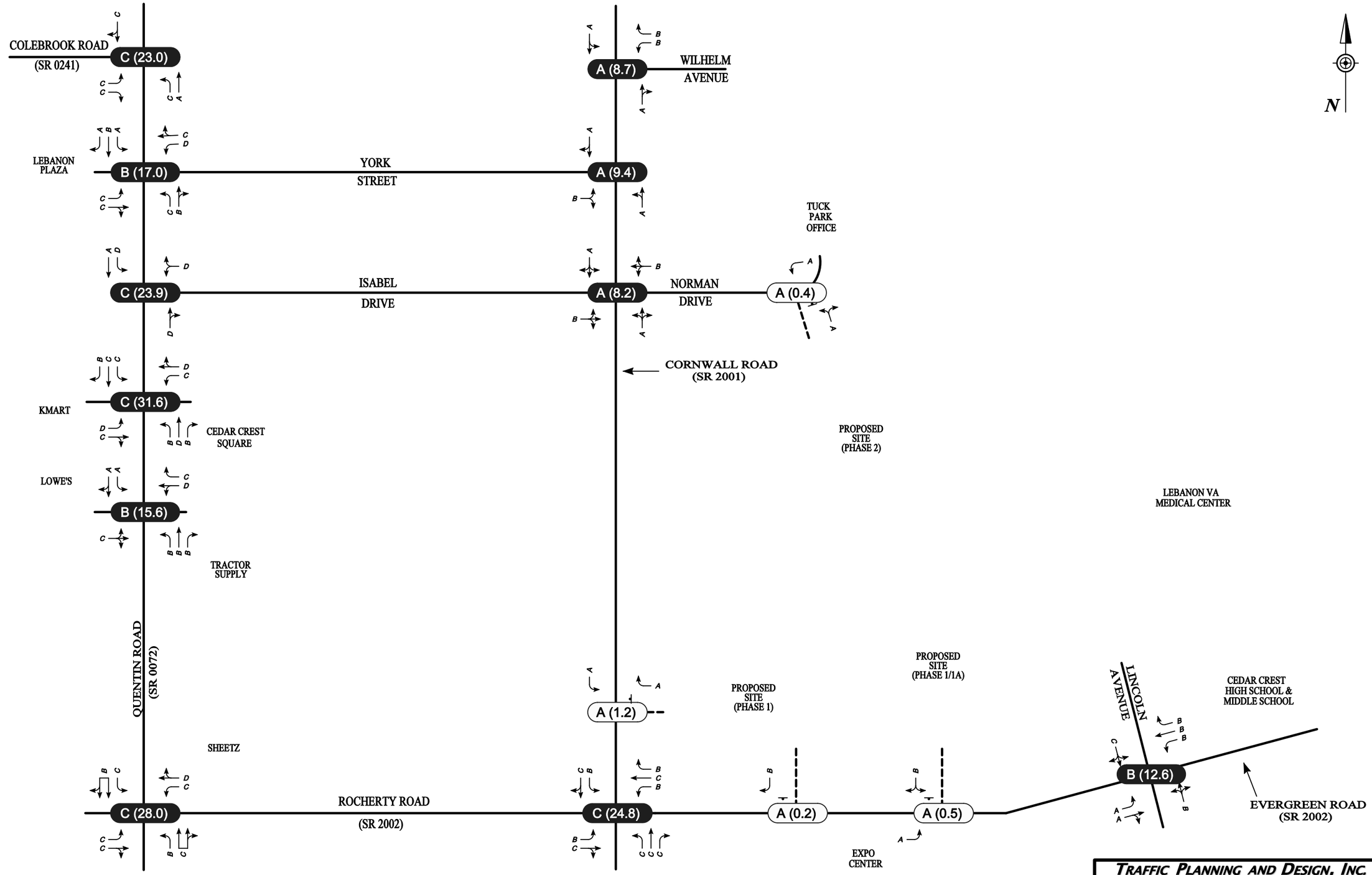
FIGURE 48

2025 PROJECTED CONDITIONS
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE
TOWNSHIP MASTER PLAN GUIDELINES



KEY:

STOP CONTROLLED

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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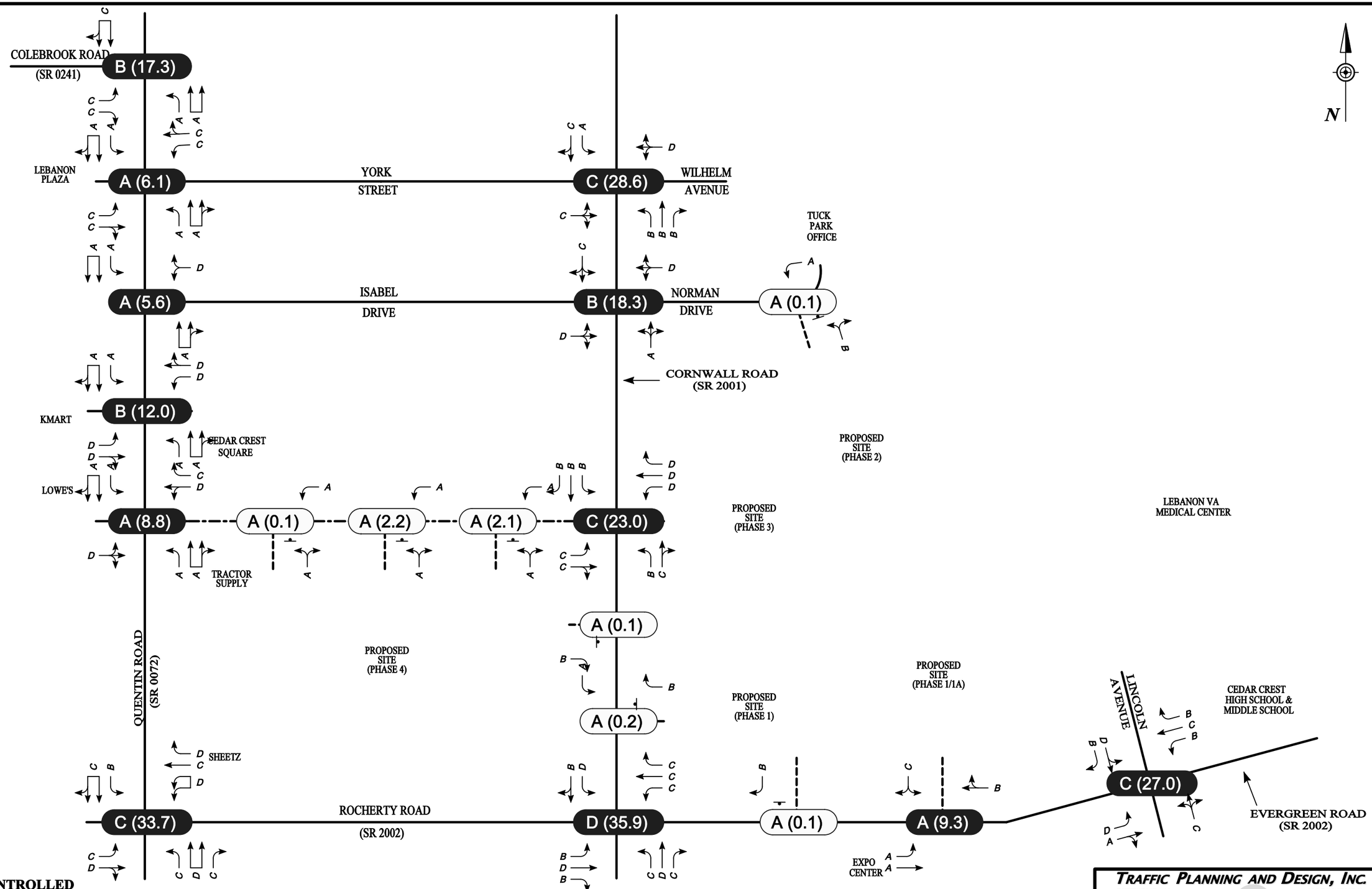
FIGURE 49

2025 PROJECTED CONDITIONS
SATURDAY MIDDAY PEAK HOUR
LEVELS OF SERVICE
TOWNSHIP MASTER PLAN GUIDELINES



KEY:

- STOP CONTROLLED
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) INTERSECTION LOS(DELAY)

B (13.5) UNSIGNALIZED INTERSECTION LOS(DELAY)

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FIGURE 50

2035 PROJECTED CONDITIONS (PHASES 1-4)
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE
TOWNSJIP MASTER PLAN GUIDELINES

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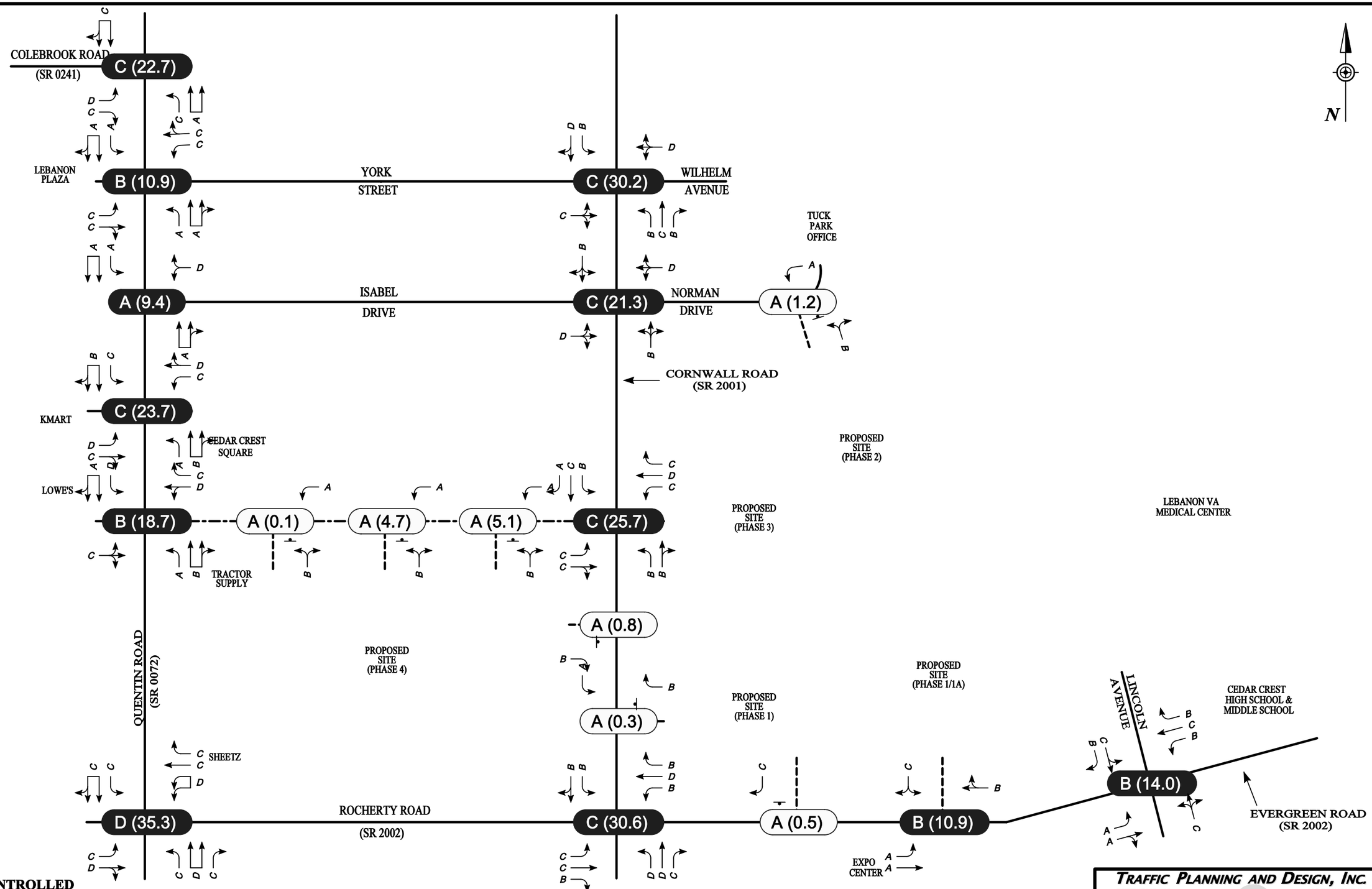

KEY:

STOP CONTROLLED

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 51

2035 PROJECTED CONDITIONS (PHASES 1-4)
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE
TOWNSJIP MASTER PLAN GUIDELINES

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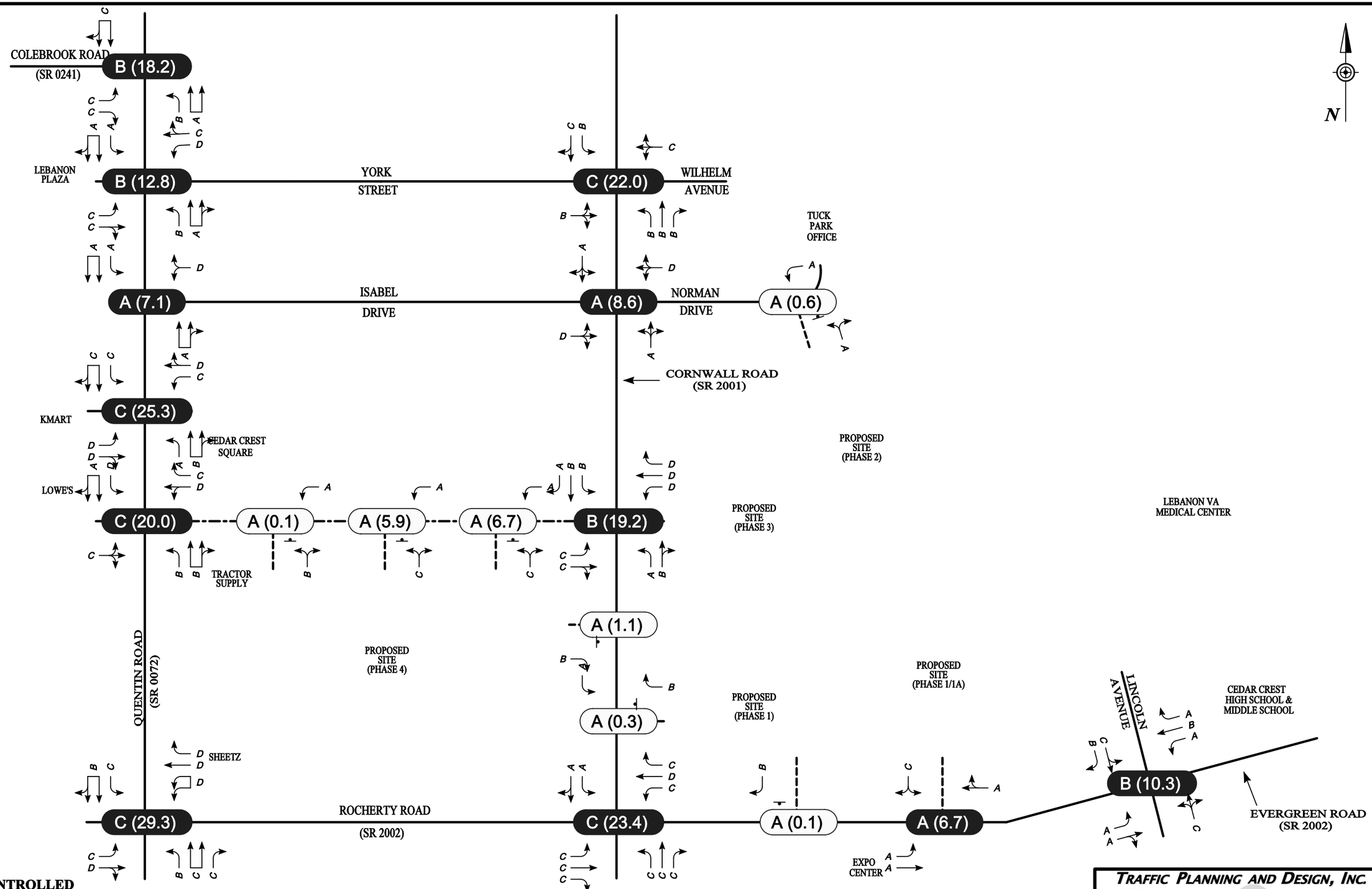

KEY:

- STOP CONTROLLED
- PROPOSED ROADWAY
- PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) INTERSECTION LOS(DELAY)

B (13.5) UNSIGNALIZED INTERSECTION LOS(DELAY)

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FIGURE 52

2035 PROJECTED CONDITIONS (PHASES 1-4)
SATURDAY MIDDAY PEAK HOUR
LEVELS OF SERVICE
TOWNSJIP MASTER PLAN GUIDELINES

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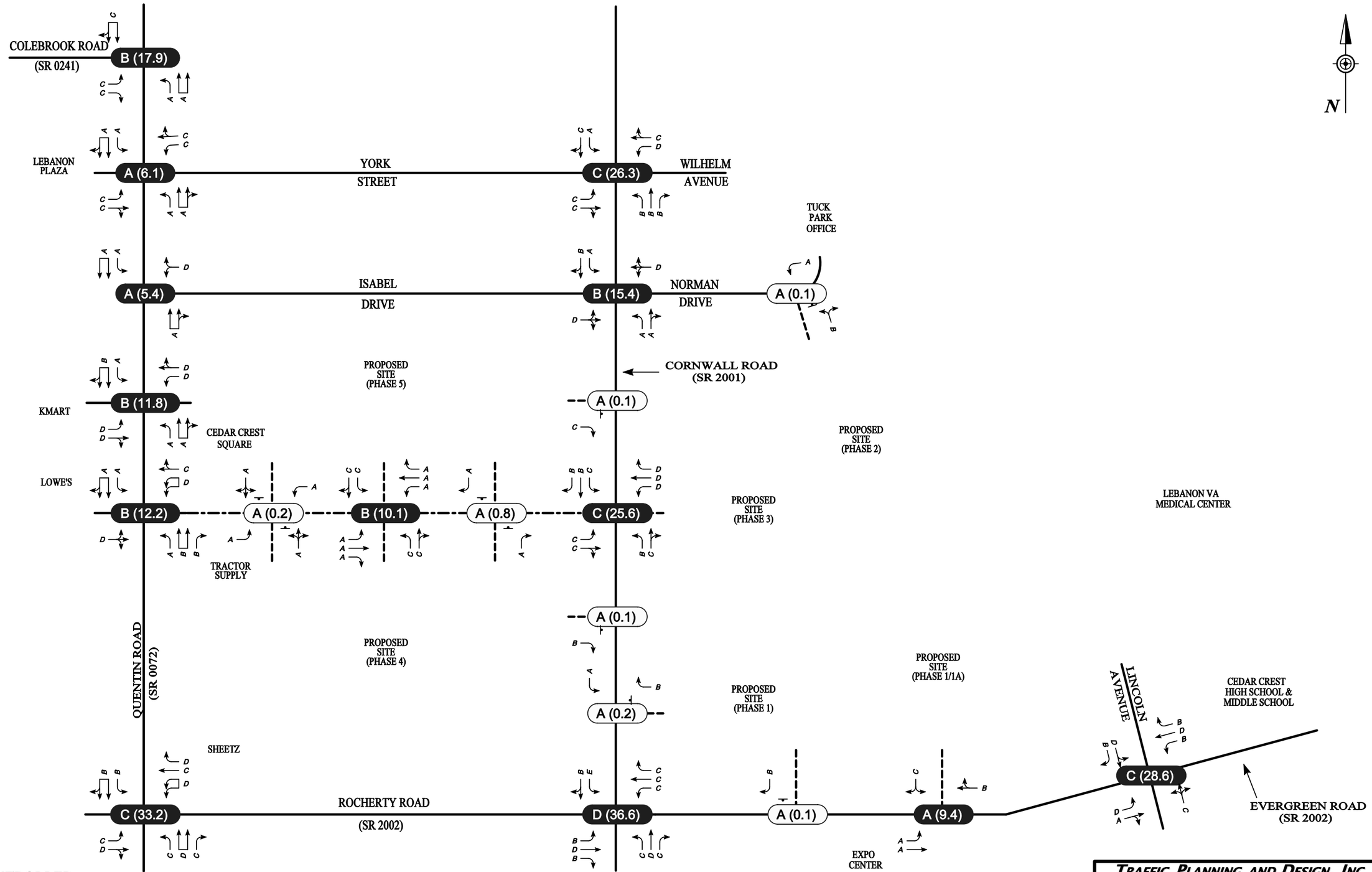

KEY:

STOP CONTROLLED

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 53

2035 PROJECTED CONDITIONS (PHASES 1-5)
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE
TOWNSHIP MASTER PLAN GUIDELINES

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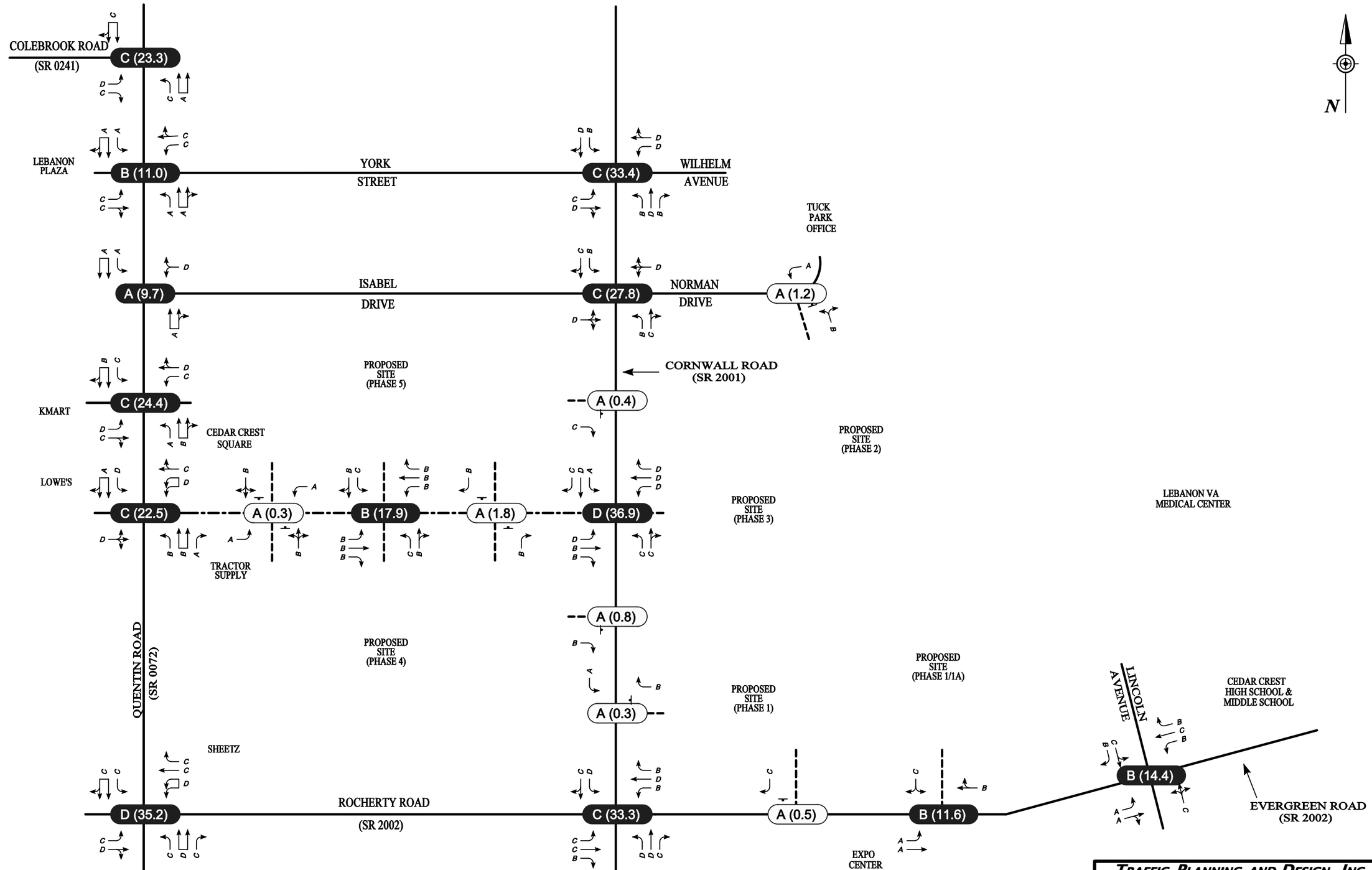

KEY:

STOP CONTROLLED

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 54

2035 PROJECTED CONDITIONS (PHASES 1-5)
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE
TOWNSHIP MASTER PLAN GUIDELINES

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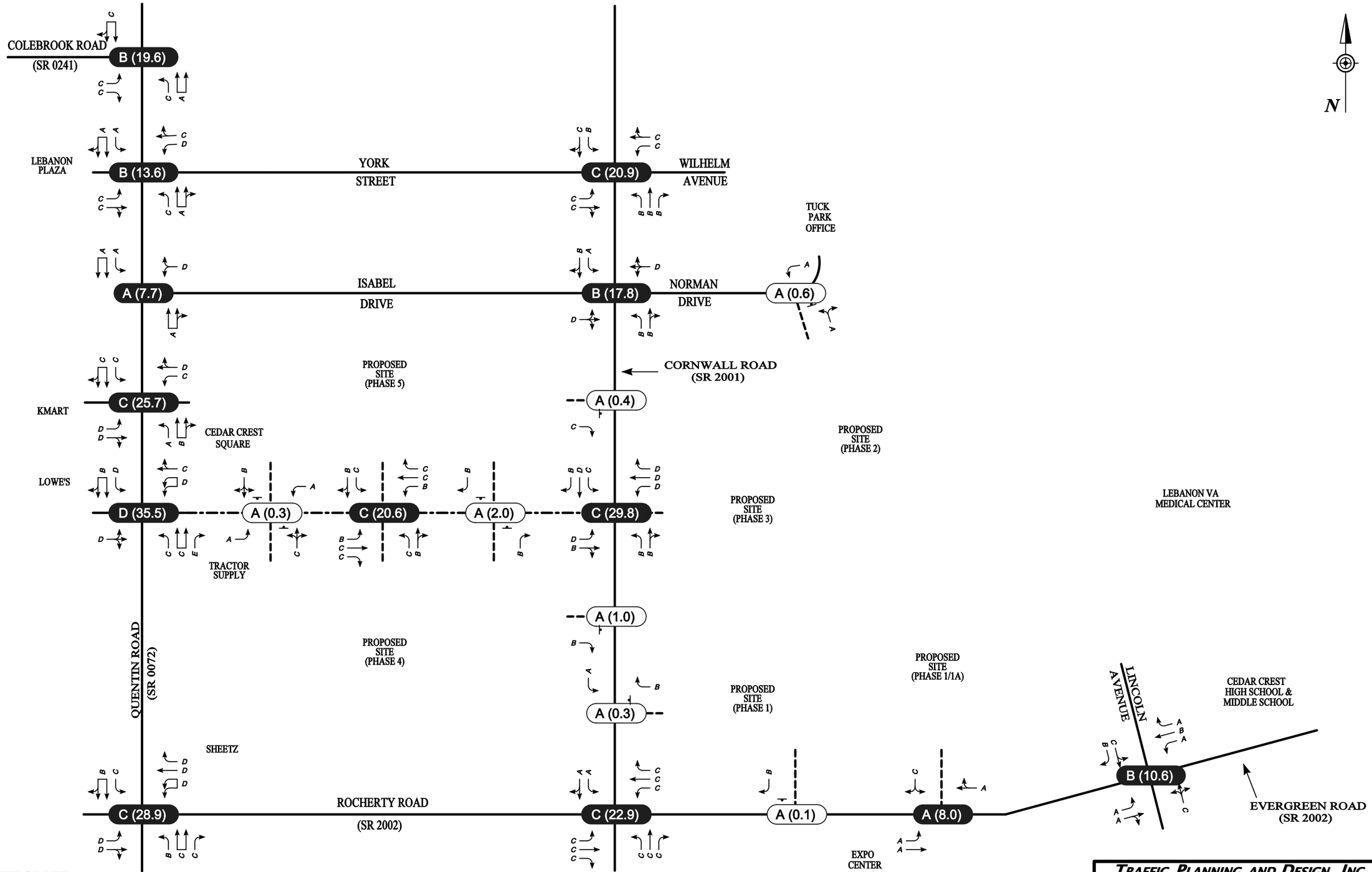

KEY:

STOP CONTROLLED

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

B (13.5) **INTERSECTION LOS(DELAY)**

B (13.5) **UNSIGNALIZED INTERSECTION LOS(DELAY)**

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FIGURE 55

2035 PROJECTED CONDITIONS (PHASES 1-5)
SATURDAY MIDDAY PEAK HOUR
LEVELS OF SERVICE
TOWNSHIP MASTER PLAN GUIDELINES

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APPENDIX A

PROJECT CORRESPONDENCE

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Est. 1989
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April 24, 2012

Ms. Robin Getz, Manager
North Cornwall Township
320 South 18th Street
Lebanon, PA 17042

Re: **Response to 4/3/12 Review No. 1 – Master Plan Transportation Impact Study**
Springwood Development Partners, LP
North Cornwall Township, Lebanon County, PA
TPD# BLAC.A.00001

Dear Ms. Getz:

Traffic Planning and Design, Inc. (TPD) has prepared this response letter to address the Master Plan Transportation Impact Study (TIS) comments contained in the North Cornwall Township Engineer's (Rettew) review dated April 3, 2012. These comments were offered with respect to TPD's Master Plan TIS dated March 2, 2012.

MASTER PLAN TRANSPORTATION IMPACT STUDY COMMENTS

For the discussion below, the Master Plan TIS comments are shown in italic type, with the corresponding TPD response shown in regular type:

1. *The introductory paragraph of the TIS needs to be revised to include a narrative stating that the study is intended to provide an overall evaluation of the future transportation needs of the studied portions of the roadway corridors located within North Cornwall Township, South Lebanon Township and Lebanon City.*

   Response: The requested narrative has been provided in the revised TIS.

2. *The applicant needs to verify that the "Township Guidelines" and "Master Plan Guidelines" referenced in Table i are referring to the same requirements.*

   Response: The annotations referenced in Table i do refer to the same requirements. For purposes of clarity, the table was updated accordingly in the revised TIS to utilize only the "Master Plan Guidelines" annotation.

3. *Right-turn lane warrant analyses need to be provided for the following:*

   a. *Westbound Rocherty Road at its intersection with Quentin Road (Route 72) under 2025 conditions.*
   b. *Southbound Cornwall Road at its intersection with Rocherty Road under 2025 and 2035 conditions.*

   Response: The requested right-turn lane warrant analyses are provided in Appendix L of the revised TIS.

4. *Additional information needs to be provided on the purpose of the proposed eastbound Rocherty Road left-turn lane at its intersection with the right-in/right-out driveway, as shown in Table i. We note this turn lane is not included on the exhibits presented at the March 6th Supervisors' meeting.*

   Response: A separate left-turn is not proposed on the eastbound Rocherty Road approach at the right-in/right-out driveway. Table i was updated accordingly in the revised TIS.

5. *The applicant needs to provide a narrative discussing the limitations, if any, and/or the feasibility of installing the improvements indicated under the Township Master Plan Guidelines.*

   Response: The requested narrative has been provided in the revised TIS.

6. *The TIS indicates a full access driveway on Cornwall Road under 2025 conditions and restricting exiting left turns under 2035 conditions, which requires a modification of the Settlement Agreement. As outlined in our preliminary/final land development plan review letter dated January 25, 2012, in response to the applicant's modification request, we recommend disapproval of this modification request.*

   Response: The Board of Supervisors considered the Applicant' modification request related to providing full movements at the Cornwall Road driveway at their meeting on April 3, 2012. The Board did not support the modification request for full movements, but did approve a modified request to permit left-in/right-in/right-out movements at the driveway. Therefore, the applicable traffic volumes and capacity analyses were updated accordingly in the revised TIS.

Thank you for your continuing review, and please call if there is any further information you require with regards to these responses.

Respectfully Submitted,

TRAFFIC PLANNING AND DESIGN, INC.

Eric M. Mountz, P.E., PTOE
emountz@trafficpd.com
Project Manager

cc: James Caldwell, P.E., *Rettew*
John Schick, *Rettew*
Donna Deerin-Ward, *Springwood Development Partners, LP*
Rich Ozimek, *Springwood Development Partners, LP*
Michael Swank, P.E., *Steckbeck Engineering & Surveying, Inc.*
Charlie Courtney, Esq, *McNees Wallace & Nurick, LLC*

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April 3, 2012

Ms. Robin Getz, Manager
North Cornwall Township
320 South 18th Street
Lebanon, PA 17042

RE: Springwood Development Partners, LP
Master Plan Transportation Impact Study
Review No. 1
RETTEW Project No. 08-02260-003

Dear Ms. Getz:

We have completed our review of the above referenced study as prepared by Traffic Planning and Design, Inc. Our review was of the following information:

1. Master Plan Transportation Impact Study dated March 2, 2012; and,
2. Two (2) electronic copies of study information.

We have the following comments for your consideration:

The applicant has submitted this Master Plan Transportation Impact Study (TIS) to provide a comprehensive evaluation of portions of the Cornwall Road, Rocherty Road, and Route 72 corridors. The purpose of the Master Plan Transportation Impact Study is to provide a thorough evaluation of the future transportation needs of the portions of the corridors located primarily in North Cornwall Township with portions also located in South Lebanon Township and Lebanon City.

The Master Plan Transportation Impact Study is not limited to identifying improvements associated with the buildout of the Springwood development. Rather, the Study analyzes impacts associated with the Springwood development and surrounding nearby developments. While only certain nearby developments in the area are specifically included in the analyses, the applicant applied background growth factors of 17.5% and 31.9% to the 2025 and 2035 study years, respectively, in order to adequately account for other development in the area and general regional traffic growth.

MASTER PLAN TRANSPORTATION IMPACT STUDY

1. The introductory paragraph of the TIS needs to be revised to include a narrative stating that the study is intended to provide an overall evaluation of the future transportation needs of the studied portions of the roadway corridors located within North Cornwall Township, South Lebanon Township and Lebanon City.

2. The applicant needs to verify that the "Township Guidelines" and "Master Plan Guidelines" referenced in Table i are referring to the same requirements.

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3. Right-turn lane warrant analyses need to be provided for the following:
   a. Westbound Rocherty Road at its intersection with Quentin Road (Route 72) under 2025 conditions.
   b. Southbound Cornwall Road at its intersection with Rocherty Road under 2025 and 2035 conditions.

4. Additional information needs to be provided on the purpose of the proposed eastbound Rocherty Road left-turn lane at its intersection with the right-in/right-out driveway, as shown in Table i. We note this turn lane is not included on the exhibits presented at the March 6th Supervisors' meeting.

5. The applicant needs to provide a narrative discussing the limitations, if any, and/or the feasibility of installing the improvements indicated under the Township Master Plan Guidelines.

6. The TIS indicates a full access driveway on Cornwall Road under 2025 conditions and restricting exiting left turns under 2035 conditions, which requires a modification of the Settlement Agreement. As outlined in our preliminary/final land development plan review letter dated January 25, 2012, in response to the applicant's modification request, we recommend disapproval of this modification request.

We recommend the Township acknowledge this Master Plan Transportation Impact Study as a Master Plan providing an overall evaluation of the future transportation needs of the studied portions of the Cornwall Road, Rocherty Road, and Route 72 corridors located within North Cornwall Township, South Lebanon Township and Lebanon City, subject to the applicant addressing the comments above to the satisfaction of the Township.

Should you have any questions, or require additional information, please feel free to contact us at any time.

Sincerely,

James R. Caldwell
Group Manager

copy: Eric Mountz – Traffic Planning and Design, Inc.

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March 2, 2012

Ms. Robin Getz, Manager
North Cornwall Township
320 South 18th Street
Lebanon, PA 17042

Re: **Response to 1/25/12 Review No. 2 – Traffic Impact Study**
Springwood Development Partners, LP
Phases 1 and 1A
Preliminary/Final Land Development Plan
North Cornwall Township, Lebanon County, PA
TPD# BLAC.A.00001

Dear Ms. Getz:

This letter regards the Springwood Development Partners, LP Development Plan (Phases 1 and 1A) in North Cornwall Township, Lebanon County, PA. Traffic Planning and Design, Inc. (TPD) has prepared this response letter to address the Traffic Impact Study (TIS) comments contained in the North Cornwall Township Engineer's (Rettew) review dated January 25, 2012. These comments were offered with respect to TPD's Memorandum dated November 17, 2011.

TRAFFIC IMPACT STUDY COMMENTS

For the discussion below, the TIS comments are shown in italic type, with the corresponding TPD response shown in regular type:

We note that this submission does not constitute an official Traffic Impact Study (TIS) submission but rather provides a technical summary of the information to be included in the formal TIS. A full TIS will need to be submitted. In addition, it is important to note that while the information provided includes trip generation data for Phase 5 of the proposed development, this information was not accounted for in the capacity analyses. While it is understood that no specific timeline or plan exists for the development of Phase 5, the amount of development allowed in accordance with the Settlement Agreement for that lot represents a "worst-case" (highest traffic volume) scenario for the purposes of the Master Plan TIS. Without including traffic attributed to Phase 5 of the development, it is difficult to determine whether the improvements proposed as part of Phases 1-4 will accommodate Phase 5 traffic or be compatible with potential future improvements once the Phase 5 lot is developed. Therefore, we note that the following comments are based on the development of Phases 1-4 only and recommend that additional Phase 5 information be provided in order to produce an overall picture of the improvements needed within the study area of the Master Plan TIS.

1. *The TIS assumes granting of the modification request currently in front of the Township regarding the lane configuration at the southern driveway to Cornwall Road to allow entering and exiting left-turn movements. We note that depending on the outcome of the modification request, the TIS may need to be revised.*

Response: So noted.

2. *There are multiple level of service degradations for both individual turning movements and overall intersections between future no-build and future build conditions, during both the 2025 and 2035 time periods. The applicant needs to provide additional information detailing the causes of the degradations and the improvements necessary to mitigate the level of service. It is understood that some improvements may be outside the scope of this development but need to be included to provide a more comprehensive Master Plan TIS.*

   Response: Per the direction of Rettew, additional capacity analyses have been completed in order to identify the additional roadway improvements necessary to provide for level of service 'D' or better for the following conditions:

   - 2025 Projected Conditions (Build-Out of Phases 1, 1A and 50% of 2).
   - 2035 Projected Conditions (Build-Out of Phases 1, 1A, 2, 3 and 4).
   - 2035 Projected Conditions (Build-Out of Phases 1, 1A, 2, 3, 4 and 5).

   The additional capacity analyses (identified as Township Master Plan Guidelines) are included in Appendix K of the Master Plan TIS.

3. *The applicant needs to confirm at what locations auxiliary turn lane warrants were evaluated and the analyses need to be provided.*

   Response: The locations for which auxiliary turn lane analyses were evaluated are summarized in Tables 13 and 14 of the Master Plan TIS. The auxiliary turn lane analysis worksheets are included in Appendix L of the Master Plan TIS.

4. *The results of the queue analysis show numerous queues that exceed both the future no-build queue and the proposed storage capacity of the auxiliary turn lane. Additional information needs to be provided identifying what improvements are necessary to accommodate the projected queue lengths.*

   Response: The additional capacity analyses referenced in the response to comment #2 also considered the required lengthening of auxiliary turn lanes. The lane lengths utilized in the additional capacity analyses were based upon the methodologies contained in Chapter 11 of PennDOT's *Publication 46* and Strike-Off Letter 470-08-07.

5. *The applicant needs to verify the lane configuration shown at the intersection of Route 72 and the Lowes's/K-Mart/Cedar Crest Square driveway under the 2035 projected with improvements condition during the PM peak hour. It appears the eastbound right turn is not accounted for.*

   Response: The lane configuration has been revised accordingly in the Master Plan TIS.

6. *The applicant needs to clarify whether a separate right-turn lane is proposed on eastbound Township Roadway at the middle driveway. The separate lane is shown in the capacity analyses but not referenced elsewhere in the TIS.*

Response: A separate right-turn lane is proposed on eastbound Township Roadway at the middle driveway. The recommendations of the Master Plan TIS have been revised accordingly.

7. *The applicant needs to clarify whether a separate right-turn lane is proposed on southbound Cornwall Road at the right-in/right-out driveway to the western development. The separate lane is shown in the capacity analyses but not referenced elsewhere in the TIS.*

   Response: A separate right-turn lane is proposed on southbound Cornwall Road at the right-in/right-out driveway to the western development. The recommendations of the Master Plan TIS have been revised accordingly.

8. *The capacity analyses need to be revised at the proposed Cornwall Road southern access under 2035 projected conditions to include the proposed northbound right-turn lane.*

   Response: The capacity analyses have been revised accordingly in the Master Plan TIS.

9. *Both the 95th and 50th percentile queues on the northbound through movement at the intersection of Route 72 and the Lowe's/K-Mart/Cedar Crest Square driveway extend beyond the adjacent intersection under 2035 conditions during the weekday PM peak hour. The applicant needs to evaluate additional mitigation alternatives.*

   Response: See the response to comments #2 and #4.

10. *The proposed Township Roadway and a portion of the Phase 4 development are located on the Kreider tract. It is our understanding that this property is not owned by the applicant. Therefore, additional information needs to be provided clarifying how this proposed development will be accommodated.*

    Response: So noted. This comment will be discussed in more detail when Springwood Development Partners, LP proceed with Phase 4 of the development.

Thank you for your continuing review, and please call if there is any further information you require with regards to these responses.

Respectfully Submitted,

TRAFFIC PLANNING AND DESIGN, INC.

Eric M. Mountz, P.E., PTOE
emountz@trafficpd.com
Project Manager

cc: James Caldwell, P.E., *Rettew*
John Schick, *Rettew*
Donna Deerin-Ward, *Springwood Development Partners, LP*
Rich Ozimek, *Springwood Development Partners, LP*
Michael Swank, P.E., *Steckbeck Engineering & Surveying, Inc.*
Charlie Courtney, Esq, *McNees Wallace & Nurick, LLC*

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January 25, 2012

Ms. Robin Getz, Manager
North Cornwall Township
320 South 18th Street
Lebanon, PA 17042

RE: Springwood Development Partners, LP
Phases 1 and 1A
Preliminary/Final Land Development Plan
Review No. 2
RETTEW Project No. 08-02260-003

Dear Ms. Getz:

We have completed our review of the above referenced plan as prepared by Steckbeck Engineering & Surveying, Inc. Our review was of the following information:

1. Seventy (70) plan sheets dated April 20, 2011, revised November 9, 2011;
2. Post-construction storm water management report dated April 2011, revised November 2011;
3. Response letter dated November 9, 2011;
4. Construction cost opinion dated November 9, 2011;
5. Modification request letter dated November 9, 2011;
6. Twelve (12) revised lighting and landscape plan sheets dated April 20, 2011, revised December 8, 2011;
7. Modification request letter dated December 8, 2011; and,
8. Miscellaneous supporting documentation.

We have the following comments for your consideration:

This initial review is based upon the site design standards prescribed in the Settlement Agreement and as provided in the North Cornwall Township Subdivision and Land Development Ordinance.

REQUESTED MODIFICATIONS

A. Section 5.07.E – Storm Water Calculation Methodology

The applicant has requested a modification of the requirement to model pre-development versus post-development runoff rates and to design storm water management facilities based upon the current USDA Soil-Cover-Complex method described in TR-55. In the alternative, the applicant proposes to utilize the Rational Method. The Rational Method is an approved method for culvert sizing in Section 5.07.E.4 of the Subdivision and Land Development Ordinance. In addition, the applicant has indicated that using the Rational Method will result in lower

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pre-developed rates of runoff that will result in lower allowable post-development rates of runoff to be discharged from the project.

We recommend approval of this modification based upon the justification and the alternative provided.

B. Section 5.07.E.9.a – Storm Water Basin Maximum Depth

The applicant has requested a modification of the requirement to maintain a maximum water depth in retention and detention basins of no greater than six (6) feet. In the alternative, the applicant proposes a permanent pool depth of 6.5 feet and an overall depth from the basin bottom to the spillway crest of 12 feet. The applicant proposes to install an aquatic/safety bench between the permanent pool depth and the storm water detention area in the basin as well as enclose the facility with 4' high chain link fence and 'No Trespassing' signs.

We recommend postponing action on this modification request to allow the applicant the opportunity to address the following items:

1. The minimum depth for the clay liner needs to be determined to limit any potential sinkhole activity and maintain the permanent pool;
2. The connectivity of a potential walking trail in future phases along the swales and basins needs to be considered, particularly in light of the proposed chain link fence;
3. A landscape plan needs to be provided for the retention/detention basin that includes plantings which are appropriate for submerged conditions as well as partially wet or dry conditions.

C. Article 3.9.2 – Vehicular Access (Settlement Agreement)

The applicant has requested a modification of the requirement for the Cornwall Road access to be restricted to right-in/right-out and, in the alternative, provide a full access (right and left turns in and out) to Cornwall Road on an interim basis. The applicant is willing to enter into a formal agreement with the Township that requires the Cornwall Road access to be modified to restrict the exiting left-turn movement when the Eastern Street A intersection with Cornwall Road is constructed under a subsequent phase.

We recommend disapproval of this modification request as it relates to allowing full access for the Cornwall Road access, disapproval of this modification request as it relates to allowing full access on an interim basis, and disapproval of this modification request as it relates to allowing left turns out of the site on to south bound Cornwall Road.

We recommend approval of this modification request as it relates to permitting south bound Cornwall Road left turns in to the site thereby limiting access from Cornwall Road to right and left in and right out movements. This would result in a configuration/traffic movements that are similar to the configuration of the recently revised south bound SR 0072 BTKD/Sheetz access drive.

We recommend the Township approval the modification as it relates to allowing entering left turns, however we do not recommend allowing exiting left turns. Motorists leaving the site that would turn left to access Rocherty Road will alternatively be able to utilize the Rocherty Road right-in/right-out access.

D. Articles 3.13.2, 3.13.4, and 2.12.6 – Light Fixture Spacing and Required Maintained Lighting Levels (Settlement Agreement)

The applicant has requested a modification of the requirement to provide maximum fifty (50) foot spacing between light fixtures along Eastern Streets A, B, C, and D and, in the alternative, provide a maximum spacing of eighty (80) feet based on the justification that it is not feasible to meet the illumination level requirements with fifty (50) foot spacing. In addition, the applicant has requested a modification of the required average footcandle measurements and, in the alternative, provide a range of acceptable average footcandle measurements for each area of the development in order to comply with the required minimum and maximum light level requirements.

We recommend the Township postpone action on these modification requests to allow the applicant time to provide additional engineering or design-driven justification for the requested modifications from the agreed upon standards provided in the Settlement Agreement. It should be noted that the fifty (50) foot spacing requirement is met in many locations. The applicant's additional justification needs to include specific locations where the spacing and the minimum and maximum light level modifications are being requested.

DESIGN STANDARDS

1. § 3.5.1. requires – *"All buildings in the Commercial/Office Corridor (excluding buildings that are located along Eastern Street A with frontage along Cornwall Road or are upon any lot that incorporates the Adjoining Eastern Property) shall have a minimum of seventy percent (70%) of their front façade located at or within ten feet (10') of the street right-of-way of Eastern Street A or Eastern Street B (as applicable)."*

   We note that the southeast corner of the building proposed on Lot 6 is located closer than ten (10) feet to the Eastern Street A right-of-way line. Based on our interpretation of this section of the Design Standards, the building location is compliant with the requirement of being located at or within ten (10) feet of the right-of-way line. However, confirmation and concurrence is needed from the Township.

2. § 3.7.7., § 3.7.12., § 3.10.1. specify the requirements for benches, trash receptacles, and sidewalks and landscape strips.

   Comment – The applicant has extended the street right-of-way for Eastern Street A to the northwest in front of Lot No. 6 so as to clarify the applicable setback requirements to be imposed upon this corner lot. (See comment No. 3 on November 9, 2011 letter from Steckbeck Engineering and Surveying, Inc.) This produces an additional approximately 700 lineal feet of Eastern Street A. However, the applicant's plans depict only six (6) benches and trash

receptacles along this corridor. While it is apparent that the applicant only intends to construct that segment of Eastern Street A that is located to the southeast of the intersections of Eastern Streets A, B and C at this time, the plan needs to depict all improvements, including sidewalk and landscape strips, extended to the phase line. In addition, the applicant needs to add a note to the plan stating that these improvements are to be constructed under a future phase of the development.

3. § 3.7.13. specifies the requirements for dumpsters.

Comment – Although the new location of the dumpsters for the proposed restaurants on Lot Nos. 2 and 3 comply with the requirements, we are concerned with their location directly abutting the street side sidewalk along Eastern Street B. The Township and applicant have gone to great lengths to make this sidewalk an attractive and pleasant pedestrian corridor. The dumpsters may significantly adversely affect the pedestrian experience and view in this vicinity. As an alternative we recommend that the applicant and Township consider a modification to § 3.7.13. (under Section 7.H. [page 42] of the Settlement Agreement) so that the restaurants can locate their dumpsters in the front yard of Rocherty Road and within the 50 foot setback required under § 3.7.13.A. This would enable the applicant to relocate the dumpsters to the end of the new proposed joint access drive. We also recommend the applicant consider the use of a joint dumpster installation as provided in § 3.7.13.C. This arrangement would be similar to that employed on all of the other proposed lots within this phase of the development plan. In addition, the applicant needs to furnish an elevation drawing depicting a typical dumpster enclosure not a "top view" as has been added to Sheet No. 63.

4. § 3.9.2. requires that the intersection of Eastern Street B with Cornwall Road and the intersection of Rocherty Road and Rocherty Road Access be restricted to right-in and right-out traffic movements only.

Comment – The Plans should reflect these restrictions. The applicant has submitted a modification request to allow a full-movement access drive at the southern Cornwall Road right-in/right-out access drive. However, both the Cornwall Road access and Rocherty Road access drives are currently shown as full access on the plan. The plan needs to be revised to show the Rocherty Road access drive restricted to right-in/right-out movements. In addition, depending on the outcome of the modification request, the Cornwall Road access drive configuration may need to be revised.

5. § 3.10.4. requires – *"A minimum of one (1) covered transit bus stop shall be provided in the vicinity of the intersection of Eastern Street A and Eastern Street B/Eastern Street C. Appropriate loading/unloading areas shall be provided which shall be illuminated for safety and convenience. Structural styles and colors shall complement the aesthetic ambiance of the Eastern Development."*

Comment – The applicant has added a note depicting the proposed bus stop location on the northeast corner of the intersection of Eastern Streets A and B/C to Sheet No. 10. However, since the proposed location falls within the depicted street right-of-way of Eastern Street C, more than a note should be provided. The applicant should depict an actual improvement along

with the requisite details to demonstrate compliance with the architectural standards listed in this Section. In addition, it appears the proposed location of the bus stop will cause buses to obstruct traffic. The bus stop needs to be relocated to allow buses to stop outside the travel lane.

6. § 3.10.6. requires - *"All street-side sidewalks adjoining Cornwall Road shall be a minimum of five feet (5') and shall be clear of all pedestrian obstructions. In addition, a minimum five (5) foot wide planting strip will be located between the sidewalk and the cartway for Cornwall Road. The required planting strips will permit the use of hard pedestrian surfaces that are fitted with shade trees adjoining the curb and sidewalk at maximum forty (40) foot intervals in accordance with Section 2-13.13. of these Design Standards and other ornamental landscape materials including, but not limited to, groundcover as may be suitable."*

   Comment – The proposed roadway improvements at the intersection of Cornwall Road and Rocherty Road are not depicted on the plan. Therefore, the location of the cartway and subsequently, the width of the landscape strip between the sidewalk and the cartway cannot be verified.

7. § 3.10.8. requires – *"Crosswalks shall be a minimum six (6) feet in width and shall be constructed of imprinted asphalt, imprinted hot thermoplastic markings, concrete, brick, cobblestone, concrete pavers, stamped concrete or stamped asphalt with an appropriate edge material to define the crosswalk. Accommodations shall be required to promote barrier-free access such as at-grade crossings or handicapped ramps."*

   Comment – The applicant needs to provide additional detail on the actual material proposed for the crosswalks.

8. § 3.10.11. requires – *"In addition to the street-side sidewalks, one (1) pedestrian-oriented space shall be provided in the Eastern Development on the lot adjoining the intersection of Cornwall Road and Rocherty Road. This pedestrian oriented space shall include a fountain, sculpture, courtyard, or other similar prominent feature."*

   Comment – Although Sheet No. 9 depicts an area for this improvement and some graphic representation of an improvement, no specific information and details are furnished. This is an important component of this development and more detailed information needs to be provided to demonstrate compliance with this requirement.

9. § 3.11.1.E. requires that *"the shared use path shall be fitted with landscaping that complies with Section 3-14 of this Eastern Site Design Standards."* § 3.14.1. requires that *"landscaping shall be arranged to provide visual interest, define outdoor pedestrian-oriented spaces, complement the proposed architectural style, preserve existing mature vegetation where practicable, and achieve other functional and aesthetic elements within the development."* The applicant shall be required to submit landscape plans by a qualified expert during land development review that demonstrates compliance to all applicable landscaping, screening and mature vegetation preservation requirements.

Comment – We recommend the applicant consider ornamental fencing along the shared use path between the path and the slope of storm water facilities to provide for both safety and aesthetics.

10. § 3.11.1.F. requires that *"perpetual maintenance of the shared use path, and the open space or greenway areas through which the path extends, shall be provided for through condominium documents, easement agreements or other similar recorded instruments."*

Comment – No such information has been submitted.

11. § 3.12.5, 6, 7, 8 and 9. list the requirements relating to signs for individual uses and access drives.

Comment – The proposed sign at the intersection of Cornwall Road and Rocherty Road is labeled as a Freestanding Gateway sign. A Freestanding Gateway sign is only permitted in the area of Eastern Street A and Cornwall Road. In addition, the Freestanding Directional signs located along Eastern Street B in the vicinity of Cornwall Road (approximately Sta. 8 + 25.00) need to be identified. Furthermore, the applicant needs to provide additional information relating the proposed signage to the specific signage classifications within the Settlement Agreement. Finally, the applicant's Sheet No. 8 includes the signage legend which indicates that such freestanding directional signs shall be "4' by 4'." This produces a sign of 16 square feet. This legend needs to be revised to indicate that such signs shall not exceed 4 square feet.

12. § 3.13.2. requires – *"The street-side sidewalks along Eastern Street A, Eastern Street B, Eastern Street C and Eastern Street D shall be fitted with full cut-off decorative lighting fixtures that are located a maximum of fifty feet (50') on center. Light fixtures shall not exceed a maximum permitted height of twelve feet (12') along Eastern Street A and Eastern Street B and along street frontages containing townhouses. Light fixtures shall not exceed a maximum permitted height of twenty (20) feet elsewhere within the Eastern Development."*

Comment – The revised lighting plans have corrected the maximum permitted pole height and now reflect a maximum permitted height of twelve (12) feet for street lights and eighteen (18) feet for freestanding parking lot lights. However, there is one discrepancy on Sheet No. 34 that needs to be resolved. While the "Luminaire Schedule" lists a maximum mounting height of eighteen (18) feet for the various parking lot light fixtures, the "Light Pole Foundation Detail" located just below the schedule includes a note that a maximum of twenty (20) feet is allowed. While the ordinance permits a maximum height of twenty (20) feet it would seem from the schedule that an eighteen (18) foot maximum is proposed and should be reflected on the "Detail" drawing.

13. § 3.13.3. requires – *"Poles and standards supporting lighting fixtures, except wooden poles or standards, shall be suitably protected from collision by vehicles by being placed atop a concrete pedestal at least 18 inches high or protected by steel bollards, or when directly behind parking spaces set back a minimum of 5 feet behind tire stops or edge of pavement."*

Comment – The revised lighting plans do not differentiate between light poles that will utilize foundations and those that won't. In any event, the plans depict numerous parking lot fixtures located within designated parking spaces. For example Lot No. 1 includes 11 such fixtures. It is unclear whether or not these fixtures represent overhang fixture locations whose poles are located in an adjoining landscape strip. If the actual poles are located within the parking spaces then this arrangement needs to be revised. If the poles are located outside of the parking spaces then they need to be atop a concrete foundation or maintain the 5 foot setback required above; the plans do not depict this setback.

14. § 3.13.5. requires that no light source which casts light on adjacent property that is not a part of the Eastern Development shall exceed one-tenth (0.1) footcandle as measured at the property line.

Comment – Lot No. 1 (Hotel) shares its northern property line with a lot that is not part of the Eastern Development. Sheet No. 35 lists lighting levels along this property line ranging between 0.0 to 0.7 footcandles. It is impossible to determine whether or not the higher values produce light spillage onto this adjoining property. The applicant needs to verify and report the light levels at the property line to demonstrate compliance with this Section. This would be consistent with the manner in which the applicant depicted light levels for the adjoining rail trail along the eastern edge of the townhouse section of the development.

15. § 3.14.12. requires - *"Section 2-13.13. of the Design Standards lists the types of vegetation approved for specific uses. Additional types of vegetation may be permitted by the Township."*

Comment – Street trees encroach upon clear-sight triangles of roads and access drives at the following locations:

- Four (4) trees at the intersection of Street B and Cornwall Road;
- One (1) tree at the intersection of the Rocherty Road Access and Rocherty Road;
- Three (3) trees at the intersection of the Rocherty Road Access and Street B;
- One (1) tree at the intersection of the Lot 4/Lot 5 access drive and Street B;
- One (1) tree at the intersection of Street A and Rocherty Road; and,
- Three (3) trees at the intersection of Street A and Street B/Street C.

16. § 3.16.5. requires that *"Off-street loading spaces shall be located along the rear, side or end facades of buildings and shall be screened from adjoining roads and sidewalks."*

Comment – Although none of the proposed loading spaces appear to be screened from all adjoining roads and properties, they appear to be reasonably located so that in most cases their view is blocked by either the adjoining building or dumpster enclosure from the closest sidewalk and street. In the cases of Lots 1, 2, and 3 their location amid the parking lots make screening impractical. Since none of these loading spaces are associated with loading docks and are not likely to require round-the-clock use, the proposed arrangement is satisfactory. However, Lots 4, 5, and 6 have locations at which additional screen plantings need to be provided. In the case of Lot No. 6 we recommend the applicant supplement the proposed planting with a few more

shrubs along the northern property line. In the case of Lots 4 and 5, peripheral screening needs to be added around the loading space itself.

17. § 3.16.6. requires that *"Off-street loading spaces and lanes shall be designed so that there will be no need for service vehicles to back onto designated parking spaces, streets or sidewalks. Furthermore, off-street loading spaces shall not interfere with the use of access drives, sidewalks and streets."*

Comment – The location of the loading space on Lot No. 5 directly conflicts with, and would block passage on, a sidewalk that passes atop the loading space. We recommend the applicant considering revising the sidewalk design to eliminate crossing the loading space.

18. § 4.3.3. requires *"End units of townhouse buildings, and their garages and driveways, shall maintain a minimum twenty-foot (20') setback between such end units, regardless of their respective orientation (except that a maximum of three locations shall be permitted to have a minimum fifteen-foot (15') setback between end units of townhouse buildings."*

Comment – The Plan has eliminated one of the locations where the minimum 20 foot setback between the end units of townhouses has been violated; however, the applicant's response letter indicates that the distance between Units 124 and 125 is less than the required 20 feet when in fact the plan depicts it at 20.13 feet. The Plan is acceptable and the applicant should verify that the Plan is what is intended and not the statement listed in the response letter.

19. § 4.8.5. requires that *"sidewalks be fitted with designated crosswalks at all intersections of streets with streets and streets with alleys."*

Comment – Additional crosswalks need to be provided at the following locations:

- At the intersection of Townhouse Roads 3 and 4 in the extreme southeast corner of the property between townhouse unit Nos. 142 and 143;
- At the intersection of Townhouse Roads 2 and 4 either between townhouse unit Nos. 83 and 150 or 82 and 153. We recommend the applicant consider coordinating the placement of any proposed fire hydrant along Townhouse Road 4 to accommodate such a crosswalk at this location; and,
- At the intersection of Eastern Street C and Townhouse Road 2 crossing Eastern Street C on either side of Townhouse Road 2.

20. § 4.8.8. requires that *"street-side sidewalks shall be planted with a minimum of one (1) shade tree with a minimum caliper of two and one-half inches (2½") measured six (6) inches above the root ball for every forty (40) lineal feet on center."*

Comment – Additional shade trees need to be provided at the following locations:

- The southwest side of Townhouse Road 2 requires one additional shade tree; and,
- The southwest side of Townhouse Road 3 requires one additional shade tree.

21. § 4.9.5. requires that *"the Developer must also propose a suitable means for ownership and maintenance of the above uses in a manner acceptable to the Developer and Township Solicitor."*

    Comment – No such information has been provided.

22. §4.11.2. requires that *"outdoor lighting shall be provided in accordance with Section 2.12.6. of the Western Design Standards."*

    Comment – The following locations do not meet the minimum/maximum lighting level requirements:

    - Along Townhouse Road 1 at the southwest corner of unit No. 55 is a level of 0.1 footcandles;
    - Along Townhouse Road 2 at the southeast corner of unit No. 82 is a level of 2.8 footcandles; and,
    - Along Townhouse Road 3 at the southeast corner of unit No. 142 is a level of 2.5 footcandles.

23. § 4.13.1. requires that *"each townhouse shall provide for two (2) off-street parking spaces."*

    Comment – Sheet No. 11 depicts four locations where the number of parking spaces labeled does not match the actual number plotted as follows:

    - Southwest side of Townhouse Road 2 in front on Townhouse Units 61-70 there are 9 parallel parking spaces labeled and only 8 are depicted;
    - Northeast side of Townhouse Road 2 in front on Townhouse Units 98-105 there are 9 parallel parking spaces labeled and only 8 are depicted;
    - Northeast side of Townhouse Road 1 in front on Townhouse Units 49-54 there are 5 parallel parking spaces labeled and only 4 are depicted; and,
    - Southwest side of Townhouse Road 1 in front on Townhouse Units 19-24 there are 5 parallel parking spaces labeled and only 4 are depicted.

SUBDIVISION AND LAND DEVELOPMENT

1. It appears that there are trees and shrubs within five (5) feet of the water and sewer laterals. This needs to be revised (§ 4.02.G.13).

2. An exhibit indicating all proposed easements, including but not limited to, pedestrian, utility and storm water management easements needs to be provided (§ 4.02.C.2.a, 5.02.G).

3. The date, final action and conditions of approval by the Board of Supervisors on any approved modification requests needs to be included on the plan (§ 4.02.D.5).

4. All plan certificates need to be completed prior to recording the plan (§ 4.02.E).

5. The applicant will need to provide final plans on eighteen (18) inch by twenty-four (24) inch sheets (§ 4.04).

6. Evidence of an approved planning module, exemption request, or notice that a planning module is not required needs to be provided (§ 5.08).

7. The applicant needs to provide evidence of water and sewer capacity, design and financial security approvals (§ 4.03.G.20, 4.03.G.21, 5.08, 5.09).

8. The sight distance details on Sheet 61 need to be revised to note that the calculations are based on the proposed intersection configuration. In addition, the applicant needs to provide additional information on the cause of sight distance deficiencies at the Lot 6 Access Drive intersection with Eastern Street B along with what measures are proposed to provide the required sight distance. Furthermore, the applicant needs to provide required and available sight distance measurements at the proposed street intersections with Cornwall Road and Rocherty Road (§ 5.10.B, Ordinance 241 § 3.11).

9. Clear sight triangles need to be provided at the street intersections within the residential development (§ 5.10.C.1.f).

10. The proposed street names need to be provided and approved by the Township (§ 5.10.C.2).

11. The plan needs to be revised to show curbed bump-outs in place of the painted bump-outs at the intersection of Eastern Street B and the joint access drive for Lots 2 and 3 (§ 5.10, 5.10.C.7).

12. The applicant needs to provide evidence of review and concurrence by emergency service providers in relation to the need of emergency vehicles to access the rear of dwellings via the alleys.

13. The applicant needs to provide evidence of approvals from PennDOT for the required Highway Occupancy Permits (§ 510.G).

14. The following traffic control sign comments need to be addressed:
    - The speed limit sign on the western side of Rocherty Road Access Road at the intersection of Eastern Street B needs to be relocated closer to the cartway, between the clear sight triangle and the parking spaces.
    - The speed limit sign on the western side of Eastern Street A at its intersection with Eastern Street C needs to be relocated outside the clear sight triangle.
    - An additional speed limit sign needs to be provided on the southern side of Townhouse Road 4, adjacent to Lot 160.
    - A pedestrian crossing sign needs to be provided on the western side of Townhouse Road 3 in the vicinity of Lots 123 and 124.

15. Any improvements proposed in the Traffic Impact Study for the adjoining streets need to be included on the plans (§ 5.10.H).

16. The financial security estimate needs to be revised based upon these review comments. Following review and approval of the revised cost estimate, financial security and a financial security agreement need to be provided (§ 5.14).

17. The Certificate of Professional Liability Insurance provided appears to be expired. The applicant needs to provide a valid and current certificate (§ 5.15).

GENERAL

1. Sheets 4, 5 and 6 show off-site clearing, grading, or construction, including within the right-of-way of Cornwall Road and Rocherty Road. Evidence of approval for all off-site work and highway and/or right-of-way occupancy permit approvals need to be provided.

2. General Note 16 needs to be revised to include well abandonment requirements included in North Cornwall Township Ordinance No. 234.

3. The Boulder Wall Detail (Lot 5) on Sheet 56 needs to be revised to remove the second sentence from Note 6.

4. The applicant needs to provide additional information to justify the proposed all-way stop control at the intersection of Eastern Street A and Eastern Street B/Eastern Street C. Use of an all-way stop condition to control speed is prohibited. We recommend the intersection be designed with Eastern Street B/Eastern Street C as the major street and Eastern Street A as the minor street. If the applicant is concerned with vehicle speeds through intersection, other options such as raising the intersection with a speed table should be evaluated.

5. All grease traps need to be provided as required in the North Cornwall Township Grease and Oil Control Ordinance (Ordinance No. 223), as applicable.

STORM WATER MANAGEMENT

1. Construction details need to be provided for the permanent pool portion of Basin A, including but not limited to, how the water will be retained (§ 5.07.C.6). The depth of the clay liner needs to be specified in the detail.

2. A 100-year water surface elevation (a 100-year floodplain) will need to be established and preserved with required freeboard for, inclusive but not limited to, the proposed Swales 3 and 4 through the site and the areas of ponding water along Rocherty Road in accordance with Sections 5.07.E.9.h, 5.07.E.21, 5.07.G.1, and 5.07.G.2. The limits of the easements will need to be shown on a plan.

3. The depth of flow along vertical curbs in all new streets must not exceed one and one-half (1.5) inches (§ 5.07.E.12.a). In order to meet this requirement, it appears that all Type C inlets have been designed in the calculations with a two (2) inch depression. The Type C inlet top detail needs to be revised for a ten (10) inch top instead of an eight (8) inch top.

4. All storm facilities not located within a public right-of-way need to be centered within an easement (§ 5.07.E.19). The limits of the easements will need to be shown on a plan.

5. The design and details of the plunge pool proposed at the Basin A outfall needs to be provided to confirm that discharges for all storm events will leave in a manner consistent with the existing point of natural drainage discharge (§ 5.07.E.23). A comparison of the depth and velocity of flow at the plunge pool discharge needs to be provided for pre-development and post-development conditions.

6. Storm water runoff from a project site needs to flow directly into a natural watercourse or into an existing storm sewer system or onto adjacent properties in a manner significantly similar to the runoff characteristics of the pre-development flow (§ 5.07.E.24). A comparison of the depth and velocity of flow at the plunge pool discharge needs to be provided for pre-development and post-development conditions.

7. Evidence from a registered professional geologist needs to be provided certifying that the proposed storm water management facilities are located within an area that is stable and not prone to sinkhole formation (§ 5.07.E.28). Though not an ordinance requirement, this is our recommendation given the sinkhole history in the area and the proposed concentration of storm water into Swales 3/4 and the forebay, all of which are to be unlined.

8. An ownership and maintenance program, in a recordable form suitable to the Township, that clearly sets forth the ownership and maintenance responsibility of all temporary and permanent storm water management facilities and erosion control facilities needs to be provided (§ 5.07.F).

9. Evidence of approval of the Erosion and Sedimentation Control Plan and NPDES Permit by the Lebanon County Conservation District needs to be provided (§ 5.07.J). In addition, the design and details of any Best Management Practices (BMPs) proposed in conjunction with the NPDES Permit will need to be provided.

10. The applicant needs to provide information that shows how the roof leaders from the commercial buildings and residential units will discharge to the proposed storm sewers. This can be shown on the plan or with typical details and notes.

11. The capacity of the existing swale at the Basin A outfall needs to be provided to ensure the depth of flow in the swale does not create a tailwater effect on the discharge from the basin.

12. Profiles and details need to be provided for the proposed Culvert 1. For dual Culvert 1, the minimum pipe separation needs to be specified as well as retaining wall details for the road embankments.

13. The applicant needs to verify that the proposed retaining walls adjacent to Culvert 1 are located entirely outside the right-of-way.

14. The proposed offsite sanitary sewer connection appears to extend through an existing storm water detention basin berm. Details for the restoration of the berm core and outlet structure

will need to be provided. Approval from the affected landowner and the sewer authority will need to be provided.

15. The applicant needs to verify whether all townhouse roof drains are proposed to tie into the storm water conveyance system.

TRAFFIC IMPACT STUDY

We note that this submission does not constitute an official Traffic Impact Study (TIS) submission but rather provides a technical summary of the information to be included in the formal TIS. A full TIS will need to be submitted. In addition, it is important to note that while the information provided includes trip generation data for Phase 5 of the proposed development, this information was not accounted for in the capacity analyses. While it is understood that no specific timeline or plan exists for the development of Phase 5, the amount of development allowed in accordance with the Settlement Agreement for that lot represents a "worst-case" (highest traffic volume) scenario for the purposes of the Master Plan TIS. Without including traffic attributed to Phase 5 of the development, it is difficult to determine whether the improvements proposed as part of Phases 1-4 will accommodate Phase 5 traffic or be compatible with potential future improvements once the Phase 5 lot is developed. Therefore, we note that the following comments are based on the development of Phases 1-4 only and recommend that additional Phase 5 information be provided in order to produce an overall picture of the improvements needed within the study area of the Master Plan TIS.

1. The TIS assumes granting of the modification request currently in front of the Township regarding the lane configuration at the southern driveway to Cornwall Road to allow entering and exiting left-turn movements. We note that depending on the outcome of the modification request, the TIS may need to be revised.

2. There are multiple level of service degradations for both individual turning movements and overall intersections between future no-build and future build conditions, during both the 2025 and 2035 time periods. The applicant needs to provide additional information detailing the causes of the degradations and the improvements necessary to mitigate the level of service. It is understood that some improvements may be outside the scope of this development but need to be included to provide a more comprehensive Master Plan TIS.

3. The applicant needs to confirm at what locations auxiliary turn lane warrants were evaluated and the analyses need to be provided.

4. The results of the queue analysis show numerous queues that exceed both the future no-build queue and the proposed storage capacity of the auxiliary turn lane. Additional information needs to be provided identifying what improvements are necessary to accommodate the projected queue lengths.

5. The applicant needs to verify the lane configuration shown at the intersection of Route 72 and the Lowes's/K-Mart/Cedar Crest Square driveway under the 2035 projected with improvements condition during the PM peak hour. It appears the eastbound right turn is not accounted for.

6. The applicant needs to clarify whether a separate right-turn lane is proposed on eastbound Township Roadway at the middle driveway. The separate lane is shown in the capacity analyses but not referenced elsewhere in the TIS.

7. The applicant needs to clarify whether a separate right-turn lane is proposed on southbound Cornwall Road at the right-in/right-out driveway to the western development. The separate lane is shown in the capacity analyses but not referenced elsewhere in the TIS.

8. The capacity analyses need to be revised at the proposed Cornwall Road southern access under 2035 projected conditions to include the proposed northbound right-turn lane.

9. Both the 95th and 50th percentile queues on the northbound through movement at the intersection of Route 72 and the Lowe's/K-Mart/Cedar Crest Square driveway extend beyond the adjacent intersection under 2035 conditions during the weekday PM peak hour. The applicant needs to evaluate additional mitigation alternatives.

10. The proposed Township Roadway and a portion of the Phase 4 development are located on the Kreider tract. It is our understanding that this property is not owned by the applicant. Therefore, additional information needs to be provided clarifying how this proposed development will be accommodated.

Should you have any questions, or require additional information, please feel free to contact us at any time.

Sincerely,

James R. Caldwell
Group Manager

copy: Michael R. Swank, PE - Steckbeck Engineering & Surveying, Inc.

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MEMORANDUM

To: Robin Getz, North Cornwall Township Manager
Jim Caldwell, Rettew (North Cornwall Township Traffic Engineer)
John Schick, Rettew (North Cornwall Township Traffic Engineer)
Chris Lincoln, Rettew (North Cornwall Township Traffic Engineer)

From: Eric Mountz, P.E., PTOE, Traffic Planning and Design, Inc. (TPD)

Cc: Tom Kotay, Lebanon County Planning Department
Joe Deerin, Springwood Development Partners, LP (Springwood)
Donna Deerin-Ward, Springwood Development Partners, LP
Charlie Courtney, Esq.

Date: November 17, 2011

Re: **Preliminary Master Plan Transportation Impact Study Results**
North Cornwall Commons
North Cornwall Township, Lebanon County, PA
TPD# BLAC.A.00001

As you are aware, a meeting was held on Tuesday, October 4, 2011 to discuss the preliminary results and conceptual roadway improvements associated with the Master Plan Transportation Impact Study (TIS) for the above referenced project. Based upon discussions at the meeting, it was agreed that TPD would provide Rettew with the preliminary traffic volume development and capacity analyses for review in advance of the formal submission of the Master Plan TIS. Enclosed please find information related to the following:

- **Development Summary** including the proposed land uses, proposed development phasing, and proposed site access.
- **Traffic Volume Development Methodology** including existing conditions, base (no-build) conditions, trip generation, trip distribution, and projected (build) conditions.
- **Capacity Analyses** including methodology, level of service matrices, 95th percentile queue length matrices.
- **Conceptual Roadway Improvement Plan Summary** including a detailed list of the preliminary identified roadway improvements at the study area intersections.

We respectfully request that Rettew review the enclosed information and offer comments regarding the preliminary results. Upon receipt of Rettew's comments, TPD will make any necessary revisions and proceed with finalizing the Master Plan TIS for submission to the Township and County for review.

Mountz, Eric

From: John Schick <jschick@rettew.com>
Sent: Friday, October 14, 2011 3:38 PM
To: 'dtkotay@comcast.net'
Cc: Mountz, Eric
Subject: RE: North Cornwall Commons - TIS Methodology Follow Up

Thanks Tom!

RETTEW
We answer to you.

John Schick
Senior Project Manager – Transportation Engineering
3020 Columbia Avenue
Lancaster, PA 17603
Office: 717.394.3721 x3207
Fax: 717.394.1063
www.rettew.com

From: dtkotay@comcast.net [mailto:dtkotay@comcast.net]
Sent: October 14, 2011 15:34 PM
To: John Schick
Cc: Eric Mountz
Subject: Fwd: North Cornwall Commons - TIS Methodology Follow Up

John:

Sorry, I forgot to cc you on the below e-mail.

Tom

From: dtkotay@comcast.net
To: "Eric Mountz" <emountz@trafficpd.com>
Cc: "Jonathan" <JFitzkee@lebcnty.org>
Sent: Friday, October 14, 2011 3:32:03 PM
Subject: Re: North Cornwall Commons - TIS Methodology Follow Up

Eric:

The County is comfortable with this approach. As the years move along and anaylsis techniques/TIS procedures change, we'll have to adapt. Thanks!

Tom

From: "Eric Mountz" <emountz@trafficpd.com>
To: "dtkotay@comcast.net" <dtkotay@comcast.net>
Sent: Friday, October 14, 2011 10:02:21 AM
Subject: FW: North Cornwall Commons - TIS Methodology Follow Up

Tom,

When you have a chance could you please give me a call to discuss the below email.

Thanks,

Eric Mountz, P.E., PTOE
Project Manager
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1426 N. Third Street
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www.trafficpd.com

From: John Schick [mailto:jschick@rettew.com]
Sent: Friday, October 14, 2011 9:50 AM
To: Mountz, Eric; Chris Lincoln
Cc: Jim Caldwell
Subject: RE: North Cornwall Commons - TIS Methodology Follow Up

Eric:

If PennDOT District 8-0 and Lebanon County sign-off on this, we will go along with it. I'm somewhat hesitant about this since we have actual phf's from "real" data…my interpretation of the use of the 0.92 phf is for a planning study where "real" data doesn't exist. The HCM indicates that using the 0.92 should be only if "real" or field data is not available. However, if PennDOT and the County are OK with this approach, we will also concur.

…John

RETTEW
We answer to you.

John Schick
Senior Project Manager – Transportation Engineering
3020 Columbia Avenue
Lancaster, PA 17603
Office: 717.394.3721 x3207
Fax: 717.394.1063
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From: Mountz, Eric [mailto:emountz@trafficpd.com]
Sent: October 05, 2011 14:37 PM
To: John Schick; Chris Lincoln
Subject: North Cornwall Commons - TIS Methodology Follow Up

John/Chris,

This email is intended to serve as a follow up to yesterday's meeting to discuss the preliminary findings of the Master TIS for the North Cornwall Commons Development. In particular, it is in reference to TPD's methodology related to the peak hour factors (PHF) utilized in the capacity analyses completed in conjunction with the Master TIS. As we discussed, TPD utilized the following methodology related to the PHF's.

2025 Future Conditions:

The capacity analyses completed for the 2025 future conditions (both no-build and build) utilized PHF's by movement in accordance with current PennDOT methodology. No adjustments were made to the PHF's noted on the manual traffic count printouts. TPD utilized the current PennDOT methodology since the 2025 future condition capacity analyses were completed for the initial phases of the development, and thus we would anticipate presenting TIS's to PennDOT regarding these phases in the near future.

2035 Future Conditions:

The capacity analyses completed for the 2035 future conditions (both no-build and build) utilized a minimum PHF of 0.92 for all movements. Please note that if the PHF for a particular movement exceeded 0.92 today, no additional adjustments were made under the 2035 future conditions. Please note 0.92 was utilized in accordance with Chapter 10 of the HCM 2000. TPD utilized this methodology for the "master planning" portion of the study in order to maintain the spirit of preparing a realistic projection of future traffic operations.

Furthermore, it is our opinion that it the methodology is appropriate since the HCM 2010 will ultimately result in utilization of the overall intersection PHF when conducting capacity analyses. Based upon feedback from PennDOT, it is our understanding that they intend to adopt the HCM 2010 sometime in late 2011 or 2012. As such, by the time Springwood gets to the later phases of the development, and TIS's are prepared for PennDOT, the capacity analyses will be conducted utilizing of the overall intersection PHF. I have attached a summary of the manual traffic counts for the development. As you will see, of the 33 counts completed, all but 9 have overall intersection PHF's equal to or greater than 0.92.

Lastly, I would note that the utilized methodology is consistent with that recently accepted by PennDOT in the Transportation Planning Study prepared by TPD for the Route 10 Improvement Project (SR 0010, Section 000, MPMS# 10331). It has been TPD's experience that PennDOT deems the proposed methodology appropriate for long-range planning.

I would appreciate your feedback on the proposed methodology.

Thanks,

Eric Mountz, P.E., PTOE
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MEETING SUMMARY

Project: North Cornwall Commons

Location: North Cornwall Township, Lebanon County

Date: Monday, April 4, 2011 (1:00 pm)

Subject: Master Transportation Impact Study (TIS) Scoping Meeting

Place: PennDOT District 8-0 Office, 2140 Herr Street, Harrisburg, PA

Attendees: Jason Bewley, PennDOT 8-0 District Traffic Engineer
Mazhar Malik, PennDOT 8-0 District Permit Manager
Rich Deen, PennDOT 8-0 District ITS & Congestion Mgt. Manager
Eric Kinard, PennDOT 8-0 District Signals & Congestion Mgt. Supervisor
Rich Alandar, PennDOT 8-0 Assistant District Permit Manager
Chuck Trapp, PennDOT 8-0 District Traffic Unit
Tom Kotay, Lebanon County Planning Department
Bob Sentz, Lebanon County Planning Department
Jim Caldwell, Rettew, Township Traffic Engineer
John Schick, Rettew, Township Traffic Engineer
Joe Deerin, Springwood Development Partners, LP
Melissa Kelly, Springwood Development Partners, LP
Eric Mountz, Traffic Planning and Design, Inc. (TPD)

TPD Job #: BLAC.A.00001

Preparer: Eric Mountz – TPD

A scoping meeting was held to discuss the Master TIS Scoping Application dated March 11, 2011 regarding the above noted project, as well as PennDOT's associated review of the Application dated March 23, 2011. A summary of key discussion points is summarized below.

INTRODUCTION

Eric Mountz began with a brief summary of the meeting held with PennDOT on February 11, 2011 during which the Master TIS methodology was approved based upon support from North Cornwall Township and the Lebanon County Planning Department (see minutes from 2/11/11 meeting for more detail). Eric Mountz indicated that he met with Tom Kotay and John Schick on March 3, 2011 to discuss the scope of the Master TIS. Based upon feedback received during that meeting TPD prepared and submitted the Master TIS Scoping Application dated March 11, 2011. PennDOT provided comments related to the Scoping Application dated March 23, 2011 (attached).

TOPIC 1 – REVIEW OF 3/23/11 MASTER TIS SCOPING APPLICATION COMMENTS

PennDOT reviewed and provided comments dated March 23, 2011 regarding the submitted Master TIS Scoping Application. Each of the five (5) comments was discussed as described below:

Comment #1: Revisit the directional distributions used in the trip generation for the Office Park. In the am peak 88%/12% is used, but both ITE and Table 1 in the scoping application indicate that 89%/11% is to be used. In the pm peak, it is 17%/83% instead of 14%/86%. In the Saturday peak, it is 54%/46% instead of 74%/26%.

- Eric Mountz acknowledged the oversight in the application and indicated that the Office Park directional distributions would be revised accordingly when preparing the TIS.

Comment #2: Label the buildings on the site plans (restaurant, bank, pharmacy, office building, townhouse, etc), at least for the early phases of development.

- Eric Mountz indicated that the labeling will be provided on future submissions.

Comment #3: Provide the January 7, 2011 memo detailing the growth rate methodology.

- Eric Mountz indicated that the memo was provided to the Department on March 23, 2011.
- Eric Mountz noted that the memo was prepared based upon a concern raised by Township and County staff that application of a background growth factor of 33% in addition to specifically including traffic from the six (6) nearby planned developments may be unrealistic, and could ultimately lead to overdesigned intersections and roadways. As such, the memo proposed to utilize the "Build-Up Method, Using Specific Developments" outlined in Chapter 4 "Non-Site Transportation Forecast" contained in the ITE's publication Transportation Impact Analyses for Site Development. Based upon this methodology TPD proposes to assign traffic from each of the 6 known nearby planned developments to the study area intersections based upon information contained in their respective TIS's. TPD will then evaluate each individual movement at the study area intersections and assign additional traffic from unknown future development in order to ensure that each individual movement will experience a minimum total background growth consistent with that recommended by the PennDOT Bureau of Planning and Research (BPR). For the subject site, the PennDOT BPR recommends using a background growth factor of 1.16% per year in Lebanon County for urban non-interstate roadways. Therefore, under the proposed methodology each individual movement at the study area intersections will experience a minimum total background growth percentage of 33% (1.16% per year, compounded over 25 years) for the 2035 conditions.
- Jason Bewley indicated that the Department is OK with the proposed methodology outlined in the memo dated January 7, 2011 related to the background growth.

Comment #4: Explain what differentiates Phase 1A from the rest of the phases (i.e., why isn't it considered Phase 2).

- Joe Deerin explained that Phase 1 encompasses the entire section of development adjacent to Rocherty Road, including 160 townhomes. He noted that the desire is not to develop all 160

townhomes simultaneously, and as a result Phase 1A was indentified to include 108 townhomes which will be developed subsequent to the initial 52 townhomes.

Comment #5: Provide municipal comments or approval with the initial TIS submission.

- Eric Mountz indicated that the applicable comments will be provided with future submissions.

TOPIC 2 – GENERAL DISCUSSION ITEMS

- Mazhar Malik questioned the classification of the proposed roadway traversing both proposed development tracts. Jim Caldwell indicated that it will be a local roadway that will be taken over by the Township. Mazhar indicated that the Department will require a letter from the Township indicating that it is their intention to take over the roadway.
- Eric Mountz discussed the anticipated approach to identifying the roadway improvements in the Master TIS. He indicated that the TIS will analyze 10 and 20-year design horizons. The 10-year horizon (2025) will examine the initial phases of the subject development and will identify a core set of roadway improvements that will be required for the surrounding roadways. The 20-year horizon (2035) will examine full build-out of the subject development and will identify the ultimate set of roadway improvements that will be required for the surrounding roadways to accommodate traffic from not only the subject development, but also development of adjacent developments within North Cornwall Township and the surrounding municipalities.
- Eric Mountz indicated that the intention is to utilize trip thresholds to determine when improvements indentified in the Master TIS will be required. He indicated that as each Land Development application is filed with the Township a traffic evaluation will be required to identify the improvements from the Master TIS that will be required for the particular proposal. He also noted that consideraion will be given to smart implementation of the improvements when reviewing each land development application (i.e. don't complete improvements at a particular intersection multiple times). John Schick added that this approach provides a built-in check to make sure the required improvements match the level of development.
- Mazhar Malik questioned if it would be more appropriate to tie the required improvements to building permits rather than trips since the Department does not have a mechanism to monitor trips as development progresses. John Schick and Tom Kotay both indicated that it is their preference to utilize the trip threshold approach since it provides flexibility as the development progresses and adapts to economic conditions. Mazhar indicated that he is OK with this approach, but acknowledged that a detailed monitoring agreement will be required. Jason Bewley echoed Mazhar's statement that a very detailed monitoring agreement is going to be required between the Developer, Township, County, and PennDOT.
- Eric Kinard questioned if the Developer will be responsible for all of the improvements identified in the Master TIS. Eric Mountz indicated that the Developer would not be responsible for all of the improvements, but rather would be responsible for a core set of roadway improvements and a fair-share of the ultimate set of roadway improvements. Tom Kotay indicated that the MPO will be a partner in the improvements, and that the Master TIS will help them identify improvements to be added to future amendments to the TIP.

- Eric Kinard questioned if it would make sense for the MPO to take the lead as the facilitator of the improvements. Bob Sentz indicated that he didn't see a problem with the MPO taking the lead, but noted that the Township will need to play a role in the decision making process.
- Jim Caldwell indicated that the municipalities within and including the Cornwall-Lebanon School District have begun a Regional Comprehensive Plan for the area.
- Eric Mountz indicated that the Master TIS will utilize a preferred LOS to identify necessary roadway improvements rather than PennDOT's current methodology related to mitigation between build and no-build conditions. Jason Bewley indicated that the Department is OK with the approach, and that their guidelines allow it with support from the Township and County.
- Jason Bewley questioned if the one-way pairs concept for Route 72 and Cornwall Road was going to be considered in the Master TIS. Tom Kotay indicated that it would not. He indicated that there is no need for the improvement today, and that development needs to progress in order to determine if the concept is viable. Tom noted that he feels the street system would need additional improvements to accommodate the concept.
- Mazhar indicated that Tucker Ferguson asked him to relay that the Department is fully supportive of this project, and will help to ensure it becomes a reality.

Attachment: Meeting Sign-In Sheet
PennDOT's Master TIS Scoping Comments

Copy to: Meeting Attendees

8-0 Permits

pennsylvania
DEPARTMENT OF TRANSPORTATION

A Smart Transportation System & Good Access Management Practice's

Start Here on: (Date) 4-4-2011 (Time) 1:00 PM. ~~AM~~ / PM

Meeting Location: DAUPHIN ROOM

SR: _____ Offset: _____ County: LEBANON

Township/Borough: _____

Meeting Reason: T-1-S. SCOPING MEETING NORTH CORNWALL COMMONS.

Meeting Requested By: Eric Mountz Phone #: 717-234-1430 Ext. 2147

Township/ Borough Invited: yes ☑ no ☐ Any Attorney Invited: yes ☐ no ☑

Highway Occupancy Permits Meeting Sign-In (please print legibly)

Name / Phone # / Email Address:	Organization:	Job Title:
~~Randall Staudt, P~~.E. / 717-783-3848/rastaudt@state.pa.us	PENNDOT Dist. 8-0 Construction	Construction Services Engineer
☑ Mazhar Malik / 717-787-5179 / mmalik@state.pa.us	PENNDOT Dist. 8-0 Permits	District Permit Manager
☑ Rich Alandar / 717-787-5179/ ralandar@state.pa.us	PENNDOT Dist. 8-0 Permits	Assistant Permit Manager
✓ Richard Deen P.E. ~~Richard Deen, PE~~ / 717-783-3949/ rdeen@state.pa.us	PENNDOT Dist. 8-0 Traffic	ITS & Congestion Mgt. Manager
☑ Jason Bewley, P.E. / 717-783-3981/ jbewley@state.pa.us	PENNDOT Dist. 8-0 Traffic	District Traffic Engineer
☑ Eric Kinard / 717-787-9237/ ekinard@state.pa.us	PENNDOT Dist. 8-0 Traffic	Signals & Congestion Mgt. Supervisor
BOB SENTZ	LEBANON COUNTY PLANNING DEPT.	(717) 228-4444 bsentz@lebcnty.org
MELISSA KELLY	SPRINGWOOD DEV.	mkelly@lms-pma.com
Eric Mountz	TPD	emountz@trafficpd.com
JOSEPH DEERIN	SPRINGWOOD DEV	JW DEERIN@LMS-PMA.COM
Chuck Trapp 717-705-6178	PennDOT Traffic	Traffic Control Specialist
JOHN SCHICK 394-3721 JSCHICK@RETTEW.COM	RETTEW	Sr. PROJ. MGR
TOM KOTAY 272-0642 DTKOTAY@COMCAST.NET		LEBCO MPO STAFF SUPPORT
JIM CALDWELL	RETTEW/N. CORNWALL TWP.	MUNI. CONSULTANT.

- * NOT IN ATTENDANCE
- MINUTES OF MEETING WILL BE PREPARED BY PERSON REQUESTING THE MEETING
- A COPY OF THIS SIGN IN SHEET WILL BE DISTRIBUTED AFTER THE MEETING
- LETTERS OF CREDIT WILL BE REQUIRED BEFORE THE PERMIT IS ISSUED ON DEPARTMENT FORM (M-950L) EXCEPT FOR MINIMUM USE DRIVEWAYS
- APPLICANT/ENGINEER MUST REVIEW RECENT STRIKE OFF MEMO 470 - 09 -2, SOL ON ACCESS RELEASE PROCEDURES, AND MEMO 450 – 09 – 7, SOL ON THE FORM OF INDEMNIFICATION
- DEPARTMENT CAN NOT ACCEPT ANY CHANGES TO THE FORMS ALREADY APPROVED BY THE DEPARTMENT
- ALL HIGH & MEDIUM VOLUME DRIVEWAY HOP PACKAGES ARE TO BE DROPPED OFF AT THE RECEPTIONIST'S DESK OF THE DISTRICT 8-0 OFFICE BUILDING.

THANK YOU…

Updated: 02/18/2011

Scope Application Comment Sheet

COUNTY:	Lebanon County	**MUNICIPALITY:**	North Cornwall Township, Lebanon County
JOB NAME:	North Cornwall Commons	**PREPARED BY:**	TPD
		REVIEW BY:	PennDOT/SAI/FE

Please incorporate these comments into the Master Traffic Impact Study for this development.

Scope Application Comments

1. Revisit the directional distributions used in the trip generation for the Office Park. In the am peak 88% / 12% is used, but both ITE and Table 1 in the scoping application indicate that 89% / 11% is to be used. In the pm peak, it is 17% / 83% instead of 14% / 86%. In the Saturday peak, it is 54% / 46% instead of 74% / 26%.

2. Label the buildings on the site plans (restaurant, bank, pharmacy, office building, townhouse, etc), at least for the early phases of development.

3. Provide the January 7, 2011 memo detailing the growth rate methodology.

4. Explain what differentiates Phase 1A from the rest of the phases (i.e., why isn't it considered Phase 2)?

5. Provide municipal comments or approval with the initial TIS submission.

TRAFFIC PLANNING AND DESIGN, INC.
Est. 1989
4507 NORTH FRONT STREET, STE 202
HARRISBURG, PA 17110
PHONE: 717.234.1430
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WWW.TRAFFICPD.COM

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March 11, 2011

Mr. Mazhar Malik
Permits Manager
PennDOT District 8-0
2140 Herr Street
Harrisburg, PA 17103

RE: **Master Transportation Impact Study (TIS) Scoping Application**
North Cornwall Commons
North Cornwall Township, Lebanon County, PA
TPD# BLAC.A.00001

Dear Mazhar:

On behalf of Springwood Development Partners, L.P., Traffic Planning and Design, Inc. (TPD) has prepared the following revised TIS Scoping Application for the above referenced project. The application has been revised based upon feedback received at the meeting held with the Department on February 11, 2011 (see attached minutes), and subsequent correspondence with the North Cornwall Township Traffic Engineer (Rettew) and the Lebanon County Planning Department. This information has been compiled in accordance with the application procedures outlined in Strike-Off Letter 470-09-4, dated February 12, 2009. We appreciate your review of the enclosed information.

Scoping Meeting Date(s): June 28, 2010 and February 11, 2011
Applicant: Springwood Development Partners, L.P.
Applicant's Consultant: TPD (Eric Mountz)
Applicant's Primary Contacts: Joe Deerin/Rich Welkowitz

A list of the anticipated meeting attendees including phone numbers and email addresses is attached.

1. *LOCATION OF PROPOSED DEVELOPMENT:*

   PennDOT Engineering District: 8-0 County: Lebanon
   Municipality: North Cornwall Township
   State Routes: Cornwall Road (S.R. 2001)
   Segment(s): 0060 Offset(s): 1383;

   Please refer to the attached **Figure 1** which shows the project location.

2. *DESCRIPTION OF PROPOSED DEVELOPMENT:*

   - Proposed Site Access:

     67+/- Acre Tract on the Western Side of Cornwall Road (S.R. 2001)

     - With development of the proposed site the Applicant is proposing to construct a new east-west Township Roadway that will connect Cornwall Road (S.R. 2001) to Route 72

(S.R. 0072) via the existing access to the Tractor Supply/Cedar Crest Square. This portion of the development will be served via three (3) full-access driveways to the proposed Township Roadway. In addition, there will be two (2) right-in/right-out driveways to Cornwall Road (S.R. 2001).

81+/- Acre Tract on the Eastern Side of Cornwall Road (S.R. 2001)

- This portion of the development will be served via five (5) driveways to the external roadway network, comprised of the following:
  - A full-access driveway to Cornwall Road (S.R. 2001), opposite the proposed Township Roadway through the 67+/- Acre Tract;
  - A right-in/right-out driveway to Cornwall Road (S.R. 2001);
  - Two (2) full-access driveways to Rocherty Road (S.R. 2002), opposite the existing driveways to the Lebanon Valley Expo Center;
  - A full-access connection to Norman Drive.

- Proposed Land Uses:

67+/- Acre Tract on the Western Side of Cornwall Road

- 600,600 square foot Shopping Center consisting of an integrated mix of big box retail, strip retail, and pad sites.

81+/- Acre Tract on the Eastern Side of Cornwall Road

- 436,400 square foot Office Park consisting of an integrated mix of office building and support services, including a 11,400 square foot pharmacy, two (2) 6,000 square foot sit-down restaurants, and a 4,000 square foot drive-in bank;
- 100 room hotel;
- 160 luxury townhomes.

- Community Linkages (access to neighboring properties, cross easements, pedestrian and transit accommodations): The proposed development will include an internal pedestrian trail system interconnecting the entire site, a connection to the Lebanon Valley Rail-Trail, and designated stops for the Lebanon Transit Authority.

3. *DEVELOPMENT SCHEDULE AND STAGING:*

- Anticipated Opening Year: 2012
- Anticipated Full Build-Out Year: 2030
- Proposed Phasing (see attached plans):

Phase 1 (southern portion of 67+/- acre tract located generally adjacent to Rocherty Road):

- 56,400 square feet of the Office Park, including the two (2) 6,000 square foot sit-down restaurants;
- 100 room hotel;
- 52 luxury townhomes.

Phase 1A (southern portion of 67+/- acre tract located generally adjacent to Rocherty Road):

- 108 luxury townhomes.

Phase 2 (northeast portion of 67+/- acre tract located adjacent to the Tuck Business Park):

- 160,600 square feet of the Office Park.

Phase 3 (northwest portion of 67+/- acre tract located generally adjacent to Cornwall Road):

- 216,200 square feet of the Office Park, including the 11,400 square foot pharmacy and the 4,000 square foot drive-in bank.

Phase 4 (located on southern side of proposed Township roadway that bisects the 81+/- acre tract):

- 322,150 square feet of the Shopping Center.

Phase 5 (located on northern side of proposed Township roadway that bisects the 81+/- acre tract):

- 278,450 square feet of the Shopping Center.

4. *TRIP GENERATION:*

Trip generation for the proposed development will be based on:

☒ ITE Trip Generation Manual.

- Residential Condominium/Townhouse (ITE Land Use Code #230)
- Hotel (ITE Land Use Code #310)
- Office Park (ITE Land Use Code #750)
- Shopping Center (ITE Land Use Code #820)

☐ Other independent surveys.

Table 1 shows the trip generation equations and directional splits for an average weekday and the weekday A.M., weekday P.M., and Saturday midday peak hours.

TABLE 1
TRIP GENERATION DATA

Land Use	Time Period	Trip Generation Equations	Directional Split	
			Entering	Exiting
Residential Condominium/ Townhouse (#230)	Average Weekday	Ln(**T**) = 0.87 Ln(**X**) + 2.46	50%	50%
	A.M. Peak Hour	Ln(**T**) = 0.80 Ln(**X**) + 0.26	17%	83%
	P.M. Peak Hour	Ln(**T**) = 0.82 Ln(**X**) + 0.32	67%	33%
	Saturday Peak Hour	**T** = 0.29(**X**) + 42.63	54%	46%
Hotel (#310)	Average Weekday	**T** = 8.17(**X**)	50%	50%
	A.M. Peak Hour	**T** = 0.56(**X**)	61%	39%
	P.M. Peak Hour	**T** = 0.59(**X**)	53%	47%
	Saturday Peak Hour	**T** = 0.72(**X**)	56%	44%
Office Park (#750)	Average Weekday	**T** = 11.42(**X**)	50%	50%
	A.M. Peak Hour	**T** = 1.71(**X**)	89%	11%
	P.M. Peak Hour	**T** = 1.48(**X**)	14%	86%
	Saturday Peak Hour	**T** = 0.14(**X**)	74%	26%
Shopping Center (#820)	Average Weekday	Ln(**T**) = 0.65 Ln(**X**) + 5.83	50%	50%
	A.M. Peak Hour	Ln(**T**) = 0.59 Ln(**X**) + 2.32	61%	39%
	P.M. Peak Hour	Ln(**T**) = 0.67 Ln(**X**) + 3.37	49%	51%
	Saturday Peak Hour	Ln(**T**) = 0.65 Ln(**X**) + 3.76	52%	48%

T = Total Trips, **X** = Independent Variable (Dwelling Units, Rooms, 1,000 Square Feet Gross Floor/Leasable Area)

Based on the information provided in the Trip Generation Manual, an Institute of Transportation Engineers (ITE) Informational Report, not all trips generated by the site are trips that are "new" to the roadway system. In addition to the new trips generated, there are pass-by trips, which are trips that are drawn from the passing traffic stream and do not add trips to the adjacent roadways. Pass-by trip percentages for the proposed site were utilized as specified in the ITE Trip Generation Handbook, June 2004 edition. The pass-by percentages utilized are shown in **Table 2**.

TABLE 2
PASS-BY PERCENTAGES

Land Use	Pass-by Percentage		
	A.M. Peak Hour	P.M. Peak Hour	Saturday Peak Hour
Residential Condominium/ Townhouse	0%	0%	0%
Hotel	0%	0%	0%
Office Park	0%	0%	0%
Shopping Center	0%	34%	26%

The PennDOT Policies and Procedures for Transportation Impact Studies, January 28, 2009, recognizes the potential for non-vehicular trips and offers standard assumptions for the modal split of alternative trips provided that pedestrian, bike, and transit-friendly characteristics present. Based upon a review of Table 2 on page 21 of the document, TPD utilized modal trip reductions of 4%, 1%, and 3% to account for alternative trips made by pedestrians, bikes, and transit vehicles, respectively.

For purposes of this trip generation analysis, **Full Build-Out** of the proposed development plan was assumed to consist of the following mix of land uses:

- 160 Condominium/Townhome dwelling units (ITE Land Use Code #230);
- 100 room hotel (ITE Land Use Code #310);
- 436,400 square foot office park (ITE Land Use Code #750);
- 600,600 square foot Shopping Center (ITE Land Use Code #820).

Tables 3, 4, 5 and 6 summarize the trip generation for **Full Build-Out** of the proposed development for an average weekday and the weekday A.M., P.M., and Saturday midday peak hours, respectively.

TABLE 3
TRIP GENERATION (FULL BUILD-OUT) – AVERAGE WEEKDAY

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	21778	-1742	-0	20036	10018	10018	---	---	---	---	---	---
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	970	-78	-0	892	446	446	---	---	---	---	---	---
Hotel	818	-64	-0	754	377	377	---	---	---	---	---	---
Office Park	4984	-398	-0	4586	2293	2293	---	---	---	---	---	---
Subtotal	6772	-540	-0	6232	3116	3116	---	---	---	---	---	---
Total	**28550**	**-2282**	**-0**	**26268**	**13134**	**13134**	**---**	**---**	**---**	**---**	**---**	**---**

TABLE 4
TRIP GENERATION (FULL BUILD-OUT) –WEEKDAY A.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	444	-36	-0	408	249	159	0	0	0	408	249	159
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	75	-6	-0	69	12	57	0	0	0	69	12	57
Hotel	56	-4	-0	52	32	20	0	0	0	52	32	20
Office Park	746	-60	-0	686	604	82	0	0	0	686	604	82
Subtotal	877	-70	-0	807	648	159	0	0	0	807	648	159
Total	**1321**	**-106**	**-0**	**1215**	**897**	**318**	**0**	**0**	**0**	**1215**	**897**	**318**

TABLE 5
TRIP GENERATION (FULL BUILD-OUT) –WEEKDAY P.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	2115	-169	-0	1946	954	992	662	331	331	1284	623	661
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	88	-7	-0	81	54	27	0	0	0	81	54	27
Hotel	59	-5	-0	54	29	25	0	0	0	54	29	25
Office Park	646	-52	-0	594	101	493	0	0	0	594	101	493
Subtotal	793	-64	-0	729	184	545	0	0	0	729	184	545
Total	**2908**	**-233**	**-0**	**2675**	**1138**	**1537**	**662**	**331**	**331**	**2013**	**807**	**1206**

TABLE 6
TRIP GENERATION (FULL BUILD-OUT) – SATURDAY MIDDAY PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	2748	-220	-0	2528	1315	1213	658	329	329	1870	986	884
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	89	-7	-0	82	44	38	0	0	0	82	44	38
Hotel	72	-6	-0	66	37	29	0	0	0	66	37	29
Office Park	61	-5	-0	56	30	26	0	0	0	56	30	26
Subtotal	222	-18	-0	204	111	93	0	0	0	204	111	93
Total	**2970**	**-238**	**-0**	**2732**	**1426**	**1306**	**658**	**329**	**329**	**2074**	**1097**	**977**

5. *ESTIMATED DAILY TRIP GENERATION/DRIVEWAY CLASSIFICATION:*

   a. Estimated Daily Trip Generation of Full Build-Out of the Proposed Development (Assuming One Access Point): 26,268 trips/day = 13,134 vehicles/day
   b. Driveway Classification Based on Trip Generation and One Access Point: High Volume Driveway

6. *TRANSPORTATION IMPACT STUDY REQUIRED?*

   ☐ No
   ☒ Yes, based on:
   - ☒ 3,000 or more vehicle trips/day generated
   - ☒ During any one-hour time period, 100 or more new (added) vehicle trips generated entering or 100 or more new (added) vehicle trips generated exiting development
   - ☐ Other considerations as described below:

7. *TRAFFIC IMPACT ASSESSMENT REQUIRED?* ☒ **No** ☐ **Yes**

8. *TIS STUDY AREA:*

   - Roadway and Study Intersections:
     - Route 72 (S.R. 0072) & Rocherty Road;
     - Route 72 (S.R. 0072) & Lowe's/Cedar Crest Square/Tractor Supply Driveways;
     - Route 72 (S.R. 0072) & Lowe's/K-Mart/Cedar Crest Square Driveways;
     - Route 72 (S.R. 0072) & Isabel Drive;
     - Route 72 (S.R. 0072) & York Street/Lebanon Plaza Mall Driveway;
     - Route 72 (S.R. 0072) & Colebrook Road (S.R. 0241);
     - Cornwall Road (S.R. 2001) & Rocherty Road (S.R. 2002);
     - Cornwall Road (S.R. 2001) & Isabel Drive/Norman Drive;
     - Cornwall Road (S.R. 2001) & York Street;
     - Cornwall Road (S.R. 2001) & Wilhelm Avenue;
     - Rocherty Road/Evergreen Road (S.R. 2002) & Lincoln Avenue.
     - [*See proposed circled study area intersections from attached* ***Figure 1****].*

9. *STUDY AREA TYPE:*

   Urban ☒ Rural ☐

   - Per PennDOT's Functional Classification Map of Lebanon County, Route 72 (S.R. 0072) is defined as a principal arterial roadway.
   - Per PennDOT's Functional Classification Map of Lebanon County, Cornwall Road (S.R. 2001) to the north of Rocherty Road, York Street, and Wilhelm Avenue are defined as minor arterial roadways.
   - Per PennDOT's Functional Classification Map of Lebanon County, Cornwall Road (S.R. 2001) to the south of Rocherty Road, Rocherty Road (S.R. 2002) to the east of Route 72, Lincoln Avenue to the north of Rocherty Road, and Colebrook Road (S.R. 0241) are defined as collector roadways.

- Per PennDOT's Functional Classification Map of Lebanon County, Rocherty Road to the west of Route 72, Lincoln Avenue to the south of Rocherty Road, Isabel Drive, and Norman Drive are defined as local roadways.
- The Lowe's, Cedar Crest Square, Tractor Supply, and Lebanon Plaza Mall Driveways are private roadways.

10. TIS ANALYSIS PERIODS AND TIMES:

Peak Hours to be evaluated:

- Weekday A.M. peak hour (peak hour within the 7:00-9:00 A.M. peak period);
- Weekday P.M. peak hour (peak hour within the 2:30-6:00 P.M. peak period);
- Saturday midday peak hour (peak hour within the 10:45 A.M.-12:45 P.M. peak period).

Study Years to be evaluated:

- Existing Conditions
- 2025 Conditions (10-Year Build-Out)
  - Per the request of the Township and County, this study year has been included in order to analyze the future traffic conditions 10-years beyond opening of the proposed development. The associated analyses will include traffic associated with the development related land uses/phases that are reasonably assumed to be constructed within the 10-year period. The specific land uses/phases to be assumed have not yet been determined, however will be provided for review in advance of proceeding with the TIS.
- 2035 Conditions (20-Year Full Build-Out in accordance with Federal Design Standards)

11. TRAFFIC ADJUSTMENT FACTORS:

a. Seasonal Adjustment: N/A
b. Annual Base Traffic Growth: Based upon correspondence with Township and County staff, utilize the "Build-Up Method, Using Specific Developments" outlined in Chapter 4 "Non-Site Transportation Forecast" contained in the ITE's publication Transportation Impact Analyses for Site Development. A summary of the proposed methodology is outlined below. Additional detail is included in the memorandum prepared by TPD dated January 7, 2011.

   TPD proposes to assign traffic from each of the six (6) known nearby planned developments (see section 12 below) to the study area intersections based upon information contained in their respective TIS's. TPD will then evaluate each individual movement at the study area intersections and assign additional traffic from unknown future development in order to ensure that each individual movement will experience a minimum total background growth consistent with that recommended by the PennDOT Bureau of Planning and Research (BPR). For the subject site, the PennDOT BPR recommends using a background growth factor of 1.16% per year in Lebanon County for urban non-interstate roadways. Therefore, under the proposed methodology each individual movement at the study area intersections will experience a minimum total background growth percentage of 33% (1.16% per year, compounded over 25 years) for the 2035 conditions.

c. Pass-By Trips: Per ITE *Trip Generation Handbook* (see section #4 – Trip Generation for more information).
d. Captured Trips for Multi-Use Sites: N/A.
e. Modal Split Reductions: Per PennDOT *Policies and Procedures for Transportation Impact Studies* (see section #4 – Trip Generation for more information)
f. Other Reduction: N/A

12. *OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC:*

TPD will specifically include background traffic volumes related to the following developments:

- *BTKD Development (aka Sheetz Outparcels)*, located in North Cornwall Township on the northern side of Rocherty Road, east of Route 72. Based upon TPD's knowledge, the development will consist of 30,813 s.f. of specialty retail space.
- *Tractor Supply Outparcels*, located in North Cornwall Township on the eastern side of Route 72, north of Rocherty Road. Based upon TPD's knowledge, the outparcels will consist of a 4,279 s.f. drive-in bank and one other commercial user that will be consistent with current zoning for the parcel.
- *Veteran's Administration Medical Center Expansion*, located in South Lebanon Township between Lincoln Avenue and State Drive, north of Rocherty Road. The proposed expansion will consist of adding 504 employees at the existing facility.
- *Alden Place*, located in Cornwall Borough on the eastern side of Route 72, between Route 419 and Ironmaster Road. The proposed age-restricted development will be constructed in five (5) phases, with full build-out consisting of 505 residential dwelling units (445 single homes/villas in the Cornwall neighborhood and 60 single homes in the Northgate neighborhood). Based upon a conversation with a staff member of the communities sales office in October 2009, 100 of the units in the Cornwall neighborhood are built and occupied and 3 of the units in the Northgate neighborhood are built and occupied.
- *The Preserve at Historic Cornwall Village*, located in Cornwall Borough between Route 322 and Route 419 in the vicinity of Burd Coleman Village and Minersvillage. Full build-out of the proposed development will consist of 590 residential dwelling units (390 age-targeted units and 200 market-rate units), a hotel with 250 conventional rooms and 60 cottages, a 60,000 square foot (s.f.) indoor water park, a village commercial area with 150,000 s.f. of total space, and 12,000 s.f. of restaurant space.

13. *TRIP DISTRIBUTION AND ASSIGNMENT:*

The distribution and assignment of site-generated new trips will be based upon an analysis of the following: (1) existing traffic patterns and distributions within the study area; (2) available routes for travel; and (3) the proposed site driveway locations.

For the office/residential land uses, a modified gravity model analysis was performed using the 2000 census journey to work figures for North Cornwall Township. The 2000 census journey to work figures summarize the number of people that travel to North Cornwall

Township to work from seventy-one surrounding municipalities in Berks, Chester, Cumberland, Dauphin, Juniata, Lancaster, Lebanon, Northumberland, Schuylkill, Westmoreland and York Counties. The results of the gravity model analysis are attached for reference. Furthermore, the trip distribution percentage between the eastern and western tracts of the development was determined based upon ITE's methodology for calculating the interaction factor for multi-use developments. The results of the interaction factor calculations are attached for reference. Based on the results of the gravity model and interaction factor methodology, the new office/residential trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 7**.

TABLE 7
NEW TRIP DISTRIBUTION PERCENTAGES
OFFICE/RESIDENTIAL LAND USES

Distribution	Destination	Assignment (To/From)	Percentage
To/From North	Route 72, Route 343, Route 934 and Route 422	North via Route 72	16%
		North via Cornwall Road	31%
To/From South	Route 72, Route 322 and Route 419	South via Route 72	16%
		South via Cornwall Road	5%
To/From East	Route 422, Route 501 and Route 897	East via Evergreen Road	5%
		East via Wilhelm Avenue	11%
To/From West	Route 241, Route 322 and Route 934	West via Rocherty Road	6%
To/From Proposed Site	Eastern and Western Tracts	Proposed Township Road	10%

For the retail land uses, a gravity model analysis was performed using the 2000 census population figures for North Cornwall Township and the twelve (12) neighboring municipalities (approximately 10 mile radius). The results of the gravity model analysis are attached for reference. Furthermore, the trip distribution percentage between the eastern and western tracts of the development was determined based upon ITE's methodology for calculating the interaction factor for multi-use developments. The results of the interaction factor calculations are attached for reference. Based on the results of the gravity model and interaction factor methodology, the new retail trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 8**.

TABLE 8
NEW TRIP DISTRIBUTION PERCENTAGES
RETAIL LAND USES

Distribution	Destination	Assignment (To/From)	Percentage
To/From North	Route 72, Route 343, Route 934 and Route 422	North via Route 72	18%
		North via Cornwall Road	26%
To/From South	Route 72, Route 322 and Route 419	South via Route 72	13%
		South via Cornwall Road	4%
		South via Lincoln Avenue	1%
To/From East	Route 422, Route 501 and Route 897	East via Evergreen Road	9%
		East via Wilhelm Avenue	9%
To/From West	Route 241, Route 322 and Route 934	West via Rocherty Road	10%
To/From Proposed Site	Eastern and Western Tracts	Proposed Township Road	10%

14. APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES:

Manual traffic counts were conducted in May 2009 and October 2010 at the study area intersection (see section 8 above) for the weekday morning (7:00-9:00 A.M.), weekday evening (2:30-6:00 P.M.), and Saturday midday (10:45 A.M.-12:45 P.M.) peak hour time periods. TPD proposes to utilize these traffic counts in the TIS.

Existing peak hour traffic volumes are attached as **Figures 2-4** for the weekday A.M., weekday P.M., and Saturday midday peak hours.

15. CAPACITY/LOS ANALYSIS:

Capacity analyses will be conducted at the study area intersection for the peak hours and the study years will be evaluated according to the methodologies contained in the 2000 Highway Capacity Manual (HCM), utilizing SYNCHRO software. In addition, capacity analyses will be conducted at the proposed site driveway intersections under opening year and design year conditions during the peak hours.

16. ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED:

N/A

17. OTHER NEEDED ANALYSES:

a. Sight Distance Analysis: A sight distance analysis will be performed for the proposed site driveway locations.

b. Signal Warrant Analysis: If necessary, TPD will complete signal warrant analyses at the unsignalized study intersections and/or proposed site driveway locations.

c. Required Signal Phasing/Timing Modifications: If necessary, TPD will make recommendations for traffic signal timing and/or phasing modifications based on results of the analysis.

d. Traffic Signal Corridor/Network Analysis: N/A

e. Analysis of the Need for Turning Lanes: TPD will analyze auxiliary turn lane warrants at the proposed site driveway locations and the study area intersections during all scenarios. The warrant analysis methodology contained within Chapter 11 of PennDOT's Publication 46 and Strike-Off Letter 470-08-07 will be utilized for this analysis.

f. Turning Lane Lengths: TPD will analyze auxiliary turn lane lengths at the proposed site driveway locations and the study area intersection during full build-out condition for all scenarios. The analysis methodology contained within Chapter 11 of PennDOT's Publication 46 and Strike-Off Letter 470-08-07 will be utilized for this analysis.

g. Left Turn Signal Phasing Analysis: TPD will analyze left turn signal phasing only where signal phasing changes are proposed *(please see 17.c. – Required Signal Phasing/Timing Modifications for more information)*.

h. Queuing Analysis: TPD will analyze the 95th percentile queue lengths for all approaches of the proposed site driveways and study area intersections during all time periods analyzed. This analysis will be completed using the SYNCHO software which is based on the methodologies contained in the 2000 Highway Capacity Manual (HCM).

i. Gap Studies: N/A

j. Crash Analysis: TPD will conduct and submit a crash data analysis under separate cover that will contain an analysis of reportable crashes along roadway segments in the study area. A reportable crash shall be defined as a crash where fatality occurs and/or a vehicle is towed from the scene of the crash.

k. Weaving Analysis: N/A

l. Other Required Studies: N/A

18. ADDITIONAL COMMENTS OR RECOMMENDATIONS RELATIVE TO THE SCOPE OF THE TIS:

During the previously referenced meeting with PennDOT on February 11, 2011, it was suggested that the Master Transportation Impact Study employ the basic principles of an ACT 209 Study. In particular, both the County and Township have recommended utilizing the "Preferred Level of Service" methodology associated with a Roadway Sufficiency Analysis to identify the required set of roadway improvements. As such, TPD proposes to utilize the noted methodology in place of the current level of service requirements identified in PennDOT's Transportation Impact Study Guidelines to determine the appropriate roadway improvements.

We appreciate your review of the enclosed information. If there are any questions or comments, please do not hesitate to contact me.

Respectfully submitted,

TRAFFIC PLANNING AND DESIGN, INC.

Eric M. Mountz, P.E., PTOE
Project Manager

Attachments: 2/11/11 Meeting Minutes
Anticipated Meeting Attendee Contact List
Figure 1: Location Map
Figures 2-4: Existing Condition Traffic Volumes
Gravity Model Analysis
Site Plans with Phasing

cc: Joe Deerin, Springwood Development Partners, L.P.
Rich Welkowitz, Springwood Development Partners, L.P.
Robin Getz, North Cornwall Township Manager
Tom Kotay, Lebanon County Planning Department
John Schick, Rettew (North Cornwall Township Traffic Engineer)
Jim Caldwell, Rettew (North Cornwall Township Traffic Engineer)
Project File, TPD# BLAC.A.00002

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MEETING SUMMARY

Project: North Cornwall Commons

Location: North Cornwall Township, Lebanon County

Date: Friday, February 11, 2011 (1:00 pm)

Subject: Future Transportation Planning and Master Plan TIS Methodology

Place: PennDOT District 8-0 Office, 2140 Herr Street, Harrisburg, PA

Attendees:
Jason Bewley, PennDOT 8-0 District Traffic Engineer
Mazhar Malik, PennDOT 8-0 District Permit Manager
Rich Deen, PennDOT 8-0 District ITS & Congestion Management Manager
Kris Troup, Lebanon County Planning Department
Tom Kotay, Lebanon County Planning Department
Bob Sentz, Lebanon County Planning Department
Jonathan Fitzkee, Lebanon County Planning Department
Scott Russell, Rettew, Township Traffic Engineer
Jim Caldwell, Rettew, Township Traffic Engineer
John Schick, Rettew, Township Traffic Engineer
Curtis Kulp, South Lebanon Township Manager
Richard McAlevy, Lebanon VA Medical Center
Ricardo Ramos, Lebanon VA Medical Center
Nick Rakowski, Nave Newell, Inc.
Joe Deerin, Springwood Development Partners, LP
Rich Welkowitz, Springwood Development Partners, LP
Donna Deerin Ward, Springwood Development Partners, LP
Melissa Kelly, Springwood Development Partners, LP
Eric Mountz, Traffic Planning and Design, Inc. (TPD)

TPD Job #: BLAC.A.00001

Preparer: Eric Mountz – TPD

A meeting was held to discuss the future transportation planning for North Cornwall Township, as well as the Master Plan Transportation Impact Study (TIS) methodology proposed in conjunction with the North Cornwall Commons Development. A summary of key discussion points is summarized below.

INTRODUCTION

Tom Kotay and Kris Troup spoke on behalf of the Lebanon County Planning Department and provided a brief overview regarding the importance of the proposed North Cornwall Commons Development. Their key points were as follows:

- The project is supported by many of local entities including, but not limited to, the Lebanon County Planning Department, the Lebanon County Commissioners, the Lebanon Valley Expo Center, Lebanon County Economic Development Corporation, the City of Lebanon, North Cornwall Township, the Cornwall-Lebanon School District, the Lebanon County Chamber of Commerce, Lebanon Transit, the Lebanon VA Medical Center, Representative Gingrich, Senator Folmer, Senator Casey, and Congressman Holden.
- The project is located in the heart of one of the county's key growth areas, as designated in the Lebanon County Comprehensive Plan.
- The proposed development is consistent with three (3) key objectives of the Lebanon County Comprehensive Plan: (1) encourage development that includes multi-model transportation opportunities, (2) encourage development that preserves agriculture, and (3) encourage development in areas with suitable roadway infrastructure and promote PennDOT smart growth concepts.
- The proposed development will provide much needed jobs, an increased tax base, and needed service uses.
- Through added infrastructure sewer service will be extended to the adjacent Lebanon Valley Expo Center and County office building which currently are limited by on-site facilities.
- The proposed development will help facilitate many of the core transportation improvements that have been needed in the area for many years.

Eric Mountz provided an update regarding the current status of the transportation planning for the proposed North Cornwall Commons Development. His key points were as follows:

- The development consists of approximately 150± acres which are bisected by Cornwall Road. The eastern tract consists of 81± acres and will include a 436,400 square foot Office Park, a 100-room hotel, and 160 luxury townhomes. The western tract consists of approximately 67± acres and will include a 600,600 square foot Towne Center.
- The proposed development has been in the planning stages for the past four years, and as of the fall of last year a Settlement Agreement was finalized with North Cornwall Township.
- A TIS scoping application for the project was approved by PennDOT on September 23, 2010.
- Subsequent to receiving the approved TIS scope the developer identified a build-out schedule consisting of five (5) phases. The eastern tract is anticipated to comprise the first three (3) phases of development, with the final two (2) phases of development anticipated on the western tract.
- Based upon the anticipated phasing schedule, 70-75% of the total traffic generation for the development will not occur until phases 4 and 5 (i.e. shopping center on western tract).

- Given the fact that a large majority of the traffic generation, and associated roadway improvements, will not occur until the final phases of development, phasing of the roadway improvements is critical to the project.
- The project team understands that PennDOT is receptive to phased roadway improvements, but also understands that PennDOT typically requires that all required right-of-way (ROW) for the overall set of roadway improvements is obtained in conjunction with the initial phase.
- Given the fact that obtaining all required ROW for the overall set of roadway improvements is likely to be difficult with the initial phase, the Project Team met with County and Township staff to discuss a strategy for implementation of long term transportation improvements.
- As a result of meetings with County and Township staff, it was suggested that the developer fund a Master Plan TIS that will be prepared on behalf of North Cornwall Township. The Master Plan TIS would consider the future transportation needs of the surrounding roadway network for a 20-year period (2035).
- By completing the Master Plan TIS, the developer could complete smaller studies as individual phases or parcels come on line. Under this option appropriate roadway improvements would be identified for the phase or parcel based upon the Master Plan TIS, and associated HOP applications would be filed with PennDOT. This methodology would eliminate the need to acquire all of the required ROW for the overall set of roadway improvements with the initial phase.

TOPIC 1 – MASTER PLAN TRANSPORTATION IMPACT STUDY

Based upon the information presented during the introductions, Jason Bewley indicated that he felt that the proposed Master Plan TIS methodology is most appropriate since it will: (1) Link land use and transportation needs in accordance with Smart transportation principals, and (2) Allow the County and Township to take the lead on planning future transportation improvements. He indicated that the State is encouraging economic development, and that the proposed development will obviously help with that objective.

Jason questioned if the County or Township have a Transportation Impact Fee (ACT 209) or Ordinances that will help drive the Master Plan TIS process. Tom indicated that the Township does not have an ACT 209 and that there are not any specific Ordinances that will help drive the process, however noted the location of the development is located in the urban growth boundary outlined in the County's Comprehensive Plan. He indicated that the surrounding roadway network is generally acceptable today, and therefore the goal is to properly plan for the future. Kris added that having the ability to work with a single developer in planning the 150+/- acres is an ideal situation when compared to potentially having to deal with multiple developers. Jim Caldwell added that the municipalities within and including the Cornwall-Lebanon School District have begun a Comprehensive Plan for the area. He also added that North Cornwall Township has completed a Master Plan for Non-Motorized Trail Connections, and that the proposed development will incorporate many elements of that plan including a trailhead connection to the adjacent rail-trail.

John Schick indicated that he envisions that the Master Plan TIS will include a comprehensive list of improvements that will be required to accommodate future transportation needs. The list will

need to include trip thresholds related to when each improvement will be required. As development comes on line the associated trip generation will need to be considered and an appropriate level of improvements will be required. Joe Deerin indicated that John's approach is appropriate given the fact that he and Rich Welkowitz cannot afford to fund all of the required improvements that will be identified in the Master Plan TIS, nor will they create the need for all of the future improvements.

Scott Russell indicated that a similar Master Plan process is underway in East Hempfield Township, Lancaster County. He indicated that the Project team is more than welcome to coordinate with Rettew regarding the details of that process. He also indicated that many of the elements from an ACT 209 study would be appropriate to consider when preparing the Master Plan TIS.

TOPIC 2 – REQUIRED RIGHT-OF-WAY

Joe Deerin indicated that the Settlement Agreement for the project includes a condition that North Cornwall Township must promptly employ Eminent Domain to obtain additional temporary and/or permanent ROW for streets (and related grading, traffic control equipment, utilities, and stormwater facilities). He indicated that construction will not proceed on buildings for a particular phase or parcel if the ROW for associated roadway improvements has not been secured. Therefore, he noted that PennDOT does have a mechanism in place to ensure that required roadway improvements will be constructed in conjunction with development of appropriate phases or parcels.

Mazhar Malik indicated that the District will cooperate fully with the phasing of roadway improvements, and that all of the required ROW for the overall set of roadway improvements does not need to be acquired with the initial phase of development. He mentioned that PennDOT's Expedited HOP review process can be utilized, and that roundabouts should be considered when developing the required roadway improvements.

Jason Bewley stressed the importance of identifying the required roadway improvements and associated required ROW in a timely manner. He also reiterated Mazhar's recommendation to consider "out-of-the-box" roadway improvements when completing the master Plan TIS. Tom indicated that the County's CCIP is considering such measures, including one-way pairs for Route 72 and Cornwall Road. He indicated that he feels the one-way pair concept will be difficult given the lack of a true grid system in the area.

TOPIC 3 – BACKGROUND GROWTH FACTOR

Eric Mountz indicated that the County and Township have both raised some concerns relative to the background growth factor to be utilized in the Master Plan TIS. PennDOT's BPR data indicates a recommended growth factor of 1.16% per year, which would result in a growth factor of 33% for the 2035 future conditions. The general consensus is that application of a background growth factor of 33% in addition to specifically including traffic from the 6 nearby planned developments is unrealistic, and could ultimately lead to overdesigned intersections and roadways. As such, TPD prepared a memo dated January 7, 2011 proposing an alternative methodology, at the direction of the County and Township staff. Eric requested that the Department review the contents of the memo and offer their feedback. Jason Bewley indicated that the Department would consider an alternative methodology as long as there is information to back the methodology up.

TOPIC 4 – ACTION ITEMS

Eric Mountz indicated that he will schedule a meeting with the County and Township staff to discuss the scope of the Master Plan TIS. Subsequent to that meeting an amended Scoping Application will be submitted to PennDOT.

Joe Deerin and Rich Welkowitz indicated that they will continue to explore potential funding sources for the required roadway improvements, and are working with the County in order to place some of the core roadway improvements onto their Transportation Improvement Program (TIP). They noted that having the projects on the TIP will provide a tremendous benefit when exploring potential funding sources.

The meeting concluded with Joe Deerin and Rich Welkowitz thanking the Department for their cooperation, and noted that they look forward to working together to make their project a reality.

The above is TPD's understanding of the items discussed at the meeting. If the attendees do not agree with these minutes or would like to add to them, please contact Eric Mountz (717-234-1430 x2147, emountz@trafficpd.com) within ten (10) working days of the issuance of this draft summary.

Attachment: Meeting Sign-In Sheet
Meeting Agenda

Copy to: Meeting Attendees

pennsylvania
DEPARTMENT OF TRANSPORTATION

8-0 Permits

A Smart Transportation System & Good Access Management Practice's

Start Here on: (Date) 2-11-2011 (Time) 1:00 ~~AM~~ / PM

Meeting Location: FRANKLIN CONFERENCE ROOM

SR: _____ Offset: _____ County: LEBANON

Township/Borough: _____

Meeting Reason: HOP- TIS VARIOUS PERMITS

Meeting Requested By: TPD Phone #: 717-234-1430

Township/ Borough Invited: yes ☐ no ☐ Any Attorney Invited: yes ☐ no ☐

Highway Occupancy Permits Meeting Sign-In (please print legibly)

Name / Phone # / Email Address:	Organization:	Job Title:
☒ Randall Staudt, P.E. / 717-783-3848/rastaudt@state.pa.us	PENNDOT Dist. 8-0 Construction	Construction Services Engineer
☑ Mazhar Malik / 717-787-5179 / mmalik@state.pa.us	PENNDOT Dist. 8-0 Permits	District Permit Manager
☒ Rich Alandar / 717-787-5179/ ralandar@state.pa.us	PENNDOT Dist. 8-0 Permits	Assistant Permit Manager
☑ Richard Deen, P.E. / 717-783-3949/ rdeen@state.pa.us	PENNDOT Dist. 8-0 Traffic	ITS & Congestion Mgt. Manager
☑ Jason Bewley, P.E. / 717-783-3981/ jbewley@state.pa.us	PENNDOT Dist. 8-0 Traffic	District Traffic Engineer
☒ Eric Kinard / 717-787-9237/ ekinard@state.pa.us	PENNDOT Dist. 8-0 Traffic	Signals & Congestion Mgt. Supervisor
TOM DEHRIN	SPRINGWOOD	
Eric Mountz/emountz@trafficpd.com	TPD	
Jonathan Fitzkee/jfitzkee@lebcounty.org	Leb Co. Planning Dept	Transportation Planner
BOB SENTZ/bsentz@lebcounty.org	" "	ASSISTANT DIRECTOR
Kris Troup / KTroup@Lebcnty.org	Lebanon County Planning	Executive Director
Tom Kotay /	Leb. Cnty Transportation	Transportation Consultant
Melissa Kelly mkelly@jms-pma.com	Springwood	
Scott Russell srussell@rettew.com	RETTEW	Civil/municipal Director
Rich Weikowitz SPRINGWOODS DEV	SPRINGWOOD	DEVELOPER
John Schick JSCHICK@RETTEW.COM	RETTEW	TRAFFIC ENGINEER (NCT)
Jim Calowell JRC@RETTEW.com	RETTEW/N. CORNWALL TWP.	TWP. ENG. REP. -
Nick Rakowski nrakowski@navenewell.net	NAVE NEWELL	Project Designer - V.A.

* NOT IN ATTENDANCE

- MINUTES OF MEETING WILL BE PREPARED BY PERSON REQUESTING THE MEETING
- A COPY OF THIS SIGN IN SHEET WILL BE DISTRIBUTED AFTER THE MEETING
- LETTERS OF CREDIT WILL BE REQUIRED BEFORE THE PERMIT IS ISSUED ON DEPARTMENT FORM (M-950L) EXCEPT FOR MINIMUM USE DRIVEWAYS
- APPLICANT/ENGINEER MUST REVIEW RECENT STRIKE OFF MEMO 470 - 09 -2, SOL ON ACCESS RELEASE PROCEDURES, AND MEMO 450 – 09 – 7, SOL ON THE FORM OF INDEMNIFICATION
- DEPARTMENT CAN NOT ACCEPT ANY CHANGES TO THE FORMS ALREADY APPROVED BY THE DEPARTMENT
- EXPEDITED REVIEW COST + TIME
- ROUND ABOUT.

THANK YOU…

Updated: 03252009

Highway Occupancy Permits Meeting Sign-In (please print legibly)

Name / Phone # / Email Address:	Organization:	Job Title:
Richard McAlevy richard.mcalevy@va.gov	Lebanon VA Medical Ctr	Assistant Chief Engineer
Ricardo Ramos / ricardo.ramos@va.gov	" "	General Engineer
Donna Deerin Ward / ddeerin@LMS-PMA.com	Springwood Dev.	director development
Jeffrey Deerin JWDeerin@LMS-PMA.com	" "	General Partner
Curtis Kreider CURT.SLT@COMCAST.NET	So Lebanon Township	Manager

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MEETING AGENDA

Meeting Date: Friday, February 11, 2011

Time: 1:00 P.M.

Location: PennDOT Engineering District 8
2140 Herr Street
Harrisburg PA 17103-1699

RE: **Future Transportation Planning and "Master Plan" TIS Methodology**
North Cornwall Commons
North Cornwall Township, Lebanon County, PA

---

1. Sign-in sheet and introductions
2. Summary of TIS Scoping Application dated 9/23/10
   - Approved by PennDOT on 9/29/10 based upon support from North Cornwall Township and Lebanon County
   - Included 11 intersections, 3 time periods, and 2 phases
3. Summary of currently proposed phasing (Handouts)
   - 5 total phases, 3 on the eastern tract and 2 on the western tract
   - Limited trip generation for initial phases
4. Summary of meetings held 10/12/10 and 12/14/10 with staff from North Cornwall Township and Lebanon County
   - Concerns with upfront acquisition of all required right-of-way for overall development
   - Springwood proposed to complete 2 separate studies for eastern and western tracts
   - Suggestion from Township staff to complete an Alternative Transportation Plan which includes preparation of a "Master Plan" TIS for use in master planning of future transportation improvements.
   - "Master Plan" TIS to be funded by the developers of North Cornwall Commons
   - Strong Support from both North Cornwall Township and Lebanon County
5. Summary of proposed "Master Plan" TIS methodology (TPD memo dated 12/9/10)
   - Develop set of roadway improvements for build-out (i.e. 20-year period) of proposed developments located in the vicinity of Route 72, Cornwall Road, and Rocherty Road
   - Include one or two interim development phases
   - Develop memorandum of understanding with North Cornwall Township, the Lebanon County Planning Department, and PennDOT

6. Summary of proposed 2035 traffic volumes (TPD memo dated 1/7/11)

- 2010 Existing Traffic Volumes = **54%**
- Background Growth Traffic Volumes = **29%**
  - Includes background growth factor of 33% (1.15% per year compounded for 25 years) and the following 6 nearby planned developments:
    - *Sheetz Outparcels*, located in North Cornwall Township
    - *Tractor Supply Outparcels*, located in North Cornwall Township
    - *First National Bank of Fredericksburg*, located in North Cornwall Township
    - *VA Medical Center Expansion*, located in South Lebanon Township
    - *Alden Place*, located in Cornwall Borough
    - *The Preserve at Historic Cornwall Village*, located in Cornwall Borough
- Additional North Cornwall Commons Traffic Volumes = **17%**
- North Cornwall Township and Lebanon County raised concerns regarding background growth factor being too high
- Propose to utilize "Build-Up Method, Using Specific Developments" per ITE's publication Transportation Impact Analyses for Site Development

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MEMORANDUM

To: Robin Getz, North Cornwall Township Manager
Jim Caldwell, Rettew (North Cornwall Township Traffic Engineer)
John Schick, Rettew (North Cornwall Township Traffic Engineer)
Tom Kotay, Lebanon County Planning Department

From: Eric Mountz, P.E., PTOE, Traffic Planning and Design, Inc.

Cc: Joe Deerin, Springwood Development Partners, LP
Melissa Kelly, Springwood Development Partners, LP
Charlie Courtney, Esq.

Date: January 7, 2011

Re: **Background Growth Factor for TIS**
North Cornwall Commons
North Cornwall Township, Lebanon County, PA
TPD# BLAC.A.00001

As you are aware, a meeting was held on Tuesday, December 14, 2010 to discuss the anticipated phasing and the methodologies to be utilized in preparation of the Transportation Impact Study (TIS) for the above noted project. One of the key items discussed during the meeting was development of the 2035 future condition traffic volumes. A summary was presented outlining the composition of the 2035 future condition traffic volumes based upon current PennDOT methodology, as noted below:

- 2010 Existing Traffic Volumes = **54%**
- Background Growth Traffic Volumes = **29%**
  - Includes background growth factor of 33% (1.15% per year compounded for 25 years) and the following 6 nearby planned developments:
    - *Sheetz Outparcels*, located in North Cornwall Township
    - *Tractor Supply Outparcels*, located in North Cornwall Township
    - *First National Bank of Fredericksburg*, located in North Cornwall Township
    - *Veteran's Administration Medical Center Expansion*, located in South Lebanon Township
    - *Alden Place*, located in Cornwall Borough
    - *The Preserve at Historic Cornwall Village*, located in Cornwall Borough
- Additional North Cornwall Commons Traffic Volumes = **17%**

Discussion ensued regarding the background growth traffic volumes, and the fact that they comprise a significant portion of the 2035 future condition traffic volumes. The general consensus was that application of a background growth factor of 33% in addition to specifically including traffic from the 6 nearby planned developments was unrealistic, and could ultimately lead to overdesigned intersections and roadways. A good example of the inflated traffic volumes that could occur as a result of this methodology are the through volumes along Route 72 at its intersection with the Lowe's/Cedar Crest Square/Tractor Supply Driveways. These movements are both approximately 500-600 vehicles during the peak hours under the 2010 existing conditions. The 33% background growth factor increases the volumes for the movements by 150-200 vehicles and the nearby planned developments add an additional 150-175 vehicles. In total this increases the through volumes to 800-1,000 vehicles in each direction. By all accounts this 60-70% increase in traffic volume over the 2010 existing conditions does not appear to be consistent with anticipated growth patterns for the area. As such, TPD was directed to explore additional alternatives with respect to application of background growth.

In exploring additional alternatives with respect to application of background growth, TPD reviewed Chapter 4 "Non-Site Transportation Forecast" contained in the ITE's publication Transportation Impact Analyses for Site Development. The publication notes that there are three principal methods of projecting non-site traffic. Each of the methods and their corresponding advantages and concerns are noted below:

1. **Build-Up Method, Using Specific Developments**
   - Typically appropriate in areas of moderate growth;
   - Usually used when the project has a horizon of five years or less; and,
   - Often the best method when there is good local information on development approvals.
2. **Use of Area Transportation Plan or Modeled Volumes**
   - Often used with large, regional projects that will develop over a long period;
   - Often appropriate for areas of high growth; and,
   - Locally credible transportation plan data that is adaptable to the study year must be available.
3. **Trends or Growth Rate Method**
   - Typically used for small projects that will be built within a year or two;
   - Local recordkeeping of traffic counts must be good;
   - At least five years of data showing stable growth should be available;
   - Simple, straightforward approach;
   - Not appropriate for long-range horizons; and,
   - May result in over- or undercounting of non-site traffic growth.

Based upon the above, method 2 "Use of Area Transportation Plan or Modeled Volumes" would be most appropriate for the subject development. Unfortunately, a local transportation plan is not available, and thus the method cannot be utilized. Therefore, the next best option is to utilize method 1 "Build-Up Method, Using Specific Developments" since there is good local information on development approvals. As noted in the ITE publication, this method is appropriate when considering a study area with several major projects being developed during the same period as the subject project. This technique is most beneficial when it is desired to accurately reflect local area traffic patterns that will change as a result of limited or moderate

non-site development, or when the project site is in an area where available traffic volume projections are sketchy. The concept consists of projecting peak hour traffic to be generated by approved and anticipated developments in the study area (background development), assigning it to the projected street system, and adding in through traffic with both trip ends outside the study area (background growth). Trips already made in the area street system should be accounted for to avoid double counting.

The "Build-Up Method, Using Specific Developments" was discussed in detail during a conference call between Eric Mountz, John Schick, and Tom Kotay on Tuesday, January 4, 2011. Based upon this call it was determined that the method is most appropriate in estimating background growth for the subject project since it blends known traffic from nearby planned developments with unknown traffic that may occur in the future. It was agreed that the method will result in the most realistic future traffic projections for regional projects with a 20-year plus build-out horizon.

Utilizing the "Build-Up Method, Using Specific Developments" for the TIS for the subject site, TPD proposes to assign traffic from each of the 6 above noted known nearby planned developments to the study area intersections based upon information contained in their respective TIS's. TPD will then evaluate each individual movement at the study area intersections and assign additional traffic from unknown future development in order to ensure that each individual movement will experience a minimum total background growth consistent with that recommended by PennDOT's Bureau of Planning and Research (BPR). For the subject site, PennDOT's BPR recommends using a background growth factor of 1.15% per year in Lebanon County for urban non-interstate roadways. Therefore, under the proposed methodology each individual movement at the study area intersections will experience a minimum total background growth percentage of 33% (1.15% per year, compounded over 25 years) for the 2035 future conditions. Please note that there are particular movements that will experience background growth in excess of 33% as a result of the nearby planned developments alone. This methodology would modify the previously noted composition of the 2035 future condition traffic volumes, as follows:

- 2010 Existing Traffic Volumes = **60%**
- Background Growth Traffic Volumes = **21%**
- Additional North Cornwall Commons Traffic Volumes = **19%**

If you have any questions or comments related to this proposed methodology regarding development of the background growth traffic, please call.

OS-2 (10-08)

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DEPARTMENT OF TRANSPORTATION
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RECEIVED
SEP 06 2010
Traffic Planning and Design, Inc.

September 29, 2010

Eric Mountz, P. E., PTOE
Traffic Planning & Design, Inc.
2500 East High Street
Suite 650
Pottstown, PA 19464

Lebanon Co.-N. Cornwall Twp./S. Lebanon Twp.
N. Cornwall Commons
Scope Application

Dear Mr. Mountz:

The Pennsylvania Department of Transportation (PennDOT) has received the revised Scope Application dated September 23, 2010 for the subject location.

Based on input from the Lebanon County Planning Department and local municipalities to eliminate several intersections from the study area, PennDOT has found the Scope to be acceptable. While this proposed development will add traffic volume and congestion to the intersections that were deleted from the original study area, we understand that these effects are acceptable to these agencies and are consistent with their regional congestion management planning.

If you have any further questions regarding this matter, please contact Jason Bewley, P.E., District Traffic Engineer, at 717-783-3981.

Sincerely,

Jason C. Bewley

for: Tucker Ferguson, P.E.
District Executive

JAW/sab
(jaw0928l)

cc: Office of Planning & Zoning, N. Cornwall Twp.
Office of Planning & Zoning, S. Lebanon Twp.
Tom Kotay, Lebanon County Planning Department
John Schick, P. E., RETTEW Associates, Inc.

RETTEW

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RECEIVED
SEP 30 2010
Traffic Planning and Design, Inc.

September 27, 2010

Ms. Robin Getz, Manager
North Cornwall Township
320 South 18th Street
Lebanon, PA 17042

RE: North Cornwall Commons
Traffic Impact Study Scope
Review No. 2
RETTEW Project No. 08-02260-003

Dear Ms. Getz:

We have completed our review of the above referenced plan as prepared by Traffic Planning and Design, Inc. Our review was of the following information received on September 24, 2010:

1. Traffic Impact Study Scope dated May 24, 2010, revised September 23, 2010.

We have the following comment for your consideration:

TRAFFIC IMPACT STUDY

1. We concur with the methodology presented in the revised scope as well as the limits/intersections included in the study area.

Should you have any questions, or require additional information, please feel free to contact us at any time.

Sincerely,

James R. Caldwell
Group Manager

copy: Eric Mountz, Traffic Planning and Design, Inc.

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May 24, 2010, revised September 23, 2010

Mr. Mazhar Malik
Permits Manager
PennDOT District 8-0
2140 Herr Street
Harrisburg, PA 17103

RE: **Transportation Impact Study (TIS) Scoping Application**
North Cornwall Commons
North Cornwall Township, Lebanon County, PA
TPD# BLAC.A.00001

Dear Mazhar:

On behalf of Springwood Development Partners, L.P., Traffic Planning and Design, Inc. (TPD) has prepared the following revised TIS Scoping Application for the above referenced project. The application has been revised based upon feedback received at the Scoping Meeting held with the Department on June 28, 2010, and subsequent correspondence. This information has been compiled in accordance with the application procedures outlined in Strike-Off Letter 470-09-4, dated February 12, 2009. We appreciate your review of the enclosed information.

Scoping Meeting Date: June 28, 2010
Applicant: Springwood Development Partners, L.P.
Applicant's Consultant: TPD (Eric Mountz)
Applicant's Primary Contacts: Joe Deerin/Rich Welkowitz

A list of the anticipated meeting attendees including phone numbers and email addresses is attached.

1. *LOCATION OF PROPOSED DEVELOPMENT:*

   PennDOT Engineering District: 8-0 County: Lebanon
   Municipality: North Cornwall Township
   State Routes: Cornwall Road (S.R. 2001)
   Segment(s): 0060 Offset(s): 1383;

   Please refer to the attached **Figure 1** which shows the project location.

2. *DESCRIPTION OF PROPOSED DEVELOPMENT:*

   - Proposed Site Access:

     67+/- Acre Tract on the Western Side of Cornwall Road (S.R. 2001)

     - With development of the proposed site the Applicant is proposing to construct a new east-west Township Roadway that will connect Cornwall Road (S.R. 2001) to Route 72 (S.R. 0072) via the existing access to the Tractor Supply/Cedar Crest Square. This

portion of the development will be served via three (3) full-access driveways to the proposed Township Roadway. In addition, there will be two (2) right-in/right-out driveways to Cornwall Road (S.R. 2001).

<u>81+/- Acre Tract on the Eastern Side of Cornwall Road (S.R. 2001)</u>

- This portion of the development will be served via five (5) driveways to the external roadway network, comprised of the following:
  - A full-access driveway to Cornwall Road (S.R. 2001), opposite the proposed Township Roadway through the 67+/- Acre Tract;
  - A right-in/right-out driveway to Cornwall Road (S.R. 2001);
  - Two (2) full-access driveways to Rocherty Road (S.R. 2002), opposite the existing driveways to the Lebanon Valley Expo Center;
  - A full-access connection to Norman Drive.

- Proposed Land Uses:

<u>67+/- Acre Tract on the Western Side of Cornwall Road</u>

- 600,600 square foot Shopping Center consisting of an integrated mix of big box retail, strip retail, and pad sites.

<u>81+/- Acre Tract on the Eastern Side of Cornwall Road</u>

- 436,400 square foot Office Park consisting of an integrated mix of office building and support services, including a 11,400 square foot pharmacy, two (2) 6,000 square foot sit-down restaurants, and a 4,000 square foot drive-in bank;
- 100 room hotel;
- 160 luxury townhomes.

- Community Linkages (access to neighboring properties, cross easements, pedestrian and transit accommodations): The proposed development will include an internal pedestrian trail system interconnecting the entire site, a connection to the Lebanon Valley Rail-Trail, and designated stops for the Lebanon Transit Authority.

3. *DEVELOPMENT SCHEDULE AND STAGING:*

- Anticipated Opening Year: 2012
- Phase 1 Build-Out Year: 2014
- Full Build-Out Year: 2022
- Proposed Phasing:
  - Phase 1 of the development will consist of the following:

<u>67+/- Acre Tract on the Western Side of Cornwall Road</u>

- 226,900 square foot Shopping Center.

81+/- Acre Tract on the Eastern Side of Cornwall Road

- 97,600 square foot Office Park;
- 80 luxury townhomes.

4. *TRIP GENERATION:*

Trip generation for the proposed development will be based on:

☒ ITE Trip Generation Manual.

- Residential Condominium/Townhouse (ITE Land Use Code #230)
- Hotel (ITE Land Use Code #310)
- Office Park (ITE Land Use Code #750)
- Shopping Center (ITE Land Use Code #820)

☐ Other independent surveys.

Table 1 shows the trip generation equations and directional splits for an average weekday and the weekday A.M., weekday P.M., and Saturday midday peak hours.

TABLE 1
TRIP GENERATION DATA

Land Use	Time Period	Trip Generation Equations	Directional Split	
			Entering	Exiting
Residential Condominium/ Townhouse (#230)	Average Weekday	Ln(**T**) = 0.87 Ln(**X**) + 2.46	50%	50%
	A.M. Peak Hour	Ln(**T**) = 0.80 Ln(**X**) + 0.26	17%	83%
	P.M. Peak Hour	Ln(**T**) = 0.82 Ln(**X**) + 0.32	67%	33%
	Saturday Peak Hour	**T** = 0.29(**X**) + 42.63	54%	46%
Hotel (#310)	Average Weekday	**T** = 8.17(**X**)	50%	50%
	A.M. Peak Hour	**T** = 0.56(**X**)	61%	39%
	P.M. Peak Hour	**T** = 0.59(**X**)	53%	47%
	Saturday Peak Hour	**T** = 0.72(**X**)	56%	44%
Office Park (#750)	Average Weekday	**T** = 11.42(**X**)	50%	50%
	A.M. Peak Hour	**T** = 1.71(**X**)	89%	11%
	P.M. Peak Hour	**T** = 1.48(**X**)	14%	86%
	Saturday Peak Hour	**T** = 0.14(**X**)	74%	26%
Shopping Center (#820)	Average Weekday	Ln(**T**) = 0.65 Ln(**X**) + 5.83	50%	50%
	A.M. Peak Hour	Ln(**T**) = 0.59 Ln(**X**) + 2.32	61%	39%
	P.M. Peak Hour	Ln(**T**) = 0.67 Ln(**X**) + 3.37	49%	51%
	Saturday Peak Hour	Ln(**T**) = 0.65 Ln(**X**) + 3.76	52%	48%

T = Total Trips, **X** = Independent Variable (Dwelling Units, Rooms, 1,000 Square Feet Gross Floor/Leasable Area)

Based on the information provided in the Trip Generation Manual, an Institute of Transportation Engineers (ITE) Informational Report, not all trips generated by the site are trips that are "new" to the roadway system. In addition to the new trips generated, there are pass-by trips, which are trips that are drawn from the passing traffic stream and do not add trips to the adjacent roadways. Pass-by trip percentages for the proposed site were utilized as specified in the ITE Trip Generation Handbook, June 2004 edition. The pass-by percentages utilized are shown in **Table 2**.

TABLE 2
PASS-BY PERCENTAGES

Land Use	Pass-by Percentage		
	A.M. Peak Hour	P.M. Peak Hour	Saturday Peak Hour
Residential Condominium/ Townhouse	0%	0%	0%
Hotel	0%	0%	0%
Office Park	0%	0%	0%
Shopping Center	0%	34%	26%

The PennDOT Policies and Procedures for Transportation Impact Studies, January 28, 2009, recognizes the potential for non-vehicular trips and offers standard assumptions for the modal split of alternative trips provided that pedestrian, bike, and transit-friendly characteristics present. Based upon a review of Table 2 on page 21 of the document, TPD utilized modal trip reductions of 4%, 1%, and 3% to account for alternative trips made by pedestrians, bikes, and transit vehicles, respectively.

For purposes of this trip generation analysis, **Phase 1** of the proposed development was assumed to consist of the following mix of land uses:

- 80 Condominium/Townhome dwelling units (ITE Land Use Code #230);
- 97,600 square foot Office Park (ITE Land Use Code #750);
- 226,900 square foot Shopping Center (ITE Land Use Code #820).

Tables 3, 4, 5 and 6 summarize the trip generation for **Phase 1** of the proposed development for an average weekday and the weekday A.M., P.M., and Saturday midday peak hours, respectively.

TABLE 3
TRIP GENERATION (PHASE 1) – AVERAGE WEEKDAY

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	11568	-924	-0	10644	5322	5322	---	---	---	---	---	---
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	530	-42	-0	488	244	244	---	---	---	---	---	---
Office Park	1116	-88	-0	1028	514	514	---	---	---	---	---	---
Subtotal	1646	-130	-0	1516	758	758	---	---	---	---	---	---
Total	**13214**	**-1054**	**-0**	**12160**	**6080**	**6080**	**---**	**---**	**---**	**---**	**---**	**---**

TABLE 4
TRIP GENERATION (PHASE 1) –WEEKDAY A.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	250	-20	-0	230	140	90	0	0	0	230	140	90
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	43	-3	-0	40	7	33	0	0	0	40	7	33
Office Park	167	-13	0	154	137	17	0	0	0	154	137	17
Subtotal	210	-16	-0	194	144	50	0	0	0	194	144	50
Total	**460**	**-36**	**-0**	**424**	**284**	**140**	**0**	**0**	**0**	**424**	**284**	**140**

TABLE 5
TRIP GENERATION (PHASE 1) –WEEKDAY P.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	1101	-88	-0	1013	496	517	346	173	173	667	323	344
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	50	-4	-0	46	31	15	0	0	0	46	31	15
Office Park	144	-12	-0	132	18	114	0	0	0	132	18	114
Subtotal	194	-16	0	178	49	129	0	0	0	178	49	129
Total	**1295**	**-104**	**-0**	**1191**	**545**	**646**	**346**	**173**	**173**	**845**	**372**	**473**

TABLE 6
TRIP GENERATION (PHASE 1) – SATURDAY MIDDAY PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	1460	-117	-0	1343	698	645	350	175	175	993	523	470
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	66	-5	-0	61	33	28	0	0	0	61	33	28
Office Park	14	-1	-0	13	10	3	0	0	0	13	10	3
Subtotal	80	-6	-0	74	43	31	0	0	0	74	43	31
Total	**1540**	**-123**	**-0**	**1417**	**741**	**676**	**350**	**175**	**175**	**1067**	**566**	**501**

For purposes of this trip generation analysis, **Full Build-Out** of the proposed development plan was assumed to consist of the following mix of land uses:

- 160 Condominium/Townhome dwelling units (ITE Land Use Code #230);
- 100 room hotel (ITE Land Use Code #310);
- 436,400 square foot office park (ITE Land Use Code #750);
- 600,600 square foot Shopping Center (ITE Land Use Code #820).

Tables 7, 8, 9 and 10 summarize the trip generation for **Full Build-Out** of the proposed development for an average weekday and the weekday A.M., P.M., and Saturday midday peak hours, respectively.

TABLE 7
TRIP GENERATION (FULL BUILD-OUT) – AVERAGE WEEKDAY

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	21778	-1742	-0	20036	10018	10018	---	---	---	---	---	---
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	970	-78	-0	892	446	446	---	---	---	---	---	---
Hotel	818	-64	-0	754	377	377	---	---	---	---	---	---
Office Park	4984	-398	-0	4586	2293	2293	---	---	---	---	---	---
Subtotal	6772	-540	-0	6232	3116	3116	---	---	---	---	---	---
Total	**28550**	**-2282**	**-0**	**26268**	**13134**	**13134**	**---**	**---**	**---**	**---**	**---**	**---**

TABLE 8
TRIP GENERATION (FULL BUILD-OUT) –WEEKDAY A.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	444	-36	-0	408	249	159	0	0	0	408	249	159
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	75	-6	-0	69	12	57	0	0	0	69	12	57
Hotel	56	-4	-0	52	32	20	0	0	0	52	32	20
Office Park	746	-60	-0	686	604	82	0	0	0	686	604	82
Subtotal	877	-70	-0	807	648	159	0	0	0	807	648	159
Total	**1321**	**-106**	**-0**	**1215**	**897**	**318**	**0**	**0**	**0**	**1215**	**897**	**318**

TABLE 9
TRIP GENERATION (FULL BUILD-OUT) –WEEKDAY P.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	2115	-169	-0	1946	954	992	662	331	331	1284	623	661
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	88	-7	-0	81	54	27	0	0	0	81	54	27
Hotel	59	-5	-0	54	29	25	0	0	0	54	29	25
Office Park	646	-52	-0	594	101	493	0	0	0	594	101	493
Subtotal	793	-64	-0	729	184	545	0	0	0	729	184	545
Total	**2908**	**-233**	**-0**	**2675**	**1138**	**1537**	**662**	**331**	**331**	**2013**	**807**	**1206**

TABLE 10
TRIP GENERATION (FULL BUILD-OUT) – SATURDAY MIDDAY PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	2748	-220	-0	2528	1315	1213	658	329	329	1870	986	884
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	89	-7	-0	82	44	38	0	0	0	82	44	38
Hotel	72	-6	-0	66	37	29	0	0	0	66	37	29
Office Park	61	-5	-0	56	30	26	0	0	0	56	30	26
Subtotal	222	-18	-0	204	111	93	0	0	0	204	111	93
Total	**2970**	**-238**	**-0**	**2732**	**1426**	**1306**	**658**	**329**	**329**	**2074**	**1097**	**977**

5. *ESTIMATED DAILY TRIP GENERATION/DRIVEWAY CLASSIFICATION:*

   a. Estimated Daily Trip Generation of Full Build-Out of the Proposed Development (Assuming One Access Point): 26,268 trips/day = 13,134 vehicles/day
   b. Driveway Classification Based on Trip Generation and One Access Point: High Volume Driveway

6. *TRANSPORTATION IMPACT STUDY REQUIRED?*

   ☐ No
   ☒ Yes, based on:
   - ☒ 3,000 or more vehicle trips/day generated
   - ☒ During any one-hour time period, 100 or more new (added) vehicle trips generated entering or 100 or more new (added) vehicle trips generated exiting development
   - ☐ Other considerations as described below:

7. *TRAFFIC IMPACT ASSESSMENT REQUIRED?* ☒ **No** ☐ **Yes**

8. *TIS STUDY AREA:*

   - Roadway and Study Intersections:
     - Route 72 (S.R. 0072) & Rocherty Road;
     - Route 72 (S.R. 0072) & Lowe's/Cedar Crest Square/Tractor Supply Driveways;
     - Route 72 (S.R. 0072) & Lowe's/K-Mart/Cedar Crest Square Driveways;
     - Route 72 (S.R. 0072) & Isabel Drive;
     - Route 72 (S.R. 0072) & York Street/Lebanon Plaza Mall Driveway;
     - Route 72 (S.R. 0072) & Colebrook Road (S.R. 0241);
     - Cornwall Road (S.R. 2001) & Rocherty Road (S.R. 2002);
     - Cornwall Road (S.R. 2001) & Isabel Drive/Norman Drive;
     - Cornwall Road (S.R. 2001) & York Street;

- Cornwall Road (S.R. 2001) & Wilhelm Avenue;
- Rocherty Road/Evergreen Road (S.R. 2002) & Lincoln Avenue.
- [*See proposed circled study area intersections from attached* ***Figure 1****]*.

9. *STUDY AREA TYPE:*

Urban ☒ Rural ☐

- Per PennDOT's Functional Classification Map of Lebanon County, Route 72 (S.R. 0072) is defined as a principal arterial roadway.
- Per PennDOT's Functional Classification Map of Lebanon County, Cornwall Road (S.R. 2001) to the north of Rocherty Road, York Street, and Wilhelm Avenue are defined as minor arterial roadways.
- Per PennDOT's Functional Classification Map of Lebanon County, Cornwall Road (S.R. 2001) to the south of Rocherty Road, Rocherty Road (S.R. 2002) to the east of Route 72, Lincoln Avenue to the north of Rocherty Road, and Colebrook Road (S.R. 0241) are defined as collector roadways.
- Per PennDOT's Functional Classification Map of Lebanon County, Rocherty Road to the west of Route 72, Lincoln Avenue to the south of Rocherty Road, Isabel Drive, and Norman Drive are defined as local roadways.
- The Lowe's, Cedar Crest Square, Tractor Supply, and Lebanon Plaza Mall Driveways are private roadways.

10. *TIS ANALYSIS PERIODS AND TIMES:*

Peak Hours to be evaluated:

- Weekday A.M. peak hour (peak hour within the 7:00-9:00 A.M. peak period);
- Weekday P.M. peak hour (peak hour within the 2:30-6:00 P.M. peak period);
- Saturday midday peak hour (peak hour within the 10:45 A.M.-12:45 P.M. peak period).

Study Years to be evaluated:

- Existing Conditions
- 2014 Phase 1 Opening Year
- 2022 Full Build-Out Opening Year
- 2027 Full Build-Out Design Year

11. *TRAFFIC ADJUSTMENT FACTORS:*

a. Seasonal Adjustment: N/A
b. Annual Base Traffic Growth: 1.15% per year based on PennDOT Bureau of Planning and Research (BPR) data for July 2009 to July 2010 pertaining to urban non-interstate roadways in Lebanon County.
c. Pass-By Trips: Per ITE *Trip Generation Handbook* (see section #4 – Trip Generation for more information).
d. Captured Trips for Multi-Use Sites: N/A.
e. Modal Split Reductions: Per PennDOT *Policies and Procedures for Transportation Impact Studies* (see section #4 – Trip Generation for more information)

f. Other Reduction: N/A

12. *OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC:*

TPD will specifically include background traffic volumes related to the following developments:

- *Sheetz Outparcels*, located in North Cornwall Township on the northern side of Rocherty Road, east of Route 72. Based upon TPD's knowledge, the outparcels will consist of 9,500 s.f. of professional office space, 20,000 s.f. of retail space, and a 5,786 s.f. sit-down restaurant. TPD will assume full build-out of this development by 2014.
- *Tractor Supply Outparcels*, located in North Cornwall Township on the eastern side of Route 72, north of Rocherty Road. Based upon TPD's knowledge, the outparcels will consist of a 4,279 s.f. drive-in bank and two (2) 6,500 s.f. high-turnover (sit-down) restaurants. TPD will assume full build-out of this development by 2014.
- *Veteran's Administration Medical Center Expansion*, located in South Lebanon Township between Lincoln Avenue and State Drive, north of Rocherty Road. The proposed expansion will consist of adding 504 employees at the existing facility. TPD will assume full build-out of this development by 2014.
- *Alden Place*, located in Cornwall Borough on the eastern side of Route 72, between Route 419 and Ironmaster Road. The proposed age-restricted development will be constructed in five (5) phases, with full build-out consisting of 505 residential dwelling units (445 single homes/villas in the Cornwall neighborhood and 60 single homes in the Northgate neighborhood). Based upon a conversation with a staff member of the communities sales office in October 2009, 100 of the units in the Cornwall neighborhood are built and occupied and 3 of the units in the Northgate neighborhood are built and occupied. TPD will assume full build-out of this development by 2014.
- *The Preserve at Historic Cornwall Village*, located in Cornwall Borough between Route 322 and Route 419 in the vicinity of Burd Coleman Village and Minersvillage. Full build-out of the proposed development will consist of 590 residential dwelling units, a hotel with 250 conventional rooms and 60 cottages, a 60,000 square foot (s.f.) indoor water park, a village commercial area with 150,000 s.f. of total space, and 12,000 s.f. of restaurant space. Phase 1 of the proposed development will consist of 137 residential dwelling units, the hotel with 250 conventional rooms and 60 cottages, and the 60,000 square foot (s.f.) indoor water park. TPD will assume phase 1 of this development by 2014 and full build-out by 2022.

13. *TRIP DISTRIBUTION AND ASSIGNMENT:*

The distribution and assignment of site-generated new trips will be based upon an analysis of the following: (1) existing traffic patterns and distributions within the study area; (2) available routes for travel; and (3) the proposed site driveway locations.

For the office/residential land uses, a modified gravity model analysis was performed using the 2000 census journey to work figures for North Cornwall Township. The 2000 census journey to work figures summarize the number of people that travel to North Cornwall Township to work from seventy-one surrounding municipalities in Berks, Chester, Cumberland, Dauphin, Juniata, Lancaster, Lebanon, Northumberland, Schuylkill, Westmoreland and York Counties. The results of the gravity model analysis are attached for reference. Furthermore, the trip distribution percentage between the eastern and western tracts of the development was determined based upon ITE's methodology for calculating the interaction factor for multi-use developments. The results of the interaction factor calculations are attached for reference. Based on the results of the gravity model and interaction factor methodology, the new office/residential trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 11**.

TABLE 11
NEW TRIP DISTRIBUTION PERCENTAGES
OFFICE/RESIDENTIAL LAND USES

Distribution	Destination	Assignment (To/From)	Percentage
To/From North	Route 72, Route 343, Route 934 and Route 422	North via Route 72	16%
		North via Cornwall Road	31%
To/From South	Route 72, Route 322 and Route 419	South via Route 72	16%
		South via Cornwall Road	5%
To/From East	Route 422, Route 501 and Route 897	East via Evergreen Road	5%
		East via Wilhelm Avenue	11%
To/From West	Route 241, Route 322 and Route 934	West via Rocherty Road	6%
To/From Proposed Site	Eastern and Western Tracts	Proposed Township Road	10%

For the retail land uses, a gravity model analysis was performed using the 2000 census population figures for North Cornwall Township and the twelve (12) neighboring municipalities (approximately 10 mile radius). The results of the gravity model analysis are attached for reference. Furthermore, the trip distribution percentage between the eastern and western tracts of the development was determined based upon ITE's methodology for calculating the interaction factor for multi-use developments. The results of the interaction factor calculations are attached for reference. Based on the results of the gravity model and interaction factor methodology, the new retail trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 12**.

TABLE 12
NEW TRIP DISTRIBUTION PERCENTAGES
RETAIL LAND USES

Distribution	Destination	Assignment (To/From)	Percentage
To/From North	Route 72, Route 343, Route 934 and Route 422	North via Route 72	18%
		North via Cornwall Road	26%
To/From South	Route 72, Route 322 and Route 419	South via Route 72	13%
		South via Cornwall Road	4%
		South via Lincoln Avenue	1%
To/From East	Route 422, Route 501 and Route 897	East via Evergreen Road	9%
		East via Wilhelm Avenue	9%
To/From West	Route 241, Route 322 and Route 934	West via Rocherty Road	10%
To/From Proposed Site	Eastern and Western Tracts	Proposed Township Road	10%

14. APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES:

TABLE 13
DATA COLLECTION SUMMARY

Locations	Time Period	Count Type
Eleven (11) study area intersections noted above in Item 8 & circled on Figure 1	Weekday A.M., Weekday P.M., and Saturday Midday Peak Hours	Manual Traffic Counts

15. CAPACITY/LOS ANALYSIS:

Capacity analyses will be conducted at the study area intersection for the peak hours and the study years will be evaluated according to the methodologies contained in the 2000 Highway Capacity Manual (HCM), utilizing SYNCHRO software. In addition, capacity analyses will be conducted at the proposed site driveway intersections under opening year and design year conditions during the peak hours.

16. ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED:

N/A

17. OTHER NEEDED ANALYSES:

a. Sight Distance Analysis: A sight distance analysis will be performed for the proposed site driveway locations.

b. Signal Warrant Analysis: If necessary, TPD will complete signal warrant analyses at the unsignalized study intersections and/or proposed site driveway locations.

c. Required Signal Phasing/Timing Modifications: If necessary, TPD will make recommendations for traffic signal timing and/or phasing modifications based on results of the analysis.

d. Traffic Signal Corridor/Network Analysis: N/A

e. Analysis of the Need for Turning Lanes: TPD will analyze auxiliary turn lane warrants at the proposed site driveway locations and the study area intersections during all scenarios. The warrant analysis methodology contained within Chapter 11 of PennDOT's Publication 46 and Strike-Off Letter 470-08-07 will be utilized for this analysis.

f. Turning Lane Lengths: TPD will analyze auxiliary turn lane lengths at the proposed site driveway locations and the study area intersection during full build-out condition for all scenarios. The analysis methodology contained within Chapter 11 of PennDOT's Publication 46 and Strike-Off Letter 470-08-07 will be utilized for this analysis.

g. Left Turn Signal Phasing Analysis: TPD will analyze left turn signal phasing only where signal phasing changes are proposed *(please see 17.c. – Required Signal Phasing/Timing Modifications for more information).*

h. Queuing Analysis: TPD will analyze the 95th percentile queue lengths for all approaches of the proposed site driveways and study area intersections during all time periods analyzed. This analysis will be completed using the SYNCHO software which is based on the methodologies contained in the 2000 Highway Capacity Manual (HCM).

i. Gap Studies: N/A

j. Crash Analysis: TPD will conduct and submit a crash data analysis under separate cover that will contain an analysis of reportable crashes along roadway segments in the study area. A reportable crash shall be defined as a crash where fatality occurs and/or a vehicle is towed from the scene of the crash.

k. Weaving Analysis: N/A

l. Other Required Studies: N/A

We appreciate your review of the enclosed information. If there are any questions or comments, please do not hesitate to contact me.

Respectfully submitted,

TRAFFIC PLANNING AND DESIGN, INC.

Eric M. Mountz, P.E., PTOE
Project Manager

Attachments: Anticipated Meeting Attendee Contact List
Figure 1 –Location Map
Gravity Model Analysis
Site Plans

cc: Joe Deerin, Springwood Development Partners, L.P.
Rich Welkowitz, Springwood Development Partners, L.P.
Robin Getz, North Cornwall Township Manager
Tom Kotay, Lebanon County Planning Department
John Schick, Rettew (North Cornwall Township Traffic Engineer)
Larry Lawyer, P.E., Delta Development Group, Inc.
Project File, TPD# BLAC.A.00002

Mountz, Eric

From: Mountz, Eric
Sent: Tuesday, September 21, 2010 4:44 PM
To: 'Kinard, Eric W'
Cc: 'John Schick'; 'dtkotay@comcast.net'
Subject: North Cornwall Commons - Alternative Trip Generation #2
Attachments: Scoping Meeting Follow-Up - North Cornwall Commons; 2010-09-21, Trip Generation-Alternative #2.pdf

Eric,

We have received the Department's review dated 8/19/10 regarding the TIS Scoping Application dated 5/24/10 for the proposed North Cornwall Commons Development in North Cornwall Township, Lebanon County. As you are aware, both the County MPO and North Cornwall Township supported the proposed trip generation outlined in the Scoping Application, which included assumptions related to the pass-by and internal capture percentages during time periods for which the ITE Trip Generation handbook does not contain published data. The assumptions utilized in the Scoping Application were consistent with the methodology approved by the Department for the Preserve at Historic Cornwall Village project located just south of the proposed site in Cornwall Borough. However, as noted in comment #2 of the Department's review, TPD's assumptions related to the pass-by and internal capture percentages are not being permitted. Consequently, a 2nd meeting has been requested with the Department to further discuss the topic. While awaiting the meeting, TPD has prepared a 2nd alternative trip generation calculation for the project that is 100% compliant with published ITE data. The attached email summarizes the 1st alternative trip generation calculation that was provided to the Department for review on 6/29/10.

As outlined in the attached PDF, the trip generation was recalculated utilizing ITE Land Use Code #750 (Office Park) for the proposed office space, bank, pharmacy, and restaurants located on the 81+/- acre tract located on the eastern side of Cornwall Road. This was done in place of the methodology outlined in the Scoping Application which utilized ITE Land Use Codes 710 (General Office Building), 912 (Drive-In Bank), 881 (Pharmacy/Drugstore with Drive-Through Window), and 932 (High-Turnover (Sit-Down) Restaurant) individually. It is our opinion that use of Land Use Code #750 is appropriate for the eastern tract since it fits that description contained in the ITE manual which states, "Office Parks are usually suburban subdivisions or planned unit developments containing general office building and support services, such as banks, restaurants, and service stations". Furthermore, the published data for Land Use Code #750 is based upon multiple studies and the size of the proposed office park is consistent with the average size of the sites studied for the published data. It is our opinion that this is a very similar concept to utilizing Land Use Code #820 for a Shopping Center in place of the respective Land Use Codes for each individual user in a retail complex. As noted in the attachment, no internal capture was assumed during any of the analyzed time periods for purposes of this analysis. The below table compares the external trip generation between the methodology proposed in the Scoping Application and the methodology which utilizes ITE Land Use Code #750.

Time Period	External Trip Generation					
	TIS Scoping Application[1]			Alternative #2[2]		
	Total	Enter	Exit	Total	Enter	Exit
Average Weekday	27410	13705	13705	26267	13134	13133
Weekday AM peak	1262	869	393	1215	897	318
Weekday PM peak	2820	1254	1566	2675	1138	1537
Saturday Midday Peak	3054	1596	1458	2732	1426	1306

1 = From TIS Scoping Application dated 5/24/10
2 = From attached information utilizing Land Use Code #750

As shown in the above table, the methodology that utilizes ITE Land Use Code #750 results in an external trip generation that is comparable, but lower, than that proposed in the Scoping Application. Therefore, we believe it is appropriate to utilize either the trip generation outlined in the TIS Scoping Application or one of the alternatives presented to the Department. We look forward to discussing this topic in more detail once a meeting date is set. In the meantime, if you have any questions please do not hesitate to contact me.

Thanks,

Eric Mountz, P.E., PTOE
Traffic Planning and Design, Inc.
2500 East High Street, Suite 650
Pottstown, PA 19464
Phone: (610) 326-3100 x2147
Fax: (610) 326-9410
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Trip Generation Analysis - Alternative #2

Average Weekday

Description	Land Use #	Size		Total Trips	Modal Trips	Inter. Trips	Driveway Trips				Pass-By Trips				New Trips		
							Total	Enter%	Enter	Exit	%	Total	Enter	Exit	Total	Enter	Exit
67 ± Acre Tract on the Western Side of Cornwall Road																	
Shopping Center	820	600.6	KSF	21778	-1742	0	20036	50%	10018	10018	0%	0	0	0	20036	10018	10018
Subtotal		**600.6**	**KSF**	**21778**	**-1742**	**0**	**20036**		**10018**	**10018**		**0**	**0**	**0**	**20036**	**10018**	**10018**
81 ± Acre Tract on the Eastern Side of Cornwall Road																	
Office Park	750	436.4	KSF	4984	-399	0	4585	50%	2293	2292	0%	0	0	0	4585	2293	2292
Townhomes	230	160	DU	970	-78	0	892	50%	446	446	0%	0	0	0	892	446	446
Hotel	310	100	Rooms	818	-64	0	754	50%	377	377	0%	0	0	0	754	377	377
Subtotal				**6772**	**-540**	**0**	**6231**		**3116**	**3115**		**0**	**0**	**0**	**6231**	**3116**	**3115**
				28550	**-2283**	**0**	**26267**		**13134**	**13133**		**0**	**0**	**0**	**26267**	**13134**	**13133**

Weekday A.M. Peak Hour

Description	Land Use #	Size		Total Trips	Modal Trips	Inter. Trips	Driveway Trips				Pass-By Trips				New Trips		
							Total	Enter%	Enter	Exit	%	Total	Enter	Exit	Total	Enter	Exit
67 ± Acre Tract on the Western Side of Cornwall Road																	
Shopping Center	820	600.6	KSF	444	-36	0	408	61%	249	159	0%	0	0	0	408	249	159
Subtotal		**600.6**	**KSF**	**444**	**-36**	**0**	**408**		**249**	**159**		**0**	**0**	**0**	**408**	**249**	**159**
81 ± Acre Tract on the Eastern Side of Cornwall Road																	
Office Park	750	436.4	KSF	746	-60	0	686	88%	604	82	0%	0	0	0	686	604	82
Townhomes	230	160	DU	75	-6	0	69	17%	12	57	0%	0	0	0	69	12	57
Hotel	310	100	Rooms	56	-4	0	52	61%	32	20	0%	0	0	0	52	32	20
Subtotal				**877**	**-70**	**0**	**807**		**648**	**159**		**0**	**0**	**0**	**807**	**648**	**159**
				1321	**-106**	**0**	**1215**		**897**	**318**		**0**	**0**	**0**	**1215**	**897**	**318**

Weekday P.M. Peak Hour

Description	Land Use #	Size		Total Trips	Modal Trips	Inter. Trips	Driveway Trips				Pass-By Trips				New Trips		
							Total	Enter%	Enter	Exit	%	Total	Enter	Exit	Total	Enter	Exit
67 ± Acre Tract on the Western Side of Cornwall Road																	
Shopping Center	820	600.6	KSF	2115	-169	0	1946	49%	954	992	34%	662	331	331	1284	623	661
Subtotal		**600.6**	**KSF**	**2115**	**-169**	**0**	**1946**		**954**	**992**		**662**	**331**	**331**	**1284**	**623**	**661**
81 ± Acre Tract on the Eastern Side of Cornwall Road																	
Office Park	750	436.4	KSF	646	-52	0	594	17%	101	493	0%	0	0	0	594	101	493
Townhomes	230	160	DU	88	-7	0	81	67%	54	27	0%	0	0	0	81	54	27
Hotel	310	100	Rooms	59	-5	0	54	53%	29	25	0%	0	0	0	54	29	25
Subtotal				**793**	**-63**	**0**	**729**		**184**	**545**		**0**	**0**	**0**	**729**	**184**	**545**
				2908	**-233**	**0**	**2675**		**1138**	**1537**		**662**	**331**	**331**	**2013**	**807**	**1206**

Saturday Midday Peak Hour

Description	Land Use #	Size		Total Trips	Modal Trips	Inter. Trips	Driveway Trips				Pass-By Trips				New Trips		
							Total	Enter%	Enter	Exit	%	Total	Enter	Exit	Total	Enter	Exit
67 ± Acre Tract on the Western Side of Cornwall Road																	
Shopping Center	820	600.6	KSF	2748	-220	0	2528	52%	1315	1213	26%	658	329	329	1870	986	884
Subtotal		**600.6**	**KSF**	**2748**	**-220**	**0**	**2528**		**1315**	**1213**		**658**	**329**	**329**	**1870**	**986**	**884**
81 ± Acre Tract on the Eastern Side of Cornwall Road																	
Office Park	750	436.4	KSF	61	-5	0	56	54%	30	26	0%	0	0	0	56	30	26
Townhomes	230	160	DU	89	-7	0	82	54%	44	38	0%	0	0	0	82	44	38
Hotel	310	100	Rooms	72	-6	0	66	56%	37	29	0%	0	0	0	66	37	29
Subtotal				**222**	**-18**	**0**	**204**		**111**	**93**		**0**	**0**	**0**	**204**	**111**	**93**
				2970	**-238**	**0**	**2732**		**1426**	**1306**		**658**	**329**	**329**	**2074**	**1097**	**977**

Land Use: 750
Office Park

Description

Office parks are usually suburban subdivisions or planned unit developments containing general office buildings and support services, such as banks, restaurants and service stations, arranged in a park- or campus-like atmosphere. General office building (Land Use 710), corporate headquarters building (Land Use 714), single tenant office building (Land Use 715), research and development center (Land Use 760) and business park (Land Use 770) are related uses.

Additional Data

Some of the regression curves may produce illogical trip-end estimates for small office parks. When the proposed site size is significantly smaller than the average-sized facility published in this report, caution should be used when applying these statistics. For more information, please refer to Chapter 3, "Guidelines for Estimating Trip Generation," of the ITE *Trip Generation Handbook*, Second Edition.

The sites were surveyed between the 1970s and the 2000s throughout the United States, with many conducted in New York.

Trip Characteristics

The trip generation for the a.m. and p.m. peak hours of the generator typically coincided with the peak hours of the adjacent street traffic; therefore, only one a.m. peak hour and one p.m. peak hour, which represent both the peak hour of the generator and the peak hour of the adjacent street traffic, are shown for office parks.

Source Numbers

4, 15, 160, 161, 184, 185, 193, 253, 268, 300, 301, 356, 550, 618

Office Park
(750)

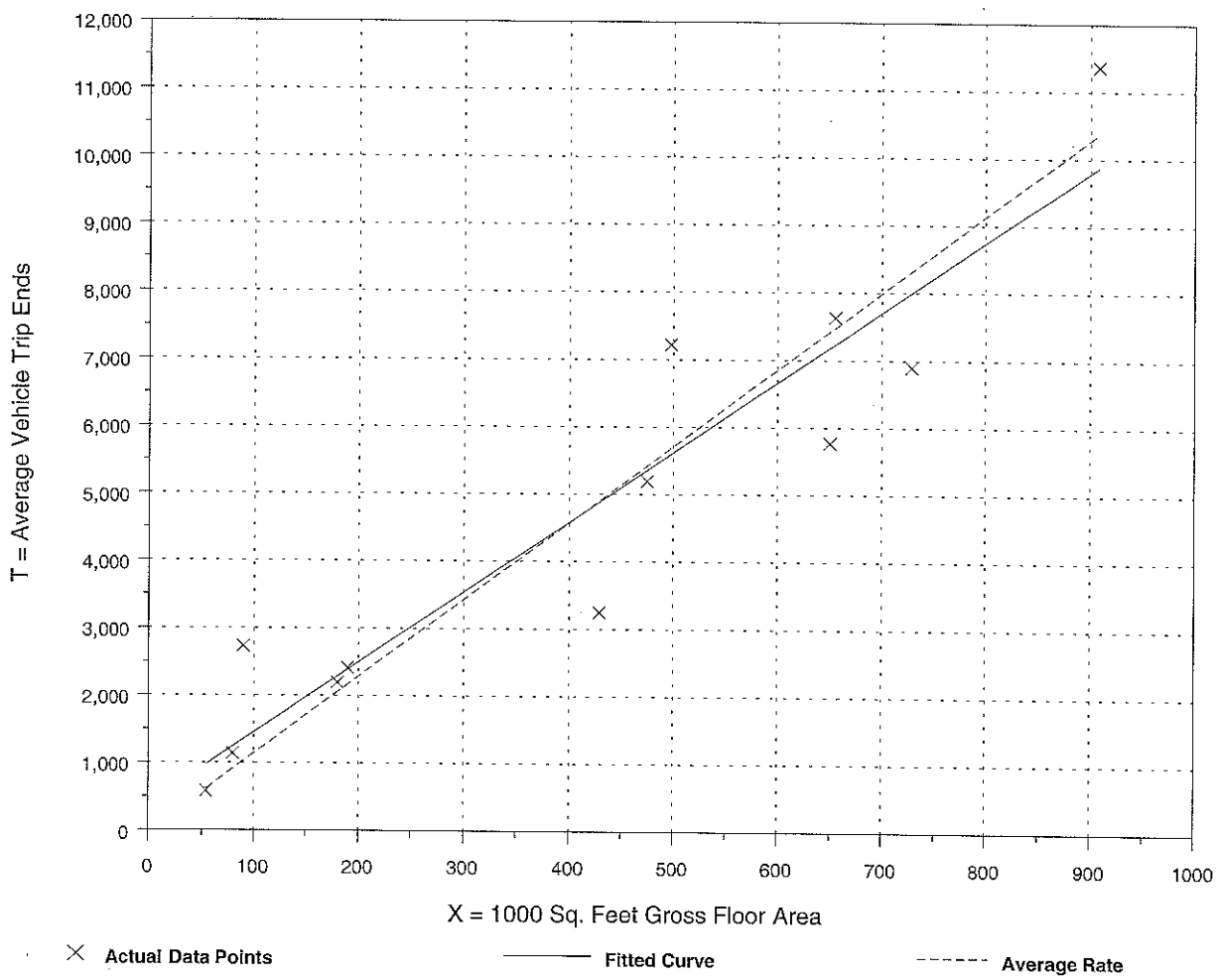
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday

Number of Studies: 12
Average 1000 Sq. Feet GFA: 412
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
11.42	7.56 - 30.30	4.69

Data Plot and Equation



× Actual Data Points ——— Fitted Curve ------ Average Rate

Fitted Curve Equation: T = 10.42(X) + 409.04 **R^2 = 0.88**

Office Park
(750)

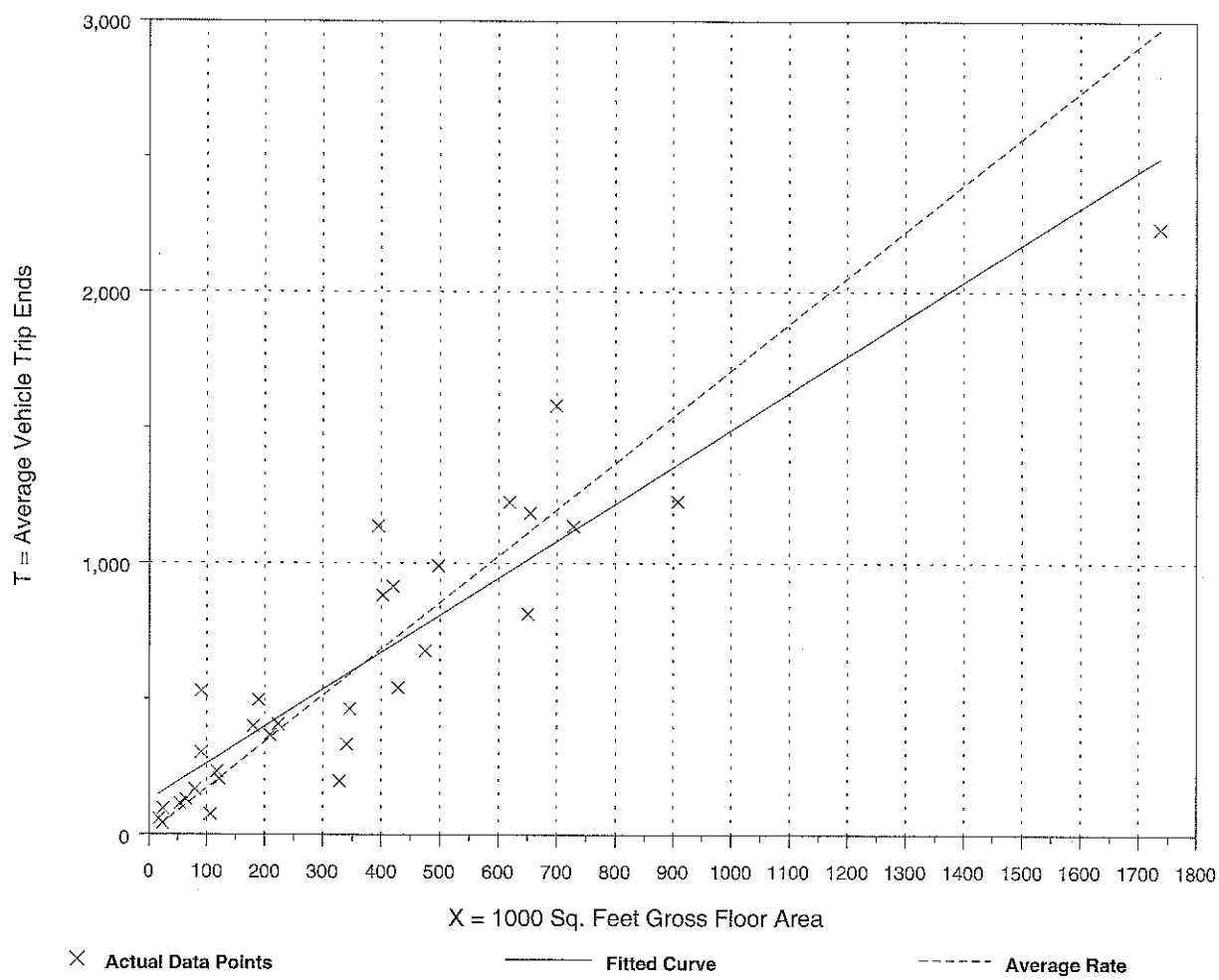
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
A.M. Peak Hour

Number of Studies: 31
Average 1000 Sq. Feet GFA: 362
Directional Distribution: 89% entering, 11% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.71	0.60 - 5.89	1.46

Data Plot and Equation



Fitted Curve Equation: T = 1.37(X) + 124.36 $R^2 = 0.85$

Office Park
(750)

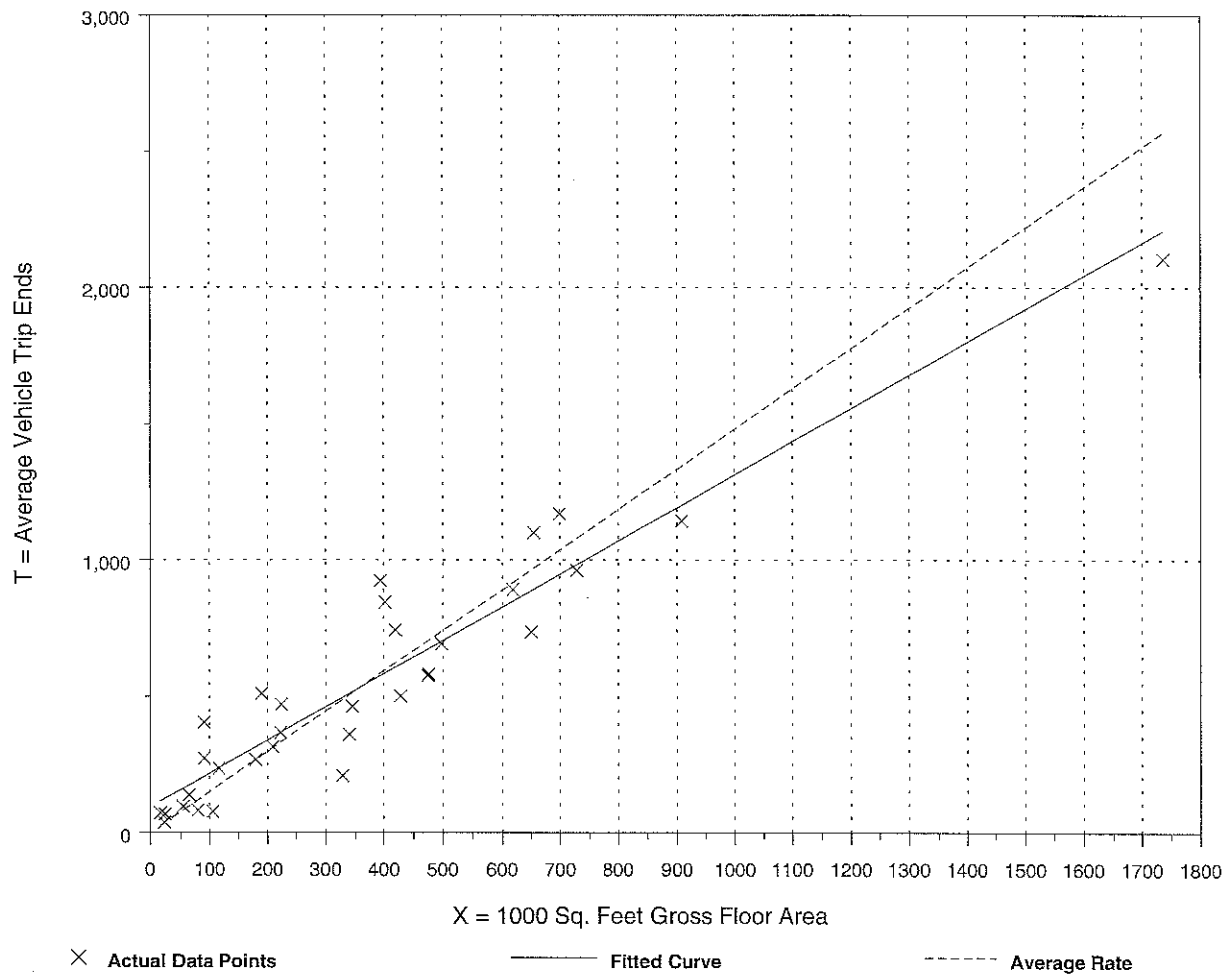
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
P.M. Peak Hour

Number of Studies: 32
Average 1000 Sq. Feet GFA: 369
Directional Distribution: 14% entering, 86% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.48	0.64 - 4.50	1.31

Data Plot and Equation



Fitted Curve Equation: T = 1.22(X) + 95.83 $R^2 = 0.90$

Office Park
(750)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Saturday,
Peak Hour of Generator

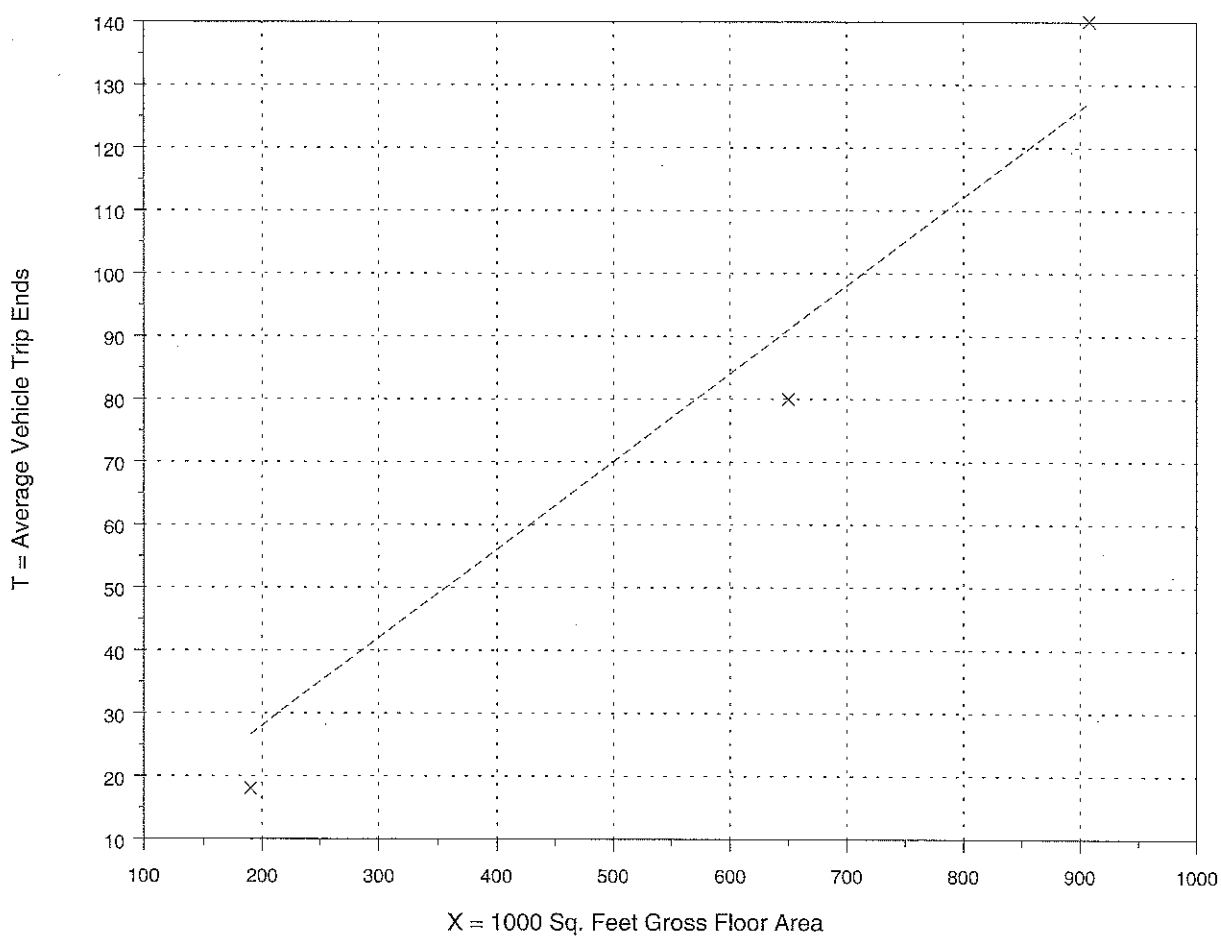
Number of Studies: 3
Average 1000 Sq. Feet GFA: 583
Directional Distribution: 74% entering, 26% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.14	0.09 - 0.15	0.37

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



× **Actual Data Points** ------ **Average Rate**

Fitted Curve Equation: Not given R^2 = ****

OS-2 (10-08)

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AUG 13 2010
Traffic Planning and Design, Inc.

August 10, 2010

Eric Mountz, P. E., PTOE
Traffic Planning & Design, Inc.
2500 East High Street
Suite 650
Pottstown, PA 19464

Lebanon Co.-N. Cornwall Twp.
North Cornwall Commons
Scope of Study Review

Dear Mr. Mountz:

We have reviewed the scope of study for the subject development, and have found that there are corrections required or additional information needed as noted on the enclosed sheet. This information is required in order to conform to our current regulations as outlined in Chapter 441, Publication 282, and strike-off letter 470-93.35.

If you have any questions regarding this matter, please contact Eric Kinard of the District Traffic Unit at 717-787-9237.

Sincerely,

for: Tucker Ferguson, P.E.
District Executive

JAW/sab
(jaw0810l)

Enclosure

cc: Jonathan Fitzkee, Transportation Planner, Lebanon County Planning Department
John M. Schick, RETTEW
Office of Planning & Zoning, North Cornwall Township

Scope Application Review Comment Sheet

COUNTY:	Lebanon	MUNICIPALITY:	North Cornwall Twp
JOB NAME:	North Cornwall Commons	PREPARED BY:	TPD, Inc.
		REVIEW BY:	PennDOT

The following comments are in direct reference to Action Items presented in the July 21, 2010 Meeting Minutes:

1. The proposed phasing and analysis years 2012, 2014, 2022 & 2027 are acceptable.
2. The following comments are in regards to the proposed trip generation:
   a. ITE does not support the use of pass-by trips for the A.M. peak periods when using Land-use Codes – 820, 881, 912, and 932. Please revise Trip Generation to show 0 pass-by trips for this time period or collect relevant local data according to ITE procedures and submit for approval.
   b. According to the ITE Handbook there is no data provided for internal capture in either the weekday morning peak period or Saturday midday peak period (page 92). It is recommended by ITE to collect local data to establish an internal capture rate or assume no internal capture.
3. Please add the following intersections to the Study Area:
   - SR 0072, 10th Street and Cornwall Road.
   - Evergreen Road & State Street
   - SR 0241 & SR 0072
   - SR 0072 & York Street
   - SR 0072 & Summit Street
4. Include all Meeting Minutes in the correspondence section of the TIS.

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MEETING MINUTES
Proposed North Cornwall Commons
July 21, 2010

Subject: North Cornwall Commons
North Cornwall Township, Lebanon County, PA
TPD# BLAC.A.00001

Meeting Date: Monday, June 28, 2010 – 2:00 P.M.

Place: PennDOT District 8-0, Franklin Room

Attendees:
Jason Bewley – PennDOT District 8-0
Eric Kinard - PennDOT District 8-0
Richard Dean – PennDOT District 8-0
Rich Alandar - PennDOT District 8-0
Mazhar Malik - PennDOT District 8-0
Mike Centi – PennDOT District 8-0
Jim Caldwell – Rettew (North Cornwall Township Engineer)
John Schick – Rettew (North Cornwall Township Engineer)
Jim Loser – South Lebanon Township
Tom Kotay – Lebanon County Planning Department
Bob Sentz – Lebanon County Planning Department
Jonathon Fitzkee – Lebanon County Planning Department
Joe Deerin – Springwood Development Partners, L.P.
Richard Welkowitz – Springwood Development Partners, L.P.
Larry Lawyer – Delta Development Group, Inc.
Eric Mountz – Traffic Planning & Design (TPD)
Brett Coleman – Traffic Planning & Design (TPD)

Prepared By: Brett Coleman Reviewed By: Eric Mountz

A meeting was held to discuss the Transportation Impact Study (TIS) Scoping Meeting Application, dated 5/24/10 for the proposed North Cornwall Commons project in North Cornwall Township, Lebanon County, Pennsylvania. The proposed development includes two (2) parcels of land located to the north of Rocherty Road (S.R. 2002) along Cornwall Road (S.R. 2001). There is a 67± acre parcel located on the western side of Cornwall Road (S.R. 2001) that is proposed to consist of a 600,600 square foot (s.f.) shopping center consisting of an integrated mix of big box retail, strip retail, and pad sites. There is also an 81± acre parcel located on the eastern side of Cornwall Road (S.R. 2001) that is proposed to consist of a 409,000 s.f. office park, a 100 room hotel, an 11,400 s.f. pharmacy, two (2) 6,000 s.f. sit-down restaurants, a 4,000 s.f. drive-in bank, and 160 rental luxury townhomes.

With development of the proposed site the Applicant is proposing to construct a new east-west Township Roadway that will connect Cornwall Road (S.R. 2001) to Route 72 (S.R. 0072) via the existing access to the Tractor Supply/Cedar Crest Square. The 67± acre parcel will be served via three (3) full-access driveways to the proposed Township Roadway and two (2) right-in/right-out driveways to Cornwall Road (S.R. 2001). The 81± acre parcel will be served via a full-access driveway to Cornwall Road (S.R. 2001), a right-in/right-out driveway to Cornwall Road (S.R. 2001), two (2) full-access driveways to Rocherty Road (S.R. 2002), and a full-access connection to Norman Drive.

The following items were discussed:

1. Eric Mountz (EM) gave an overview of the project (as described above) which included the proposed land uses, the sizes of the proposed uses, the proposed driveway locations, and a brief summary of the adjacent roadway network.
2. Joe Deerin (JD) stated that the Lebanon County Comprehensive Plan has designated the area where the proposed site is located as the area for future growth in Lebanon County. JD also informed PennDOT that a mutually agreed upon development agreement is in place between North Cornwall Township and Springwood Development Partners. The only remaining action is for the judge to sign the agreement.
3. EM asked if there were any general questions prior to discussing the contents of the Scoping Application. Jason Bewley (JB) asked if the previous studies for the developments previously proposed on the subject parcels would be updated, or if TPD would be completing a new TIS. EM stated that there were previously three (3) separate TIS's prepared for the Wal-Mart, the North Cornwall Commons Shopping Center, and the North Cornwall Commons Business Park TIS. EM noted that the proposed TIS will start from the beginning with the Scoping Application and follow the new PennDOT guidelines, since it will include all three of the land parcels noted above. EM added that the only information that will be utilized from the prior TIS's is the background information. He also noted that new traffic counts were conducted in June 2009 prior to school being out for the summer.
4. EM noted that prior to the Scoping Application meeting, TPD received feedback in the form of emails and memorandums from both the County and Township regarding the proposed TIS scope. He noted that a meeting was held on June 22, 2010 between the County, the Township, and the Project team in order to discuss the feedback from both parties. Based upon the outcome of that meeting, both the County and Township agreed that they were comfortable with the scope outlined in the May 24, 2010 Application. The applicable feedback from the Township and County are attached for reference.
5. EM suggested that each section of the Scoping Application be reviewed on a point-by-point basis. The discussions related to the sections were as follows:
    a. Section #1 (Location of Proposed Development) – Covered during introduction.
    b. Section #2 (Description of Proposed Development) – EM described the proposed size and approximate locations of the land uses on the aerial site plan. EM noted that the proposed TIS will include phasing, with the opening year being 2012, the phase 1 build-out year being 2014, the full build-out year being 2022, and the design year being 2027.

EM noted that the full build-out year of 2022 was used in order to be consistent with the proposed H&K development, the Preserve at Historic Cornwall Village, which is located to the south of the proposed site. Mazhar Malik (MM) asked what was proposed in Phase 1 of the study. EM stated that there will be 226,900 s.f. of retail space built on the 67± acre parcel and 97,600 s.f. of office space and 80 rental luxury townhomes built on the 81± acre parcel. MM stated that the Department will consider phasing of roadway improvements; however all of the right-of-way needs to be in place in order for the Highway Occupancy Permit (HOP) to be issued. **TPD requests PennDOT's feedback confirming that the proposed phasing and analysis years of 2014, 2022, and 2027 are acceptable.**

JB questioned if there were any public funds that will be used for this project. JD explained that Springwood Development Partners is working with Delta Development Group and The Carmen Group on applications for both State and Federal Funding. He added that Lebanon County is also involved in the applications through Tom Kotay (TK) at the Lebanon County Planning Department. JD reported that no public funds have been awarded yet, however they are confident that they will be awarded some funds in the coming months. JB indicated that if public funds are utilized the criteria for the TIS are slightly different than the PennDOT standards. EM agreed and noted that they only real difference is that the study associated with the public funds must consider a 20-year design horizon rather than the 5-year horizon required by PennDOT. He added that with the proposed phasing for the PennDOT TIS the design year is proposed to be 2027. Therefore, the difference between years between the Federal and PennDOT guidelines may not be that significant, especially given the fact that the background growth factor for the area is only 1.15% per year. It was agreed that this issue would be addressed if public funds are awarded for the project.

EM asked if there were any more questions related to the phasing of the study. JB stated that he hadn't had a chance to review the Application in detail. EM asked how long it would take to receive feedback regarding the proposed scope for the TIS. JB suggested submitting the meeting minutes and noting in the minutes the items related to the scope that require the Department's feedback.

c. Section #3 (Development Schedule and Staging) – Covered in Section #2.

d. Section # 4 (Trip Generation) – EM described the assumed land uses, internal capture percentages, pass-by percentages, and modal trip reduction. EM discussed the pass-by and internal capture percentage assumptions utilized for the trip generation during time periods for which there is not published ITE data. He noted that assumptions for pass-by percentages were utilized for the shopping center (Land Use Code #820), the pharmacy (Land Use Code #881), the drive-in bank (Land Use Code #912), and the high-turnover restaurant (Land Use Code #932). He indicated that an assumed pass-by rate of 10% less than the weekday P.M. peak was utilized for the weekday A.M. peak and the Saturday midday peak if there was no published data. EM noted that no internal capture was assumed during the weekday A.M. peak, however TPD did utilize the ITE published internal capture percentages for the weekday midday time period to calculate the Saturday midday internal capture rate. He indicated that he felt this was appropriate

given the two time periods should have similar characteristics, with the Saturday midday potentially even having higher rates since most people consolidate trips on their day off. EM noted that all of the assumptions were consistent with the H&K TIS scoping application that was approved by PennDOT in December 2009. JB indicated that it is PennDOT's policy to stick to and only utilize ITE published data so that PennDOT can be consistent for all projects that are presented to them. JB also stated that he would consider local data and background information to support the reductions. EM indicated that the assumptions are consistent with the H&K development, and at the scoping meeting for that project, it was stated that PennDOT would accept the assumptions if the County and the Municipality supported them. Therefore, TPD proceeded under that same directive and had meetings with the County and the Township to discuss the assumptions. Ultimately it was agreed that both parties supported the assumptions and the associated trip generation presented in the scoping application. EM noted that if local data was collected for the Saturday midday peak hour, it would most likely come back with higher percentages than those assumed, and if approved by the district office, would be available to be used by everyone, not just this project. EM indicated that the developer may consider collecting the local data if they would be able to use the rates for future projects. EM noted that a pass-by reduction is crucial because the 3,500 Saturday midday peak hour trips are not realistic for this development. He noted that the roadway improvements will be difficult enough but with 3,500 trips, would likely be impossible. JB indicated that the 3,500 trips is not realistic, however he wants background support in order to approve the assumptions. **TPD requests PennDOT's feedback regarding the proposed assumptions related to the pass-by and internal capture percentages during time periods for which there is not published ITE data.**

EM described the modal trip reduction. He indicated that the maximum reduction rates contained on page 21 of PennDOT's TIS Guidelines were utilized for the following reasons: 1) Lebanon Transit has agreed to extend bus service to the site, 2) extensive internal trails and sidewalks are being proposed on site, and 3) a direct connection is being provided to the existing Lebanon Valley Rail-Trail located on the eastern property boundary of the 81± acre parcel. He noted that although the existing area does not meet the PennDOT criteria to take the maximum reductions, the accommodations being proposed in conjunction with the development are anticipated to meet the criteria. He added that the Municipality is requiring the developer to provide every possible measure to allow for pedestrian/bicycle connectivity and public transportation, thus creating a "livable community". Jim Caldwell (JC) indicated that as long as the developer has documentation from Lebanon Transit regarding the anticipated bus routes, he would be ok with the maximum reduction. JB stated that he needs justification that there is will be a future demand to justify the modal trip reductions. JD indicated that he could contact Lebanon Transit and get documentation regarding the future demand and the anticipated facilities proposed for the site. John Schick (JS) stated that he would like documentation from Lebanon Transit as well. It was agreed that it was appropriate to utilize the maximum model trip reductions, contingent upon providing a letter from Lebanon Transit regarding the anticipated bus routes. **Post Meeting Update:** The requested letter from Lebanon Transit is attached.

e. Section #5 (Estimated Daily Trip Generation/Driveway Classification) – Did not require discussion.

f. Section #6 (Transportation Impact Study Required) – Did not require discussion.

g. Section #7 (Traffic Impact Assessment Required) – Did not require discussion.

h. Section #8 (TIS Study Area) – EM described the proposed study area intersections. He noted that they are consistent with the intersections analyzed as part of the previously discussed TIS's completed in the area. Eric Kinard (EK) requested that a one mile radius (related to unsignalized intersections) and a two mile radius (related to signalized intersections) be placed on the location map in order to look at the potential need to include additional intersections in the TIS (attached). JB questioned why the intersection of Route 72 and Cornwall Road was not included as a study area intersection. EM noted that the intersection had been previously discussed in detail with the County and Township. He stated that it is highly likely that the PennDOT LOS requirements will not be met, and thus an alternative transportation plan (ATP) would likely be required. TK added that the County is aware that the intersection is currently congested, particularly during the start/end of school, and has overlooked needed improvements at the intersection since funding just isn't available. Therefore, at the June 22, 2010 meeting with the County and Township it was agreed that the developer would do a supplemental analysis of the intersection and provide the information to the County since TK stated that it would be helpful in their future corridor study. JC noted that the intersection cannot be overlooked, however the Township agreed with the County to keep the intersection out of the study if a supplemental analysis was completed. This way the developer would be contributing towards the future planning efforts at the intersection rather than providing improvements at another location as part of the ATP. EK indicated that he will need to see where the intersection falls within the previously discussed radii, but it was very likely that the intersection will need to be included in the TIS.

   JB questioned if access could be provided to Isabel Drive to reduce the traffic at the access intersection with Route 72. According to JC one of the lots may be available for purchase, but the other vacant lots have land development approvals or have begun construction.

   Jim Loser (JL) indicated that South Lebanon Township would like to see the intersection of Wilhelm Avenue and Lincoln Avenue studied. EM questioned if the intersection was included in the VA Medical Hospital TIS since the intersection is in very close proximity to the hospital's access to Lincoln Avenue. It was determined that the intersection was not included in the VA TIS. TK indicated that he thought that the intersection should have been studied by the VA Medical Hospital, but noted regardless he felt it would appropriate to include the intersection in the study area for the subject TIS.

   TPD requests PennDOT's feedback regarding the proposed study area intersections for the TIS.

i. Section #9 (Study Area Type) - Did not require discussion.

j. Section #10 (TIS Analysis Periods and Times) – EM indicated that the weekday A.M., weekday P.M., and Saturday midday time periods were proposed to be analyzed as part of the TIS. He noted that the P.M. time period studied was 2:30-6:00 P.M. to account for the school traffic and the Saturday midday time period was 10:45 A.M. - 12:45 P.M. since the peak from the hose counts showed a higher peak at slightly early time period then typically studied.

k. Section #11 (Traffic Adjustment Factors) – Did not require discussion.

l. Sections #12 (Other Projects Within Study Area to be Added to Base Traffic) – JB questioned if the future land parcels along the Route 72 corridor were included as nearby developments. EM indicated that traffic from five (5) nearby developments were included, which includes the developments along the Route 72 corridor. EM added that the TIS for the proposed VA Medical Hospital Expansion required mitigation at the intersection of Rocherty Road and Cornwall Road. The TIS for that project recommend that a fee in-lieu-of contribution be made for future improvements at the intersection rather than completing half of the ultimate improvements that will required in the future once all of the proposed developments in the vicinity of the intersection are built-out. JC indicated that North Cornwall Township is coordinating with South Lebanon Township to set-up an escrow agreement for the $480,000 fee in-lieu-of contribution.

6. JB questioned if there was anything on the Lebanon County TIP within the study area of this TIS and EM answered there was not.

7. JB questioned if there are any critical intersections between the proposed site and the H&K site that are not being analyzed as part of one of the TIS's. EM indicated that the H&K TIS studied up to the Route 72 and Route 419 intersection and the Route 419 and Cornwall Road intersection. He noted that there were no critical intersections between the H&K study area intersections and the proposed study area intersections for this project.

8. EM questioned the process of obtaining an approved TIS scope. PennDOT indicated that they wanted to see the meeting minutes (with unanswered scope items highlighted) and the radii figure. Once they review that information they will send a letter confirming the required scope for the TIS.

These comments reflect our understanding of the issues discussed at the meeting. If any attendee does not agree with these minutes or would like to add to them, please contact us as soon as possible.

Attachments: Meeting Sign-in Sheet
Email dated 5/31/10 from the Lebanon County Planning Department
Memorandum dated 6/17/10 from Rettew
Letter from Lebanon Transit dated 7/20/10
Location Map with 1 and 2-Mile Radii

pennsylvania
DEPARTMENT OF TRANSPORTATION

8-0 Permits

A Smart Transportation System & Good Access Management Practice's

Start Here on: (Date) 6-28-10 (Time) 2:00 ~~AM~~ / PM

Meeting Location: Franklin

SR: _____ Offset: _____ County: Lebanon

Township/~~Borough~~: North Cornwall

Meeting Reason: _____

Meeting Requested By: Eric Mountz (TPD) Phone #: 610·326·3100 Ext. 2147

Township/ Borough Invited: yes ☐ no ☐ Any Attorney Invited: yes ☐ no ☐

Highway Occupancy Permits Meeting Sign-In (please print legibly)

Name / Phone # / Email Address:	Organization:	Job Title:
~~*Randall Staudt, P.E.~~ / 717-783-3848/rastaudt@state.pa.us	PENNDOT Dist. 8-0 Construction	Construction Services Engineer
☑ Mazhar Malik / 717-787-5179 / mmalik@state.pa.us	PENNDOT Dist. 8-0 Permits	District Permit Manager
☑ Rich Alandar / 717-787-5179/ ralandar@state.pa.us	PENNDOT Dist. 8-0 Traffic	Assistant Permit Manager
☑ Richard Deen, P.E. / 717-783-3949/ rdeen@state.pa.us	PENNDOT Dist. 8-0 Traffic	ITS & Congestion Mgt. Manager
☑ Jason Bewley, P.E. / 717-783-3981/ jbewley@state.pa.us	PENNDOT Dist. 8-0 Traffic	District Traffic Engineer
☑ Eric Kinard, ~~P.E.~~ / 717-787-9237/ ekinard@state.pa.us	PENNDOT Dist. 8-0 Permit	Signals & Congestion Mgt. Supervisor
Jim Loser	South Lebanon Twp	Asst. Manager
Joe Deere	RMS A.E. (Sparmiccia)	Owner/Partner
Richard Meckentz	Developer Blackford	Owner
Anthony [illegible]	DELPH	VP
Jonathan Fitzkee	Lebanon Co. Planning Dept.	Transportation Planner
BOB SENTZ	" "	ASSISTANT DIRECTOR
Jim CALDWELL	RETTEW ASSOC.	NCT TWP. ENGINEER
John SCHICK	RETTEW ASSOCIATES INC	NCT TWP. TRAFFIC ENGINEER
Eric Mountz	Traffic Planning & Design	emountz@trafficpd.com
Brett Coleman	Traffic Planning & Design	bcoleman@trafficpd.com
TOM KOTAY	LEBCO MPO STAFF	DTKOTAY@COMCAST.NET
Mike Centi 787-5313 mcenti@state.pa.us	PennDOT 8-0 Signals	Traffic control Specialist

* NOT IN ATTENDANCE

- MINUTES OF MEETING WILL BE PREPARED BY PERSON REQUESTING THE MEETING
- A COPY OF THIS SIGN IN SHEET WILL BE DISTRIBUTED AFTER THE MEETING
- LETTERS OF CREDIT WILL BE REQUIRED BEFORE THE PERMIT IS ISSUED ON DEPARTMENT FORM (M-950L) EXCEPT FOR MINIMUM USE DRIVEWAYS
- APPLICANT/ENGINEER MUST REVIEW RECENT STRIKE OFF MEMO 470 - 09 -2, SOL ON ACCESS RELEASE PROCEDURES, AND MEMO 450 – 09 – 7, SOL ON THE FORM OF INDEMNIFICATION
- DEPARTMENT CAN NOT ACCEPT ANY CHANGES TO THE FORMS ALREADY APPROVED BY THE DEPARTMENT

THANK YOU…

Updated: 03252009

RETTEW

We answer to you.

3020 Columbia Avenue, Lancaster, PA 17603 Phone: (717) 394-3721 Fax: (717) 394-1063

MEMORANDUM

DATE: June 17, 2010

TO: Jim Caldwell

FROM: John M. Schick

SUBJECT: North Cornwall Commons – Traffic Impact Study Scope

As per your request, we have reviewed the Traffic Impact Study Scope for North Cornwall Commons, prepared by Traffic Planning and Design, Inc., dated May 24, 2010. We concur with the scope as presented with the exception of the following items:

1. The intersection of PA Route 72, Cornwall Road, 10th, and Poplar Street should also be included in the analysis since more than 40% of the proposed site-generated traffic will go through this intersection.

2. The analysis conducted by TPD to determine the modal split reduction percentages selected should be provided. This analysis should address each item in Step 6 of the *Policies and Procedures – Traffic Impact Studies* for the pedestrian, bicycle, and transit modes. For example, for the 3% transit mode reduction, there needs to be a bus frequency of more than 6 buses per hour traveling within the adjacent "roadway network" for 19-24 hours per day. Reviewing the current COLT route information, it does not appear that this criteria and/or frequency of bus activity exists in this area. Also, there is no bus service currently along Cornwall Road on Saturday. Therefore, separate weekday and weekend modal split reduction analysis should be conducted and included in the Scoping Application.

3. The pass-by capture percentages for the site may overestimate the amount of pass-by trips given the level of traffic on Cornwall Road. The report *Transportation Impact Analyses for Site Development* suggests re-consideration of pass-by rates where the amount of pass-by trips diverted from a through-fare exceeds 15 percent of the total traffic volume on the thorough-fare. The 2009 PM peak hour volume along Cornwall Road is 753 vehicles and on the Saturday mid-day peak is 411 vehicles. The calculated pass-by reduction proposed to be used indicated there would be 798 pass-by trips during the PM peak hour and 770 pass-by trips during the Saturday peak hour entering the site. A breakdown or more detailed analysis that would separate the diverted-link trips from the pass-by trips should be provided.

4. New PennDOT growth rates will be available in July. The new urban non-interstate rate for Lebanon County should be utilized.

5. We also concur with Tom Kotay's suggestion to solicit South Lebanon Township's input on the Scope and to invite them to the PennDOT Scoping Meeting.

6. Any additional comments received from the adjacent municipalities or PennDOT at the scoping meeting should also be incorporated into the final traffic impact study scope.

TRAFFIC PLANNING AND DESIGN, INC.
Est. 1989
4507 NORTH FRONT STREET, STE 202
HARRISBURG, PA 17110
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TPD@TRAFFICPD.COM
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PA Society of Professional Engineers
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#1 Best Civil Engineering Firm
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Inc. 5000
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May 24, 2010

Mr. Mazhar Malik
Permits Manager
PennDOT District 8-0
2140 Herr Street
Harrisburg, PA 17103

RE: **Transportation Impact Study (TIS) Scoping Meeting Application**
North Cornwall Commons
North Cornwall Township, Lebanon County, PA
TPD# BLAC.A.00001

Dear Mazhar:

On behalf of Springwood Development Partners, L.P., Traffic Planning and Design, Inc. (TPD) has prepared the following TIS Scoping Meeting Application for the above referenced project. This information has been compiled in accordance with the application procedures outlined in Strike-Off Letter 470-09-4, dated February 12, 2009. We appreciate your review of the enclosed information and if deemed necessary would like to schedule a meeting to confirm the scope at your earliest convince.

Scoping Meeting Date: To be determined
Applicant: Springwood Development Partners, L.P.
Applicant's Consultant: TPD (Eric Mountz)
Applicant's Primary Contacts: Joe Deerin/Rich Welkowitz

A list of the anticipated meeting attendees including phone numbers and email addresses is attached.

1. *LOCATION OF PROPOSED DEVELOPMENT:*

   PennDOT Engineering District: 8-0 County: Lebanon
   Municipality: North Cornwall Township
   State Routes: Cornwall Road (S.R. 2001)
   Segment(s): 0060 Offset(s): 1383;

   Please refer to the attached **Figure 1** which shows the project location.

2. *DESCRIPTION OF PROPOSED DEVELOPMENT:*

   - Proposed Site Access:

     67+/- Acre Tract on the Western Side of Cornwall Road (S.R. 2001)

     - With development of the proposed site the Applicant is proposing to construct a new east-west Township Roadway that will connect Cornwall Road (S.R. 2001) to Route 72 (S.R. 0072) via the existing access to the Tractor Supply/Cedar Crest Square. This

portion of the development will be served via three (3) full-access driveways to the proposed Township Roadway. In addition, there will be two (2) right-in/right-out driveways to Cornwall Road (S.R. 2001).

81+/- Acre Tract on the Eastern Side of Cornwall Road (S.R. 2001)

- This portion of the development will be served via five (5) driveways to the external roadway network, comprised of the following:
  - A full-access driveway to Cornwall Road (S.R. 2001), opposite the proposed Township Roadway through the 67+/- Acre Tract;
  - A right-in/right-out driveway to Cornwall Road (S.R. 2001);
  - Two (2) full-access driveways to Rocherty Road (S.R. 2002), opposite the existing driveways to the Lebanon Valley Expo Center;
  - A full-access connection to Norman Drive.

- Proposed Land Uses:

67+/- Acre Tract on the Western Side of Cornwall Road

- 600,600 square foot Shopping Center consisting of an integrated mix of big box retail, strip retail, and pad sites.

81+/- Acre Tract on the Eastern Side of Cornwall Road

- 409,000 square foot office park;
- 100 room hotel;
- 11,400 square foot pharmacy;
- Two (2) 6,000 square foot sit-down restaurants;
- 4,000 square foot drive-in bank;
- 160 rental luxury townhomes.

- Community Linkages (access to neighboring properties, cross easements, pedestrian and transit accommodations): The proposed development will include an internal pedestrian trail system interconnecting the entire site, a connection to the Lebanon Valley Rail-Trail, and designated stops for the Lebanon Transit Authority.

3. *DEVELOPMENT SCHEDULE AND STAGING:*

- Anticipated Opening Year: 2012
- Phase 1 Build-Out Year: 2014
- Full Build-Out Year: 2022
- Proposed Phasing:
  - Phase 1 of the development will consist of the following:

67+/- Acre Tract on the Western Side of Cornwall Road

- 226,900 square feet of retail space.

<u>81+/- Acre Tract on the Eastern Side of Cornwall Road</u>

- 97,600 square feet of office space;
- 80 rental luxury townhomes.

4. *TRIP GENERATION:*

Trip generation for the proposed development will be based on:

☒ ITE Trip Generation Manual.

- Residential Condominium/ Townhouse (ITE Land Use Code #230)
- Hotel (ITE Land Use Code #310)
- General Office Building (ITE Land Use Code #710)
- Shopping Center (ITE Land Use Code #820)
- Pharmacy/Drugstore with Drive-Through Window (ITE Land Use Code #881)
- Drive-in Bank (ITE Land Use Code #912)
- High-Turnover (Sit-Down) Restaurant (ITE Land Use Code #932)

☐ Other independent surveys.

Table 1 shows the trip generation equations and directional splits for an average weekday and the weekday A.M., weekday P.M., and Saturday midday peak hours.

TABLE 1
TRIP GENERATION DATA

Land Use	Time Period	Trip Generation Equations	Directional Split	
			Entering	Exiting
Residential Condominium/ Townhouse (#230)	Average Weekday	Ln(**T**) = 0.87 Ln(**X**) + 2.46	50%	50%
	A.M. Peak Hour	Ln(**T**) = 0.80 Ln(**X**) + 0.26	17%	83%
	P.M. Peak Hour	Ln(**T**) = 0.82 Ln(**X**) + 0.32	67%	33%
	Saturday Peak Hour	**T** = 0.29(**X**) + 42.63	54%	46%
Hotel (#310)	Average Weekday	**T** = 8.17(**X**)	50%	50%
	A.M. Peak Hour	**T** = 0.56(**X**)	61%	39%
	P.M. Peak Hour	**T** = 0.59(**X**)	53%	47%
	Saturday Peak Hour	**T** = 0.72(**X**)	56%	44%
General Office Building (#710)	Average Weekday	Ln(**T**) = 0.77 Ln(**X**) + 3.65	50%	50%
	A.M. Peak Hour	Ln(**T**) = 0.80 Ln(**X**) + 1.55	88%	12%
	P.M. Peak Hour	**T** = 1.12(**X**) + 78.81	17%	83%
	Saturday Peak Hour	Ln(**T**) = 0.81 Ln(**X**) – 0.12	54%	46%
Shopping Center (#820)	Average Weekday	Ln(**T**) = 0.65 Ln(**X**) + 5.83	50%	50%
	A.M. Peak Hour	Ln(**T**) = 0.59 Ln(**X**) + 2.32	61%	39%
	P.M. Peak Hour	Ln(**T**) = 0.67 Ln(**X**) + 3.37	49%	51%
	Saturday Peak Hour	Ln(**T**) = 0.65 Ln(**X**) + 3.76	52%	48%
Pharmacy (#881)	Average Weekday	**T** = 88.16(**X**)	50%	50%
	A.M. Peak Hour	**T** = 2.66(**X**)	57%	43%
	P.M. Peak Hour	**T** = 10.35(**X**)	50%	50%
	Saturday Peak Hour	**T** = 7.85(**X**)	50%	50%
Drive-in Bank (#912)	Average Weekday	**T** = 148.15(**X**)	50%	50%
	A.M. Peak Hour	**T** = 12.35(**X**)	56%	44%
	P.M. Peak Hour	**T** = 25.82(**X**)	50%	50%
	Saturday Peak Hour	**T** = 26.53(**X**)	52%	48%
High-Turnover Restaurant (#932)	Average Weekday	**T** = 127.15(**X**)	50%	50%
	A.M. Peak Hour	**T** = 11.52(**X**)	52%	48%
	P.M. Peak Hour	**T** = 11.15(**X**)	59%	41%
	Saturday Peak Hour	**T** = 14.07(**X**)	53%	47%

T = Total Trips, **X** = Independent Variable (Dwelling Units, Rooms, 1,000 Square Feet Gross Floor/Leasable Area)

Based on the information provided in the Trip Generation Manual, an Institute of Transportation Engineers (ITE) Informational Report, not all trips generated by the site are trips that are "new" to the roadway system. In addition to the new trips generated, there are pass-by trips, which are trips that are drawn from the passing traffic stream and do not add trips to the adjacent roadways. Pass-

by trip percentages for the proposed site were utilized as specified in the ITE Trip Generation Handbook, June 2004 edition. The pass-by percentages utilized are shown in **Table 2**. Please note that a pass-by percentage of 10% less than the weekday P.M. peak hour was utilized for other peak time periods for which published data was not available. Regarding pass-by assumptions for peak time periods during which data is not available, ITE's Trip Generation manual, 5th Edition, provides the following indication: *The data from a limited number of studies also indicate that the percentage of pass-by trips is higher during the P.M. peak period (4:00 to 6:00 P.M.) than during the rest of the day. The percentage of pass-by trips entering a shopping center during hours other than the P.M. peak is more scattered, more difficult to estimate, and is generally 10% less than during the P.M. peak period.*

TABLE 2
PASS-BY PERCENTAGES

Land Use	Pass-by Percentage		
	A.M. Peak Hour	P.M. Peak Hour	Saturday Peak Hour
Residential Condominium/ Townhouse	0%	0%	0%
Hotel	0%	0%	0%
General Office Building	0%	0%	0%
Medical-Dental Office Building	0%	0%	0%
Shopping Center	24%[1]	34%	26%
Pharmacy	39%[1]	49%	39%[1]
Drive-in Bank	37%[1]	47%	37%[1]
High-Turnover Restaurant	33%[1]	43%	33%[1]

1 = No ITE data available; utilized 10% less than weekday P.M. peak hour rate

The PennDOT Policies and Procedures for Transportation Impact Studies, January 28, 2009, recognizes the potential for non-vehicular trips and offers standard assumptions for the modal split of alternative trips provided that pedestrian, bike, and transit-friendly characteristics present. Based upon a review of Table 2 on page 21 of the document, TPD utilized modal trip reductions of 4%, 1%, and 3% to account for alternative trips made by pedestrians, bikes, and transit vehicles, respectively.

The ITE Trip Generation Handbook, June 2004 edition, recommends that when studying multi-use developments (i.e., the proposed development) that an interaction factor be applied to the trip generation to determine the quantity of "external trips" (trips from external roadways) and "internal trips" (trips between uses on-site that do not utilize the external roadways). This methodology was utilized to determine the interaction factor between the office, residential, and retail land uses on the 81+/- acre tract on the eastern side of Cornwall Road. In order to take a conservative approach when calculating the interaction factor the pharmacy, bank, and restaurants were summed together into a general "retail" category. This methodology is conservative in the fact that it assumes zero interaction between similar land uses (i.e. nobody who uses the bank will also use the pharmacy). In order to be further conservative the hotel was not included in the calculation of interaction factor. Based on this analysis, interaction factors of 11%, 9% and 12% were calculated under the full build-out conditions for the uses assumed to interact with one another for an average weekday and the

weekday P.M. and Saturday midday peak hours, respectively. No interaction factors were assumed under Phase 1 of the development, as well during the weekday A.M. peak hour under full build-out of the development. The Multi-Use Development Trip Generation and Internal Capture Summary sheets are attached for reference.

It should be noted that the interaction factor calculation for the Saturday midday peak hour utilizes the internal capture rates contained in Tables 7.1 and 7.2 of the ITE Trip Generation Handbook, June 2004 edition related to the weekday midday peak hour. Although there is not specific published data related to internal capture percentages during the Saturday midday peak hour, it is reasonable to assume the Saturday midday would have similar characteristics to the weekday midday time period, if not a higher percentage. Since the computations are based on a percentage of trips and not number of trips, the interaction is based on types of trips being performed during a certain time period. It is our opinion Saturday trips to retail establishments reflect the same type of multi-destination visits as during a midday peak hour.

For purposes of this trip generation analysis, **Phase 1** of the proposed development was assumed to consist of the following mix of land uses:

- 80 condominium/townhome dwelling units (ITE Land Use Code #230);
- 97,600 square foot office park (ITE Land Use Code #710);
- 226,900 square foot Shopping Center (ITE Land Use Code #820).

Tables 3, 4, 5 and 6 summarize the trip generation for **Phase 1** of the proposed development for an average weekday and the weekday A.M., P.M., and Saturday midday peak hours, respectively.

TABLE 3
TRIP GENERATION (PHASE 1) – AVERAGE WEEKDAY

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	11568	-924	-0	10644	5322	5322	---	---	---	---	---	---
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	530	-42	-0	488	244	244	---	---	---	---	---	---
General Office Buildings	1310	-104	-0	1206	603	603	---	---	---	---	---	---
Subtotal	1840	-146	-0	1694	847	847	---	---	---	---	---	---
Total	**13408**	**-1070**	**-0**	**12338**	**6169**	**6169**	**---**	**---**	**---**	**---**	**---**	**---**

TABLE 4
TRIP GENERATION (PHASE 1) –WEEKDAY A.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	250	-20	-0	230	140	90	56	28	28	174	112	62
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	43	-3	-0	40	7	33	0	0	0	40	7	33
General Office Buildings	184	-15	-0	169	149	20	0	0	0	169	149	20
Subtotal	227	-18	-0	209	156	53	0	0	0	209	156	53
Total	**477**	**-38**	**-0**	**439**	**296**	**143**	**56**	**28**	**28**	**383**	**268**	**115**

TABLE 5
TRIP GENERATION (PHASE 1) –WEEKDAY P.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	1101	-88	-0	1013	496	517	346	173	173	667	323	344
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	50	-4	-0	46	31	15	0	0	0	46	31	15
General Office Buildings	188	-15	-0	173	29	144	0	0	0	173	29	144
Subtotal	238	-19	-0	219	60	159	0	0	0	219	60	159
Total	**1339**	**-107**	**-0**	**1232**	**556**	**676**	**346**	**173**	**173**	**886**	**383**	**503**

TABLE 6
TRIP GENERATION (PHASE 1) – SATURDAY MIDDAY PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	1460	-117	-0	1343	698	645	350	175	175	993	523	470
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	66	-5	-0	61	33	28	0	0	0	61	33	28
General Office Buildings	36	-3	-0	33	18	15	0	0	0	33	18	15
Subtotal	102	-8	-0	94	51	43	0	0	0	94	51	43
Total	**1562**	**-125**	**-0**	**1437**	**749**	**688**	**350**	**175**	**175**	**1087**	**574**	**513**

For purposes of this trip generation analysis, **Full Build-Out** of the proposed development plan was assumed to consist of the following mix of land uses:

- 160 condominium/townhome dwelling units (ITE Land Use Code #230);
- 100 room hotel (ITE Land Use Code #310);
- 409,000 square foot office park (ITE Land Use Code #710);
- 600,600 square foot Shopping Center (ITE Land Use Code #820);
- 11,400 square foot pharmacy (ITE Land Use Code #881);
- 4,000 square foot drive-in bank (ITE Land Use Code #912);
- Two (2) 6,000 square foot sit-down restaurants (ITE Land Use Code #932).

Tables 7, 8, 9 and 10 summarize the trip generation for **Full Build-Out** of the proposed development for an average weekday and the weekday A.M., P.M., and Saturday midday peak hours, respectively.

TABLE 7
TRIP GENERATION (FULL BUILD-OUT) – AVERAGE WEEKDAY

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	21778	-1742	-0	20036	10018	10018	---	---	---	---	---	---
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	970	-78	-289	603	286	317	---	---	---	---	---	---
Hotel	818	-64	-0	754	377	377	---	---	---	---	---	---
General Office Buildings	3948	-316	-114	3518	1773	1745	---	---	---	---	---	---
Pharmacy	1006	-80	-121	805	403	402	---	---	---	---	---	---
Drive-in Bank	594	-48	-72	474	237	237	---	---	---	---	---	---
High-Turnover Restaurant	1526	-122	-184	1220	611	609	---	---	---	---	---	---
Subtotal	8862	-708	-780	7374	3687	3687	---	---	---	---	---	---
Total	**30640**	**-2450**	**-780**	**27410**	**13705**	**13705**	**---**	**---**	**---**	**---**	**---**	**---**

TABLE 8
TRIP GENERATION (FULL BUILD-OUT) –WEEKDAY A.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	444	-36	-0	408	249	159	98	49	49	310	200	110
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	75	-6	-0	69	12	57	0	0	0	69	12	57
Hotel	56	-4	-0	52	32	20	0	0	0	52	32	20
General Office Buildings	579	-46	-0	533	469	64	0	0	0	533	469	64
Pharmacy	30	-2	-0	28	16	12	12	6	6	16	10	6
Drive-in Bank	49	-4	-0	45	25	20	18	9	9	27	16	11
High-Turnover Restaurant	138	-11	-0	127	66	60	42	21	21	86	45	40
Subtotal	927	-74	-0	854	620	234	72	36	36	782	584	198
Total	**1371**	**-110**	**-0**	**1262**	**869**	**393**	**170**	**85**	**85**	**1092**	**784**	**308**

TABLE 9
TRIP GENERATION (FULL BUILD-OUT) –WEEKDAY P.M. PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	2115	-169	-0	1946	954	992	662	331	331	1284	623	661
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	88	-7	-32	49	36	13	0	0	0	49	36	13
Hotel	59	-5	-0	54	29	25	0	0	0	54	29	25
General Office Buildings	537	-43	-10	484	79	405	0	0	0	484	79	405
Pharmacy	118	-9	-15	94	47	47	48	24	24	46	23	23
Drive-in Bank	103	-8	-12	83	42	41	40	20	20	43	22	21
High-Turnover Restaurant	134	-11	-13	110	67	43	48	24	24	62	43	19
Subtotal	1039	-83	-82	874	300	574	136	68	68	738	232	506
Total	**3154**	**-252**	**-82**	**2820**	**1254**	**1566**	**798**	**399**	**399**	**2022**	**855**	**1167**

TABLE 10
TRIP GENERATION (FULL BUILD-OUT) – SATURDAY MIDDAY PEAK HOUR

Description	Total Trips	Modal Trips	Inter. Trips	Total External Trips			Pass-By Trips			New Trips		
				Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
67 +/- Tract – Western Side of Cornwall Road												
Shopping Center	2748	-220	-0	2528	1315	1213	668	329	329	1870	986	884
81 +/- Tract – Eastern Side of Cornwall Road												
Townhomes	89	-7	-20	62	33	29	0	0	0	62	33	29
Hotel	72	-6	-0	66	37	29	0	0	0	66	37	29
General Office Buildings	116	-9	-12	95	53	42	0	0	0	95	53	42
Pharmacy	89	-7	-8	74	37	37	30	15	15	44	22	22
Drive-in Bank	106	-8	-10	88	46	42	34	17	17	54	29	25
High-Turnover Restaurant	169	-14	-14	141	75	66	48	24	24	93	51	42
Subtotal	641	-51	-64	526	281	245	112	56	56	414	225	189
Total	**3389**	**-271**	**-64**	**3054**	**1596**	**1458**	**770**	**385**	**385**	**2284**	**1211**	**1073**

5. *ESTIMATED DAILY TRIP GENERATION/DRIVEWAY CLASSIFICATION:*

   a. Estimated Daily Trip Generation of Full Build-Out of the Proposed Development (Assuming One Access Point): 27,410 trips/day = 13,705 vehicles/day
   b. Driveway Classification Based on Trip Generation and One Access Point: High Volume Driveway

6. *TRANSPORTATION IMPACT STUDY REQUIRED?*

   ☐ No
   ☒ Yes, based on:
   - ☒ 3,000 or more vehicle trips/day generated
   - ☒ During any one-hour time period, 100 or more new (added) vehicle trips generated entering or 100 or more new (added) vehicle trips generated exiting development
   - ☐ Other considerations as described below:

7. *TRAFFIC IMPACT ASSESSMENT REQUIRED?* ☒ **No** ☐ **Yes**

8. *TIS STUDY AREA:*

   - Roadway and Study Intersections:
     - Route 72 (S.R. 0072) & Rocherty Road;
     - Route 72 (S.R. 0072) & Lowe's/Cedar Crest Square/Tractor Supply Driveways;
     - Route 72 (S.R. 0072) & Lowe's/K-Mart/Cedar Crest Square Driveways;
     - Route 72 (S.R. 0072) & Isabel Drive;
     - Cornwall Road (S.R. 2001) & Rocherty Road (S.R. 2002);

- Cornwall Road (S.R. 2001) & Isabel Drive/Norman Drive;
- Cornwall Road (S.R. 2001) & York Street;
- Cornwall Road (S.R. 2001) & Wilhelm Avenue;
- Rocherty Road/Evergreen Road (S.R. 2002) & Lincoln Avenue.
- [*See proposed circled study area intersection from attached* ***Figure 1****]*.
- [*See 2009 Existing Condition traffic volume from attached* ***Figures 2-4****]*

9. *STUDY AREA TYPE:*

Urban ☒ Rural ☐

- Per PennDOT's Functional Classification Map of Lebanon County, Route 72 (S.R. 0072) is defined as a principal arterial roadway.
- Per PennDOT's Functional Classification Map of Lebanon County, Cornwall Road (S.R. 2001) to the north of Rocherty Road, York Street, and Wilhelm Avenue are defined as minor arterial roadways.
- Per PennDOT's Functional Classification Map of Lebanon County, Cornwall Road (S.R. 2001) to the south of Rocherty Road, Rocherty Road (S.R. 2002) to the east of Route 72, and Lincoln Avenue to the north of Rocherty Road are defined as collector roadways.
- Per PennDOT's Functional Classification Map of Lebanon County, Rocherty Road to the west of Route 72, Lincoln Avenue to the south of Rocherty Road, Isabel Drive, and Norman Drive are defined as local roadways.
- The Lowe's/Cedar Crest Square/Tractor Supply Driveways are private roadways.

10. *TIS ANALYSIS PERIODS AND TIMES:*

Peak Hours to be evaluated:

- Weekday A.M. peak hour (peak hour within the 7:00-9:00 A.M. peak period);
- Weekday P.M. peak hour (peak hour within the 2:30-6:00 P.M. peak period);
- Saturday midday peak hour (peak hour within the 10:45 A.M.-12:45 P.M. peak period).

Study Years to be evaluated:

- Existing Conditions
- 2014 Phase 1 Opening Year
- 2022 Full Build-Out Opening Year
- 2027 Full Build-Out Design Year

11. *TRAFFIC ADJUSTMENT FACTORS:*

a. Seasonal Adjustment: N/A
b. Annual Base Traffic Growth: 1.15% per year based on PennDOT Bureau of Planning and Research (BPR) data for July 2009 to July 2010 pertaining to urban non-interstate roadways in Lebanon County.
c. Pass-By Trips: Per ITE *Trip Generation Handbook* (see section #4 – Trip Generation for more information).
d. Captured Trips for Multi-Use Sites: Per ITE *Trip Generation Handbook* (see section #4 – Trip Generation for more information).

e. Modal Split Reductions: Per PennDOT *Policies and Procedures for Transportation Impact Studies* (see section #4 – Trip Generation for more information)
f. Other Reduction: N/A

12. *OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC:*

TPD will specifically include background traffic volumes related to the following developments:

- *Sheetz Outparcels*, located in North Cornwall Township on the northern side of Rocherty Road, east of Route 72. Based upon TPD's knowledge, the outparcels will consist of 9,500 s.f. of professional office space, 20,000 s.f. of retail space, and a 5,786 s.f. sit-down restaurant. TPD will assume full build-out of this development by 2014.
- *Tractor Supply Outparcels*, located in North Cornwall Township on the eastern side of Route 72, north of Rocherty Road. Based upon TPD's knowledge, the outparcels will consist of a 4,279 s.f. drive-in bank and two (2) 6,500 s.f. high-turnover (sit-down) restaurants. TPD will assume full build-out of this development by 2014.
- *Veteran's Administration Medical Center Expansion*, located in South Lebanon Township between Lincoln Avenue and State Drive, north of Rocherty Road. The proposed expansion will consist of adding 504 employees at the existing facility. TPD will assume full build-out of this development by 2014.
- *Alden Place*, located in Cornwall Borough on the eastern side of Route 72, between Route 419 and Ironmaster Road. The proposed age-restricted development will be constructed in five (5) phases, with full build-out consisting of 505 residential dwelling units (445 single homes/villas in the Cornwall neighborhood and 60 single homes in the Northgate neighborhood). Based upon a conversation with a staff member of the communities sales office in October 2009, 100 of the units in the Cornwall neighborhood are built and occupied and 3 of the units in the Northgate neighborhood are built and occupied. TPD will assume full build-out of this development by 2014.
- *The Preserve at Historic Cornwall Village*, located in Cornwall Borough between Route 322 and Route 419 in the vicinity of Burd Coleman Village and Minersvillage. Full build-out of the proposed development will consist of 590 residential dwelling units, a hotel with 250 conventional rooms and 60 cottages, a 60,000 square foot (s.f.) indoor water park, a village commercial area with 150,000 s.f. of total space, and 12,000 s.f. of restaurant space. Phase 1 of the proposed development will consist of 137 residential dwelling units, the hotel with 250 conventional rooms and 60 cottages, and the 60,000 square foot (s.f.) indoor water park. TPD will assume phase 1 of this development by 2014 and full build-out by 2022.

13. *TRIP DISTRIBUTION AND ASSIGNMENT:*

The distribution and assignment of site-generated new trips will be based upon an analysis of the following: (1) existing traffic patterns and distributions within the study area; (2) available routes for travel; and (3) the proposed site driveway locations.

For the office/residential land uses, a modified gravity model analysis was performed using the 2000 census journey to work figures for North Cornwall Township. The 2000 census journey to work figures summarize the number of people that travel to North Cornwall Township to work from seventy-one surrounding municipalities in Berks, Chester, Cumberland, Dauphin, Juniata, Lancaster, Lebanon, Northumberland, Schuylkill, Westmoreland and York Counties. The results of the gravity model analysis are attached for reference. Furthermore, the trip distribution percentage between the eastern and western tracts of the development was determined based upon ITE's methodology for calculating the interaction factor for multi-use developments. The results of the interaction factor calculations are attached for reference. Based on the results of the gravity model and interaction factor methodology, the new office/residential trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 11**.

TABLE 11
NEW TRIP DISTRIBUTION PERCENTAGES
OFFICE/RESIDENTIAL LAND USES

Distribution	Destination	Assignment (To/From)	Percentage
To/From North	Route 72, Route 343, Route 934 and Route 422	North via Route 72	16%
		North via Cornwall Road	31%
To/From South	Route 72, Route 322 and Route 419	South via Route 72	16%
		South via Cornwall Road	5%
To/From East	Route 422, Route 501 and Route 897	East via Evergreen Road	5%
		East via Wilhelm Avenue	11%
To/From West	Route 241, Route 322 and Route 934	West via Rocherty Road	6%
To/From Proposed Site	Eastern and Western Tracts	Proposed Township Road	10%

For the retail land uses, a gravity model analysis was performed using the 2000 census population figures for North Cornwall Township and the twelve (12) neighboring municipalities (approximately 10 mile radius). The results of the gravity model analysis are attached for reference. Furthermore, the trip distribution percentage between the eastern and western tracts of the development was determined based upon ITE's methodology for calculating the interaction factor for multi-use developments. The results of the interaction factor calculations are attached for reference. Based on the results of the gravity model and interaction factor methodology, the new retail trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 12**.

TABLE 12
NEW TRIP DISTRIBUTION PERCENTAGES
RETAIL LAND USES

Distribution	Destination	Assignment (To/From)	Percentage
To/From North	Route 72, Route 343, Route 934 and Route 422	North via Route 72	18%
		North via Cornwall Road	26%
To/From South	Route 72, Route 322 and Route 419	South via Route 72	13%
		South via Cornwall Road	4%
		South via Lincoln Avenue	1%
To/From East	Route 422, Route 501 and Route 897	East via Evergreen Road	9%
		East via Wilhelm Avenue	9%
To/From West	Route 241, Route 322 and Route 934	West via Rocherty Road	10%
To/From Proposed Site	Eastern and Western Tracts	Proposed Township Road	10%

14. APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES:

TABLE 13
DATA COLLECTION SUMMARY

Locations	Time Period	Count Type
Nine (9) study area intersections noted above in Item 8 & circled on Figure 1	Weekday A.M., Weekday P.M., and Saturday Midday Peak Hours	Manual Traffic Counts

15. CAPACITY/LOS ANALYSIS:

Capacity analyses will be conducted at the study area intersection for the peak hours and the study years will be evaluated according to the methodologies contained in the 2000 Highway Capacity Manual (HCM), utilizing SYNCHRO software. In addition, capacity analyses will be conducted at the proposed site driveway intersections under opening year and design year conditions during the peak hours.

16. ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED:

N/A

17. OTHER NEEDED ANALYSES:

a. Sight Distance Analysis: A sight distance analysis will be performed for the proposed site driveway locations.

b. Signal Warrant Analysis: If necessary, TPD will complete signal warrant analyses at the unsignalized study intersections and/or proposed site driveway locations.

c. Required Signal Phasing/Timing Modifications: If necessary, TPD will make recommendations for traffic signal timing and/or phasing modifications based on results of the analysis.

d. Traffic Signal Corridor/Network Analysis: N/A

e. Analysis of the Need for Turning Lanes: TPD will analyze auxiliary turn lane warrants at the proposed site driveway locations and the study area intersections during all scenarios. The warrant analysis methodology contained within Chapter 11 of PennDOT's Publication 46 and Strike-Off Letter 470-08-07 will be utilized for this analysis.

f. Turning Lane Lengths: TPD will analyze auxiliary turn lane lengths at the proposed site driveway locations and the study area intersection during full build-out condition for all scenarios. The analysis methodology contained within Chapter 11 of PennDOT's Publication 46 and Strike-Off Letter 470-08-07 will be utilized for this analysis.

g. Left Turn Signal Phasing Analysis: TPD will analyze left turn signal phasing only where signal phasing changes are proposed *(please see 17.c. – Required Signal Phasing/Timing Modifications for more information).*

h. Queuing Analysis: TPD will analyze the 95th percentile queue lengths for all approaches of the proposed site driveways and study area intersections during all time periods analyzed. This analysis will be completed using the SYNCHO software which is based on the methodologies contained in the 2000 Highway Capacity Manual (HCM).

i. Gap Studies: N/A

j. Crash Analysis: TPD will conduct and submit a crash data analysis under separate cover that will contain an analysis of reportable crashes along roadway segments in the study area. A reportable crash shall be defined as a crash where fatality occurs and/or a vehicle is towed from the scene of the crash.

k. Weaving Analysis: N/A

l. Other Required Studies: N/A

We appreciate your review of the enclosed information and would like to schedule a meeting to confirm the scope at your earliest convenience. If there are any questions or comments, please do not hesitate to contact me.

Respectfully submitted,

TRAFFIC PLANNING AND DESIGN, INC.

Eric M. Mountz, P.E., PTOE
Project Manager

Attachments: Anticipated Meeting Attendee Contact List
Figure 1 – Site Location
Internal Capture Summary Worksheets
Figures 2-4 – 2009 Existing Condition Traffic Volumes
Gravity Model Analysis & Interaction Factor Worksheets
Site Plan

cc: Joe Deerin, Springwood Development Partners, L.P.
Rich Welkowitz, Springwood Development Partners, L.P.
Robin Getz, North Cornwall Township Manager
Tom Kotay, Lebanon County Planning Department
John Schick, Rettew (North Cornwall Township Traffic Engineer)
Larry Lawyer, P.E., Delta Development Group, Inc.
Project File, TPD# BLAC.A.00002

APPENDIX B

STUDY AREA PHOTOGRAPHS

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Route 72 & Rocherty Road*

Direction / Road: **EB Rocherty Road**

Approach / Departure: **Approach**

Distance:

Direction / Road: **WB Rocherty Road**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Route 72 & Rocherty Road*

Direction / Road: **NB Route 72**

Approach / Departure: **Approach**

Distance:

Direction / Road: **SB Route 72**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Route 72 & Lowe's/Tractor Supply*

Direction / Road: **EB Lowe's Driveway**

Approach / Departure: **Approach**

Distance:

Direction / Road: **WB Tractor Supply Driveway**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Route 72 & Lowe's/Tractor Supply*

Direction / Road: **NB Route 72**

Approach / Departure: **Approach**

Distance:

Direction / Road: **SB Route 72**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Route 72 & Lowe's/Cedar Crest*

Direction / Road: **EB Lowe's/K-Mart Driveway**

Approach / Departure: **Approach**

Distance:

Direction / Road: **WB Cedar Crest Driveway**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Route 72 & Lowe's/Cedar Crest*

Direction / Road:	**NB Route 72**
Approach / Departure:	**Approach**
Distance:	

Direction / Road:	**NB Route 72**
Approach / Departure:	**Approach**
Distance:	

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Route 72 & Isabel Drive*

Direction / Road:	**WB Isabel Drive**
Approach / Departure:	**Approach**
Distance:	

Direction / Road:	
Approach / Departure:	
Distance:	

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Route 72 & Isabel Drive*

Direction / Road: **NB Route 72**

Approach / Departure: **Approach**

Distance:

Direction / Road: **SB Route 72**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *10/21/10* *Intersection Of:* *Route 72 & York Street/Shopping Center*

Direction / Road:	**EB Shopping Center Driveway**
Approach / Departure:	**Approach**
Distance:	

Direction / Road:	**WB York Street**
Approach / Departure:	**Approach**
Distance:	

Job #: *BLAC.A.00001* *Date Taken:* *10/21/10* *Intersection Of:* *Route 72 & York Street/Shopping Center*

Direction / Road: **NB Route 72**

Approach / Departure: **Approach**

Distance:

Direction / Road: **SB Route 72**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *10/21/10* *Intersection Of:* *Route 72 & Colebrook Road*

Direction / Road: **EB Colebrook Road**

Approach / Departure: **Approach**

Distance:

Direction / Road:

Approach / Departure:

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *10/21/10* *Intersection Of:* *Route 72 & Colebrook Road*

Direction / Road: **NB Route 72**

Approach / Departure: **Approach**

Distance:

Direction / Road: **SB Route 72**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Cornwall Road & Rocherty Road*

Direction / Road:	**EB Rocherty Road**
Approach / Departure:	**Approach**
Distance:	

Direction / Road:	**WB Rocherty Road**
Approach / Departure:	**Approach**
Distance:	

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Cornwall Road & Rocherty Road*

Direction / Road: **NB Cornwall Road**

Approach / Departure: **Approach**

Distance:

Direction / Road: **SB Cornwall Road**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Cornwall Road & Isabel/Norman Drive*

Direction / Road: **EB Isabel Drive**

Approach / Departure: **Approach**

Distance:

Direction / Road: **WB Norman Drive**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Cornwall Road & Isabel/Norman Drive*

Direction / Road:	**NB Cornwall Road Road**
Approach / Departure:	**Approach**
Distance:	

Direction / Road:	**SB Cornwall Road**
Approach / Departure:	**Approach**
Distance:	

Job #: *BLAC.A.00001* *Date Taken:* *2/28/12* *Intersection Of:* *Cornwall Road & York Street*

Direction / Road:	**EB York Street**
Approach / Departure:	**Approach**
Distance:	

Direction / Road:	
Approach / Departure:	
Distance:	

Job #: *BLAC.A.00001* *Date Taken:* *2/28/12* *Intersection Of:* *Cornwall Road & York Street*

Direction / Road:	**NB Cornwall Road**
Approach / Departure:	**Approach**
Distance:	

Direction / Road:	**SB Cornwall Road**
Approach / Departure:	**Approach**
Distance:	

Job #: *BLAC.A.00001* *Date Taken:* *06/29/07* *Intersection Of:* *Cornwall Road & Wilhelm Avenue*

Direction / Road:	**WB Wilhelm Avenue**
Approach / Departure:	**Approach**
Distance:	

Direction / Road:	
Approach / Departure:	
Distance:	

Job #: *BLAC.A.00001* *Date Taken:* *06/29/07* *Intersection Of:* *Cornwall Road & Wilhelm Avenue*

Direction / Road:	**NB Cornwall Road**
Approach / Departure:	**Approach**
Distance:	

Direction / Road:	**SB Cornwall Road**
Approach / Departure:	**Approach**
Distance:	

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Lincoln Avenue & Rocherty Road*

Direction / Road: **EB Rocherty Road**

Approach / Departure: **Approach**

Distance:

Direction / Road: **WB Evergreen Road**

Approach / Departure: **Approach**

Distance:

Job #: *BLAC.A.00001* *Date Taken:* *11/15/06* *Intersection Of:* *Lincoln Avenue & Rocherty Road*

Direction / Road: **NB Lincoln Avenue**

Approach / Departure: **Approach**

Distance:

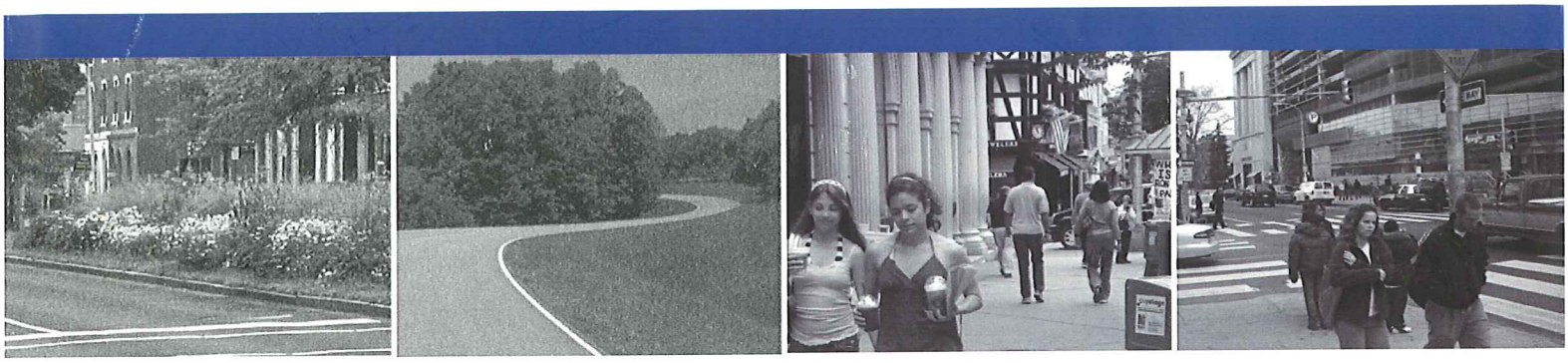
Direction / Road: **SB Lincoln Avenue**

Approach / Departure: **Approach**

Distance:

APPENDIX C

SMART TRANSPORTATION GUIDEBOOK EXCERPTS



SMART TRANSPORTATION GUIDEBOOK

Planning and Designing Highways and Streets that Support Sustainable and Livable Communities

New Jersey Department of Transportation

Pennsylvania Department of Transportation

MARCH 2008

Land Use Context

4.0

A Tale of Two Contexts

Route 30, classified as a principal arterial, has a cross-section of four 10 ft. travel lanes in both Ardmore, PA, and Wayne, PA, as shown below. The speed limit on both roads is 25 mph. In a workshop for this guidebook, DVRPC stakeholders agreed that the Wayne town center is friendlier for pedestrians, identifying Route 30 in Wayne as "an example of an arterial roadway that has evolved to a village feeling." The difference? In Wayne, the presence of on-street parking and the traditional town center context (with zero building setbacks) results in more watchful motorists and creates a defined space for pedestrians. With sporadic on-street parking and with the greater prominence of parking lots, Ardmore is an example of a suburban center.

Ardmore, PA

Wayne, PA

Land use context and roadway type comprise the organizing framework for the selection of appropriate roadway design values. A context area is a land area comprising a unique combination of different land uses, architectural types, urban form, building density, roadways, and topography and other natural features. The existing and planned land use context should be defined on every project. The roadway design should be compatible with the existing land use context, or a planned land use context that reflects the community vision.

4.1 WHY CONTEXT MATTERS

Understanding the land use context provides guidance on who will need to use the road and how. This understanding influences the geometric design of the roadway and the types of amenities required in the right-of-way.

For this document, the design elements are organized into three general categories:

Desired Operating Speed: This is the speed at which it is intended that vehicles travel. The roadway context should play a large role in determining the desired operating speed. For example, pedestrian travel and the presence of civic uses and retail close to the street all suggest the need to use the lower range of the desired operating speed.

Roadway: The design team should select roadway elements and geometry with a clear understanding of surrounding land uses. For example, in urban areas the design team should always seek to provide parking lanes. Travel lanes are often narrower than in suburban areas, particularly if this enables the installation of bike lanes.

Roadside: The roadside primarily serves the pedestrian and the transit rider and provides a transition between public and private space. The design of the roadside elements should support the land use context. Civic uses such as schools and parks, and high density neighborhoods which generate higher pedestrian activity may require wider sidewalks.

4.2 DEFINING LAND USE CONTEXT

Seven context areas are described in the following section, from the least to the most developed: Rural, Suburban Neighborhood, Suburban Corridor, Suburban Center, Town/Village Neighborhood, Town Center, and Urban Core.

The context areas are illustrated in Figure 4.2. This drawing does not arrange the areas in order of intensity, but is an illustrative example of how these areas might fall across the land.

"Quantifiable characteristics," summarized in figure 4.3, are provided for each context. They are similar to what community planners refer to as "bulk standards," normally used to prescribe the desired appearance of land uses within a zoning district. Each land use context should be identified based upon this information.

In practice, land uses do not always fit neatly into the defined context areas, or the boundaries between context areas may be fluid. The planner or designer should use their best judgment in selecting the context that most closely matches the existing and proposed land uses.

It is recommended that contexts be broadly defined, avoiding segments less than 600 ft. in length. This is largely an issue of practicality. There is a limit on the number of different roadway cross-sections that can be implemented to respond to land use context within a small area.

1. Rural

This context area consists of a few houses and structures dotting a farm or forest landscape. The areas are predominantly natural wetlands, woodlands, meadow or cultivated land. Small markets, gas stations, diners, farm supplies, convenience grocers, etc. are often seen at the intersections of arterial or collector roads. Areas with a few commercial or civic uses and a number of homes close to the roadway can be placed into the sub-context type of "rural hamlet." Once the population of the settled area exceeds 250, it should be classified into the town/village context.

Examples include areas of Burlington and Gloucester Counties to the east, and Tioga and Jefferson Counties to the west.

2. Suburban Neighborhood

Predominantly low-density residential communities, many built since WWII. House lots are typically arranged along a curvilinear internal system of streets with limited connections to regional road network or surrounding streets. Lot sizes are usually two acres to one-quarter acre, but in older suburbs, it is common to find one-eighth acre lots. Garden apartments are also included in this type. Neighborhoods can include community facilities such as schools, churches, recreational facilities, and some stores and offices. When suburban houses line an arterial roadway but have their primary access to frontage roads or rear access roads, it is possible to classify this area as a "suburban corridor."

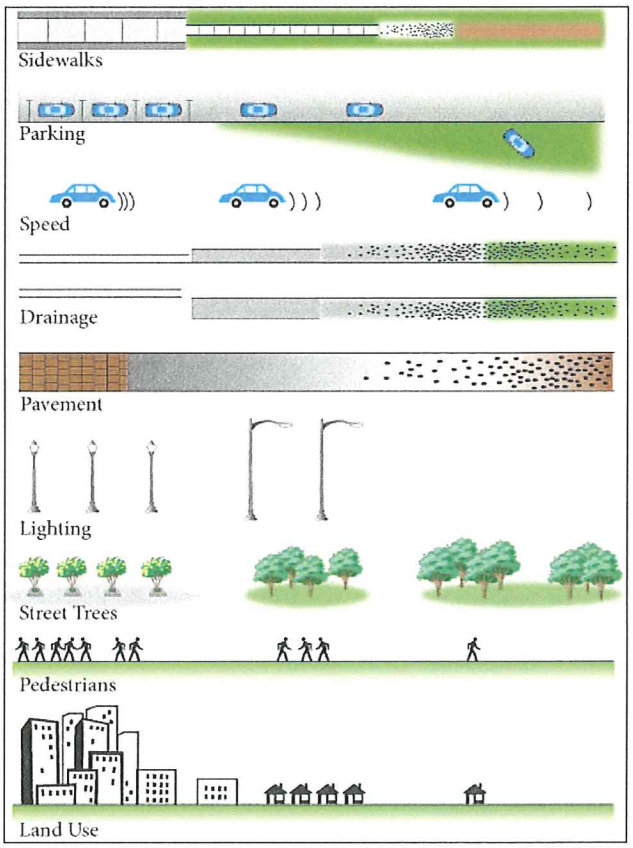


Figure 4.1 From Urban to Rural. As intensity and mix of uses along a roadway increase, there is a greater need to accommodate and prioritize other modes of travel, including bicyclists, pedestrians, and transit riders.

Figure 4.2 The Seven Land Use Contexts

3. Suburban Corridor

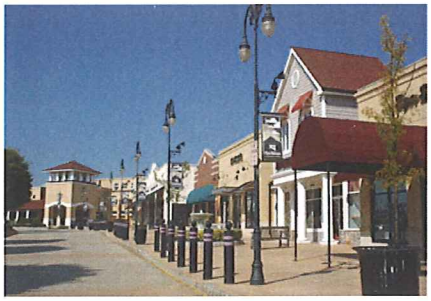
This area is characterized by big box stores, commercial strip centers, restaurants, auto dealerships, office parks, and gas stations. These uses are sometimes interspersed with natural areas and occasional clusters of homes. Buildings are usually set back from the roadway behind surface parking. Office buildings are usually set back a bit more than adjacent retail frontage to establish garden separation from ground windows.

These areas are found along many arterial roadways, such as Route 38 in Cherry Hill and Route 611 north of Philadelphia.

4. Suburban Center

Often a mixed-use, cohesive collection of land uses that may include residential, office, retail, and restaurant uses where commercial uses serve surrounding neighborhoods. These areas are typically designed to be accessible by car, and may include large parking areas and garages.

They are less accommodating to pedestrians than town centers, and opportunities to cross the primary roadway can be limited. On-street parking may or may not be provided.



Examples include Lancaster Avenue in Ardmore, PA, and Montgomery Avenue in Bryn Mawr, PA.

5. Town/Village Neighborhood

Predominantly residential neighborhoods, sometimes mixed with retail, restaurants and offices. In urban places, residential buildings tend to be close to the street. Rowhouses fronting the sidewalk, and houses back 30 feet behind a front lawn are both common types. Small retail establisments sometimes occupy principal corners. Block sizes are regular and often small in comparison to suburban neighborhood blocks. Even where streets are narrow, on-street parking is common and typically well used. The large majority of neighborhoods have sidewalks.

Existing examples include Fairview in Camden and Society Hill in Philadelphia.

Figure 4.3 Defining Contexts

	Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town Center	Urban Core
Density Units	1 DU/20 ac	1 DU/ac - 8DU/ac	2 - 30 DU/ac	3 - 20 DU/ac	4 - 30 DU/ac	8 - 50 DU/ac	16 - 75 DU/ac
Building Coverage	NA	< 20%	20% - 35%	35% - 45%	35% - 50%	50% - 70%	70% - 100%
Lot Size/Area	20 acres	5,000 - 80,000 sf	20,000 - 200,000 sf	25,000 - 100,000 sf	2,000 - 12,000 sf	2,000 - 20,000 sf	25,000 - 100,000 sf
Lot Frontage	NA	50 to 200 feet	100 to 500 feet	100 to 300 feet	18 to 50 feet	25 to 200 feet	100 to 300 feet
Block Dimensions	NA	400 wide x varies	200 wide x varies	300 wide by varies	200 by 400 ft	200 by 400 ft	200 by 400 ft
Max. Height	1 to 3 stories	1.5 to 3 stories	retail -1 story; office 3-5 stories	2 to 5 stories	2 to 5 stories	1 to 3 stories	3 to 60 stories
Min./Max. Setback	Varies	20 to 80 feet	20 to 80 ft	20 to 80 ft	10 to 20 ft	0 to 20 ft	0 to 20 ft

6. Town/Village Center

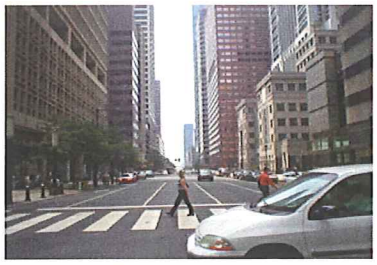
A mixed use, high density area with buildings adjacent to the sidewalk, typically two to four stories tall with commercial operations on the ground floor and offices or residences above. Parallel parking usually occupies both sides of the street with parking lots behind the buildings. Important public buildings, such as the town hall or library, are provided special prominence.

Places like Haddon Avenue in Collingswood and State and Main Streets in Doylestown are classic "Main street" town centers.

7. Urban Core

Downtown areas consisting of blocks of higher density, mixed use buildings. Buildings vary in height from 3 to 60+ stories with most buildings dating from an era when elevators were new technology - so five to twelve stories were the standard.

Examples are Trenton's Downtown and Center City Philadelphia.



4.3 PLANNING FUTURE CONTEXT AREAS

The planned land use context along the corridor is assessed by consulting the following plans and documents:

- Municipal comprehensive plan (referred to as master plan in New Jersey)
- Multi-municipal or regional comprehensive plan (applicable in Pennsylvania)
- Zoning ordinance
- Redevelopment plan (if applicable)
- State Plan designation (applicable in New Jersey)

As part of the collaboration between state and community, the study team consults with local stakeholders on the vision for their community. If no vision exists, a workshop or charrette can be held to help crystallize the community vision.

5.0 Transportation Context

Routes 1 and 27 in Central New Jersey (below) are both classified as principal arterials in traditional functional classification, but they have very different roles within the roadway network. This chapter proposes a new roadway typology to better capture the role of roadways in a community.

The transportation context consists of the role that the roadway plays, or is anticipated to play within the local community and the larger region. It also refers to the supporting street network, and the interaction of the roadway with that network.

5.1 ROADWAY TYPE

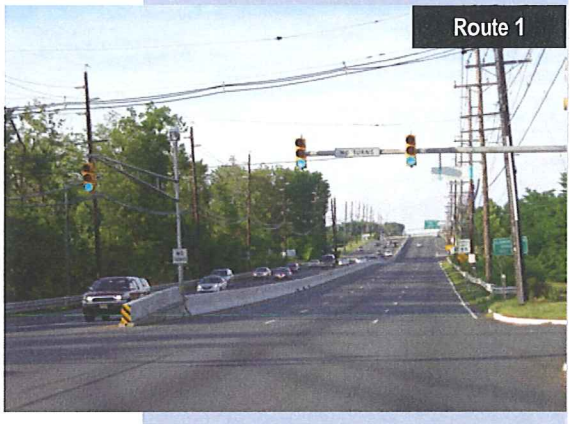
A new roadway typology is proposed for the Guidebook in order to design roadways that better reflect their role in the community and the larger transportation network.

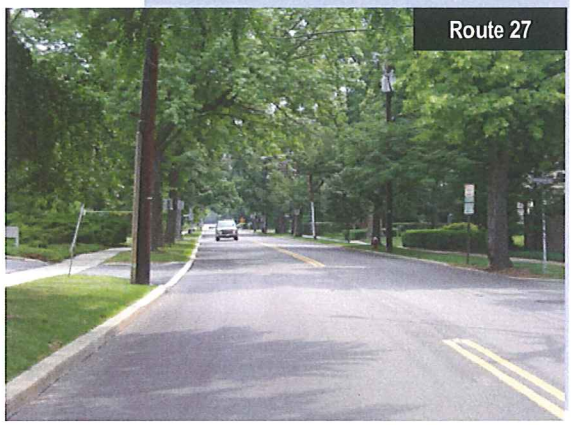
Currently, every roadway owned by NJDOT or PennDOT, or by county governments in New Jersey, is assigned a functional classification consistent with the AASHTO Green Book:

- Principal Arterial
- Minor Arterial
- Collector (subdivided into major collector and minor collector within rural areas)
- Local

A problem with the existing functional classification system is that an entire highway is sometimes placed into a certain class based on select characteristics – such as the overall highway length, or traffic volumes – although its level of access and mobility are not consistent with other roadways in that class. For example, many state highways are classified as principal arterials even if they are far more vital to community access than to regional mobility. This creates a dilemma for highway designers: the application of design standards for that class may encourage higher operating speeds than are appropriate for segments serving community access.

To address this issue, a roadway typology is proposed which better captures the role of the roadway within the community. It focuses more narrowly on the characteristics of access, mobility and speed. If a segment of an arterial roadway has a relatively low speed, is important to community access, and has a lower average trip length, it should not be designed like a high order arterial. Further, under this approach, roadways


Route 1


Route 27

are segmented to a greater degree than traditional functional classification. If one segment of a roadway has low average trip lengths and has consistently lower speeds, its design should be different than another section which carries long trips.

The roadway typology is presented in Table 5.1 and illustrated in Figure 5.1. It should be emphasized that this should be used only as a planning and design "overlay" for individual projects, and does not replace the traditional functional classification system used in both states. The roadway classes shown in Table 5.1 correspond to the classifications of arterial, collector and local as described in the 2001 AASHTO Green Book. Their design values should likewise correspond to the design guidelines provided in the Green Book.

Different state highways have different community roles, and the Guidebook recommends that this should be reflected in the design. Some state highways, such as NJ Route 1, will be considered as a Regional Arterial because of their importance to regional mobility. On the other hand, Route 27, which is classified as a principal arterial by NJDOT, actually operates more like a community arterial or a community collector. Parallel to Route 1 and the New Jersey Turnpike, this highway has a low average trip length. Maintaining regional mobility becomes a smaller concern on Route 27 and similar state roadways.

Whatever the road classification, traffic mobility and safety are important goals on state highways, and must be considered on all roadway projects. These goals will continue to receive significant attention on roads with acute safety or congestion problems. Mobility and safety goals are balanced with local development goals on projects.

PennDOT owns many roads in Pennsylvania, from arterials down through local roads. NJDOT controls a much smaller share of the road network, and virtually all of its roadways are arterials. Because of the relatively high volumes found on many NJDOT roadways, the maintenance of mobility on regional arterials remains a strong emphasis.

5.1.1 Main Street

Although not one of the Smart Transportation roadway categories, the concept of Main Street has an important place in Smart Transportation. Anchoring the center of a town, village or city, the Main Street is characterized by:

- Wide sidewalks and regular pedestrian activity;
- Mostly commercial and civic uses, with residential uses primarily found on the upper level of buildings;
- High building density;
- Buildings oriented to the street, with little or no building setbacks;
- Street furniture and public art;
- Heavy use of on-street parking;
- Speeds of 30 mph or less;
- Preferably no more than two travel lanes, although three to four lanes are seen on occasion.

Table 5.1 Roadway Categories

Roadway Class	Roadway Type	Desired Operating Speed (mph)	Average Trip Length (mi)	Volume	Intersection Spacing (ft)	Comments
Arterial	Regional	30-55	15-35	10,000-40,000	660-1,320	Roadways in this category would be considered "Principal Arterial" in traditional functional classification.
Arterial	Community	25-55	7-25	5,000-25,000	300-1,320	Often classified as "Minor Arterial" in traditional classification but may include road segments classified as "Principal Arterial."
Collector	Community	25-55	5-10	5,000-15,000	300-660	Often similar in appearance to a community arterial. Typically classified as "Major Collector."
Collector	Neighborhood	25-35	<7	<6,000	300-660	Similar in appearance to local roadways. Typically classified as "Minor Collector."
Local	Local	20-30	<5	<3,000	200-660	

Route 27, Kingston

Route 27, Princeton

The Main Street would typically belong to the Community Arterial road type, or to the Collector road type. This is the case on Route 27 in New Jersey; this roadway hosts two Main Street segments between New Brunswick and Trenton, in the towns of Princeton and Kingston. As defined here, a municipality can have more than one Main Street.

Main Streets are desirable in Smart Transportation because they support more sustainable communities, and because of their potential to increase walking, biking and transit use, as well as vehicular trip chaining.

For information on planning Main Streets, see Section 6.2.1.

5.2 ROADWAY NETWORK

Network design establishes critical parameters for roadway design—type of roadway, its general purpose (i.e., what type of traffic it is to handle) and number of lanes necessary to achieve the purpose. By increasing the options of motorists to travel from one point to another, a well-connected regional network permits greater flexibility in designing individual roadways. Improving roadway connectivity can serve regional mobility equally well as widening major roadways, and a well-connected network always serves the needs of pedestrians and bicyclists better than simply widening arterial roadways.

Because network connectivity is so important in Smart Transportation Solutions, it appears as a recurring theme in this guidebook. Network types, basic principles, and evaluating and creating a network are discussed in this section and in Chapter 3, "A Local Commitment."

5.2.1 Network types

The traditional urban grid has short blocks, straight streets, and a crosshatched pattern (Figure 5.2). The typical contemporary suburban street network has large blocks, curving streets, and a branching pattern (Figure 5.3). The two networks differ in three respects: (1) block size, (2) degree of curvature, and (3) degree of interconnectivity.

Both network designs have advantages and disadvantages. Traditional grids disperse traffic rather than concentrating it at a handful of intersections. They offer more direct routes and hence generate fewer vehicle miles of travel (VMT) than do contemporary networks. By offering many different routes to a destination, they better meet the needs of local motorists. They encourage walking and biking with their direct routing and their options for travel. Grids are also more transit-friendly; transit ridership is greatest between tracts that have relatively direct transit connections.[3]

Contemporary networks do have some advantages, such as the ability to lessen traffic on local residential streets. With their curves and dead ends, contemporary networks can go around or stop short of valuable natural areas.

Traditional grids best fulfill Smart Transportation goals, and are recommended for application in most areas.

5.2.2 Evaluation of the network

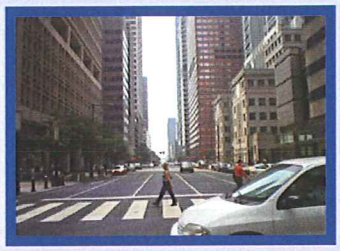
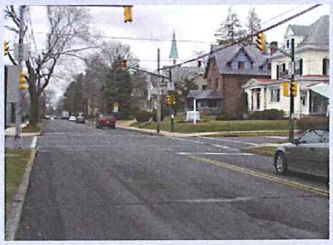
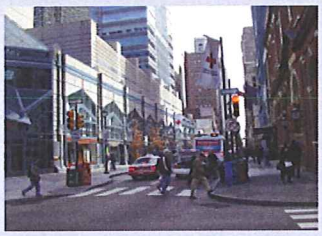
All roadway networks should be evaluated using the measures on internal connectivity, external connectivity, and route directness.

RURAL — **to**

Rural Places	Suburban Neighborhood	Suburban Corridor	Suburban Center

Figure 5.1 Roads in Context

URBAN

Town/Village Neighborhood	Town Center	Urban Core		
			REGIONAL	Regional Arterial
				Community Arterial
			to	Community Collector
				Neighborhood Collector
			LOCAL	Local Road/ Street

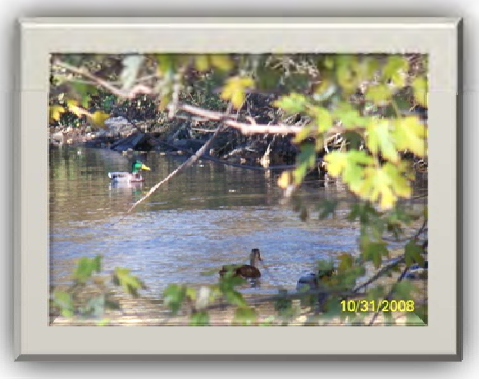
The photos enclosed in a yellow box indicate the Town Center and Core City streets that also operate as a local or regional Main Street.

APPENDIX D

NORTH CORNWALL TOWNSHIP MASTER PLAN FOR NON-MOTORIZED TRAIL CONNECTIONS EXCERPTS

NORTH CORNWALL TOWNSHIP

MASTER PLAN FOR NON-MOTORIZED TRAIL CONNECTIONS



AUGUST 3, 2010

NORTH CORNWALL TOWNSHIP

MASTER PLAN FOR NON-MOTORIZED TRAIL CONNECTIONS

PREPARED FOR THE NORTH CORNWALL TOWNSHIP BOARD OF SUPERVISORS:

Ralph Heister, Chairman

Kip Kelly, Vice Chairman

Ammon K. Peiffer, Jr., Member

WITH ASSISTANCE FROM:

STUDY COMMITTEE FOR THE MASTER PLAN FOR NON-MOTORIZED TRAIL CONNECTIONS

Tom Buzby, Lebanon Valley Chamber of Commerce

Robin Getz, North Cornwall Township Manger

Stuart Halsell, Cornwall-Lebanon School District

Ralph Heister, North Cornwall Township Board of Supervisors

Tom Long, North Cornwall Township Public Works Director; North Cornwall Township Recreation Board

Elise Salahub, North Cornwall Township Planning Commission

Robert Sentz, Lebanon County Planning Department

NORTH CORNWALL TOWNSHIP PLANNING COMMISSION

Dr. Mark Maria, Chairman

Robert Gearhart, Vice-Chairman

Robert McNamee, Secretary

Ed Arnold

Elise Salahub

Jennifer Eirich

Harold Kreider

NORTH CORNWALL TOWNSHIP RECREATION BOARD

Sue Horacek

Brian Hockley

James Lamb

Jason Norris

Dave Bailey

Tom Long, Sr.

RETTEW

INTRODUCTION

North Cornwall Township is located in Lebanon County, southwest of the City of Lebanon. In addition to bordering the city, North Cornwall Township also shares a boundary with West Lebanon, Annville, South Annville, North Lebanon, West Cornwall, and South Lebanon Townships, and Cleona and Cornwall Boroughs. The Township is experiencing increased commercial and residential growth, as development pushes outward from the City of Lebanon. The northern and eastern portions of the Township are largely of a suburban nature, and contain a variety of residential subdivisions, a commercial corridor, and an office park. The southwestern portion of the Township has a decidedly different character. This area of the Township is agricultural and more rural in nature; population and development are less dense and roadways are less congested. The Township also contains three creeks, the Quittapahilla Creek, Snitz Creek, and Beck Creek; a country club; a golf course; the Lebanon Expo Center; and several recreational and historical resources.

North Cornwall Township recognizes that with this diversity in land use comes a mixture in the type and amount of residents and visitors that are travelling within or through the Township. Although the primary mode of transit for most residents and visitors is by automobile, the Township feels that it is necessary to plan for and implement safe and appropriate facilities to accommodate pedestrians, joggers, bicyclists, equestrians, and other forms of non-motorized transportation. Furthermore, as development and the price of gas increase, and as people look to improve their own health and the health of the environment, the number of people opting for non-motorized transportation is only expected to increase.

PURPOSE OF THE PLAN

The purpose of the *North Cornwall Township Master Plan for Non-Motorized Trail Connections* is to lay the foundation for a network of greenways, trails, and on-road designated routes in the Township that provide safe and direct connections for non-motorized transportation, and opportunities for passive recreation and the conservation of natural resources. This plan and accompanying maps represent the Township's intent to improve and enhance the Township's non-motorized transportation network.

RELATIONSHIP TO STATE PLANNING DOCUMENTS

This plan has been designed to be consistent with several state planning documents and initiatives, including the PA Department of Conservation and Natural Resources' (DCNR) 2009-2013 statewide comprehensive outdoor recreation plan (SCORP), *Pennsylvania Outdoors: The Keystone for Healthy Living,* and the PA Department of Transportation's (PennDOT) Smart Transportation Initiative. The plan also supports the Keystone Principles developed by the Department

of Community and Economic Development (DCED) and is consistent with the Department of Environmental Protection's initiatives of improving the environment by giving people options for non-motorized transit, thereby encouraging increased bicyclist and pedestrian activity, and decreased dependency on the automobile.

Pennsylvania Outdoors: The Keystone for Healthy Living was developed to direct the use of federal Land and Water Conservation Funds that come to the state. It consists of a statewide assessment of outdoor recreation needs and supplies, as well as an action plan for future steps to help enhance outdoor recreation. The action plan is organized thematically under four goals:

- Strengthen connections between outdoor recreation, healthy lifestyles, and economic benefits in communities;
- Reconnect people to the outdoors and develop a stewardship ethic through outdoor recreation opportunities and experiences;
- Develop a statewide land and water trail network to facilitate recreation, transportation, and healthy lifestyles; and,
- Enhance outdoor recreation through better state agency cooperation.

The *North Cornwall Township Master Plan for Non-Motorized Trail Connections* directly supports the first three of these overriding goals, as it will connect people to parks and other destinations within and in proximity to the Township; encourage people to get outdoors to reach their destinations and to recreate; and create a network of trails to facilitate recreation, transportation, and support healthy lifestyles in the community.

This plan also supports many of the principles of PennDOT's Smart Transportation initiative. Smart Transportation is partnering to build great communities for future generations of Pennsylvanians by linking transportation investments with land use planning and decision-making. The Township's plan helps to advance several of Smart Transportation's 10 themes:

- *Leverage and preserve existing investments* – where practicable, North Cornwall's plan looks at using the existing roadway network to move non-motorized users.
- *Choose projects with high value/price ratio* – the Township will work to implement projects that form key connections between neighborhoods and destinations.
- *Safety always and maybe safety only* – safety has been a key theme of this plan and all proposed connections were designed with the intent of ensuring safety for the user.
- *Accommodate all modes of travel* – this plan strives to accommodate various types of non-motorized users, such as bicyclists, pedestrians, and equestrians.
- *Enhance local network* – North Cornwall Township has developed this plan with an eye toward regional connections and the ways in which enhancing the local network can benefit the region.
- *Build towns not sprawl* – North Cornwall Township has distinct neighborhoods and community resources; this plan will look to enable connections for non-motorized users between neighborhoods and destinations, helping to build a strong community, and increase walkability and bikeability, and enhance the overall quality of life.
- *Understand the context; plan and design within the context* – this plan recognizes that the word "trail" can have many interpretations, and that improvements associated with one proposed connection may be very different than improvements associated with another proposed connection due to existing transportation, land use, and environmental conditions.
- *Develop local governments as strong land use partners* – North Cornwall Township intends to use this plan to guide future development decisions, and intends to work with developers, Lebanon County, surrounding municipalities, and PennDOT to enable key non-motorized connections.

How to Use the Plan

The plan is organized into four sections, including this introductory section. The second section reviews existing conditions within the Township as they pertain to the non-motorized transportation network and the system's components including destinations, natural features and greenways; proposed trail connections, and the different types of users expected to take advantage of these facilities. The third section describes the public outreach program associated with this planning effort and sets forth goals and objectives for non-motorized trail connections in the Township. The fourth section represents the action plan for the future and is meant to assist the Township with implementing the plan. It discusses key issues and opportunities, provides a descriptive list of projects, and details first steps for the Township to take to implement short term improvements. The fourth section also includes a phasing plan of the overall trails system projects. Several appendices are also included with the plan.

The plan has been structured to be user friendly. It is meant to be used and handled often as the Township moves forward with implementation. The implementation strategies and phasing plan are meant to be used as a checklist to get work done. The top three priority linkages are detailed to describe the project in detail and provide typical sections for reference and consideration during the design phase of these and similar improvement projects. The maps are intended to graphically show the "big picture" of the Township's plans for trail development. As key projects are implemented, the Township will review and update the plan to define new short term improvements, and revise the maps so that they reflect completed projects and new priorities. Concurrently, the Township will involve Lebanon County Planning Department, surrounding municipalities, and other key stakeholders to develop a system of non-motorized trail connections that can serve the region within and beyond North Cornwall Township boundaries.

Building Partnerships

North Cornwall Township recognizes that they will need to engage numerous partners in order to successfully implement the plan and develop a system of non-motorized connections to serve the community and through-travelers. To that end, the Township will be looking to partner with surrounding municipalities, Lebanon County, PennDOT, DCNR, and other state agencies, local groups and organizations, developers, residents, and the business community to develop and maintain portions of the trail system.

The Township also understands that education and outreach are critical to helping people understand that safe, effective, non-motorized connections are being developed, and to communicate rules and regulations to the community to ensure appropriate use of the trails system.

North Cornwall Township

Map 1
Natural Features

Legend

- Municipal Boundary
- State Road/Highway
- Local Road
- Stream
- Water Feature
- Wetland
- Floodplain
- Forested Area
- Conservation Easement
- Agricultural Easement

0 500 1,000 2,000 3,000 4,000 Feet

August 3, 2010

RETTEW

Project No. 09-02260-003

PA State Plane South, NAD 1983
Base Map Source:
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Copyright (c) 2009 Lebanon County Conservation District
Copyright (c) 2007 Pennsylvania Department of Transportation
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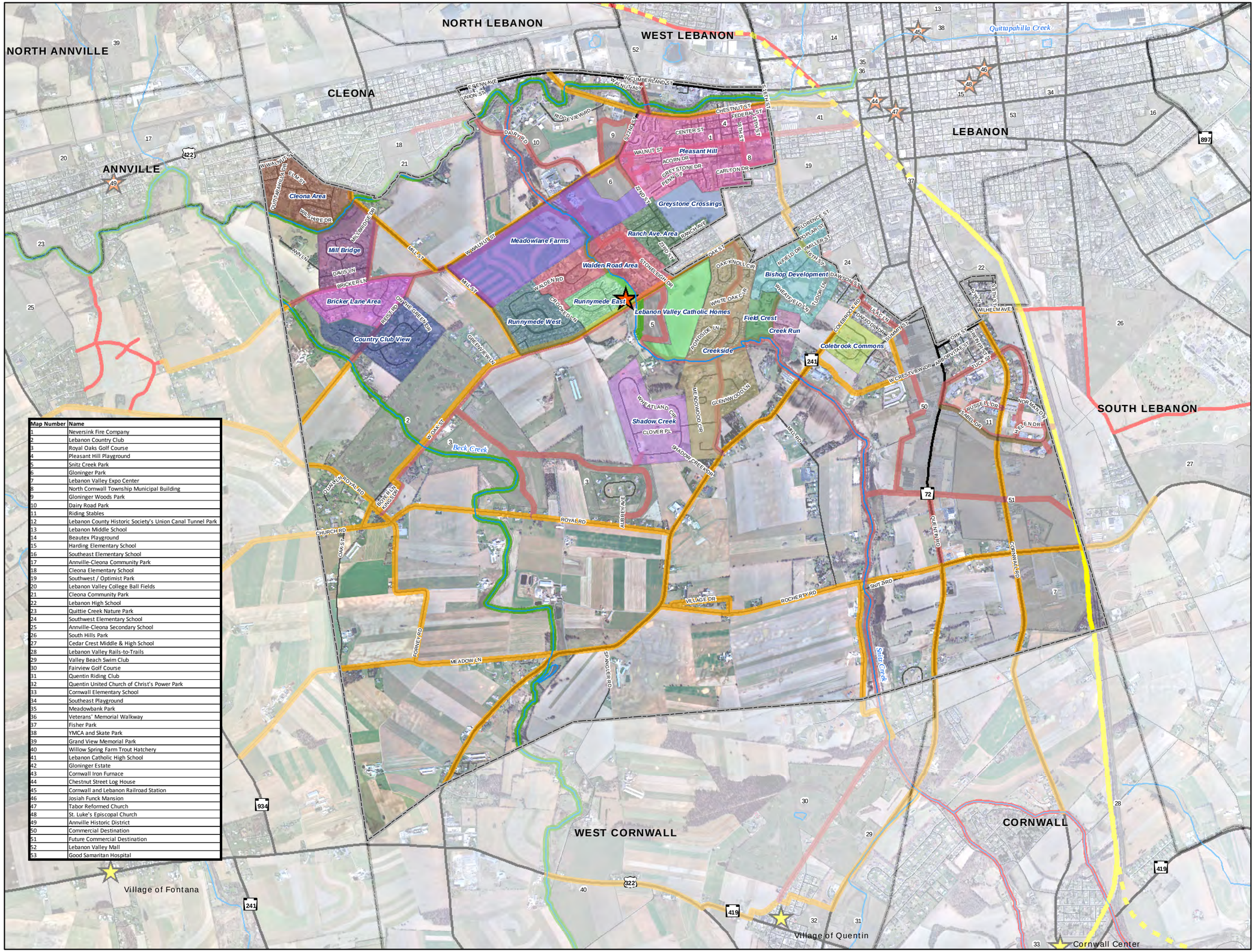
North Cornwall Township

Map 2 Neighborhoods



Map Number	Name
1	Neversink Fire Company
2	Lebanon Country Club
3	Royal Oaks Golf Course
4	Pleasant Hill Playground
5	Snitz Creek Park
6	Gloninger Park
7	Lebanon Valley Expo Center
8	North Cornwall Township Municipal Building
9	Gloninger Woods Park
10	Dairy Road Park
11	Riding Stables
12	Lebanon County Historic Society's Union Canal Tunnel Park
13	Lebanon Middle School
14	Beautex Playground
15	Harding Elementary School
16	Southeast Elementary School
17	Annville-Cleona Community Park
18	Cleona Elementary School
19	Southwest / Optimist Park
20	Lebanon Valley College Ball Fields
21	Cleona Community Park
22	Lebanon High School
23	Quittie Creek Nature Park
24	Southwest Elementary School
25	Annville-Cleona Secondary School
26	South Hills Park
27	Cedar Crest Middle & High School
28	Lebanon Valley Rails-to-Trails
29	Valley Beach Swim Club
30	Fairview Golf Course
31	Quentin Riding Club
32	Quentin United Church of Christ's Power Park
33	Cornwall Elementary School
34	Southeast Playground
35	Meadowbank Park
36	Veterans' Memorial Walkway
37	Fisher Park
38	YMCA and Skate Park
39	Grand View Memorial Park
40	Willow Spring Farm Trout Hatchery
41	Lebanon Catholic High School
42	Gloninger Estate
43	Cornwall Iron Furnace
44	Chestnut Street Log House
45	Cornwall and Lebanon Railroad Station
46	Josiah Funck Mansion
47	Tabor Reformed Church
48	St. Luke's Episcopal Church
49	Annville Historic District
50	Commercial Destination
51	Future Commercial Destination
52	Lebanon Valley Mall
53	Good Samaritan Hospital

Legend

- Municipal Boundary
- State Road/Highway
- Local Road
- Stream
- Lebanon Valley Rail Trail
- Proposed Future Rail Trail/Trail Corridor
- Existing/Proposed Municipal Trail/Greenway

Proposed NCT Trail / Greenway

- Greenway
- Bike / Pedestrian Trail
- Bike Trail
- Equestrian Trail
- Point of Interest

Neighborhood

- Bishop Development
- Bricker Lane Area
- Cleona Area
- Colebrook Commons
- Country Club View
- Creek Run
- Creekside
- Field Crest
- Greystone Crossings
- Lebanon Valley Catholic Homes
- Meadowlane Farms
- Mill Bridge
- Pleasant Hill
- Ranch Ave. Area
- Runnymede East
- Runnymede West
- Shadow Creek
- Walden Road Area

Historic Site

Nearby Destination

0 500 1,000 2,000 3,000 4,000 Feet

August 3, 2010

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Project No. 09-02260-003

PA State Plane South, NAD 1983
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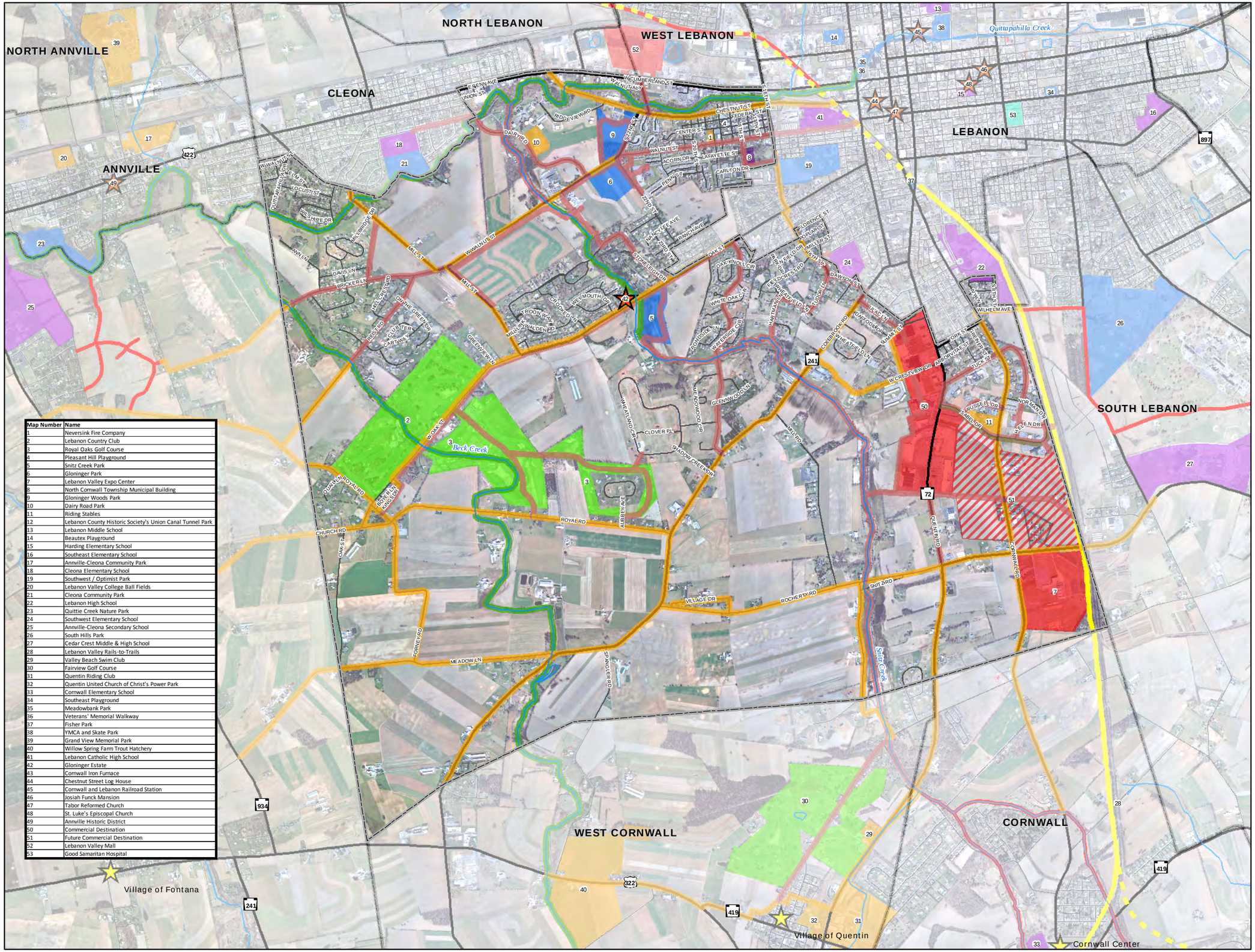
North Cornwall Township

Map 3
Proposed Connections



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2	Lebanon Country Club
3	Royal Oaks Golf Course
4	Pleasant Hill Playground
5	Snitz Creek Park
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- Greenway
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- Equestrian Trail

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- School
- Municipal Park
- Hospital
- Golf Course
- Private Recreation Facility
- Commercial Destination
- Future Commercial Destination
- Historic Site
- Nearby Destination

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August 3, 2010

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Envisioning the Future

Establishing the Study Committee

North Cornwall Township had an idea of the overriding goals that it wanted to accomplish through this planning effort, but wanted to ensure that the final plan represented various viewpoints that exist in the Township. To that end, the Township organized a study committee comprised of individuals representing the Township staff, Planning Commission, Recreation Board, Board of Supervisors, as well as the Cornwall-Lebanon School District, Lebanon County Planning Department, area businesses, and residents. Study committee members were asked to attend eight meetings including two joint meetings with the Township Board of Supervisors, a joint meeting with the Planning Commission, a joint meeting with the Recreation Board, and a community public meeting.

Community Public Meeting and Key Stakeholder Involvement

Following the study committee's refinements to the draft proposed connections map, North Cornwall Township conducted a community public meeting on Tuesday, June 15, 2010, at the Neversink Fire Company, to present and receive feedback on the draft map. The meeting was advertised on the Township website and a press release was submitted to the Lebanon Daily News. The study committee indentified 25 key stakeholders in the community that were personally invited to attend the meeting to provide input. These individuals received letter invitations and a hard copy of the draft proposed connections map. Key stakeholders included representatives from the following groups and organizations:

- Pennsylvania Department of Conservation and Natural Resources
- Lebanon County Conservation District
- Lebanon County MPO
- Lebanon Valley Bicycle Coalition
- Lebanon Valley Conservancy
- Swiss Dairy
- Creekside Homeowners Association
- Heritage Commons Homeowners Association
- Runnymede East Homeowners Association
- Lebanon School District
- Lebanon Valley Family YMCA
- City of Lebanon
- Quittapahilla Creek Watershed Association
- Cleona Borough
- South Annville Township
- South Lebanon Township
- West Cornwall Township
- Cornwall-Lebanon School District
- Neversink Fire Company
- PA House of Representatives
- PA Senate
- Lebanon VA
- Quittapahilla Audubon Society
- Pennsylvania Department of Transportation
- Lebanon Fly Fishing Group

After listening to an overview of the draft proposed connections map, meeting attendees broke out into five small groups to more closely scrutinize the proposed destinations and the best routes to connect them, as well as to discuss the top priorities on which the Township should focus. Each small group presented their feedback to the larger combined group or meeting attendees. The meeting concluded with attendees participating in a visioning exercise to list "one thing" that they wanted the plan to do or accomplish. Full results from the public participation meeting are included in Appendix IV of this report.

Several key themes emerged from the public participation meeting. Coming out of the meeting, the study committee focused on these themes to further refine the map and identify the top three priority projects for implementation. These themes included:

- Safety
- Importance of connecting to the Lebanon Valley Rail Trail, and the importance of the rail trail itself
- Connecting the parks
- Connecting people to the parks
- Consider establishing an east-west connection along the Quittapahilla Creek (previously not depicted on map)
- Utilize existing Township-owned properties, easements, or rights of way where possible

Presentation to the Planning Commission and Recreation Board

Following the community public meeting, the study committee held joint meetings with the Recreation Board (June 21st) and Planning Commission (June 30th) to present the results of the public participation meeting, and to discuss priority projects and proposed non-motorized trail connection facilities, and specific improvements. Additional feedback received from the Lebanon Valley Bicycle Coalition was also presented to the study committee, Recreation Board, and Planning Commission.

The study committee worked to revise a draft *North Cornwall Township Master Plan for Non-Motorized Trail Connections* before the draft plan was presented to the Board of Supervisors at a regular meeting on August 3, 2010. The final plan was presented to the Supervisors at their September 7, 2010 meeting.

Non-Motorized Trail Connections System Goals and Objectives

Goals and objectives for North Cornwall Township's system of non-motorized trail connections evolved throughout the master planning process as follows. These goals and objectives have provided critical guidance in developing the concepts contained in the master plan.

- Develop a system of non-motorized trail connections that provides a safe and enjoyable experience for all users.
- Develop a system of non-motorized trail connections that involves a variety of different types of facilities including off-road shared use paths, bicycle lanes, combination bicycle/pedestrian lanes, sidewalks, and equestrian trails.
- Connect neighborhoods and areas of concentrated residential development to the parks, commercial areas, and other key destinations within and in proximity to the Township.
- Enable connections between planned non-motorized trail connections in North Cornwall Township and connections in neighboring municipalities.
- Consider the Snitz and Quittapahilla Creek stream corridors as a mechanism for greenway and trail development to provide a corridor for wildlife migration and a mechanism for human non-motorized transportation.
- Be cost-efficient by making use of existing sidewalks, Township owned property, easements, and roadway infrastructure, and by encouraging new trail connections to be developed in conjunction with new residential and commercial developments.
- Develop a system of non-motorized trail connections that provides recreational opportunities, an alternative means of transportation, and enhances tourism and economic development opportunities.
- Establish a coordinated plan for community outreach and education to make people aware of the non-motorized connections that exist, and to communicate rules and regulations, helping to ensure safety for users.

Getting There – An Action Plan for the Future

Summary of Key Issues and Opportunities

Several issues and opportunities were identified at the public participation meeting and further clarified through discussions with the study committee, Planning Commission, Recreation Board, and through field verification.

Issues/Needs

- Existing lack of a non-motorized trail connection between the Township's population centers and the parks and recreational resources currently being developed in the Township and surrounding communities.
- Existing lack of a non-motorized trail connection between the various parks and recreational resources that the Township is planning to develop, including Gloninger Park, Gloninger Woods Park, and Snitz Creek Park.
- Existing lack of a non-motorized trail connection between the Township's population centers and commercial areas.
- Need to consider regional trail resources, such as the Lebanon Valley Rail Trail, and trail development efforts in surrounding municipalities.
- Need to consider that non-motorized transportation in North Cornwall Township does not begin and end at Township-boundaries.
- Need to consider that different users have different needs and safety should be a priority for all users. Several existing roadways have "choke points" that inhibit safety for bicyclists, pedestrians, and other non-motorized users.

Opportunities

- The Snitz Creek and Quittapahilla Creek provide opportunities for north-south and east-west connections, respectively, between population centers and key destinations.
- The Lebanon Valley Rail Trail serves as a tremendous regional recreation and alternative transportation resource in close proximity to the Township and there may be multiple opportunities for the Township to provide connections to this resource.
- Moving forward, there is an opportunity to work with developers to ensure that trail resources are integrated into plans for new developments in the Township.
- Existing sidewalk networks, Township-owned property, and sewer easements may offer opportunities for trail development.
- Existing roadway rights of way provide opportunities for the Township to implement non-motorized connections through appropriate roadway widening, striping, and signage.
- Opportunities for partnerships. As part of the master plan process, North Cornwall Township has involved numerous partners. Going forward, it will be important for the Township to continue to engage these partners, including the Lebanon County Planning Department, surrounding municipalities, homeowners associations, the Lebanon Valley Bicycle Coalition, and other interested groups and organizations to further implementation.

Recommended Non-Motorized Trail Connection Facilities

The proposed system of non-motorized connections in North Cornwall Township incorporates multiple types of trail facilities. The specific facility that is proposed at each location is dependent on the location, proposed user, nearby connections, and the existing resources that are available, e.g. sidewalks, roadway shoulders, etc. This section discusses typical design standards for each of the different types of proposed facilities.

Several sources were used to develop standards for North Cornwall Township to use as a base as it moves forward with implementation of the trails system. These sources include the American Association of State Highway and Transportation Officials (AASHTO) DRAFT *Guide for the Planning, Design, and Operation of Bicycle Facilities* (February 2010)*;* AASHTO *Guide for the Development of Bicycle Facilities* (1999); Montgomery County Planning Commission's *Guidelines for Trail Development within Montgomery County, Pennsylvania;* and the U.S. Department of Transportation, Federal Highway Administration's *Manual on Uniform Traffic Control Devices for Streets and Highways 2009.* The draft AASHTO publication represents the update to the 1999 guide. The first three sources noted were primarily used to establish construction design standards, while the FHA's manual was used to recommend appropriate signage.

Shared Use Path

AASHTO defines a shared use path as "physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths should be thought of as a system of off-road transportation routes for bicyclists and other users that extends and complements the roadway network." Shared use paths are designed to accommodate two-way travel for various non-motorized users, and are not meant to preclude on-road bicycle facilities.

Typical design standards for shared use paths take into account the usable width, horizontal clearance required, and ADA accessibility, among other factors as shown in Table 2. Although recommended widths for a paved shared use path range from 10-14 feet, depending on the amount and types of non-motorized traffic, a reduced width of 8 feet may be used for a short distance to avoid a physical constraint, or where the following conditions prevail:

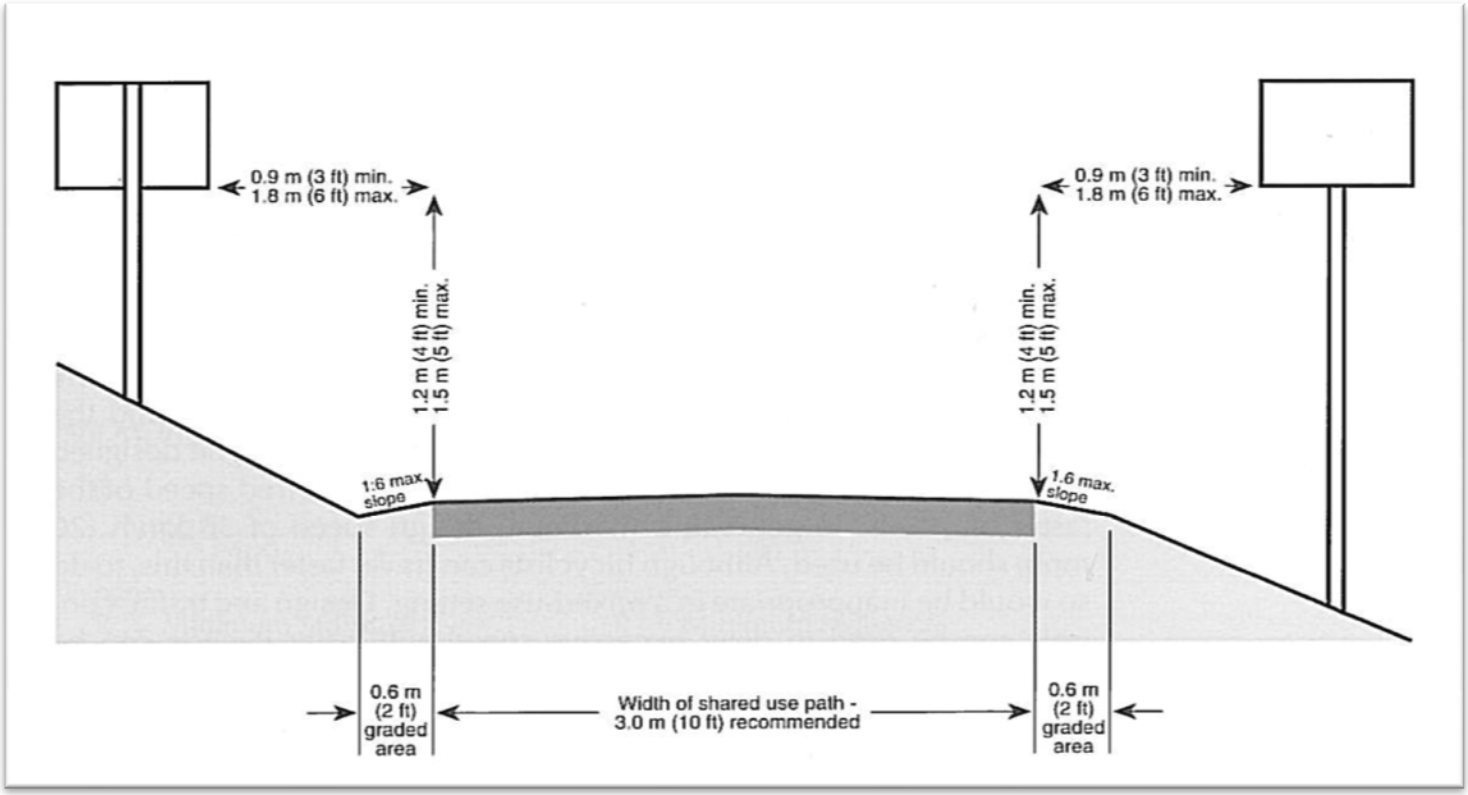
- Bicycle traffic is expected to be low, even on peak days or during peak hours.
- Pedestrian use of the facility is not expected to be more than occasional.
- Horizontal and vertical alignments provide safe and frequent passing opportunities.
- The path will not be regularly subjected to maintenance vehicle loading conditions that would cause pavement edge damage.

Table 2: Typical Standards for Shared Use Paths

Standard Description	Shared Use Path Standard
Trail Width	10’-14’
Trail Shoulder Width	3’-5’
Trail Surface Type	Macadam / Packed Stone Dust / Cinder
Trail Grade (longitudinal slope)	1%-5%
Trail Surface Grade (cross slope)	1%-2%
Vertical Clearance	8’-10’
Horizontal Clearance	2’-5’
Design Speed (mph)	20
Viewshed (linear feet) (line of sight within a corridor)	150’-200’

Source: *DRAFT Guide for the Planning, Design, and Operation of Bicycle Facilities,* AASHTO, 2010. *Guidelines for Trail Development within Montgomery County,* Montgomery County Planning Commission.

Figure 1: Cross Section of a Two-Way Shared Use Path on Separated Right-of-Way



Source: From *Guide for the Development of Bicycle Facilities,* 1999, by the American Association of State Highway and Transportation Officials, Washington, D.C. Used by permission.

As the Township looks at the design of each specific facility, appropriate surface material will also need to be considered. In high use areas, it is recommended that the Township look at paving shared use paths; in areas with a lower volume of use, the Township may instead consider Nature Trail Pathway Mix material or a packed stone dust. Nature Trail Pathway Mix is described as a self-healing trail material that has been used on the York County Rail Trail. It was developed by York Building Products and is a blend of stone and clay binders that provides a stable walking and riding surface on walkways, bike paths, and rail trails.

Sidewalk / Bike Lane

A combination of sidewalks and bike lanes are recommended in areas where an existing continuous sidewalk is in place, or is able to be extended to serve neighboring properties and form a continuous sidewalk. In areas where this type of facility is proposed, pedestrians are to be accommodated on the sidewalk, and bicyclists are to be accommodated on-road through either a striped bicycle lane or un-striped shared lane. Shared lanes are discussed further in the section that talks about bicycle lanes. Should the width of the existing automobile travel lanes become a concern in these areas, the Township may consider limiting parking to one side of the street to gain additional travel lane width. Typical standards for bicycle lanes are discussed in greater detail in the following sections.

In areas where sidewalk/bike lane facilities are proposed, the Township will need to consider retrofitting bicycle facilities on existing streets, either by widening the roadway or reconfiguring the existing roadway. In order to leave the existing sidewalk undisturbed for pedestrian use, the Township will need to look into retrofitting bicycle facilities without widening the existing roadway. There are three methods of modifying the roadway to improve bicycle accommodation:

- Reduce or reallocate the width used by travel lanes.
- Reduce the number of travel lanes.
- Reconfigure or reduce on-street parking.

It is important to remember that surface condition significantly affects bicycle travel, control, and comfort. Other improvements may be needed to better accommodate bicyclists including:

- Repairing rough or uneven pavement surfaces.
- Replacing unsafe drainage grates with a design that is compatible with bicycle use.
- Raising or lowering existing drainage grates and manhole or utility covers so they are flush with the pavement.

Sidewalks can provide a safe place for pedestrian movement, but should not be used by bicyclists. After a continuous sidewalk is established, it will be important that it is continuously maintained and kept free of vegetation and other debris, to provide a smooth, passable surface. The North Cornwall Township Subdivision and Land Development Ordinance specifies that sidewalks shall be four feet wide in single family residential developments; five feet wide in multi-family residential developments; and ten feet wide in commercial developments. The Township will also need to consider ADA accommodations, crosswalks, and appropriate traffic calming measures, especially at busy intersections.

Bike / Pedestrian Lane

A combination bicycle/pedestrian lane is proposed in areas where separated sidewalks do not currently exist and where it is not practical to establish new sidewalks. In such situations, the combination bicycle/pedestrian lane will be located on the roadway. These areas are located within, on the edge, or adjacent to neighborhoods, where it is likely that there will be a combination of pedestrians and bicyclists using the connection for transportation, recreation, or to reach a particular destination.

Each area will need to be evaluated during the design phase of the project to determine what particular improvements are necessary. Within neighborhoods, the speed and volume of automobile traffic may be low enough that erecting signage to raise awareness of bicyclists and pedestrians is the only improvement necessary. If it is determined that a striped shoulder is warranted, it is recommended that the width of the lane be at least 5 feet, and wider where possible, to encourage safety for bicyclists, pedestrians, and motor vehicle traffic. In cases where limited space is available, and conditions are practical for shared use of the roadway by automobiles and bicycles, the Township may consider designating a 4 foot to 5 foot lane for pedestrian use, and allowing bicyclists to share a travel lane with motorists.

In cases where bicyclists and pedestrians are using a combination bicycle/pedestrian lane, appropriate signage and traffic calming techniques should be put in place to encourage motorists to slow down, and to alert motorists and bicyclists that they are within a residential area and the presence of an additional user is likely. A toolbox of traffic calming techniques is included in Appendix II.

Shared Lanes (Bicycles and Automobiles)

The 2010 draft AASHTO publication notes that "there are no bicycle-specific designs or dimensions for shared lanes on roadways, but various design features can make shared lanes more compatible with bicycling, such as good pavement quality, adequate sight distances, roadway designs that encourage lower speeds, and bicycle-compatible drainage grates, bridge expansion joints, and railroad crossings. Generally speaking, roadways that carry low volumes of traffic, and/or where traffic typically operates at low speeds, may be suitable as shared lanes in their present condition."

North Cornwall Township may consider utilizing shared lanes (bicycle/automobile) in conditions where roadway width is inadequate to safely and comfortably accommodate a bicycle/pedestrian lane alongside traffic lanes. In these cases, the Township may also consider an open space separation or barrier between the shared lane and the pedestrian lane, essentially creating a pedestrian pathway.

When utilizing a shared lane approach, lane widths of 14 feet or greater enable motorists to pass a bicycle without encroaching into the adjacent lane. Adding additional lane width should be weighed against the potential for motorists to travel at higher speeds in these circumstances, potentially compromising bicycle comfort and safety. A shared lane marking symbol is useful in situations where there is inadequate width to accommodate bicyclists in a separate bicycle lane, and helps to increase awareness for motorists and other bicyclists. A "Share the Road" sign may be useful in shared lane areas, but should not be used to designate a bike route.

Bicycle Lane

Bicycle lanes are proposed in areas that bicyclists typically travel, and are designed to carry one-way bicycle traffic in the same direction as automobile traffic. In North Cornwall Township, bicycle lanes are proposed in areas where bicyclists are predominantly riding to reach a destination, and where there is little pedestrian activity anticipated, due to low population densities. In these areas, paved shoulders can be designated as bike lanes by installing bike lane symbol markings, and meeting all bicycle lane criteria.

Bike lanes are used to delineate available road space for preferential use by bicyclists and to facilitate more predictable movements by bicyclists and motorists. Bike lanes should have a smooth riding surface, and raised surfaces should not be used to separate the bicycle lane from the traffic lane, as bicyclists may need to enter the automobile travel lane to pass other bicycles or to execute turns.

AASHTO recommends that bicycle lane width be determined by context and anticipated use. Under most circumstances, the preferred width for bicycle lanes is five feet. For roadways with no curb and gutter and no on-street parking, the minimum width of a bike lane is four feet. Wider bicycle lanes may be desirable under the following conditions:

R3-17

R3-17a

R3-17b

- Adjacent to a narrow parking lane with vehicle turnover, such as those servicing shops or restaurants.
- In areas with high bicycle use, a bike lane width of 6 to 8 feet makes it possible for bicycles to ride side-by-side or pass each other without leaving the lane.
- On high-speed (greater than 45 mph) and high volume roadways, or where there is a substantial number of heavy vehicles, a wide bicycle lane provides additional lateral separation between motor vehicles and bicycles to minimize wind blast and other effects.

In North Cornwall Township, a 4 to 5 foot bicycle lane is considered adequate in most areas that bicycle lanes are recommended. Appropriate signage will help to increase awareness of bicyclists in these areas.

Recommended Signage

The *Manual on Uniform Traffic Control Devices* states that the BIKE LANE (R3-17) sign shall be used only in conjunction with marked bicycle lanes, and shall be placed at periodic intervals along the bicycle lanes. The AHEAD (R3-17a) sign should be mounted directly below a R3-17 sign in advance of the beginning of a marked bicycle lane. The ENDS (R3-17b) sign should be mounted directly below a R3-17 sign at the end of a marked bicycle lane. Sign images are from the *Manual of Traffic Signs* by Richard C. Moeur.

Separated Equestrian Trail

Equestrian trails are recommended in select locations in the Township to enable equestrians to travel from the riding stables to the equestrian facilities on the Lebanon Valley Rail Trail. Aside from this area, as of 2010, there has not been a large demand for equestrian facilities in the Township, but the Township may reevaluate the need for additional equestrian facilities in the future.

Equestrian trails should be unpaved, natural surfaces, separated from all other types of motorized and non-motorized traffic. Equestrian trails should be designed as separated, off-road facilities, at least ten feet to twelve feet wide. The Township may consider utilizing Nature Trail Pathway Mix, or a similar material in these areas.

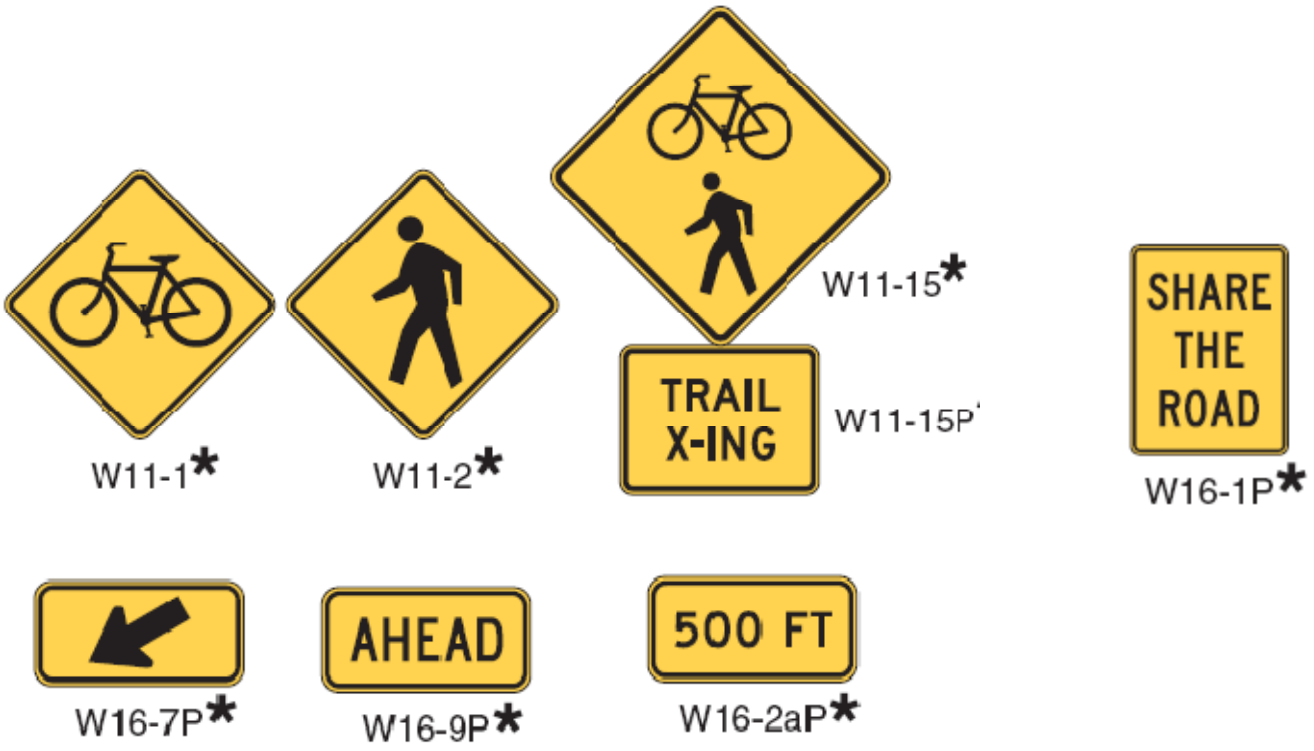
Greenways

For the purpose of this plan, greenways are proposed as facilities that provide a natural resources conservation component. Presently, areas designated as greenway are not proposed for trail development, but may be evaluated for trail development at a later time. Additionally, some areas where shared use paths are proposed, for example along the Snitz and Quittapahilla Creeks, may offer opportunities for natural resources conservation as well. These two locations, specifically, should be recognized as having conservation and recreation components.

Recommended Signage – Overall

The U.S. Department of Transportation, Federal Highway Administration's *Manual on Uniform Traffic Control Devices for Streets and Highways (2009)* states, "The Bicycle Warning (W11-1) sign alerts the road user to unexpected entries into the roadway by bicyclists, and other crossing activities that might cause conflicts. These conflicts might be relatively confined, or might occur randomly over a segment of roadway. The combined Bicycle/Pedestrian (W11-15) sign may be used where both bicyclists and pedestrians might be crossing the roadway, such as at an intersection with a shared use path. A TRAIL X-ING (W11-15P) supplemental plaque may be mounted below the W11-15 sign. A supplemental plaque with the legend AHEAD or XX FEET may be used with the Bicycle Warning or combined Bicycle/Pedestrian sign. A fluorescent yellow-green background color may be used for this sign or plaque. The background color of the plaque should match the color of the warning sign that it supplements. In situations where there is a need to warn motorists to watch for bicyclists traveling along the highway, the SHARE THE ROAD (W16-1P) plaque may be used in conjunction with the W11-1 Sign."

Figure 2: Bicycle / Pedestrian Warning Signs

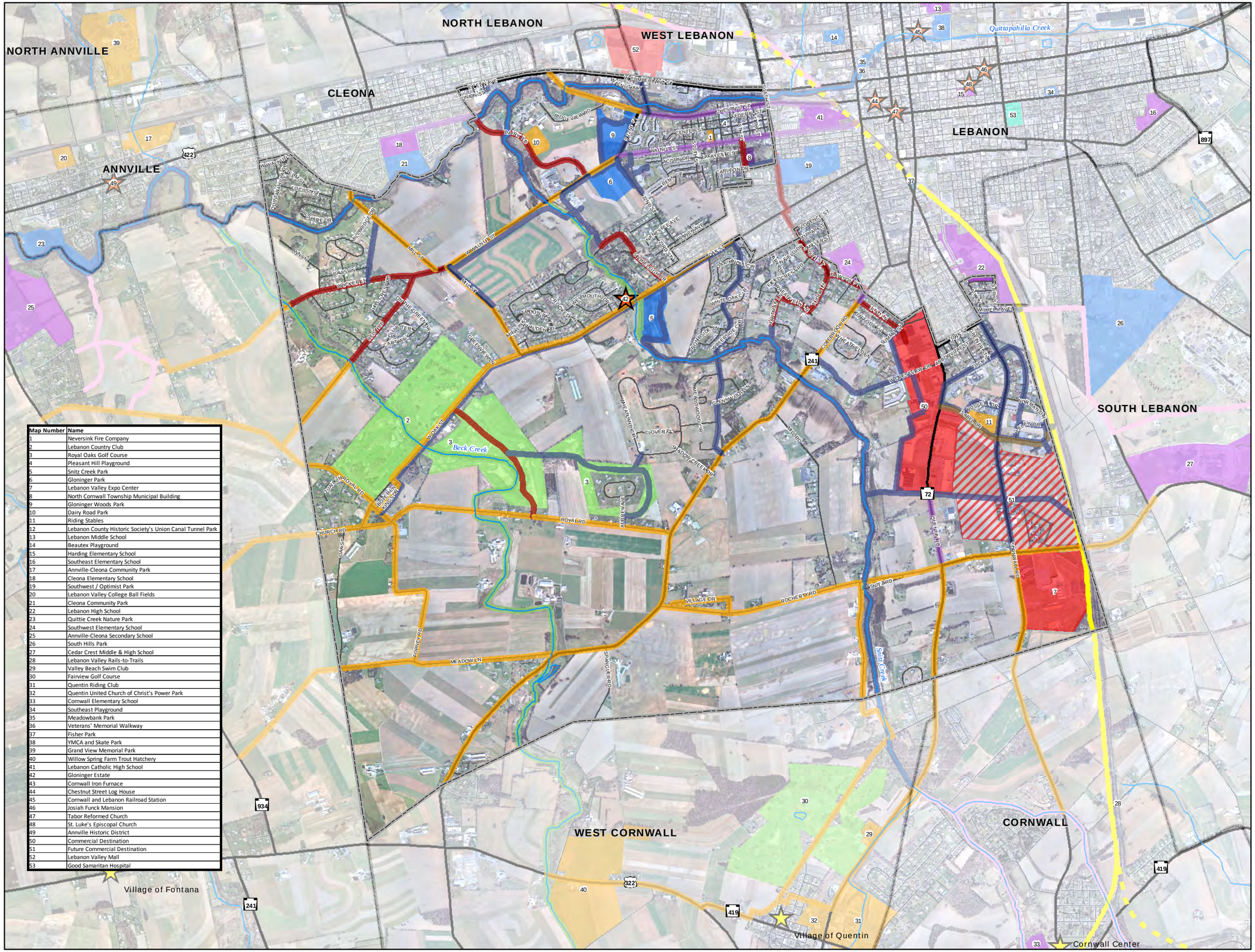


Source: U.S. Department of Transportation, Federal Highway Administration's *Manual on Uniform Traffic Control Devices for Streets and Highways* 2009.

North Cornwall Township may consider these signs, in addition to the bike lane sign and appropriate pavement markings to increase awareness of and to mark the location of a non-motorized trail connection or crossing. During the design phase for specific facilities, North Cornwall Township should reference both MUTCD and AASHTO guidelines for recommended signs and on-road markings applicable to and most appropriate for each specific improvement.

North Cornwall Township

Map 4 Proposed Facility



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Proposed Facility

- Shared Use Path
- Sidewalk/Bike Lane
- Bike/Ped Lane
- Bike Lane
- Separated Equestrian
- Greenway

Point of Interest

- Municipal Building
- School
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- Commercial Destination
- Future Commercial Destination
- Historic Site
- Nearby Destination

0 500 1,000 2,000 3,000 4,000 Feet

August 3, 2010

RETTEW

Project No. 09-02260-003

PA State Plane South, NAD 1983 (feet)
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Phasing Plan of Overall System for Non-Motorized Trail Connections

This section sets forth a phasing plan for the entire trails system. For each trail project, the table lists the proposed type of improvement, the ease of implementation, the priority status, and the timeframe to implement. Each of these three qualifiers is described in more detail below. Each "trail project" listed in the table may include more than one of the proposed facilities described in the earlier implementation strategies section, and represent workable projects that, when complete, will establish a key non-motorized connection. This approach will assist the Township in creating usable connection facilities, rather than a segmented trail system.

- Ease of Implementation – classified as easy, moderate, or challenging, this field rates the level of difficulty of the proposed project and lists key steps that will be required to complete the project.
- Priority Status – classified as low, medium, or high, this field can also be thought of as the level of importance or criticality to the Township trails system. Priority status does not necessarily correspond directly to the implementation timeframe, as there could be segments that are considered a low priority, but are easy to implement, and are therefore projected to be completed in a short or medium timeframe. Conversely, there may also be proposed projects that are of a medium to high priority, but due to circumstances surrounding the project, e.g. necessary partners or other trail components that are not yet constructed, they may not be completed in the near term.
- Timeframe to Implement – classified as short, medium, or long, this field identifies when the project will be implemented. Although the Township will first focus on short term improvements, it should also consider components of medium to long term projects that may take multiple years to implement, such as projects that involve a land acquisition or easement.

Trail Project	Type of Improvement	Ease of Implementation	Priority Status	Timeframe to Implement
Connect the Pleasant Hill area to Gloninger Park and Gloninger Woods Park	• Sidewalk / Bike Lane • Shared Use Path	Moderate • The Township will need to coordinate sidewalk improvements and ongoing maintenance with numerous property owners. • The Township will need to determine if parking should be limited to one side of Walnut and Chestnut Streets.	High	Short to Medium • Shared use paths in Gloninger and Gloninger Woods Parks will be constructed as part of park development.

Trail Project	Type of Improvement	Ease of Implementation	Priority Status	Timeframe to Implement
Connect Gloninger Park and Gloninger Woods Park to Snitz Creek Park	• Shared Use Path • Bicycle / Pedestrian Lane	Moderate • The Township will look into using existing sewer easements to extend the shared use path in the Meadowlane Farms development to Walden Road. Permitted uses within the established easement may need to be amended to also use this area for trail development. • Due to the light traffic volumes and low speeds, it may not be necessary to stripe a separate bicycle / pedestrian lane, but the Township should consider erecting appropriate signage. • The Township will need to consider appropriate traffic calming and crossing techniques on Oak Street in order to make the connection from Stoneleigh Drive to the shared use paths in Snitz Creek Park	High	Short to Medium • Shared use paths will be constructed as the Township develops the parks.
Connect Snitz Creek Park to the Commercial Area on SR 72	• Shared Use Path • Bicycle / Pedestrian Lane	Moderate to Challenging • The Township will need to work with individual property owners and the homeowners associations of Lebanon Valley Catholic Homes and the Creekside developments to secure an easement along the Snitz Creek to construct a shared use path from Snitz Creek Park to Hartman Lane. • Crossing SR 241 will be challenging. The Township will need to work with PennDOT and consider appropriate traffic calming measures in this area.	High	Short to Medium • The Township should start having conversations with necessary partners to jump start this project and continue to move it forward.
SR 72 Existing Commercial Corridor	• Shared Use Path	Easy to Moderate • The Township will need to work with existing and future businesses to develop the trail in this area. • The existing layout of buildings provides an area for a trail to the rear of several of the structures. • There may be an opportunity to coordinate trail improvements with the redevelopment of businesses in the commercial corridor.	Medium	Medium

Trail Project	Type of Improvement	Ease of Implementation	Priority Status	Timeframe to Implement
SR 72 – Springwood Shared Use Path to the Township line	• Sidewalk / Bike Lane • Bike Lane	Moderate to Difficult • The Township will need to coordinate improvements along SR 72 with PennDOT and potential developers. • The design phase of this project will look at specific improvements to improve safety for non-motorized users within this corridor.	Medium	Medium to Long • May occur in conjunction with commercial development projects along SR 72.
Connect the Springwood development to the Lebanon Valley Rail Trail	• Shared Use Path	Easy • A system of shared use paths is proposed as part of the plans for the Springwood development. • The Township will need to act as a partner to the developer and may need to facilitate conversations between the developer and Lebanon Valley Rails to Trails, Inc. to ensure that this important connection is established.	High	Short • The proposed facilities will be constructed as part of the Springwood development.
Tuck Business Park Trails / Cornwall Road	• Shared Use Path	Moderate • The Township will need to work with property owners to secure necessary easements to construct a shared use path, which should be easy within the business park, but may be more challenging along Cornwall Road. • The Township should have discussions with property owners within the Tuck Business Park to gauge their level of interest in contributing to the development, maintenance, and ownership of the trail system within the business park. • The Township will need to work with Lebanon Valley Rails to Trails, Inc. to facilitate a connection to the rail trail in this area.	Medium	Short to Medium

Trail Project	Type of Improvement	Ease of Implementation	Priority Status	Timeframe to Implement
Equestrian Trail	• Separated Equestrian Trail	Moderate to Challenging • The Township will need to engage numerous partners including the riding stables, Lebanon Valley Rails to Trails, Inc., and private property owners to construct a separate, off-road horse trail. • The Township should work with the riding stables to determine who will be responsible for maintenance of the horse trail, including cleaning up horse excrement. • The Township has acquired a 20 ft easement along the east side of Cornwall Road that will allow horses.	Medium	Medium
Snitz Creek Trail south of Hartman Lane	• Shared Use Path	Moderate • The Township will need to secure easements from various property owners, but there are not many property owners in this area.	Medium	Medium
Springwood Connection to the Snitz Creek	• Shared Use Path	Moderate to Challenging • The Township will need to secure easements from a few property owners to construct a trail linking to the Snitz Creek Trail. • Crossing SR 72 may be challenging.	Low	Long • This trail should be constructed in conjunction with or following the construction of the southern part of the Snitz Creek Trail.
Commercial Area to SR 241 via West Crestview Drive	• Shared Use Path	Moderate to Challenging • The Township will need to secure easements from property owners. • The Township will need to coordinate with PennDOT on these and other improvements that are located along state roadways.	Low	Long

Trail Project	Type of Improvement	Ease of Implementation	Priority Status	Timeframe to Implement
Royal Oaks Trails	• Bike / Pedestrian Lane • Shared Use Path	Moderate • Should this property be developed, the Township should work with the developer to construct, at minimum, a bike/pedestrian lane along the central spine of the development and shared use path surrounding the existing homes on Whitney Way. • The Township will need to secure an easement to connect this trail to the road network within the Creekside development.	Low to Medium • Priority status currently low, but may elevate to medium if/when new residential development is proposed.	Medium to Long • Will be constructed in conjunction with future residential development in this area.
Creekside Development	• Bike / Pedestrian Lane	Moderate • It appears that there is adequate right-of-way to construct a shared use path along the Creekside Drive. • The Township will need to work with property owners and the homeowners association to make this improvement.	Medium to High • When implemented, this improvement will provide a connection from a rather large residential neighborhood to the Snitz Creek Trail, allowing these residents to access the parks and other resources.	Medium • This improvement should be constructed after the Snitz Creek Trail is constructed in this area.
Meadowlane Farms Trails	• Shared Use Path	Easy • Construction of this trail will be the responsibility of the developer of the Meadowlane Farms development.	Medium	Medium • This project will be constructed in conjunction with the development of Meadowlane Farms.

Trail Project	Type of Improvement	Ease of Implementation	Priority Status	Timeframe to Implement
Millbridge / Bricker Lane Area and Mill Street	• Shared Use Path • Bike / Pedestrian Lane • Bike Lane	Moderate • Traffic calming measures will be necessary. • The Township may need to work with property owners to secure easements.	Medium to High • The proposed facilities will improve conditions for several non-motorized users and connect a residential area to the park facilities.	Medium
Oak Street	• Shared Use Path • Bike Lane	Challenging • A shared use path is necessary given existing physical constraints along Oak Street. • The Township may need to acquire an easement along portions of Oak Street if inadequate right-of-way exists. • The Township should consider various traffic calming measures to slow traffic at key places along this corridor.	Medium to High • Oak Street has the potential to serve various modes of non-motorized users that are using the facilities for a variety of reasons (e.g. transportation, recreation).	Medium to Long
Walnut Street Bike Lane	• Bike Lane	Moderate • The Township should consider traffic calming and appropriate signage in this area to increase awareness of cyclists on the road, and to encourage pedestrians to use the nearby system of shared use paths.	Medium to High	Medium
Dairy Road Connection	• Bike / Pedestrian Lane	Easy • It appears that adequate room exists within the right of way to construct bike/pedestrian lanes. • The Township should consider appropriate signage and traffic calming measures.	Medium to High • Dairy Road will provide a connection to another park resource, and to Cleona Borough and US 422.	Medium

Trail Project	Type of Improvement	Ease of Implementation	Priority Status	Timeframe to Implement
Chestnut Street Bike Lane to US 422	• Bike Lane	Moderate • The Township will consider the proposed facilities in conjunction with roadway improvements.	Low to Medium	Medium to Long
22nd Street	• Shared Use Path	Moderate • The Township will need to work with various property owners to acquire land or secure easements to construct a shared use path in this area. • The Township should consider partnering with the City of Lebanon on this project.	Medium to High • This connection will provide a connection to the Lebanon Valley Mall for non-motorized users coming from the Pleasant Hill area.	Short to Medium
Quittapahilla Creek	• Shared Use Path	Challenging • Constructing a shared use path along the creek will require coordination with numerous property owners and adjacent municipalities.	Medium • The Quittapahilla Creek provides a key east-west corridor that can be used for non-motorized transportation.	Long
Connections from the North Cornwall Township Municipal Building	• Bike / Pedestrian Lane • Shared Use Path	Moderate • The Township will need to coordinate with at least one property owner and the City of Lebanon to construct a shared use path from the Township building to the park. • Appropriate crossings and traffic calming should be considered on 16th Street.	Medium to High • This improvement will connect residents in the Pleasant Hill area to the municipal building and the recreational facilities available at Lebanon City's Southwest/Optimist Park.	Medium • This improvement can occur at any time, but the Township should first focus on the Walnut and Chestnut Street improvements in the Pleasant Hill area.

Trail Project	Type of Improvement	Ease of Implementation	Priority Status	Timeframe to Implement
SR 241 Bike Lanes	• Bike Lane	Challenging • Involves a long stretch of roadway. • Will require coordination with PennDOT.	Medium • This corridor is a key route used by cyclists traveling within and through the Township.	Medium to Long
Royal Road, "the Triangle", and Forney Road	• Bike Lane	Easy to Moderate • May require stretches of shared lane use if inadequate width is available within the right-of-way.	Medium to High • This corridor is a key route used by cyclists traveling within and through the Township and is one of the County's Scenic Bike Routes.	Medium • Consider improvements in conjunction with roadway improvements. • Recognize that Meadow Lane provides an alternate route from SR 934 and consider timing of improvements in relation to timing of improvements along Meadow Lane.
Meadow Lane	• Bike Lane	Easy to Moderate • May require stretches of shared lane use if adequate width is not available within the right-of-way.	Medium • Meadow Lane is a key transportation corridor for bicyclists.	Medium to Long • Consider improvements in conjunction with roadway improvements. • Recognize that Royal Road provides an alternate route from SR 934 and consider timing of improvements in relation to timing of improvements along Royal Road.

Trail Project	Type of Improvement	Ease of Implementation	Priority Status	Timeframe to Implement
Rocherty Road	• Bike Lane	Moderate • May require stretches of shared lane use if adequate width is not available within the right of way. • Will require coordination with PennDOT to the east of SR 72. • The Township should work with PennDOT and South Lebanon Township to facilitate the extension of the bike lane beyond North Cornwall Township's Boundary.	Medium • Rocherty Road is a key bicycling route within and through the Township and connects to several identified destinations.	Medium
Cornwall Road Bike Lane	• Bike Lane	Moderate to Challenging • May require stretches of shared lane use if adequate width is not available within the right of way. • Will require coordination with PennDOT. • The Township should work with PennDOT and Cornwall Borough to facilitate the extension of the bike lane beyond North Cornwall Township's Boundary.	Low to Medium • Cornwall Road is identified as a key transportation corridor for bicyclists, but the Lebanon Valley Rail Trail provides an existing north-south transportation route for bicyclists.	Long
Snitz Creek Trail – Quittapahilla Creek to Walnut Street	• Shared Use Path	Moderate • Will require an easement.	Low to Medium • Improvements along nearby Dairy Road may be more feasible. • This project may become more of a priority if segments of the trail along the Quittapahilla Creek are constructed.	Medium to Long

North Cornwall Township Resolution No. 2010-17

WHEREAS, The Board of Supervisors of the Township of North Cornwall, Lebanon County (herein "Board of Supervisors"), deem it to be an important goal of the Township to develop and maintain trail and non-motorized connection opportunities within the Township for the benefit of Township residents; and

WHEREAS, the Board of Supervisors has requested RETTEW Associates, Inc. to prepare a Master Plan for Non-Motorized Trail Connections; and

WHEREAS, RETTEW Associates, Inc. has presented to the Board of Supervisors, a Master Plan for Non-Motorized Trail Connections outlining the existing recreation opportunities and destinations within the Township, and setting forth a plan for future non-motorized trail connections to move people within and through the Township; and

WHEREAS, the Township will use the Master Plan for Non-Motorized Trail Connections to guide the future development of non-motorized trail connections and recreation amenities; and

WHEREAS, the Master Plan for Non-Motorized Trail Connections has been discussed with the Study Committee, Township Planning Commission, and the Township Recreation Board; and

WHEREAS, the Master Plan for Non-Motorized Trail Connections considered proposed connections in surrounding municipalities in addition to the Lebanon County Comprehensive Plan and state planning documents.

WHEREAS, the Board of Supervisors deems it to be in the best interest of the Township to adopt the Master Plan for Non-Motorized Trail Connections.

NOW, THEREFORE, BE IT IS HEREBY RESOLVED, this 3rd day of August, 2010:

1. The North Cornwall Township Master Plan for Non-Motorized Trail Connections, dated August 3, 2010, which is incorporated herein, is hereby adopted.
2. The Township Engineer, Solicitor and/or Manager are directed to take all steps necessary to incorporate the this approved plan into the Recreation Ordinance and to included this trail system as part of the Township's Official Map.
3. This resolution shall be effective immediately.

BOARD OF SUPERVISORS OF
TOWNSHIP OF NORTH CORNWALL
LEBANON COUNTY, PENNSYLVANIA

By: Ralph D. Heister III
Chairman, Ralph D. Heister, III

SEAL:

Robin L. Getz 8/3-10
Secretary Robin L. Getz Date

APPENDIX E

TRAFFIC DATA

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

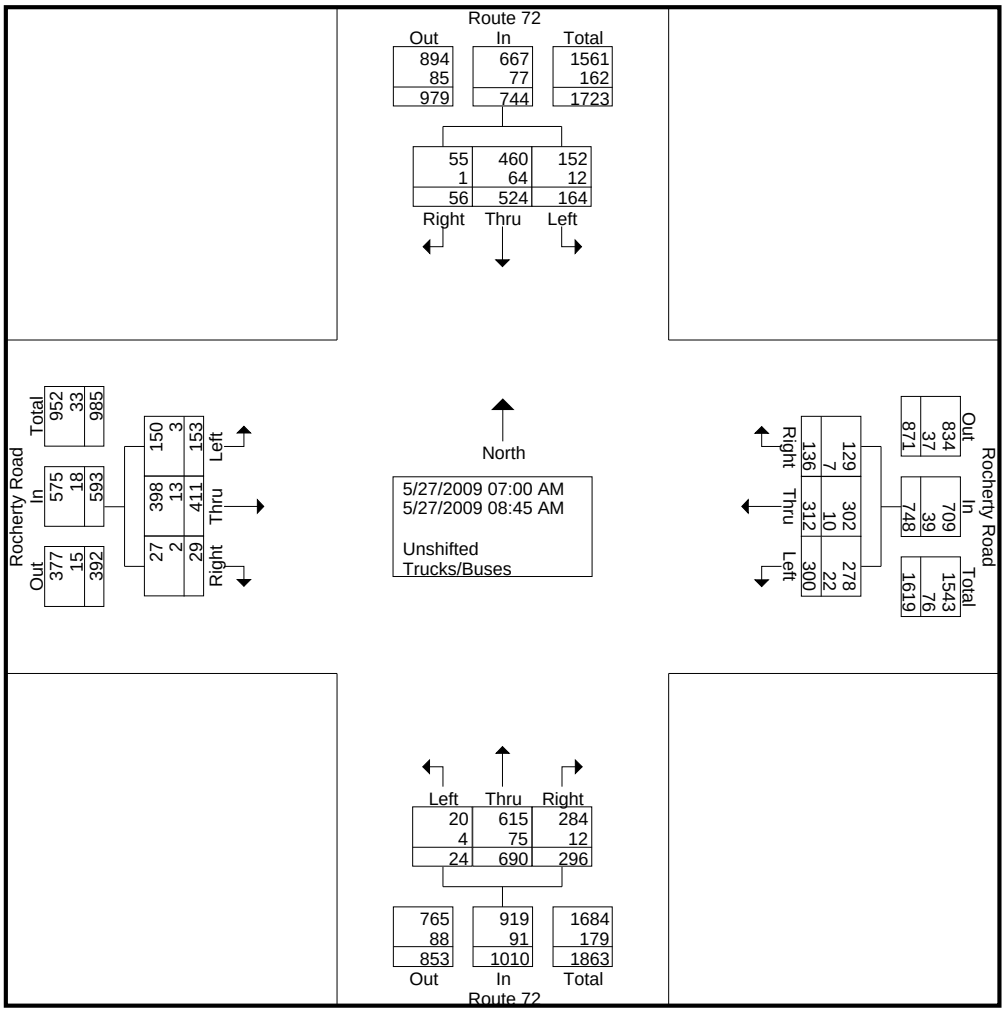
Route 72 & Rocherty Road

Counter: 2
Counted by: R. Kearney
Weather: Overcast/Rain
Saved as: 2009-05-27 AM72RR

File Name : 2009-05-27 AM72RR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

Groups Printed- Unshifted - Trucks/Buses

	Route 72 Southbound					Rocherty Road Westbound					Route 72 Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	14	53	5	1	72	40	48	3	1	91	1	59	29	4	89	16	51	3	1	70	7	322	329
07:15 AM	23	67	6	1	96	47	49	11	1	107	3	88	48	5	139	21	68	3	1	92	8	434	442
07:30 AM	23	76	8	0	107	47	49	17	1	113	2	87	39	2	128	19	60	1	0	80	3	428	431
07:45 AM	16	73	8	1	97	33	30	16	2	79	5	112	48	6	165	31	73	2	0	106	9	447	456
Total	76	269	27	3	372	167	176	47	5	390	11	346	164	17	521	87	252	9	2	348	27	1631	1658
08:00 AM	24	58	3	0	85	48	36	25	4	109	5	92	34	4	131	18	42	2	1	62	9	387	396
08:15 AM	33	66	9	3	108	34	35	17	6	86	2	88	29	0	119	17	51	5	0	73	9	386	395
08:30 AM	17	71	10	4	98	24	26	16	9	66	3	80	35	9	118	16	34	6	2	56	24	338	362
08:45 AM	14	60	7	1	81	27	39	31	3	97	3	84	34	4	121	15	32	7	3	54	11	353	364
Total	88	255	29	8	372	133	136	89	22	358	13	344	132	17	489	66	159	20	6	245	53	1464	1517
Grand Total	164	524	56	11	744	300	312	136	27	748	24	690	296	34	1010	153	411	29	8	593	80	3095	3175
Apprch %	22	70.4	7.5			40.1	41.7	18.2			2.4	68.3	29.3			25.8	69.3	4.9					
Total %	5.3	16.9	1.8		24	9.7	10.1	4.4		24.2	0.8	22.3	9.6		32.6	4.9	13.3	0.9		19.2	2.5	97.5	
Unshifted	152	460	55		678	278	302	129		736	20	615	284		953	150	398	27		583	0	0	2950
% Unshifted	92.7	87.8	98.2	100	89.8	92.7	96.8	94.9	100	95	83.3	89.1	95.9	100	91.3	98	96.8	93.1	100	97	0	0	92.9
Trucks/Buses	12	64	1		77	22	10	7		39	4	75	12		91	3	13	2		18	0	0	225
% Trucks/Buses	7.3	12.2	1.8	0	10.2	7.3	3.2	5.1	0	5	16.7	10.9	4.1	0	8.7	2	3.2	6.9	0	3	0	0	7.1

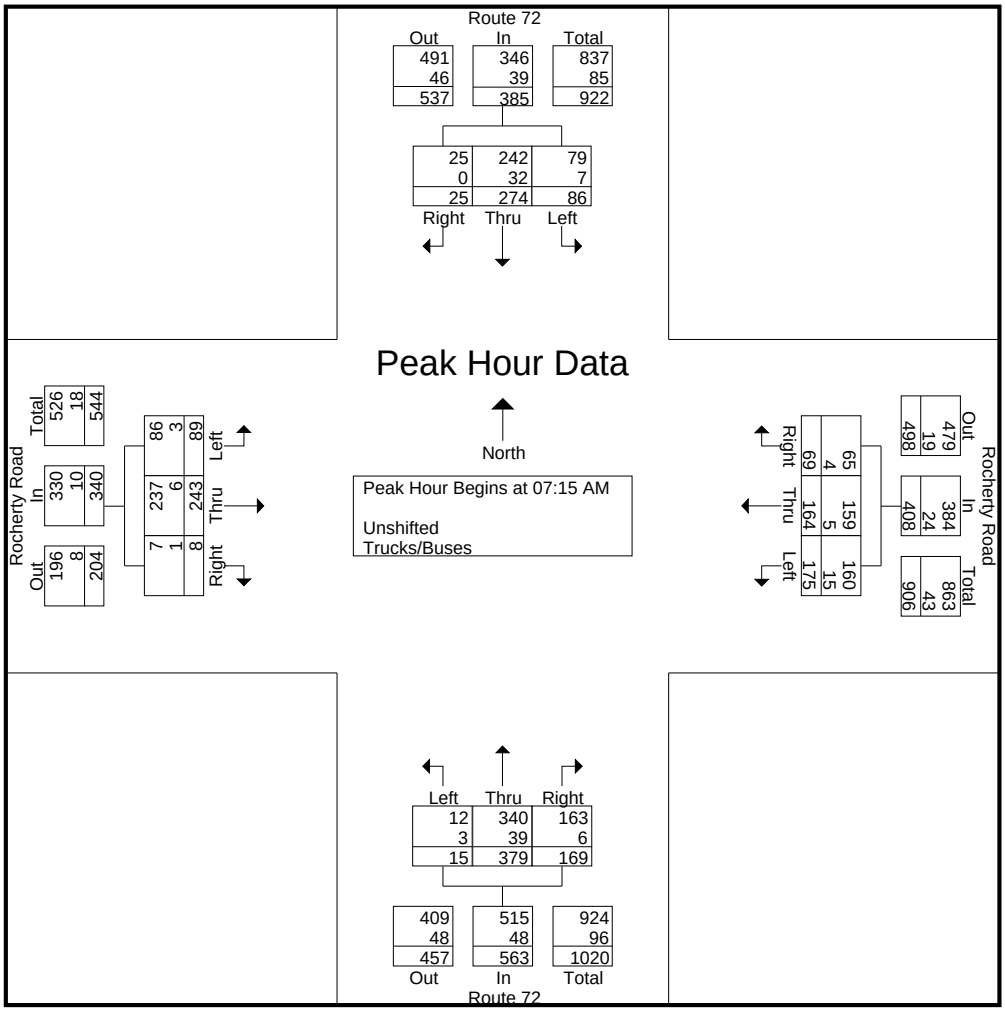


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Rocherty Road

File Name : 2009-05-27 AM72RR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

	Route 72 Southbound				Rocherty Road Westbound				Route 72 Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	23	67	6	96	47	49	11	107	3	88	48	139	21	68	3	92	434
07:30 AM	23	76	8	107	47	49	17	113	2	87	39	128	19	60	1	80	428
07:45 AM	16	73	8	97	33	30	16	79	5	112	48	165	31	73	2	106	447
08:00 AM	24	58	3	85	48	36	25	109	5	92	34	131	18	42	2	62	387
Total Volume	86	274	25	385	175	164	69	408	15	379	169	563	89	243	8	340	1696
% App. Total	22.3	71.2	6.5		42.9	40.2	16.9		2.7	67.3	30		26.2	71.5	2.4		
PHF	.896	.901	.781	.900	.911	.837	.690	.903	.750	.846	.880	.853	.718	.832	.667	.802	.949
Unshifted	79	242	25	346	160	159	65	384	12	340	163	515	86	237	7	330	1575
% Unshifted	91.9	88.3	100	89.9	91.4	97.0	94.2	94.1	80.0	89.7	96.4	91.5	96.6	97.5	87.5	97.1	92.9
Trucks/Buses	7	32	0	39	15	5	4	24	3	39	6	48	3	6	1	10	121
% Trucks/Buses	8.1	11.7	0	10.1	8.6	3.0	5.8	5.9	20.0	10.3	3.6	8.5	3.4	2.5	12.5	2.9	7.1



Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

Counter: 16
Counted by: Z. Pierce
Weather: Overcast
Saved as: 2011-04-27 AM72CCS

File Name : 2011-04-27 AM72CCS
Site Code : 00000000
Start Date : 4/27/2011
Page No : 1

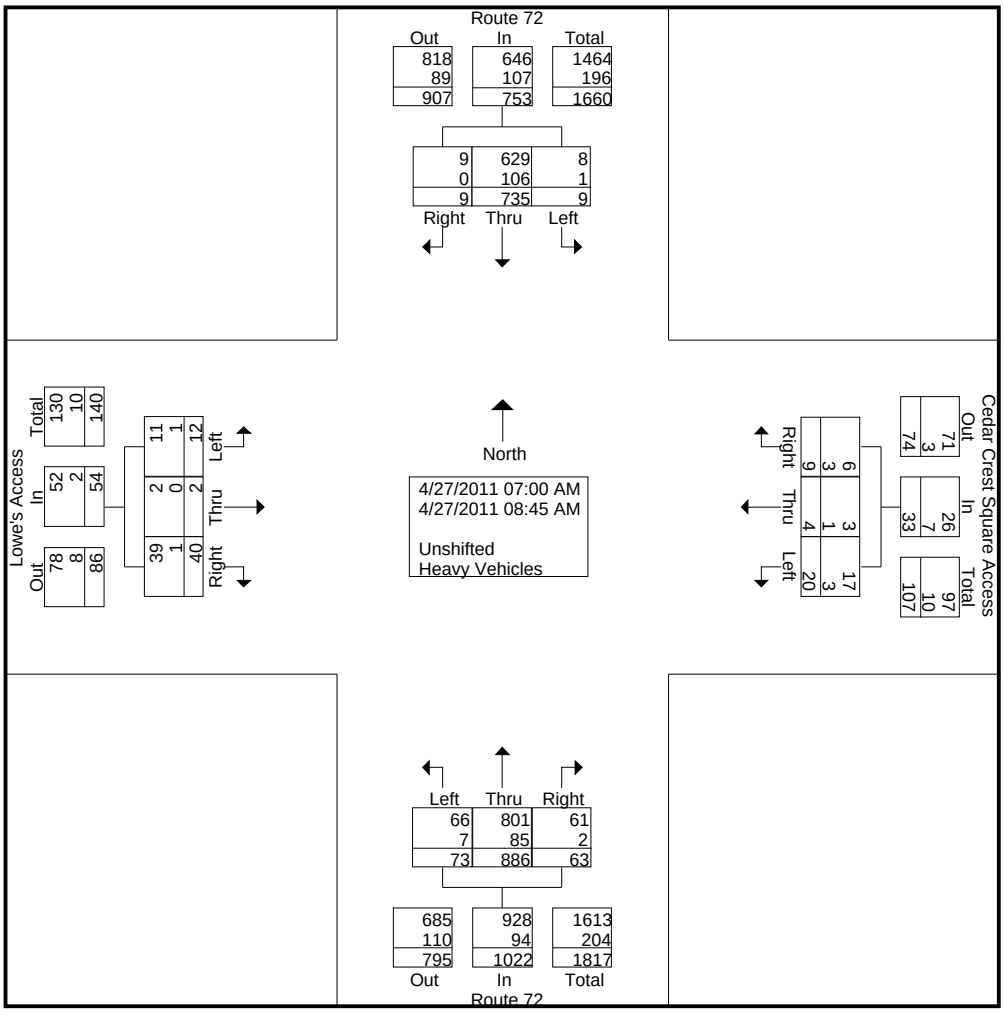
Groups Printed- Unshifted - Heavy Vehicles

	Lowe's Access Eastbound					Cedar Crest Square Access Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	Right On Red	App. Total	Left	Thru	Right	Right On Red	App. Total	Left	Thru	Right	Right On Red	App. Total	Left	Thru	Right	Right On Red	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	1	1	1	2	0	0	0	2	6	88	11	0	105	0	96	1	0	97	1	205	206
07:15 AM	1	0	3	2	4	1	0	1	0	2	5	89	1	0	95	2	109	0	0	111	2	212	214
07:30 AM	2	0	5	1	7	1	0	1	1	2	10	137	6	0	153	0	92	3	0	95	2	257	259
07:45 AM	2	0	11	8	13	0	1	1	0	2	8	133	8	0	149	2	78	1	0	81	8	245	253
Total	5	0	20	12	25	4	1	3	1	8	29	447	26	0	502	4	375	5	0	384	13	919	932
08:00 AM	0	0	6	3	6	3	1	1	0	5	8	113	10	0	131	1	77	0	0	78	3	220	223
08:15 AM	2	1	5	4	8	4	0	0	0	4	7	109	9	0	125	0	98	1	1	99	5	236	241
08:30 AM	3	0	4	3	7	4	0	3	3	7	15	91	4	0	110	0	101	1	0	102	6	226	232
08:45 AM	2	1	5	3	8	5	2	2	0	9	14	126	14	0	154	4	84	2	0	90	3	261	264
Total	7	2	20	13	29	16	3	6	3	25	44	439	37	0	520	5	360	4	1	369	17	943	960
Grand Total	12	2	40	25	54	20	4	9	4	33	73	886	63	0	1022	9	735	9	1	753	30	1862	1892
Apprch %	22.2	3.7	74.1			60.6	12.1	27.3			7.1	86.7	6.2			1.2	97.6	1.2					
Total %	0.6	0.1	2.1		2.9	1.1	0.2	0.5		1.8	3.9	47.6	3.4		54.9	0.5	39.5	0.5		40.4	1.6	98.4	
Unshifted	11	2	39		77	17	3	6		28	66	801	61		928	8	629	9		647	0	0	1680
% Unshifted	91.7	100	97.5	100	97.5	85	75	66.7	50	75.7	90.4	90.4	96.8	0	90.8	88.9	85.6	100	100	85.8	0	0	88.8
Heavy Vehicles	1	0	1		2	3	1	3		9	7	85	2		94	1	106	0		107	0	0	212
% Heavy Vehicles	8.3	0	2.5	0	2.5	15	25	33.3	50	24.3	9.6	9.6	3.2	0	9.2	11.1	14.4	0	0	14.2	0	0	11.2

Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-27 AM72CCS
Site Code : 00000000
Start Date : 4/27/2011
Page No : 2

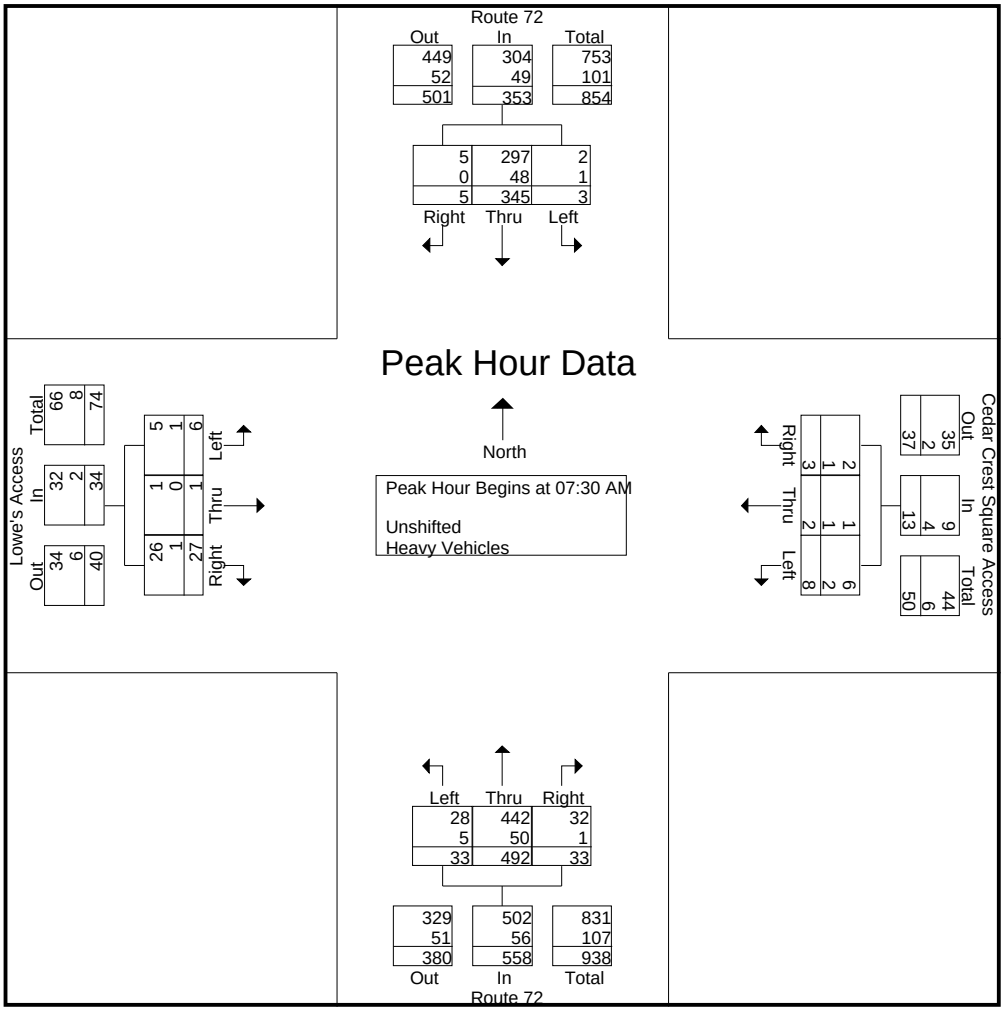


Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-27 AM72CCS
Site Code : 00000000
Start Date : 4/27/2011
Page No : 3

	Lowe's Access Eastbound				Cedar Crest Square Access Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**2**	0	5	7	1	0	**1**	2	**10**	**137**	6	**153**	0	92	**3**	95	**257**
07:45 AM	2	0	**11**	**13**	0	**1**	1	2	8	133	8	149	**2**	78	1	81	245
08:00 AM	0	0	6	6	3	1	1	**5**	8	113	**10**	131	1	77	0	78	220
08:15 AM	2	**1**	5	8	**4**	0	0	4	7	109	9	125	0	**98**	1	**99**	236
Total Volume	6	1	27	34	8	2	3	13	33	492	33	558	3	345	5	353	958
% App. Total	17.6	2.9	79.4		61.5	15.4	23.1		5.9	88.2	5.9		0.8	97.7	1.4		
PHF	.750	.250	.614	.654	.500	.500	.750	.650	.825	.898	.825	.912	.375	.880	.417	.891	.932
Unshifted	5	1	26	32	6	1	2	9	28	442	32	502	2	297	5	304	847
% Unshifted	83.3	100	96.3	94.1	75.0	50.0	66.7	69.2	84.8	89.8	97.0	90.0	66.7	86.1	100	86.1	88.4
Heavy Vehicles	1	0	1	2	2	1	1	4	5	50	1	56	1	48	0	49	111
% Heavy Vehicles	16.7	0	3.7	5.9	25.0	50.0	33.3	30.8	15.2	10.2	3.0	10.0	33.3	13.9	0	13.9	11.6



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

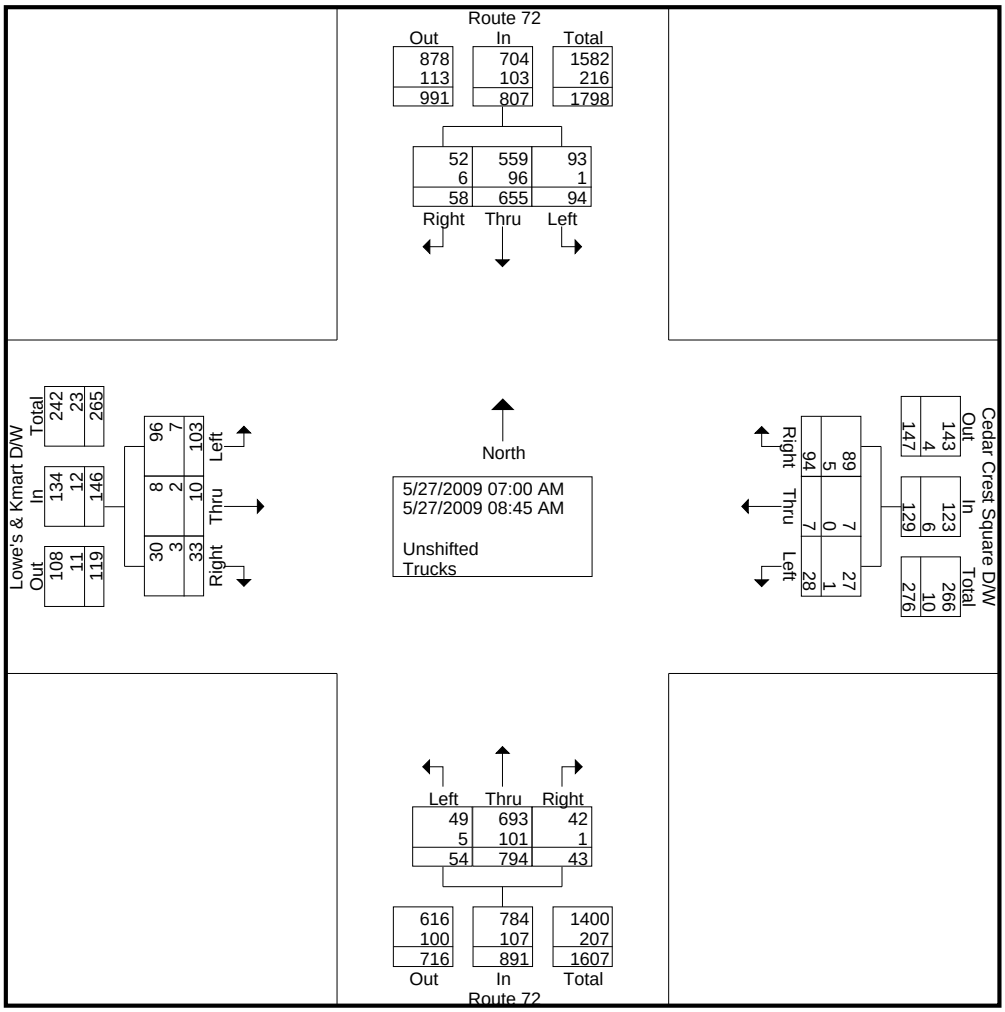
Route 72 &
Lowes & Kmart / Cedar Crest Sq. Blvd

Counter: 24
Counted by: E. Farley
Weather: Overcast/Rain
Saved as: 2009-05-27 AM72LKCC

File Name : 2009-05-27 AM72LKCC
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Route 72 Southbound					Cedar Crest Square D/W Westbound					Route 72 Northbound					Lowe's & Kmart D/W Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	5	59	6	0	70	0	0	2	1	2	2	76	2	0	80	2	1	2	0	5	1	157	158
07:15 AM	4	92	7	0	103	1	0	6	2	7	2	94	1	0	97	4	0	10	4	14	6	221	227
07:30 AM	10	95	2	0	107	4	0	4	2	8	6	102	3	0	111	9	0	1	0	10	2	236	238
07:45 AM	12	87	4	0	103	4	1	8	3	13	9	120	5	1	134	10	2	1	0	13	4	263	267
Total	31	333	19	0	383	9	1	20	8	30	19	392	11	1	422	25	3	14	4	42	13	877	890
08:00 AM	12	84	5	0	101	0	2	7	2	9	12	114	12	1	138	15	0	5	1	20	4	268	272
08:15 AM	9	88	5	0	102	7	1	15	5	23	7	112	5	0	124	20	2	4	1	26	6	275	281
08:30 AM	22	76	17	1	115	8	0	31	12	39	6	87	5	0	98	17	3	3	1	23	14	275	289
08:45 AM	20	74	12	0	106	4	3	21	8	28	10	89	10	0	109	26	2	7	2	35	10	278	288
Total	63	322	39	1	424	19	6	74	27	99	35	402	32	1	469	78	7	19	5	104	34	1096	1130
Grand Total	94	655	58	1	807	28	7	94	35	129	54	794	43	2	891	103	10	33	9	146	47	1973	2020
Apprch %	11.6	81.2	7.2			21.7	5.4	72.9			6.1	89.1	4.8			70.5	6.8	22.6					
Total %	4.8	33.2	2.9		40.9	1.4	0.4	4.8		6.5	2.7	40.2	2.2		45.2	5.2	0.5	1.7		7.4	2.3	97.7	
Unshifted	93	559	52		705	27	7	89		158	49	693	42		786	96	8	30		143	0	0	1792
% Unshifted	98.9	85.3	89.7	100	87.3	96.4	100	94.7	100	96.3	90.7	87.3	97.7	100	88	93.2	80	90.9	100	92.3	0	0	88.7
Trucks	1	96	6		103	1	0	5		6	5	101	1		107	7	2	3		12	0	0	228
% Trucks	1.1	14.7	10.3	0	12.7	3.6	0	5.3	0	3.7	9.3	12.7	2.3	0	12	6.8	20	9.1	0	7.7	0	0	11.3

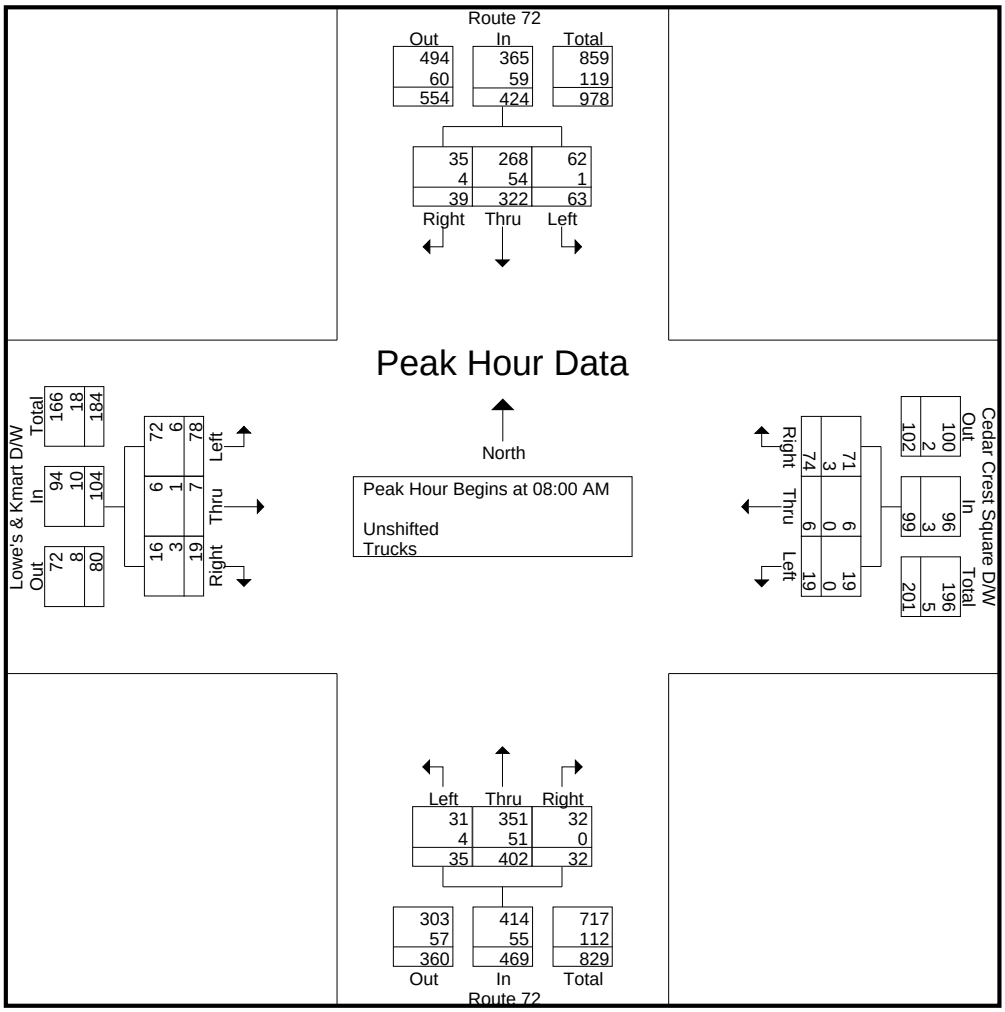


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Lowes & Kmart / Cedar Crest Sq. Blvd

File Name : 2009-05-27 AM72LKCC
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

	Route 72 Southbound				Cedar Crest Square D/W Westbound				Route 72 Northbound				Lowe's & Kmart D/W Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	12	84	5	101	0	2	7	9	12	114	12	138	15	0	5	20	268
08:15 AM	9	88	5	102	7	1	15	23	7	112	5	124	20	2	4	26	275
08:30 AM	22	76	17	115	8	0	31	39	6	87	5	98	17	3	3	23	275
08:45 AM	20	74	12	106	4	3	21	28	10	89	10	109	26	2	7	35	278
Total Volume	63	322	39	424	19	6	74	99	35	402	32	469	78	7	19	104	1096
% App. Total	14.9	75.9	9.2		19.2	6.1	74.7		7.5	85.7	6.8		75	6.7	18.3		
PHF	.716	.915	.574	.922	.594	.500	.597	.635	.729	.882	.667	.850	.750	.583	.679	.743	.986
Unshifted	62	268	35	365	19	6	71	96	31	351	32	414	72	6	16	94	969
% Unshifted	98.4	83.2	89.7	86.1	100	100	95.9	97.0	88.6	87.3	100	88.3	92.3	85.7	84.2	90.4	88.4
Trucks	1	54	4	59	0	0	3	3	4	51	0	55	6	1	3	10	127
% Trucks	1.6	16.8	10.3	13.9	0	0	4.1	3.0	11.4	12.7	0	11.7	7.7	14.3	15.8	9.6	11.6



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

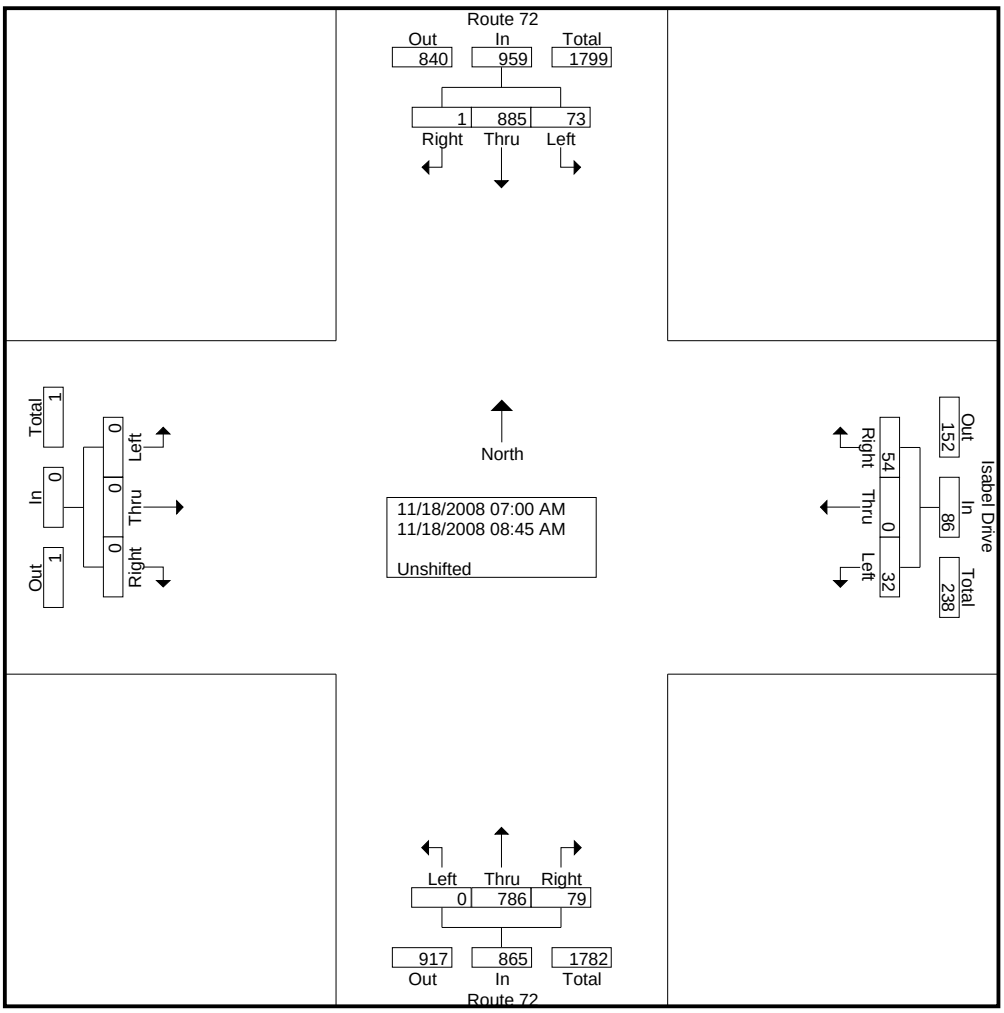
Route 72 & Isabel Drive

Counter: 26
Counted by: S. Hutt
Weather: Sunny
Saved as: 2008-11-18 AM72ID

File Name : 2008-11-18 AM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 1

Groups Printed- Unshifted

	Route 72 Southbound					Isabel Drive Westbound					Route 72 Northbound					Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	5	106	0	11	111	2	0	8	0	10	0	49	6	4	55	0	0	0	0	0	15	176	191
07:15 AM	7	117	0	11	124	2	0	3	0	5	0	91	6	6	97	0	0	0	0	0	17	226	243
07:30 AM	9	87	0	6	96	0	0	5	0	5	0	101	7	7	108	0	0	0	0	0	13	209	222
07:45 AM	9	138	0	19	147	4	0	6	1	10	0	118	22	12	140	0	0	0	0	0	32	297	329
Total	30	448	0	47	478	8	0	22	1	30	0	359	41	29	400	0	0	0	0	0	77	908	985
08:00 AM	11	101	0	11	112	3	0	7	0	10	0	105	6	9	111	0	0	0	0	0	20	233	253
08:15 AM	9	106	1	12	116	5	0	5	0	10	0	89	9	11	98	0	0	0	0	0	23	224	247
08:30 AM	18	103	0	7	121	8	0	9	1	17	0	111	8	12	119	0	0	0	0	0	20	257	277
08:45 AM	5	127	0	11	132	8	0	11	0	19	0	122	15	17	137	0	0	0	0	0	28	288	316
Total	43	437	1	41	481	24	0	32	1	56	0	427	38	49	465	0	0	0	0	0	91	1002	1093
Grand Total	73	885	1	88	959	32	0	54	2	86	0	786	79	78	865	0	0	0	0	0	168	1910	2078
Apprch %	7.6	92.3	0.1			37.2	0	62.8			0	90.9	9.1			0	0	0					
Total %	3.8	46.3	0.1		50.2	1.7	0	2.8		4.5	0	41.2	4.1		45.3	0	0	0		0	8.1	91.9	

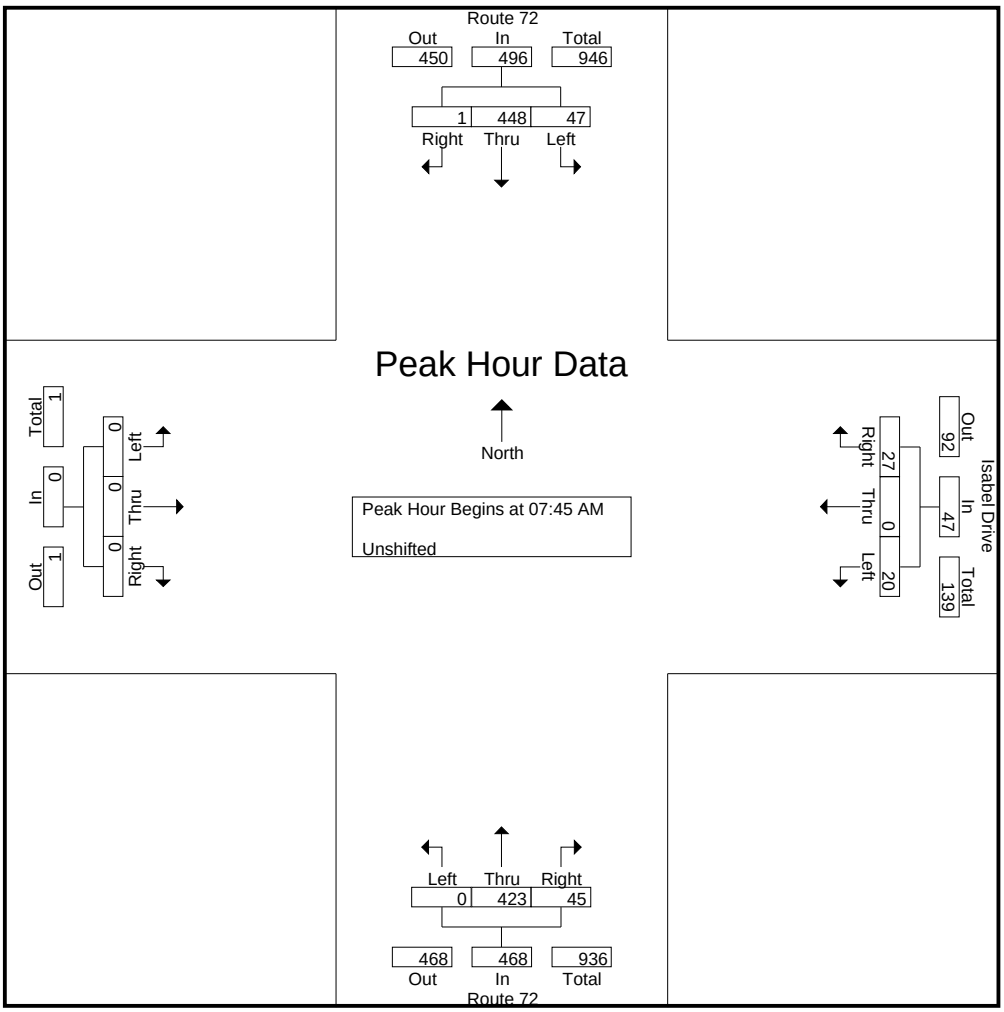


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Isabel Drive

File Name : 2008-11-18 AM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 2

	Route 72 Southbound				Isabel Drive Westbound				Route 72 Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	9	138	0	147	4	0	6	10	0	118	22	140	0	0	0	0	297
08:00 AM	11	101	0	112	3	0	7	10	0	105	6	111	0	0	0	0	233
08:15 AM	9	106	1	116	5	0	5	10	0	89	9	98	0	0	0	0	224
08:30 AM	18	103	0	121	8	0	9	17	0	111	8	119	0	0	0	0	257
Total Volume	47	448	1	496	20	0	27	47	0	423	45	468	0	0	0	0	1011
% App. Total	9.5	90.3	0.2		42.6	0	57.4		0	90.4	9.6		0	0	0		
PHF	.653	.812	.250	.844	.625	.000	.750	.691	.000	.896	.511	.836	.000	.000	.000	.000	.851



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

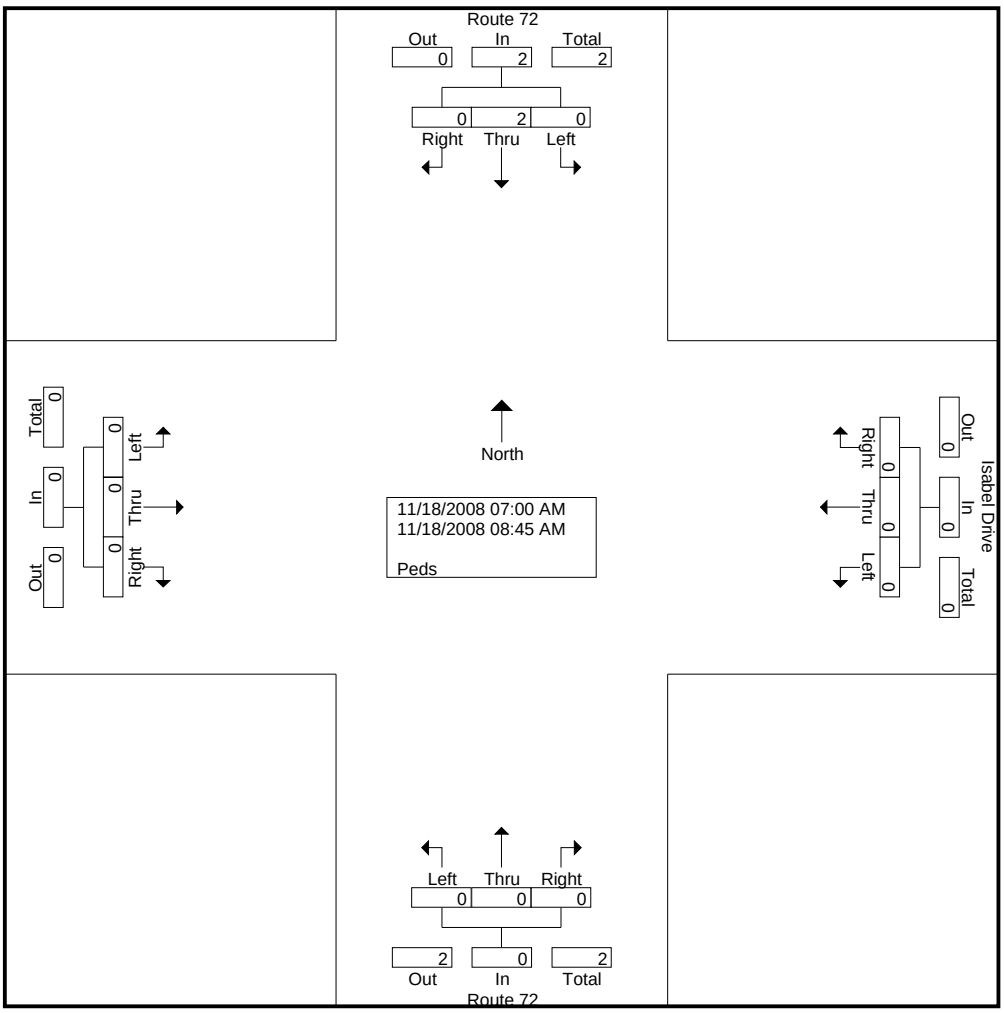
Route 72 &
Isabel Drive

Counter: 26
Counted by: S. Hutt
Weather: Sunny
Saved as: 2008-11-18 AM72ID

File Name : 2008-11-18 AM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 1

Groups Printed- Peds

	Route 72 Southbound					Isabel Drive Westbound					Route 72 Northbound					Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
07:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Apprch %	0	100	0			0	0	0			0	0	0			0	0	0					
Total %	0	100	0		100	0	0	0		0	0	0	0		0	0	0	0		0	0	100	

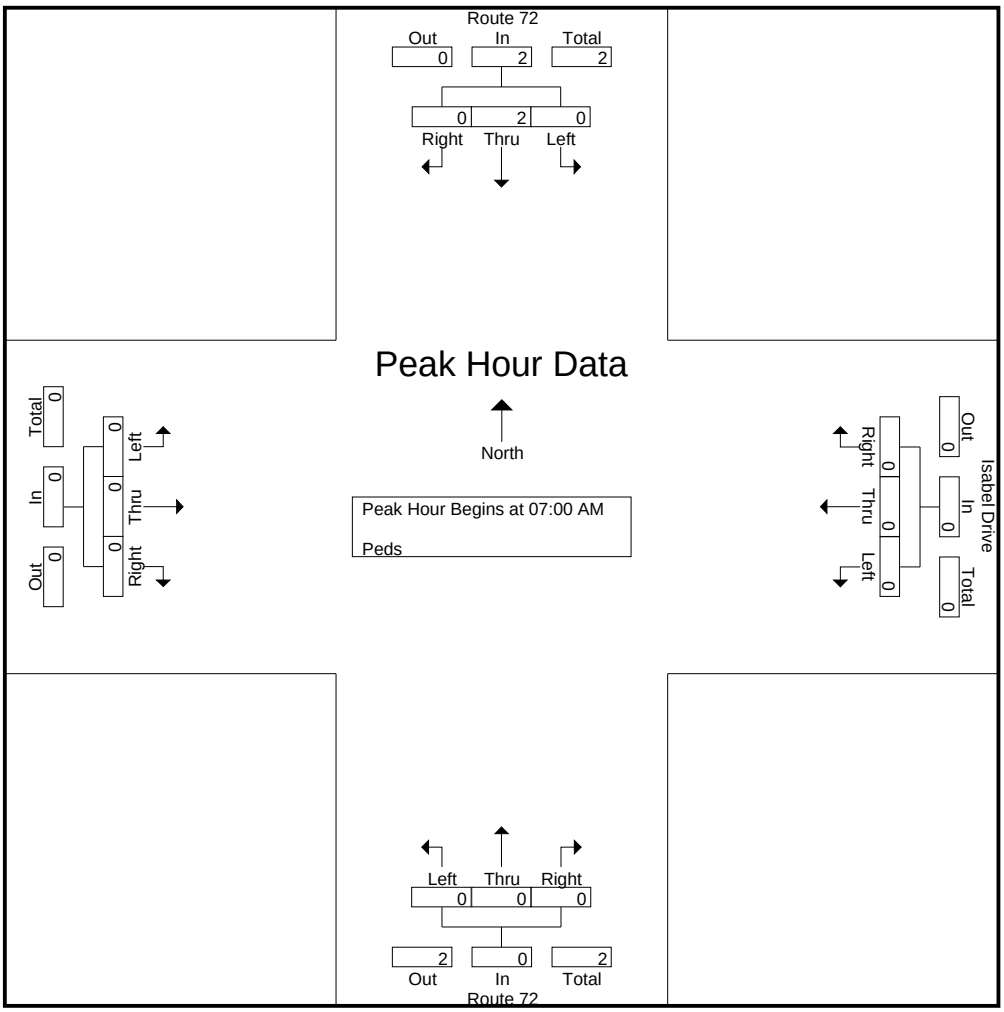


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Isabel Drive

File Name : 2008-11-18 AM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 2

	Route 72 Southbound				Isabel Drive Westbound				Route 72 Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
% App. Total	0	100	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.500	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500



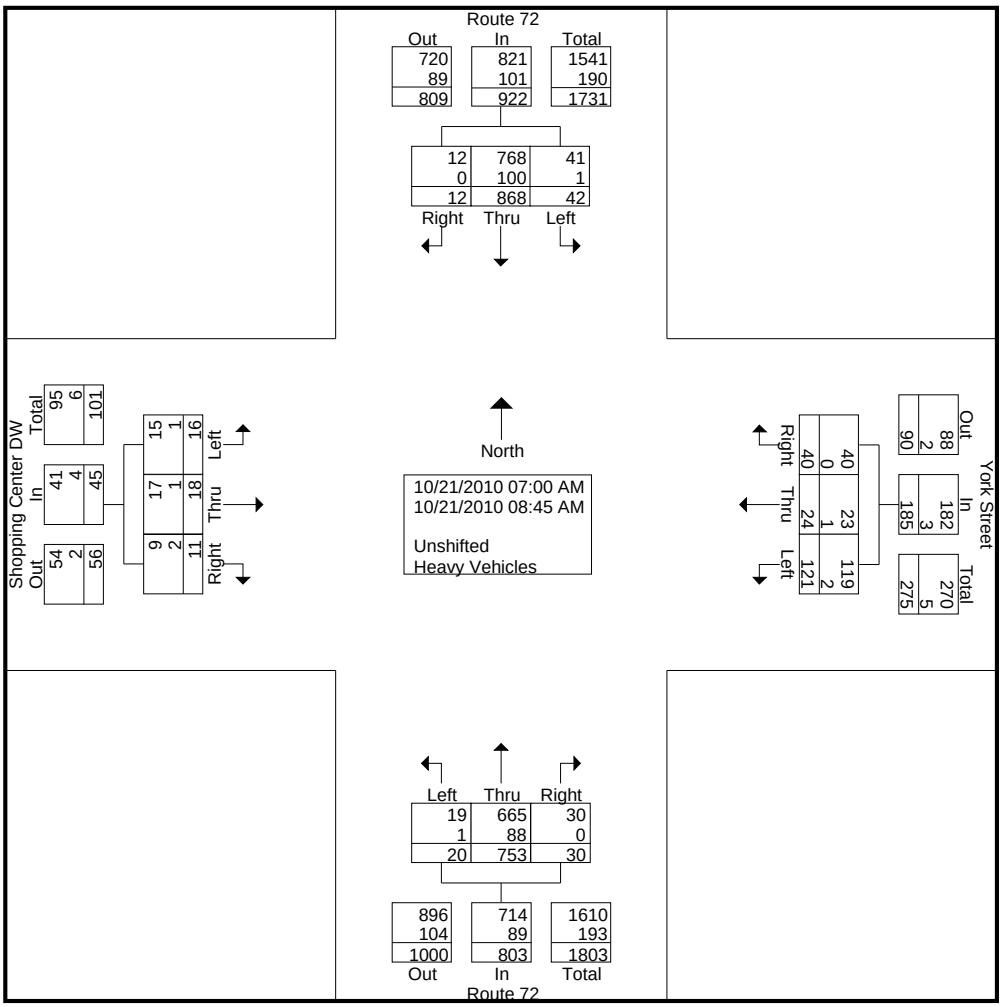
Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464
Route 72 &
York Street/Shopping Center DW

Counter: 11
Counted by: B. Coleman
Weather: Clear
Saved as: 2010-10-21 AM72YSDW

File Name : 2010-10-21 AM72YSDW
Site Code : 00000000
Start Date : 10/21/2010
Page No : 1

Groups Printed- Unshifted - Heavy Vehicles

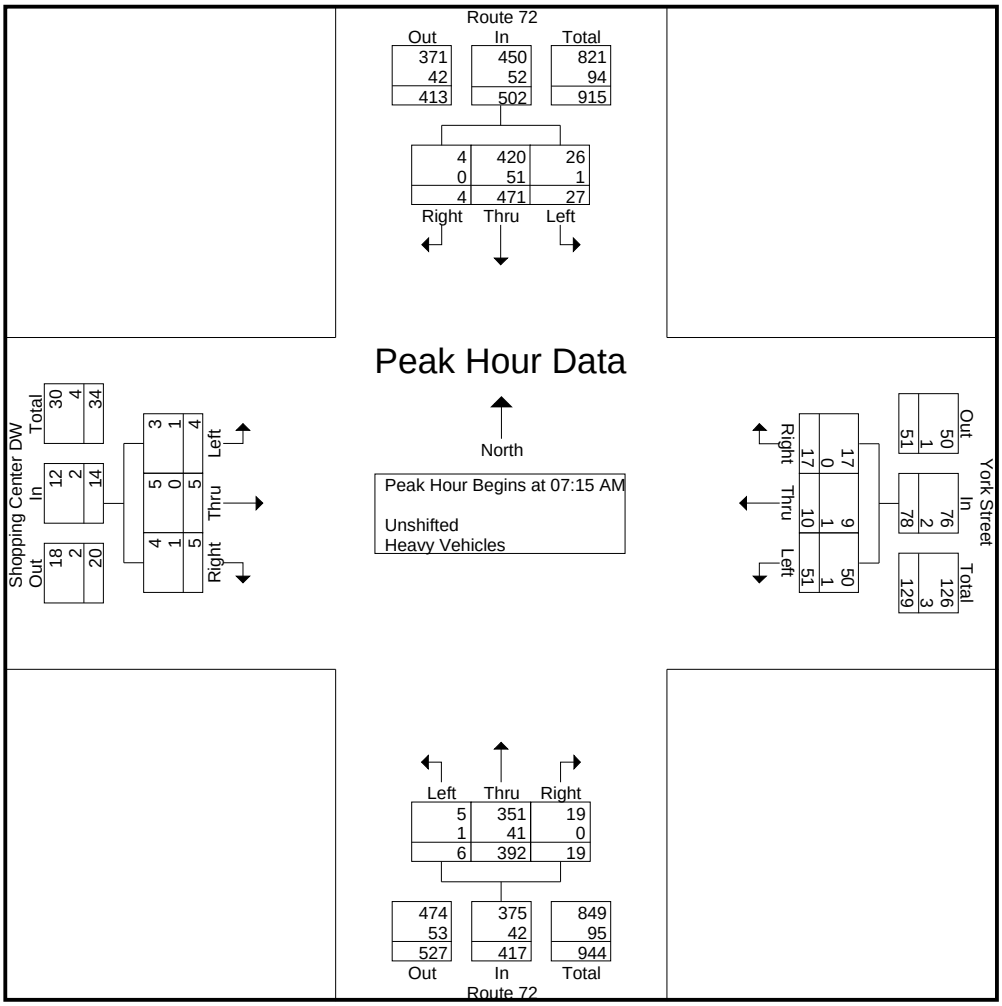
	Shopping Center DW Eastbound					York Street Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	3	1	1	4	11	0	3	2	14	0	72	2	0	74	4	87	0	0	91	3	183	186
07:15 AM	1	0	2	2	3	9	3	3	1	15	1	87	4	0	92	9	129	2	1	140	4	250	254
07:30 AM	0	3	1	0	4	10	3	5	3	18	0	88	5	1	93	5	124	0	0	129	4	244	248
07:45 AM	1	1	1	1	3	16	3	3	0	22	5	122	8	2	135	8	125	0	0	133	3	293	296
Total	2	7	5	4	14	46	9	14	6	69	6	369	19	3	394	26	465	2	1	493	14	970	984
08:00 AM	2	1	1	1	4	16	1	6	4	23	0	95	2	1	97	5	93	2	0	100	6	224	230
08:15 AM	1	2	3	1	6	8	4	6	4	18	2	92	4	3	98	4	112	2	0	118	8	240	248
08:30 AM	4	7	1	0	12	27	3	10	5	40	5	98	3	0	106	1	92	1	0	94	5	252	257
08:45 AM	7	1	1	1	9	24	7	4	1	35	7	99	2	0	108	6	106	5	0	117	2	269	271
Total	14	11	6	3	31	75	15	26	14	116	14	384	11	4	409	16	403	10	0	429	21	985	1006
Grand Total	16	18	11	7	45	121	24	40	20	185	20	753	30	7	803	42	868	12	1	922	35	1955	1990
Apprch %	35.6	40	24.4			65.4	13	21.6			2.5	93.8	3.7			4.6	94.1	1.3					
Total %	0.8	0.9	0.6		2.3	6.2	1.2	2		9.5	1	38.5	1.5		41.1	2.1	44.4	0.6		47.2	1.8	98.2	
Unshifted	15	17	9		48	119	23	40		202	19	665	30		721	41	768	12		822	0	0	1793
% Unshifted	93.8	94.4	81.8	100	92.3	98.3	95.8	100	100	98.5	95	88.3	100	100	89	97.6	88.5	100	100	89.1	0	0	90.1
Heavy Vehicles	1	1	2		4	2	1	0		3	1	88	0		89	1	100	0		101	0	0	197
% Heavy Vehicles	6.2	5.6	18.2	0	7.7	1.7	4.2	0	0	1.5	5	11.7	0	0	11	2.4	11.5	0	0	10.9	0	0	9.9



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464
Route 72 &
York Street/Shopping Center DW

File Name : 2010-10-21 AM72YSDW
Site Code : 00000000
Start Date : 10/21/2010
Page No : 2

	Shopping Center DW Eastbound				York Street Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	1	0	**2**	3	9	**3**	3	15	1	87	4	92	**9**	**129**	**2**	**140**	250
07:30 AM	0	**3**	1	**4**	10	3	5	18	0	88	5	93	5	124	0	129	244
07:45 AM	1	1	1	3	**16**	3	3	22	**5**	**122**	**8**	**135**	8	125	0	133	**293**
08:00 AM	**2**	1	1	4	16	1	**6**	**23**	0	95	2	97	5	93	2	100	224
Total Volume	4	5	5	14	51	10	17	78	6	392	19	417	27	471	4	502	1011
% App. Total	28.6	35.7	35.7		65.4	12.8	21.8		1.4	94	4.6		5.4	93.8	0.8		
PHF	.500	.417	.625	.875	.797	.833	.708	.848	.300	.803	.594	.772	.750	.913	.500	.896	.863
Unshifted	3	5	4	12	50	9	17	76	5	351	19	375	26	420	4	450	913
% Unshifted	75.0	100	80.0	85.7	98.0	90.0	100	97.4	83.3	89.5	100	89.9	96.3	89.2	100	89.6	90.3
Heavy Vehicles	1	0	1	2	1	1	0	2	1	41	0	42	1	51	0	52	98
% Heavy Vehicles	25.0	0	20.0	14.3	2.0	10.0	0	2.6	16.7	10.5	0	10.1	3.7	10.8	0	10.4	9.7



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464
Route 72 &
Route 241

Counter:
Counted by: S. Hutt
Weather: Clear
Saved as: 2010-10-21 AM72241

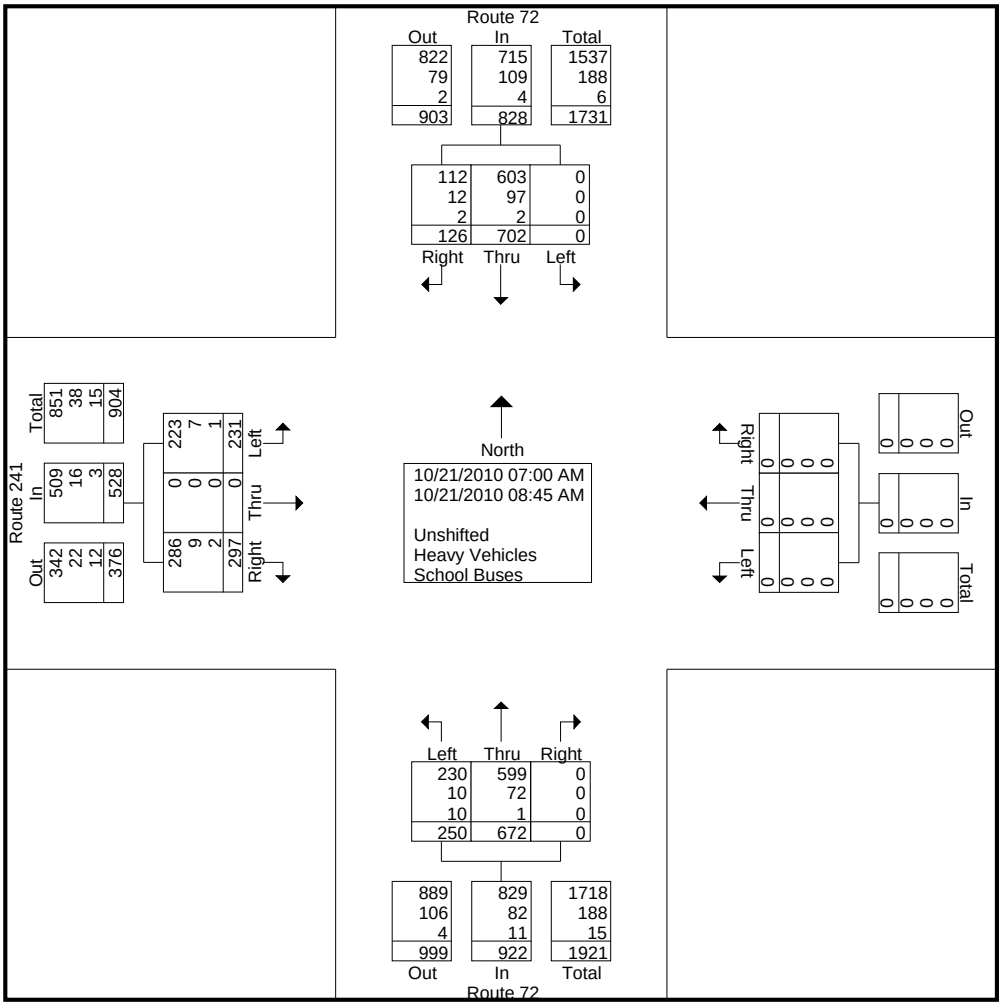
File Name : 2010-10-21 AM72241
Site Code : 00000000
Start Date : 10/21/2010
Page No : 1

Groups Printed- Unshifted - Heavy Vehicles - School Buses

	Route 241 Eastbound					Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	14	0	23	1	37	0	0	0	0	0	23	71	0	0	94	0	69	15	2	84	3	215	218
07:15 AM	17	0	44	0	61	0	0	0	0	0	32	71	0	0	103	0	97	14	0	111	0	275	275
07:30 AM	45	0	45	0	90	0	0	0	0	0	27	91	0	0	118	0	85	20	1	105	1	313	314
07:45 AM	49	0	52	0	101	0	0	0	0	0	36	109	0	0	145	0	113	14	0	127	0	373	373
Total	125	0	164	1	289	0	0	0	0	0	118	342	0	0	460	0	364	63	3	427	4	1176	1180
08:00 AM	24	0	32	0	56	0	0	0	0	0	31	97	0	0	128	0	72	17	0	89	0	273	273
08:15 AM	36	0	30	0	66	0	0	0	0	0	39	61	0	0	100	0	93	11	0	104	0	270	270
08:30 AM	21	0	26	0	47	0	0	0	0	0	27	91	0	0	118	0	89	17	0	106	0	271	271
08:45 AM	25	0	45	0	70	0	0	0	0	0	35	81	0	0	116	0	84	18	1	102	1	288	289
Total	106	0	133	0	239	0	0	0	0	0	132	330	0	0	462	0	338	63	1	401	1	1102	1103
Grand Total	231	0	297	1	528	0	0	0	0	0	250	672	0	0	922	0	702	126	4	828	5	2278	2283
Apprch %	43.8	0	56.2			0	0	0			27.1	72.9	0			0	84.8	15.2					
Total %	10.1	0	13		23.2	0	0	0		0	11	29.5	0		40.5	0	30.8	5.5		36.3	0.2	99.8	
Unshifted	223	0	286		510	0	0	0		0	230	599	0		829	0	603	112		719	0	0	2058
% Unshifted	96.5	0	96.3	100	96.4	0	0	0	0	0	92	89.1	0	0	89.9	0	85.9	88.9	100	86.4	0	0	90.1
Heavy Vehicles	7	0	9		16	0	0	0		0	10	72	0		82	0	97	12		109	0	0	207
% Heavy Vehicles	3	0	3	0	3	0	0	0	0	0	4	10.7	0	0	8.9	0	13.8	9.5	0	13.1	0	0	9.1
School Buses	1	0	2		3	0	0	0		0	10	1	0		11	0	2	2		4	0	0	18
% School Buses	0.4	0	0.7	0	0.6	0	0	0	0	0	4	0.1	0	0	1.2	0	0.3	1.6	0	0.5	0	0	0.8

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464
Route 72 &
Route 241

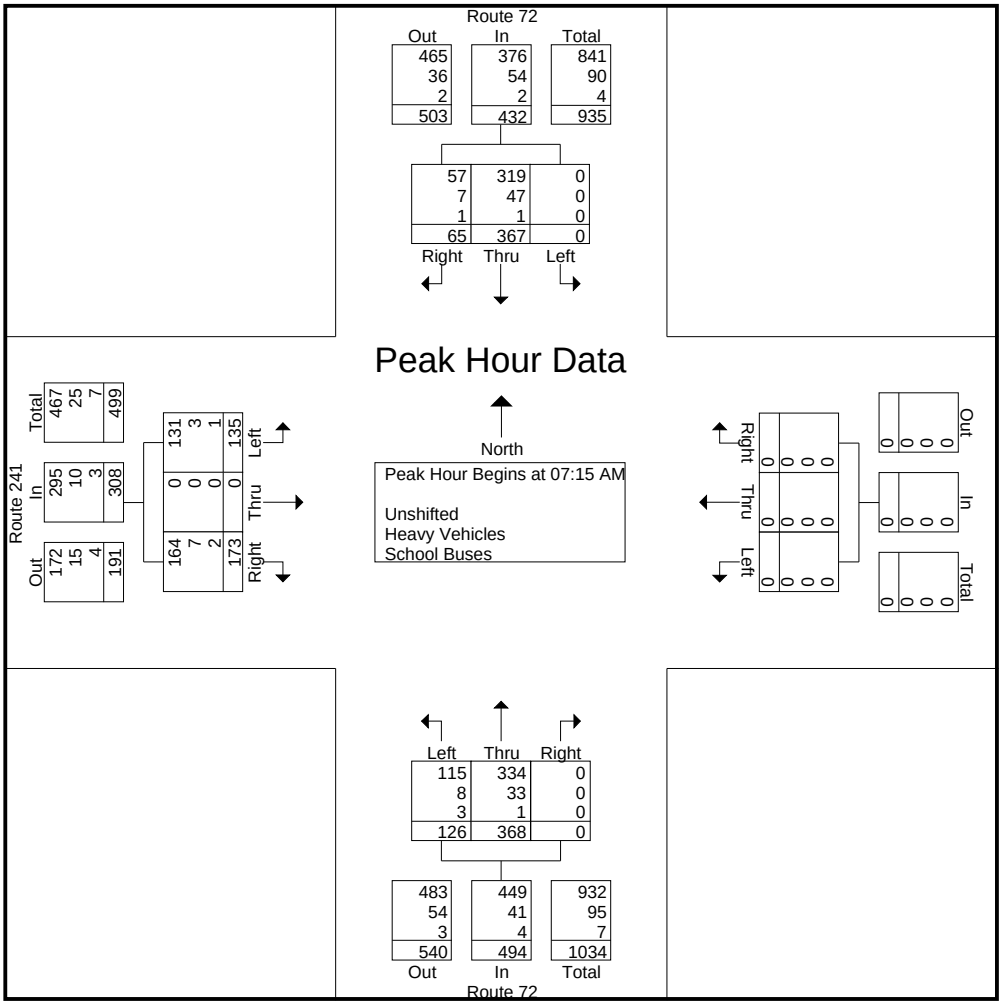
File Name : 2010-10-21 AM72241
Site Code : 00000000
Start Date : 10/21/2010
Page No : 2



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464
Route 72 &
Route 241

File Name : 2010-10-21 AM72241
Site Code : 00000000
Start Date : 10/21/2010
Page No : 3

	Route 241 Eastbound				Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	17	0	44	61	0	0	0	0	32	71	0	103	0	97	14	111	275
07:30 AM	45	0	45	90	0	0	0	0	27	91	0	118	0	85	**20**	105	313
07:45 AM	**49**	0	**52**	**101**	0	0	0	0	**36**	**109**	0	**145**	0	**113**	14	**127**	**373**
08:00 AM	24	0	32	56	0	0	0	0	31	97	0	128	0	72	17	89	273
Total Volume	135	0	173	308	0	0	0	0	126	368	0	494	0	367	65	432	1234
% App. Total	43.8	0	56.2		0	0	0		25.5	74.5	0		0	85	15		
PHF	.689	.000	.832	.762	.000	.000	.000	.000	.875	.844	.000	.852	.000	.812	.813	.850	.827
Unshifted	131	0	164	295	0	0	0	0	115	334	0	449	0	319	57	376	1120
% Unshifted	97.0	0	94.8	95.8	0	0	0	0	91.3	90.8	0	90.9	0	86.9	87.7	87.0	90.8
Heavy Vehicles	3	0	7	10	0	0	0	0	8	33	0	41	0	47	7	54	105
% Heavy Vehicles	2.2	0	4.0	3.2	0	0	0	0	6.3	9.0	0	8.3	0	12.8	10.8	12.5	8.5
School Buses	1	0	2	3	0	0	0	0	3	1	0	4	0	1	1	2	9
% School Buses	0.7	0	1.2	1.0	0	0	0	0	2.4	0.3	0	0.8	0	0.3	1.5	0.5	0.7



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

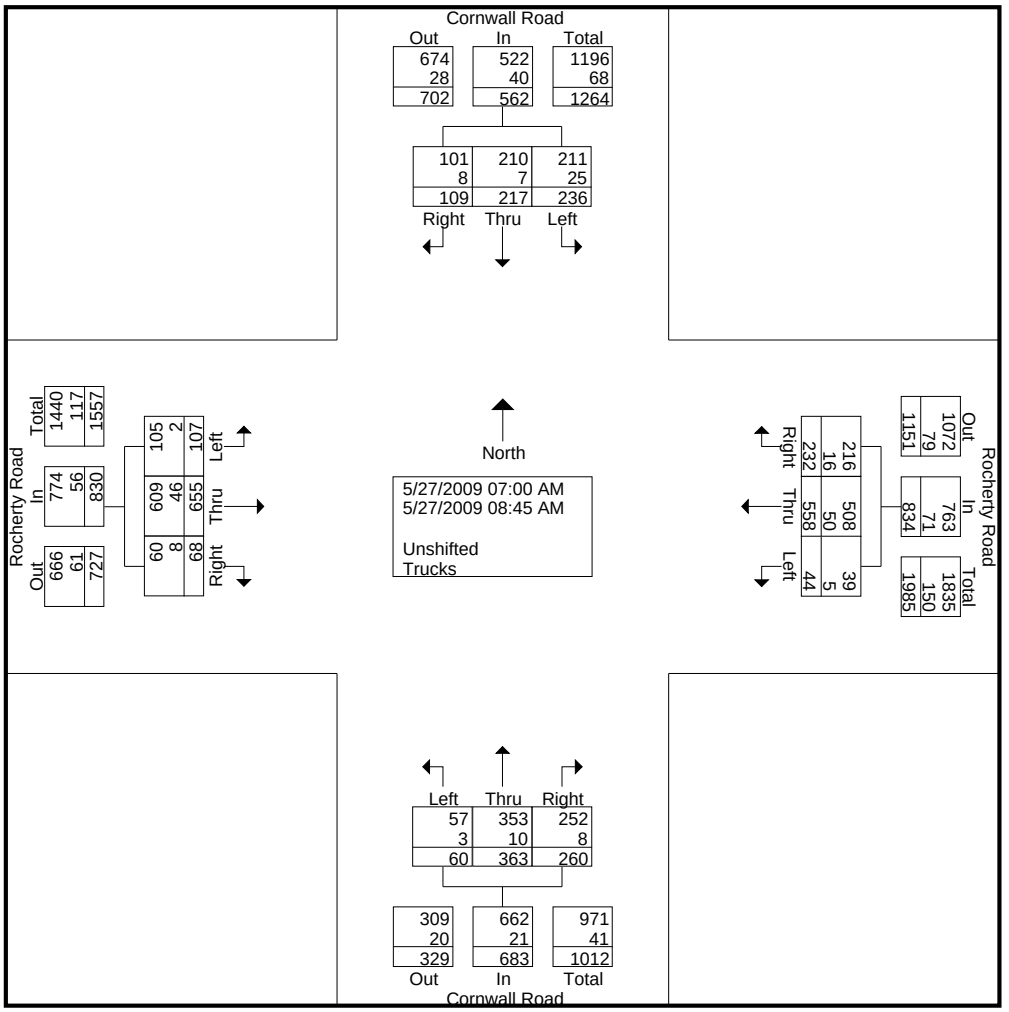
Cornwall Road & Rocherty Road

Counter: 2
Counted by: N. Zipay
Weather: Overcast/Rain
Saved as: 2009-05-27 AMCRRR

File Name : 2009-05-27 AMCRRR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Cornwall Road Southbound					Rocherty Road Westbound					Cornwall Road Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	19	22	12	1	53	1	71	17	0	89	6	30	21	2	57	11	69	4	0	84	3	283	286
07:15 AM	46	22	10	0	78	8	86	21	3	115	6	51	54	9	111	5	111	5	0	121	12	425	437
07:30 AM	39	25	14	3	78	6	71	33	1	110	5	52	47	12	104	13	96	3	1	112	17	404	421
07:45 AM	38	25	11	0	74	7	73	48	2	128	3	68	42	6	113	22	100	7	1	129	9	444	453
Total	142	94	47	4	283	22	301	119	6	442	20	201	164	29	385	51	376	19	2	446	41	1556	1597
08:00 AM	36	30	12	1	78	11	85	39	5	135	5	31	33	8	69	9	95	10	1	114	15	396	411
08:15 AM	22	27	19	6	68	6	59	23	0	88	9	34	34	2	77	19	76	10	2	105	10	338	348
08:30 AM	18	32	20	0	70	3	47	16	1	66	9	30	14	3	53	11	52	23	1	86	5	275	280
08:45 AM	18	34	11	3	63	2	66	35	1	103	17	67	15	1	99	17	56	6	0	79	5	344	349
Total	94	123	62	10	279	22	257	113	7	392	40	162	96	14	298	56	279	49	4	384	35	1353	1388
Grand Total	236	217	109	14	562	44	558	232	13	834	60	363	260	43	683	107	655	68	6	830	76	2909	2985
Apprch %	42	38.6	19.4			5.3	66.9	27.8			8.8	53.1	38.1			12.9	78.9	8.2					
Total %	8.1	7.5	3.7		19.3	1.5	19.2	8		28.7	2.1	12.5	8.9		23.5	3.7	22.5	2.3		28.5	2.5	97.5	
Unshifted	211	210	101		536	39	508	216		776	57	353	252		705	105	609	60		780	0	0	2797
% Unshifted	89.4	96.8	92.7	100	93.1	88.6	91	93.1	100	91.6	95	97.2	96.9	100	97.1	98.1	93	88.2	100	93.3	0	0	93.7
Trucks	25	7	8		40	5	50	16		71	3	10	8		21	2	46	8		56	0	0	188
% Trucks	10.6	3.2	7.3	0	6.9	11.4	9	6.9	0	8.4	5	2.8	3.1	0	2.9	1.9	7	11.8	0	6.7	0	0	6.3

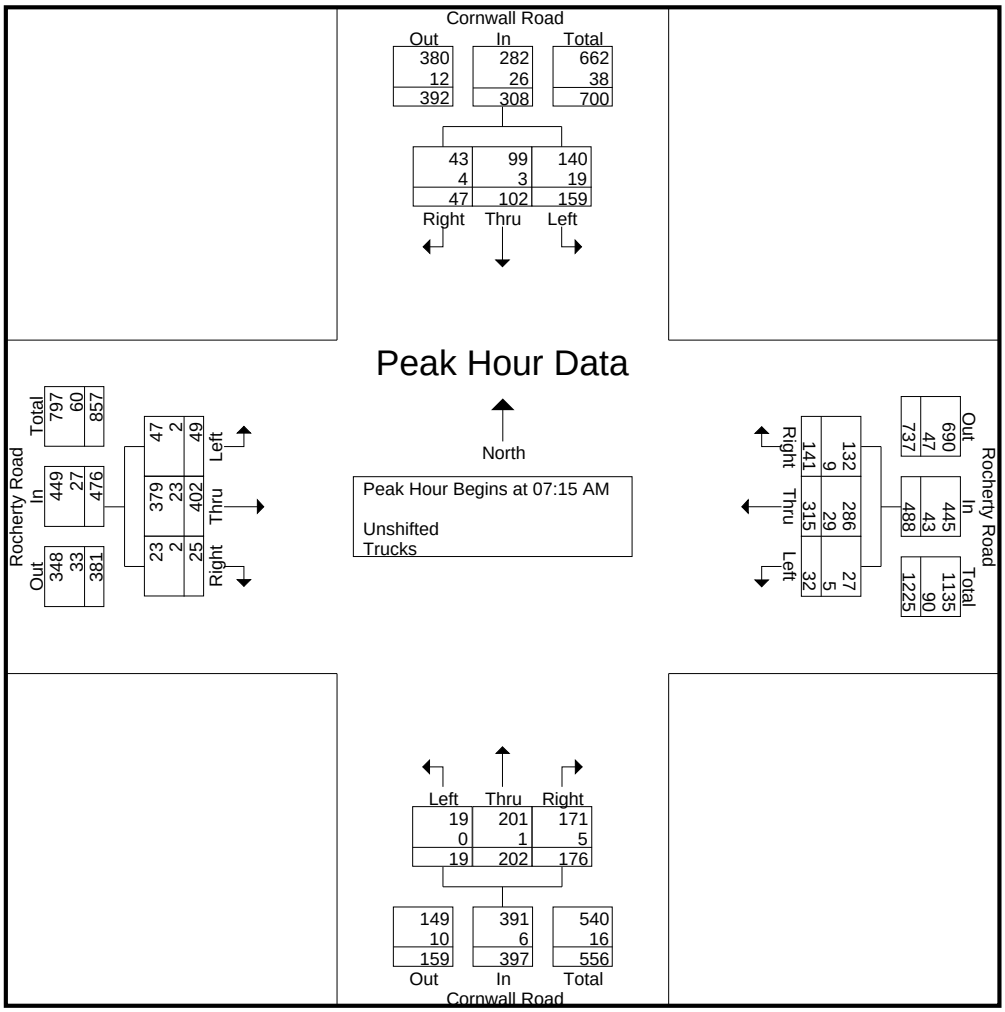


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
Rocherty Road

File Name : 2009-05-27 AMCRRR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

	Cornwall Road Southbound				Rocherty Road Westbound				Cornwall Road Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	46	22	10	78	8	86	21	115	6	51	54	111	5	111	5	121	425
07:30 AM	39	25	14	78	6	71	33	110	5	52	47	104	13	96	3	112	404
07:45 AM	38	25	11	74	7	73	48	128	3	68	42	113	22	100	7	129	444
08:00 AM	36	30	12	78	11	85	39	135	5	31	33	69	9	95	10	114	396
Total Volume	159	102	47	308	32	315	141	488	19	202	176	397	49	402	25	476	1669
% App. Total	51.6	33.1	15.3		6.6	64.5	28.9		4.8	50.9	44.3		10.3	84.5	5.3		
PHF	.864	.850	.839	.987	.727	.916	.734	.904	.792	.743	.815	.878	.557	.905	.625	.922	.940
Unshifted	140	99	43	282	27	286	132	445	19	201	171	391	47	379	23	449	1567
% Unshifted	88.1	97.1	91.5	91.6	84.4	90.8	93.6	91.2	100	99.5	97.2	98.5	95.9	94.3	92.0	94.3	93.9
Trucks	19	3	4	26	5	29	9	43	0	1	5	6	2	23	2	27	102
% Trucks	11.9	2.9	8.5	8.4	15.6	9.2	6.4	8.8	0	0.5	2.8	1.5	4.1	5.7	8.0	5.7	6.1



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

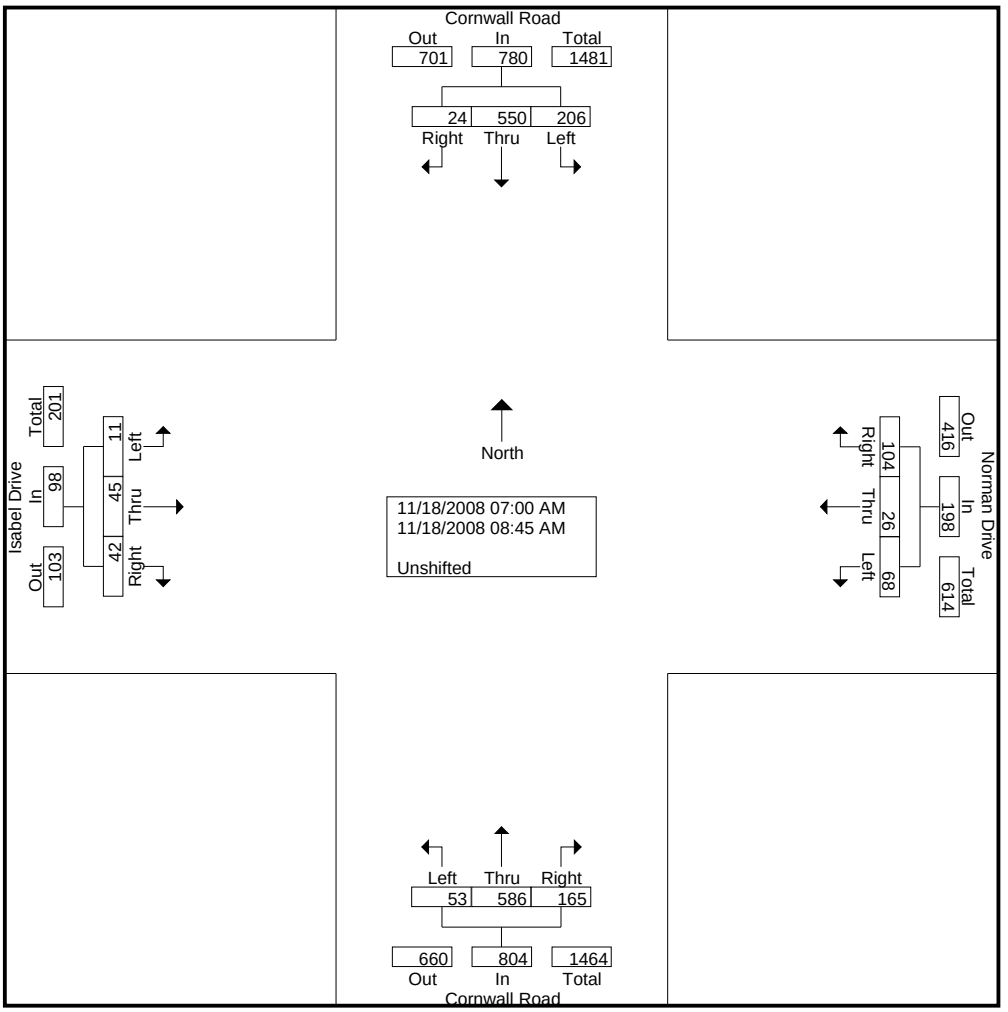
Cornwall Road & Isabel Drive

Counter: 27
Counted by: Z. Pierce
Weather: Clear
Saved as: 2008-11-18 AMCRID

File Name : 2008-11-18 AMCRID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 1

Groups Printed- Unshifted

	Cornwall Road Southbound					Norman Drive Westbound					Cornwall Road Northbound					Isabel Drive Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	17	56	3	1	76	12	2	9	0	23	8	45	19	3	72	0	4	1	0	5	4	176	180
07:15 AM	27	102	2	7	131	12	2	9	0	23	5	59	21	4	85	0	5	3	0	8	11	247	258
07:30 AM	21	90	0	3	111	8	3	14	0	25	6	87	15	2	108	0	3	8	0	11	5	255	260
07:45 AM	38	83	5	7	126	7	3	18	0	28	8	93	25	5	126	3	12	9	2	24	14	304	318
Total	103	331	10	18	444	39	10	50	0	99	27	284	80	14	391	3	24	21	2	48	34	982	1016
08:00 AM	25	56	3	3	84	8	5	9	0	22	7	96	25	5	128	2	6	6	0	14	8	248	256
08:15 AM	25	52	0	3	77	4	3	15	1	22	4	66	23	8	93	1	6	4	0	11	12	203	215
08:30 AM	24	55	5	1	84	10	2	14	1	26	6	60	10	4	76	2	3	7	0	12	6	198	204
08:45 AM	29	56	6	2	91	7	6	16	2	29	9	80	27	2	116	3	6	4	1	13	7	249	256
Total	103	219	14	9	336	29	16	54	4	99	26	302	85	19	413	8	21	21	1	50	33	898	931
Grand Total	206	550	24	27	780	68	26	104	4	198	53	586	165	33	804	11	45	42	3	98	67	1880	1947
Apprch %	26.4	70.5	3.1			34.3	13.1	52.5			6.6	72.9	20.5			11.2	45.9	42.9					
Total %	11	29.3	1.3		41.5	3.6	1.4	5.5		10.5	2.8	31.2	8.8		42.8	0.6	2.4	2.2		5.2	3.4	96.6	

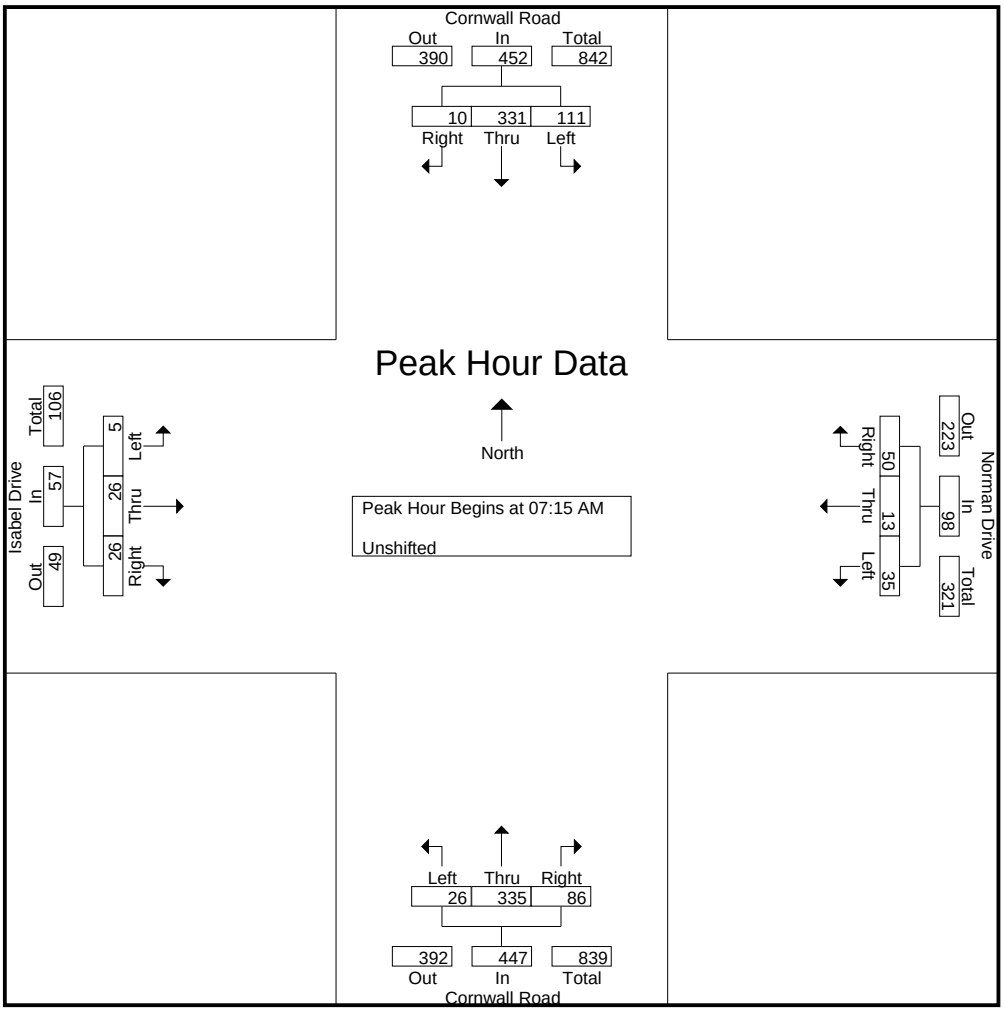


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road & Isabel Drive

File Name : 2008-11-18 AMCRID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 2

	Cornwall Road Southbound				Norman Drive Westbound				Cornwall Road Northbound				Isabel Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	27	102	2	131	12	2	9	23	5	59	21	85	0	5	3	8	247
07:30 AM	21	90	0	111	8	3	14	25	6	87	15	108	0	3	8	11	255
07:45 AM	38	83	5	126	7	3	18	28	8	93	25	126	3	12	9	24	304
08:00 AM	25	56	3	84	8	5	9	22	7	96	25	128	2	6	6	14	248
Total Volume	111	331	10	452	35	13	50	98	26	335	86	447	5	26	26	57	1054
% App. Total	24.6	73.2	2.2		35.7	13.3	51		5.8	74.9	19.2		8.8	45.6	45.6		
PHF	.730	.811	.500	.863	.729	.650	.694	.875	.813	.872	.860	.873	.417	.542	.722	.594	.867



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

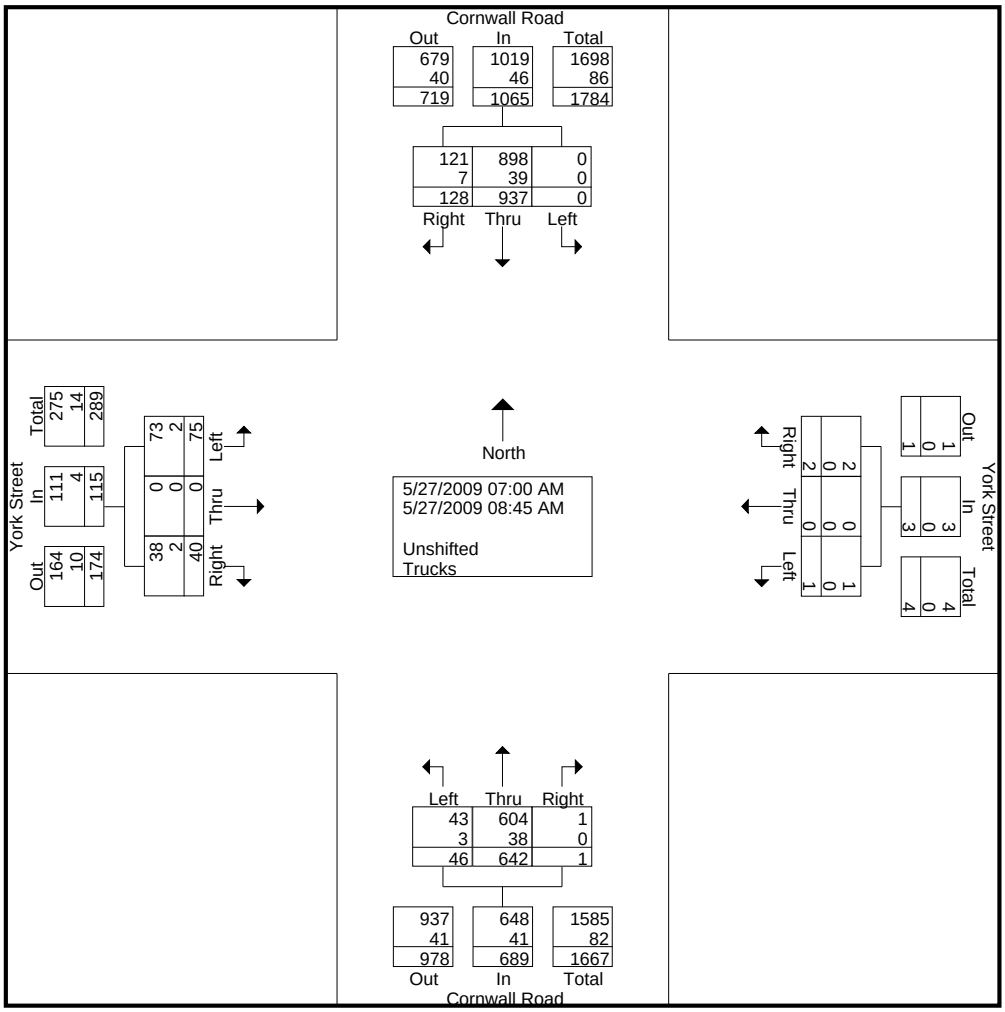
Cornwall Road & York Street

Counter: 27
Counted by: B. Coleman
Weather: Overcast/Rain
Saved as: 2009-05-27 AMCRYS

File Name : 2009-05-27 AMCRYS
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Cornwall Road Southbound					York Street Westbound					Cornwall Road Northbound					York Street Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	98	11	0	109	0	0	1	0	1	4	63	0	0	67	4	0	8	0	12	0	189	189
07:15 AM	0	124	13	0	137	0	0	0	0	0	4	59	0	0	63	5	0	3	0	8	0	208	208
07:30 AM	0	111	9	0	120	0	0	0	0	0	3	102	0	0	105	10	0	4	0	14	0	239	239
07:45 AM	0	155	11	0	166	1	0	0	0	1	5	104	0	0	109	10	0	6	0	16	0	292	292
Total	0	488	44	0	532	1	0	1	0	2	16	328	0	0	344	29	0	21	0	50	0	928	928
08:00 AM	0	106	16	0	122	0	0	0	0	0	9	75	0	0	84	6	0	4	0	10	0	216	216
08:15 AM	0	135	20	0	155	0	0	0	0	0	6	65	0	0	71	16	0	7	0	23	0	249	249
08:30 AM	0	99	20	0	119	0	0	1	0	1	6	77	0	0	83	10	0	5	0	15	0	218	218
08:45 AM	0	109	28	0	137	0	0	0	0	0	9	97	1	0	107	14	0	3	0	17	0	261	261
Total	0	449	84	0	533	0	0	1	0	1	30	314	1	0	345	46	0	19	0	65	0	944	944
Grand Total	0	937	128	0	1065	1	0	2	0	3	46	642	1	0	689	75	0	40	0	115	0	1872	1872
Apprch %	0	88	12			33.3	0	66.7			6.7	93.2	0.1			65.2	0	34.8					
Total %	0	50.1	6.8		56.9	0.1	0	0.1		0.2	2.5	34.3	0.1		36.8	4	0	2.1		6.1	0	100	
Unshifted	0	898	121		1019	1	0	2		3	43	604	1		648	73	0	38		111	0	0	1781
% Unshifted	0	95.8	94.5	0	95.7	100	0	100	0	100	93.5	94.1	100	0	94	97.3	0	95	0	96.5	0	0	95.1
Trucks	0	39	7		46	0	0	0		0	3	38	0		41	2	0	2		4	0	0	91
% Trucks	0	4.2	5.5	0	4.3	0	0	0	0	0	6.5	5.9	0	0	6	2.7	0	5	0	3.5	0	0	4.9

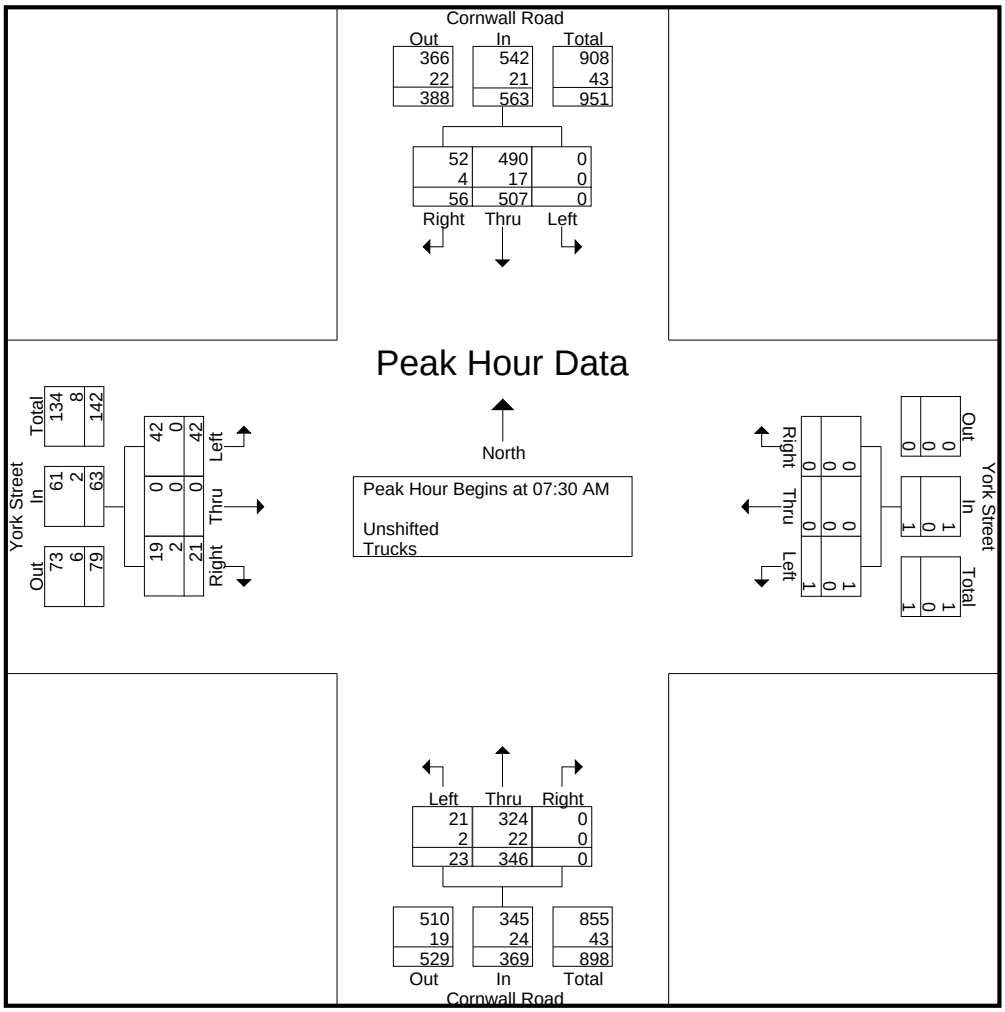


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
York Street

File Name : 2009-05-27 AMCRYS
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

	Cornwall Road Southbound				York Street Westbound				Cornwall Road Northbound				York Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	111	9	120	0	0	0	0	3	102	0	105	10	0	4	14	239
07:45 AM	0	155	11	166	1	0	0	1	5	104	0	109	10	0	6	16	292
08:00 AM	0	106	16	122	0	0	0	0	9	75	0	84	6	0	4	10	216
08:15 AM	0	135	20	155	0	0	0	0	6	65	0	71	16	0	7	23	249
Total Volume	0	507	56	563	1	0	0	1	23	346	0	369	42	0	21	63	996
% App. Total	0	90.1	9.9		100	0	0		6.2	93.8	0		66.7	0	33.3		
PHF	.000	.818	.700	.848	.250	.000	.000	.250	.639	.832	.000	.846	.656	.000	.750	.685	.853
Unshifted	0	490	52	542	1	0	0	1	21	324	0	345	42	0	19	61	949
% Unshifted	0	96.6	92.9	96.3	100	0	0	100	91.3	93.6	0	93.5	100	0	90.5	96.8	95.3
Trucks	0	17	4	21	0	0	0	0	2	22	0	24	0	0	2	2	47
% Trucks	0	3.4	7.1	3.7	0	0	0	0	8.7	6.4	0	6.5	0	0	9.5	3.2	4.7



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

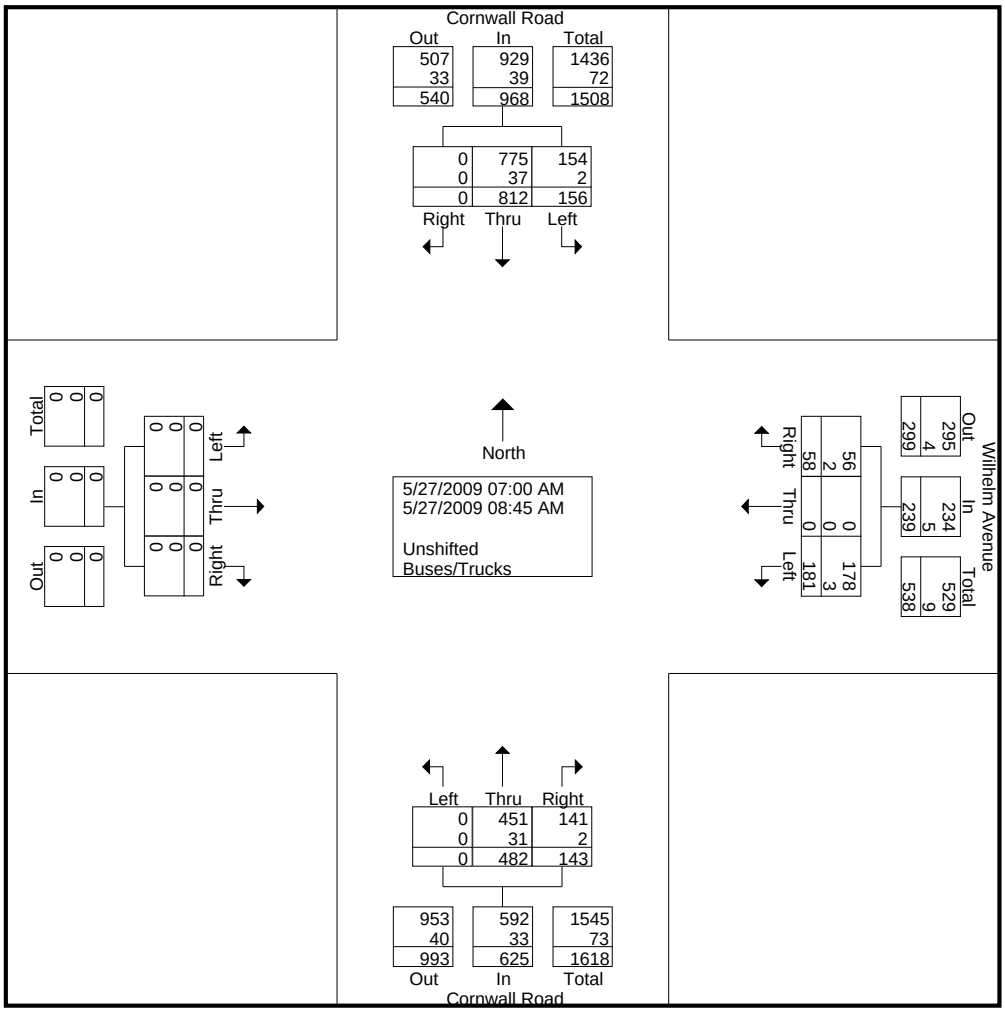
Cornwall Rd & Wilhelm Avenue

Counter: 25
Counted by: S. Hutt
Weather: Overcast/Rain
Saved as: 2009-05-27 AMCRWA

File Name : 2009-05-27 AMCRWA
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

Groups Printed- Unshifted - Buses/Trucks

	Cornwall Road Southbound					Wilhelm Avenue Westbound					Cornwall Road Northbound					Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	19	67	0	0	86	25	0	6	0	31	0	48	19	0	67	0	0	0	0	0	0	184	184
07:15 AM	41	106	0	0	147	28	0	6	0	34	0	54	12	0	66	0	0	0	0	0	0	247	247
07:30 AM	33	82	0	0	115	20	0	2	0	22	0	67	8	2	75	0	0	0	0	0	2	212	214
07:45 AM	24	134	0	0	158	24	0	11	0	35	0	79	22	0	101	0	0	0	0	0	0	294	294
Total	117	389	0	0	506	97	0	25	0	122	0	248	61	2	309	0	0	0	0	0	2	937	939
08:00 AM	7	101	0	0	108	13	0	7	0	20	0	40	12	0	52	0	0	0	0	0	0	180	180
08:15 AM	17	111	0	0	128	18	0	7	0	25	0	61	25	0	86	0	0	0	0	0	0	239	239
08:30 AM	4	100	0	0	104	25	0	12	0	37	0	49	20	0	69	0	0	0	0	0	0	210	210
08:45 AM	11	111	0	0	122	28	0	7	0	35	0	84	25	0	109	0	0	0	0	0	0	266	266
Total	39	423	0	0	462	84	0	33	0	117	0	234	82	0	316	0	0	0	0	0	0	895	895
Grand Total	156	812	0	0	968	181	0	58	0	239	0	482	143	2	625	0	0	0	0	0	2	1832	1834
Apprch %	16.1	83.9	0			75.7	0	24.3			0	77.1	22.9			0	0	0					
Total %	8.5	44.3	0		52.8	9.9	0	3.2		13	0	26.3	7.8		34.1	0	0	0		0	0.1	99.9	
Unshifted	154	775	0		929	178	0	56		234	0	451	141		594	0	0	0		0	0	0	1757
% Unshifted	98.7	95.4	0	0	96	98.3	0	96.6	0	97.9	0	93.6	98.6	100	94.7	0	0	0	0	0	0	0	95.8
Buses/Trucks	2	37	0		39	3	0	2		5	0	31	2		33	0	0	0		0	0	0	77
% Buses/Trucks	1.3	4.6	0	0	4	1.7	0	3.4	0	2.1	0	6.4	1.4	0	5.3	0	0	0	0	0	0	0	4.2

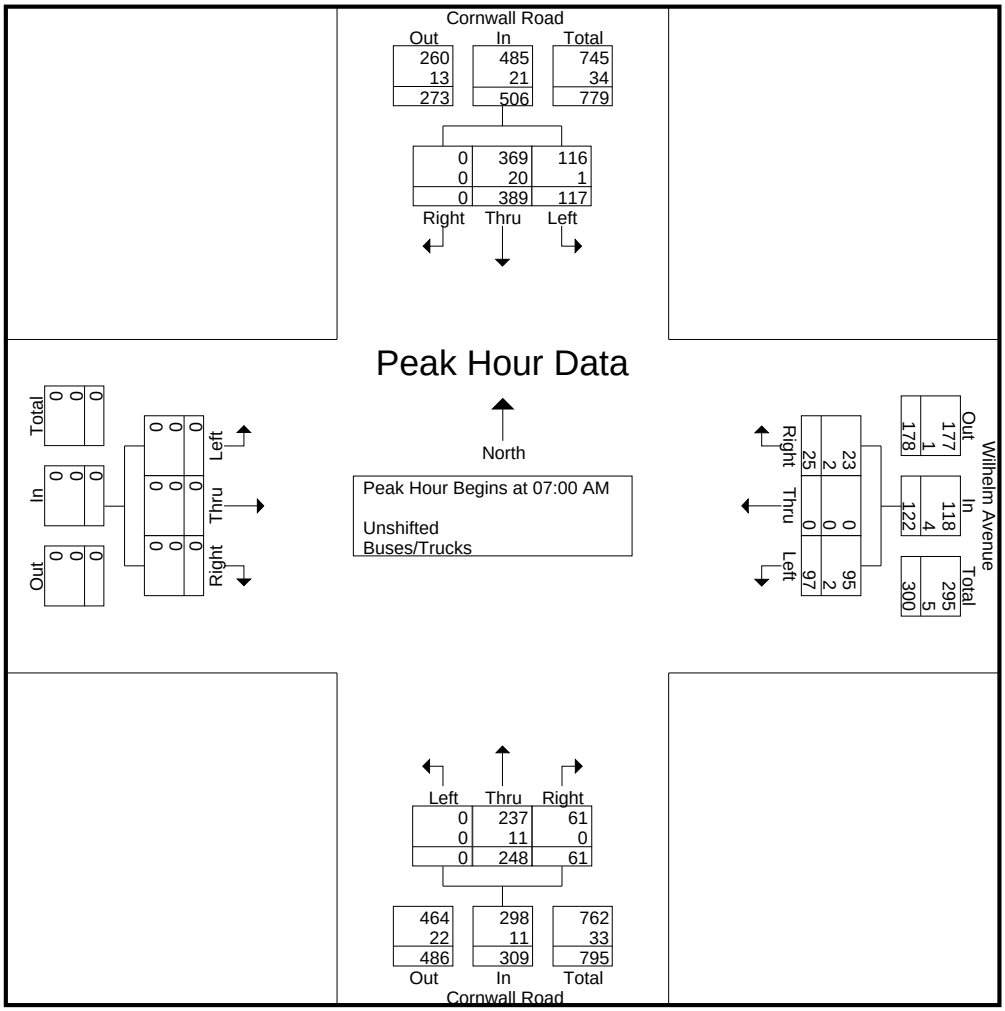


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Rd &
Wilhelm Avenue

File Name : 2009-05-27 AMCRWA
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

	Cornwall Road Southbound				Wilhelm Avenue Westbound				Cornwall Road Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	19	67	0	86	25	0	6	31	0	48	19	67	0	0	0	0	184
07:15 AM	41	106	0	147	28	0	6	34	0	54	12	66	0	0	0	0	247
07:30 AM	33	82	0	115	20	0	2	22	0	67	8	75	0	0	0	0	212
07:45 AM	24	134	0	158	24	0	11	35	0	79	22	101	0	0	0	0	294
Total Volume	117	389	0	506	97	0	25	122	0	248	61	309	0	0	0	0	937
% App. Total	23.1	76.9	0		79.5	0	20.5		0	80.3	19.7		0	0	0		
PHF	.713	.726	.000	.801	.866	.000	.568	.871	.000	.785	.693	.765	.000	.000	.000	.000	.797
Unshifted	116	369	0	485	95	0	23	118	0	237	61	298	0	0	0	0	901
% Unshifted	99.1	94.9	0	95.8	97.9	0	92.0	96.7	0	95.6	100	96.4	0	0	0	0	96.2
Buses/Trucks	1	20	0	21	2	0	2	4	0	11	0	11	0	0	0	0	36
% Buses/Trucks	0.9	5.1	0	4.2	2.1	0	8.0	3.3	0	4.4	0	3.6	0	0	0	0	3.8



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

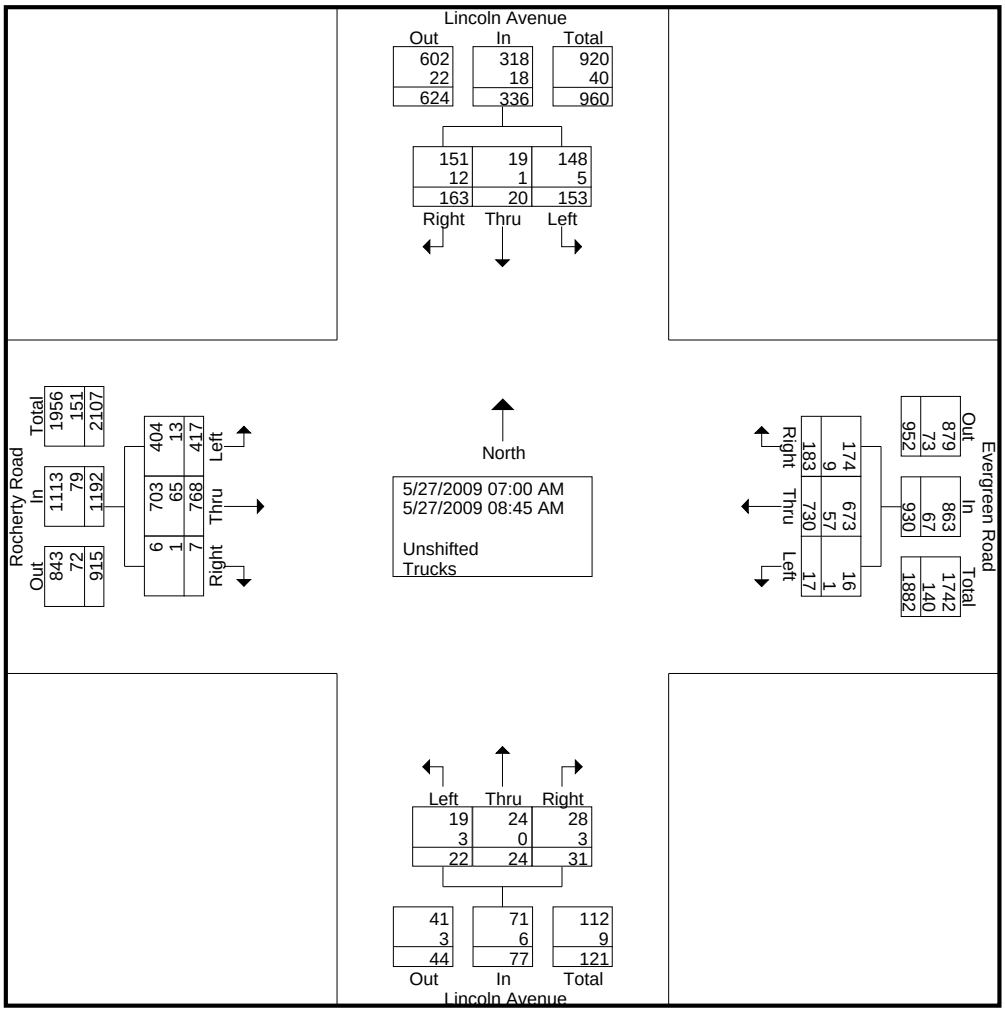
Lincoln Avenue &
Rocherty Road / Evergreen Road

Counter: 11
Counted by: Z. Pierce
Weather: Overcast/Rain
Saved as: 2009-05-27 AMLARRER

File Name : 2009-05-27 AMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Lincoln Avenue Southbound					Evergreen Road Westbound					Lincoln Avenue Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	6	4	19	7	29	1	80	9	0	90	1	0	0	0	1	37	61	0	0	98	7	218	225
07:15 AM	32	2	22	8	56	0	106	34	3	140	2	6	4	1	12	59	151	1	0	211	12	419	431
07:30 AM	32	6	25	1	63	8	106	53	2	167	6	4	7	1	17	70	131	2	0	203	4	450	454
07:45 AM	20	4	23	4	47	2	103	30	4	135	4	4	9	0	17	77	113	0	0	190	8	389	397
Total	90	16	89	20	195	11	395	126	9	532	13	14	20	2	47	243	456	3	0	702	31	1476	1507
08:00 AM	21	1	20	3	42	4	122	26	1	152	3	1	6	1	10	68	98	0	0	166	5	370	375
08:15 AM	25	2	16	3	43	1	70	12	3	83	2	2	3	0	7	35	112	1	0	148	6	281	287
08:30 AM	12	0	18	6	30	1	56	11	0	68	1	4	2	0	7	33	53	3	2	89	8	194	202
08:45 AM	5	1	20	9	26	0	87	8	0	95	3	3	0	0	6	38	49	0	0	87	9	214	223
Total	63	4	74	21	141	6	335	57	4	398	9	10	11	1	30	174	312	4	2	490	28	1059	1087
Grand Total	153	20	163	41	336	17	730	183	13	930	22	24	31	3	77	417	768	7	2	1192	59	2535	2594
Apprch %	45.5	6	48.5			1.8	78.5	19.7			28.6	31.2	40.3			35	64.4	0.6					
Total %	6	0.8	6.4		13.3	0.7	28.8	7.2		36.7	0.9	0.9	1.2		3	16.4	30.3	0.3		47	2.3	97.7	
Unshifted	148	19	151		356	16	673	174		876	19	24	28		74	404	703	6		1115	0	0	2421
% Unshifted	96.7	95	92.6	92.7	94.4	94.1	92.2	95.1	100	92.9	86.4	100	90.3	100	92.5	96.9	91.5	85.7	100	93.4	0	0	93.3
Trucks	5	1	12		21	1	57	9		67	3	0	3		6	13	65	1		79	0	0	173
% Trucks	3.3	5	7.4	7.3	5.6	5.9	7.8	4.9	0	7.1	13.6	0	9.7	0	7.5	3.1	8.5	14.3	0	6.6	0	0	6.7

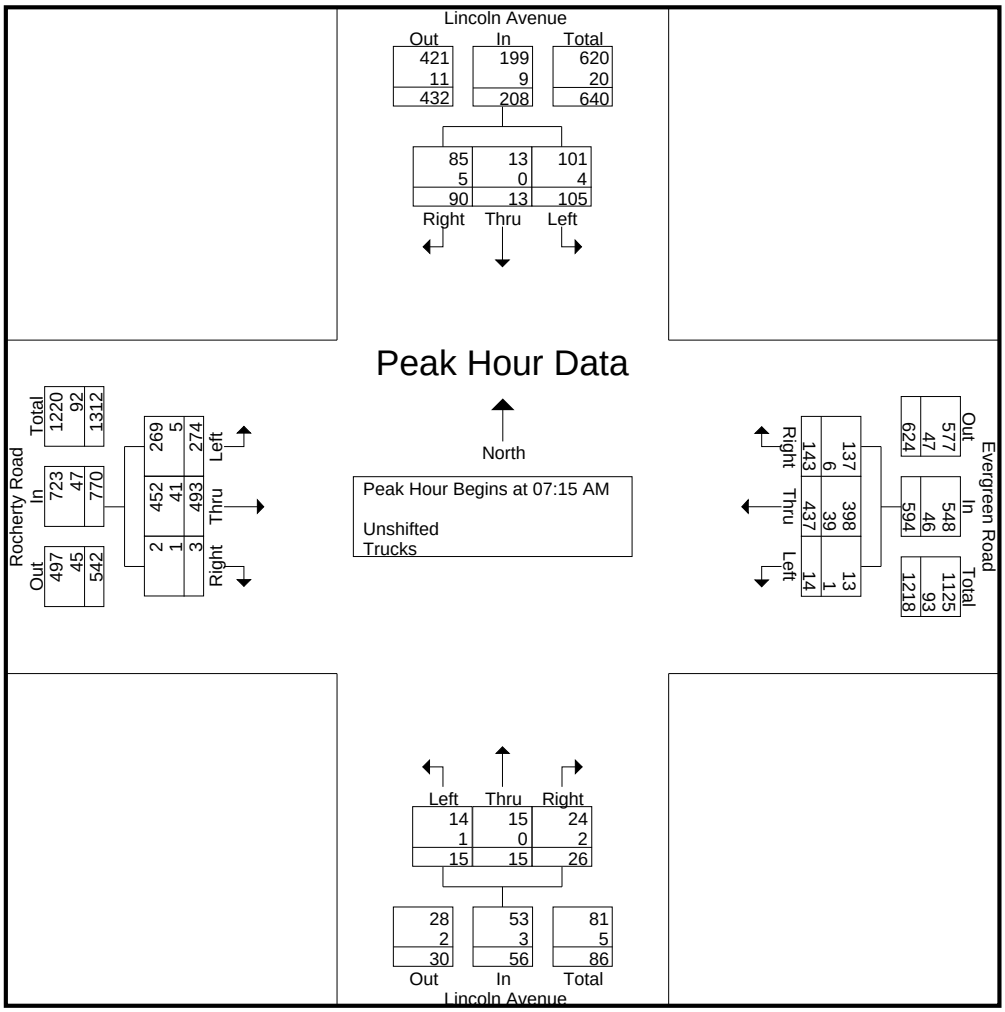


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Lincoln Avenue &
Rocherty Road / Evergreen Road

File Name : 2009-05-27 AMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

	Lincoln Avenue Southbound				Evergreen Road Westbound				Lincoln Avenue Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	32	2	22	56	0	106	34	140	2	6	4	12	59	151	1	211	419
07:30 AM	32	6	25	63	8	106	53	167	6	4	7	17	70	131	2	203	450
07:45 AM	20	4	23	47	2	103	30	135	4	4	9	17	77	113	0	190	389
08:00 AM	21	1	20	42	4	122	26	152	3	1	6	10	68	98	0	166	370
Total Volume	105	13	90	208	14	437	143	594	15	15	26	56	274	493	3	770	1628
% App. Total	50.5	6.2	43.3		2.4	73.6	24.1		26.8	26.8	46.4		35.6	64	0.4		
PHF	.820	.542	.900	.825	.438	.895	.675	.889	.625	.625	.722	.824	.890	.816	.375	.912	.904
Unshifted	101	13	85	199	13	398	137	548	14	15	24	53	269	452	2	723	1523
% Unshifted	96.2	100	94.4	95.7	92.9	91.1	95.8	92.3	93.3	100	92.3	94.6	98.2	91.7	66.7	93.9	93.6
Trucks	4	0	5	9	1	39	6	46	1	0	2	3	5	41	1	47	105
% Trucks	3.8	0	5.6	4.3	7.1	8.9	4.2	7.7	6.7	0	7.7	5.4	1.8	8.3	33.3	6.1	6.4



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

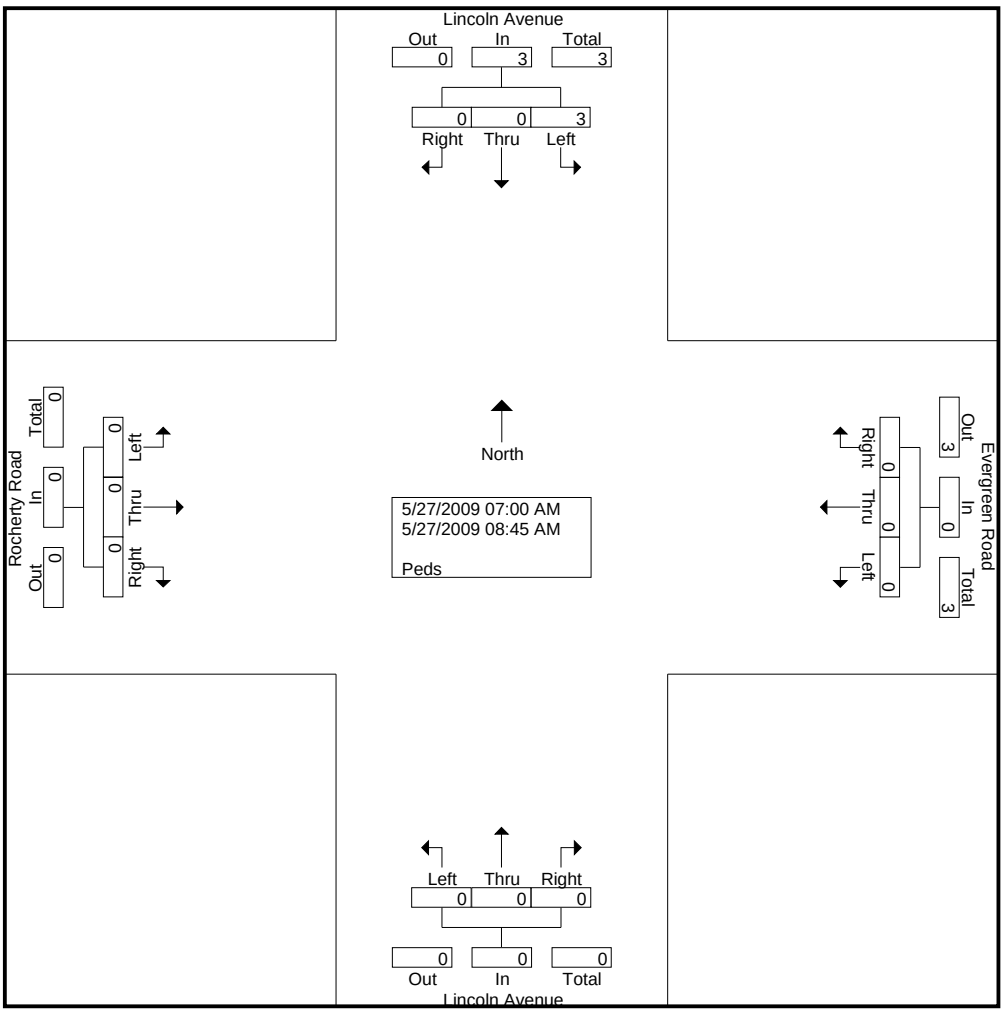
Lincoln Avenue &
Rocherty Road / Evergreen Road

Counter: 11
Counted by: Z. Pierce
Weather: Overcast/Rain
Saved as: 2009-05-27 AMLARRER

File Name : 2009-05-27 AMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

Groups Printed- Peds

	Lincoln Avenue Southbound					Evergreen Road Westbound					Lincoln Avenue Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
07:45 AM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Total	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Apprch %	100	0	0			0	0	0			0	0	0			0	0	0					
Total %	100	0	0		100	0	0	0		0	0	0	0		0	0	0	0		0	0	100	

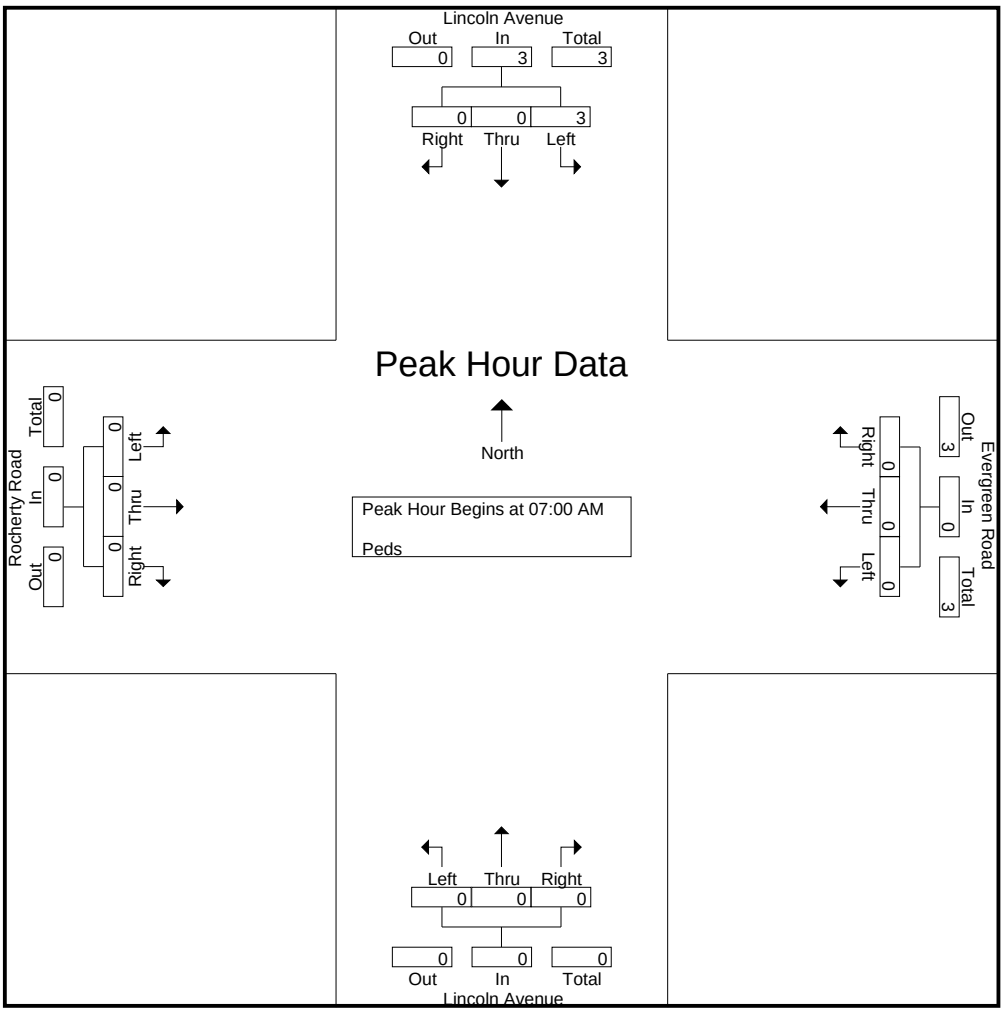


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Lincoln Avenue &
Rocherty Road / Evergreen Road

File Name : 2009-05-27 AMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

	Lincoln Avenue Southbound				Evergreen Road Westbound				Lincoln Avenue Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Total Volume	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
% App. Total	100	0	0		0	0	0		0	0	0		0	0	0		
PHF	.375	.000	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.375



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Rocherty Road

Counter: 2
Counted by: R. Kearney
Weather: Overcast/Rain
Saved as: 2009-05-27 PM72RR

File Name : 2009-05-27 PM72RR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

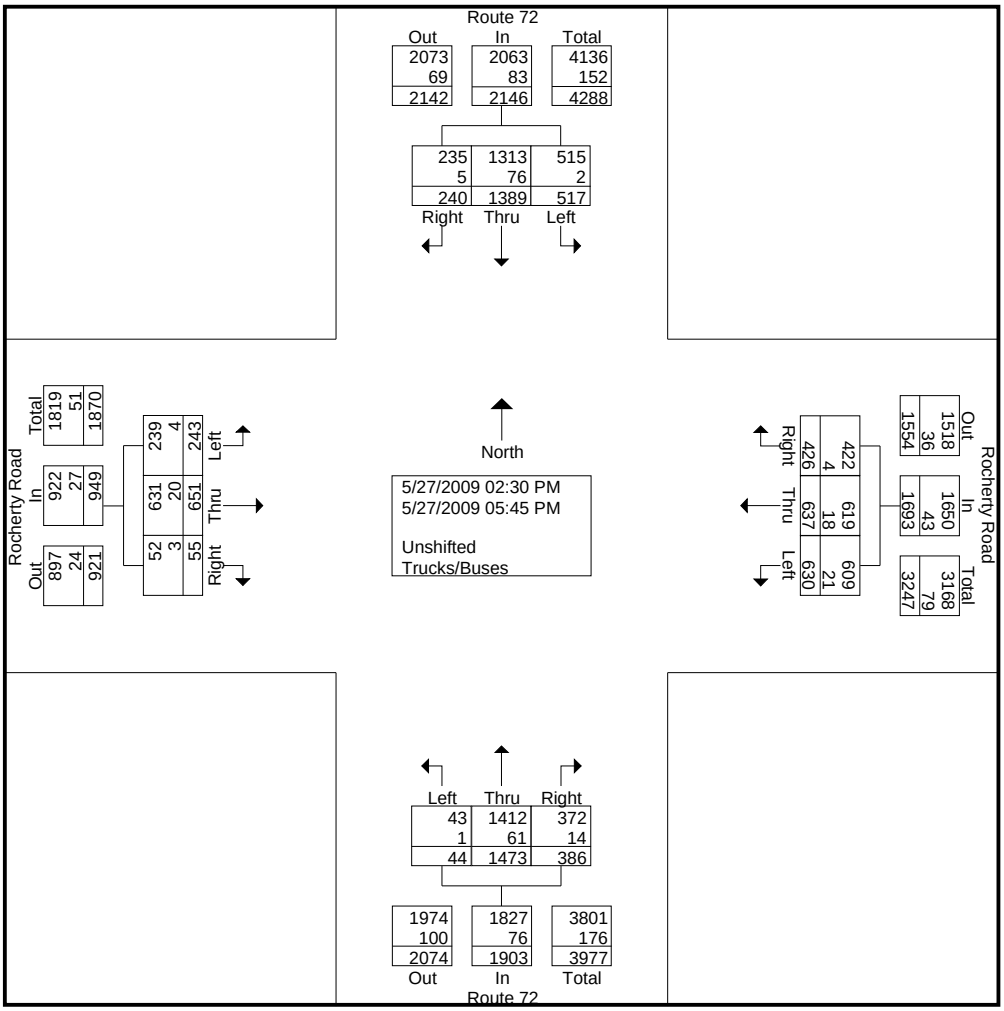
Groups Printed- Unshifted - Trucks/Buses

	Route 72 Southbound					Rocherty Road Westbound					Route 72 Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	39	99	12	1	150	33	44	32	11	109	1	70	19	5	90	17	23	4	0	44	17	393	410
02:45 PM	34	92	14	3	140	35	46	19	5	100	3	91	28	1	122	19	36	2	1	57	10	419	429
Total	73	191	26	4	290	68	90	51	16	209	4	161	47	6	212	36	59	6	1	101	27	812	839
03:00 PM	35	97	12	1	144	39	50	29	2	118	2	102	31	2	135	15	30	3	1	48	6	445	451
03:15 PM	43	105	20	1	168	53	58	22	4	133	1	97	14	2	112	11	59	6	1	76	8	489	497
03:30 PM	32	101	8	0	141	52	32	28	4	112	7	121	47	1	175	19	50	3	0	72	5	500	505
03:45 PM	39	98	14	1	151	58	43	37	5	138	4	108	28	2	140	15	44	2	0	61	8	490	498
Total	149	401	54	3	604	202	183	116	15	501	14	428	120	7	562	60	183	14	2	257	27	1924	1951
04:00 PM	21	92	18	0	131	68	52	29	4	149	6	124	32	1	162	14	42	5	1	61	6	503	509
04:15 PM	43	85	20	0	148	46	38	32	9	116	4	109	30	6	143	23	58	2	0	83	15	490	505
04:30 PM	37	98	20	2	155	57	56	50	6	163	3	105	26	2	134	21	56	5	0	82	10	534	544
04:45 PM	41	104	21	1	166	55	53	27	4	135	0	112	24	0	136	27	55	5	1	87	6	524	530
Total	142	379	79	3	600	226	199	138	23	563	13	450	112	9	575	85	211	17	2	313	37	2051	2088
05:00 PM	40	112	25	0	177	36	55	28	0	119	2	113	29	0	144	17	36	1	0	54	0	494	494
05:15 PM	32	116	22	1	170	43	48	36	6	127	2	105	22	0	129	15	60	5	1	80	8	506	514
05:30 PM	48	113	13	0	174	28	30	26	6	84	5	116	28	2	149	12	39	6	0	57	8	464	472
05:45 PM	33	77	21	0	131	27	32	31	4	90	4	100	28	1	132	18	63	6	0	87	5	440	445
Total	153	418	81	1	652	134	165	121	16	420	13	434	107	3	554	62	198	18	1	278	21	1904	1925
Grand Total	517	1389	240	11	2146	630	637	426	70	1693	44	1473	386	25	1903	243	651	55	6	949	112	6691	6803
Apprch %	24.1	64.7	11.2			37.2	37.6	25.2			2.3	77.4	20.3			25.6	68.6	5.8					
Total %	7.7	20.8	3.6		32.1	9.4	9.5	6.4		25.3	0.7	22	5.8		28.4	3.6	9.7	0.8		14.2	1.6	98.4	
Unshifted	515	1313	235		2074	609	619	422		1720	43	1412	372		1852	239	631	52		928	0	0	6574
% Unshifted	99.6	94.5	97.9	100	96.2	96.7	97.2	99.1	100	97.6	97.7	95.9	96.4	100	96.1	98.4	96.9	94.5	100	97.2	0	0	96.6
Trucks/Buses	2	76	5		83	21	18	4		43	1	61	14		76	4	20	3		27	0	0	229
% Trucks/Buses	0.4	5.5	2.1	0	3.8	3.3	2.8	0.9	0	2.4	2.3	4.1	3.6	0	3.9	1.6	3.1	5.5	0	2.8	0	0	3.4

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Rocherty Road

File Name : 2009-05-27 PM72RR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

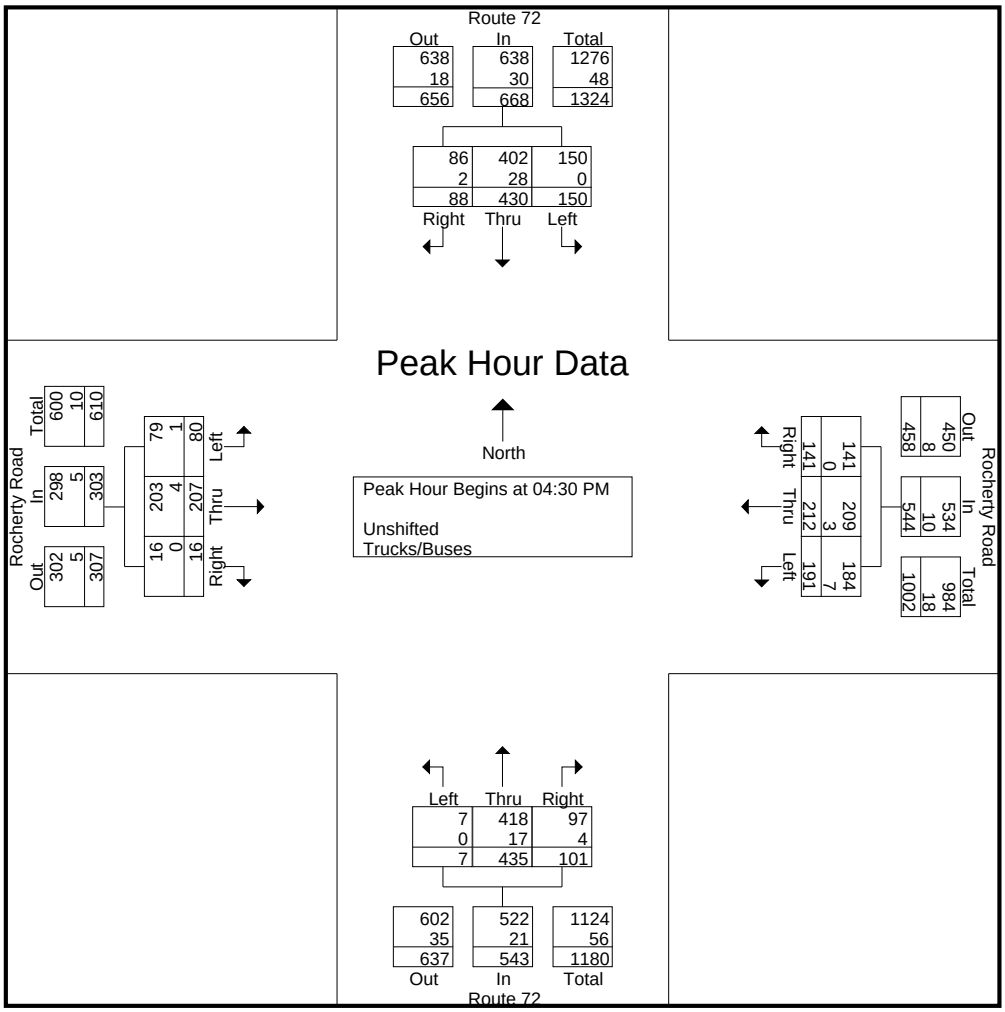


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Rocherty Road

File Name : 2009-05-27 PM72RR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 3

	Route 72 Southbound				Rocherty Road Westbound				Route 72 Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	37	98	20	155	57	56	50	163	3	105	26	134	21	56	5	82	534
04:45 PM	41	104	21	166	55	53	27	135	0	112	24	136	27	55	5	87	524
05:00 PM	40	112	25	177	36	55	28	119	2	113	29	144	17	36	1	54	494
05:15 PM	32	116	22	170	43	48	36	127	2	105	22	129	15	60	5	80	506
Total Volume	150	430	88	668	191	212	141	544	7	435	101	543	80	207	16	303	2058
% App. Total	22.5	64.4	13.2		35.1	39	25.9		1.3	80.1	18.6		26.4	68.3	5.3		
PHF	.915	.927	.880	.944	.838	.946	.705	.834	.583	.962	.871	.943	.741	.863	.800	.871	.963
Unshifted	150	402	86	638	184	209	141	534	7	418	97	522	79	203	16	298	1992
% Unshifted	100	93.5	97.7	95.5	96.3	98.6	100	98.2	100	96.1	96.0	96.1	98.8	98.1	100	98.3	96.8
Trucks/Buses	0	28	2	30	7	3	0	10	0	17	4	21	1	4	0	5	66
% Trucks/Buses	0	6.5	2.3	4.5	3.7	1.4	0	1.8	0	3.9	4.0	3.9	1.3	1.9	0	1.7	3.2



Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

Counter: 16
Counted by: Z. Pierce
Weather: Partly Sunny
Saved as: 2011-04-27 PM72CCS

File Name : 2011-04-27 PM72CCS
Site Code : 00000000
Start Date : 4/27/2011
Page No : 1

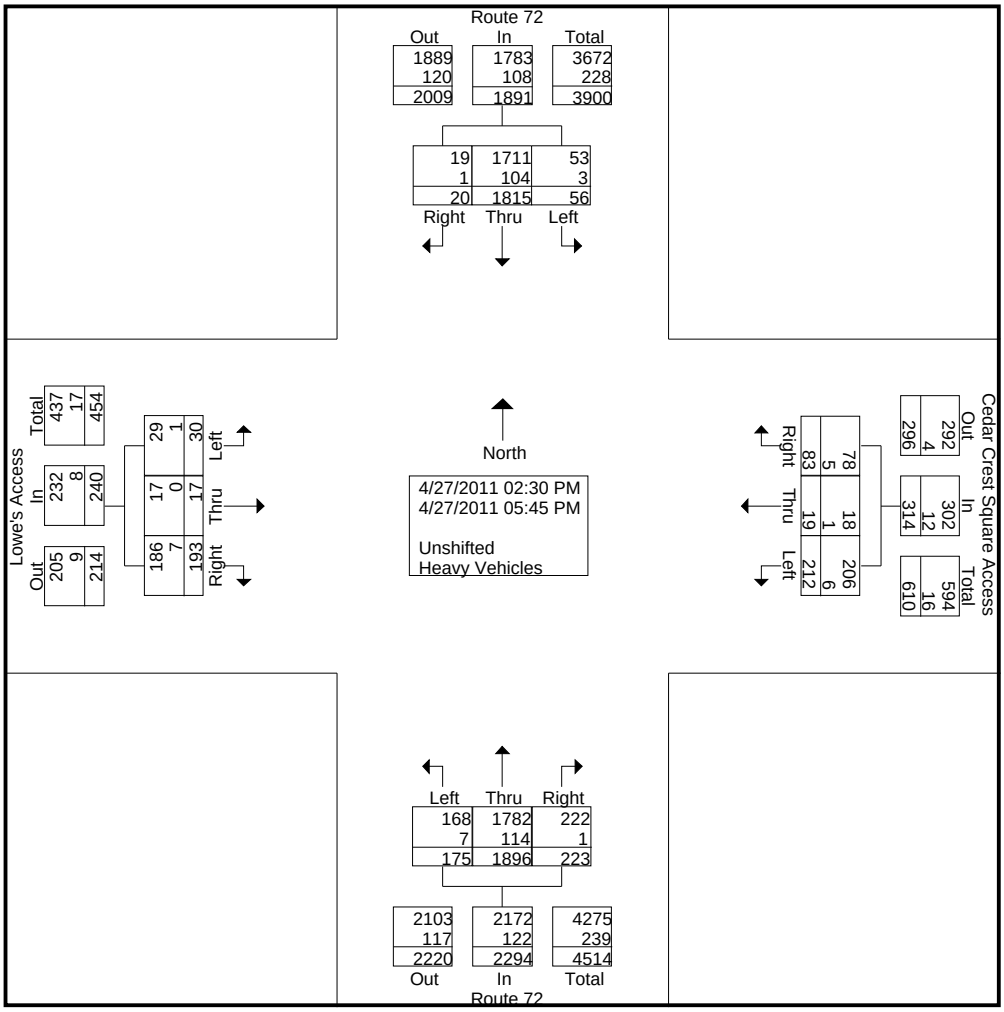
Groups Printed- Unshifted - Heavy Vehicles

	Lowe's Access Eastbound					Cedar Crest Square Access Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	Right On Red	App. Total	Left	Thru	Right	Right On Red	App. Total	Left	Thru	Right	Right On Red	App. Total	Left	Thru	Right	Right On Red	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	0	2	16	9	18	13	2	2	1	17	22	107	14	1	143	4	106	2	0	112	11	290	301
02:45 PM	4	1	27	14	32	13	1	5	1	19	7	129	9	2	145	5	124	1	0	130	17	326	343
Total	4	3	43	23	50	26	3	7	2	36	29	236	23	3	288	9	230	3	0	242	28	616	644
03:00 PM	4	2	17	7	23	14	2	6	1	22	13	129	13	1	155	3	128	0	0	131	9	331	340
03:15 PM	2	1	9	2	12	14	3	6	4	23	6	115	16	1	137	3	119	2	0	124	7	296	303
03:30 PM	0	1	9	4	10	15	1	7	5	23	11	131	13	0	155	4	140	1	0	145	9	333	342
03:45 PM	4	1	10	5	15	13	1	11	7	25	12	147	19	2	178	6	115	3	0	124	14	342	356
Total	10	5	45	18	60	56	7	30	17	93	42	522	61	4	625	16	502	6	0	524	39	1302	1341
04:00 PM	0	3	13	9	16	15	1	12	5	28	7	121	22	4	150	6	140	1	0	147	18	341	359
04:15 PM	2	1	13	8	16	9	0	2	1	11	12	156	20	2	188	4	131	3	0	138	11	353	364
04:30 PM	2	1	10	4	13	33	2	6	3	41	14	150	15	3	179	3	137	2	0	142	10	375	385
04:45 PM	4	0	18	3	22	17	1	9	1	27	18	149	16	3	183	6	136	2	0	144	7	376	383
Total	8	5	54	24	67	74	4	29	10	107	51	576	73	12	700	19	544	8	0	571	46	1445	1491
05:00 PM	2	1	12	8	15	12	0	6	5	18	16	162	18	2	196	3	144	1	0	148	15	377	392
05:15 PM	0	1	12	5	13	13	1	3	3	17	8	118	18	3	144	5	144	0	0	149	11	323	334
05:30 PM	0	1	15	8	16	18	1	3	1	22	10	149	12	1	171	2	111	0	0	113	10	322	332
05:45 PM	6	1	12	6	19	13	3	5	1	21	19	133	18	0	170	2	140	2	1	144	8	354	362
Total	8	4	51	27	63	56	5	17	10	78	53	562	66	6	681	12	539	3	1	554	44	1376	1420
Grand Total	30	17	193	92	240	212	19	83	39	314	175	1896	223	25	2294	56	1815	20	1	1891	157	4739	4896
Apprch %	12.5	7.1	80.4			67.5	6.1	26.4			7.6	82.7	9.7			3	96	1.1					
Total %	0.6	0.4	4.1		5.1	4.5	0.4	1.8		6.6	3.7	40	4.7		48.4	1.2	38.3	0.4		39.9	3.2	96.8	
Unshifted	29	17	186		322	206	18	78		338	168	1782	222		2196	53	1711	19		1784	0	0	4640
% Unshifted	96.7	100	96.4	97.8	97	97.2	94.7	94	92.3	95.8	96	94	99.6	96	94.7	94.6	94.3	95	100	94.3	0	0	94.8
Heavy Vehicles	1	0	7		10	6	1	5		15	7	114	1		123	3	104	1		108	0	0	256
% Heavy Vehicles	3.3	0	3.6	2.2	3	2.8	5.3	6	7.7	4.2	4	6	0.4	4	5.3	5.4	5.7	5	0	5.7	0	0	5.2

Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-27 PM72CCS
Site Code : 00000000
Start Date : 4/27/2011
Page No : 2

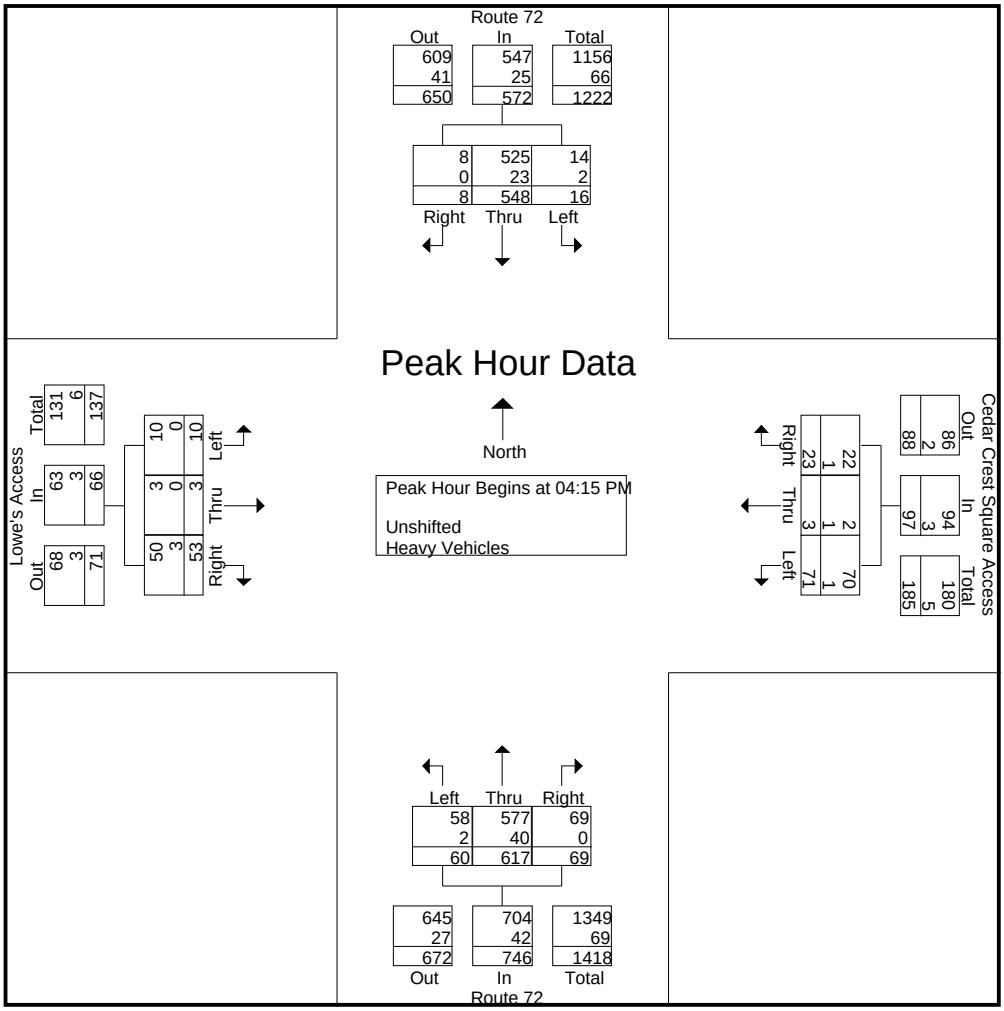


Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-27 PM72CCS
Site Code : 00000000
Start Date : 4/27/2011
Page No : 3

	Lowe's Access Eastbound				Cedar Crest Square Access Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	2	**1**	13	16	9	0	2	11	12	156	**20**	188	4	131	**3**	138	353
04:30 PM	2	1	10	13	**33**	**2**	6	**41**	14	150	15	179	3	137	2	142	375
04:45 PM	**4**	0	**18**	**22**	17	1	**9**	27	**18**	149	16	183	**6**	136	2	144	376
05:00 PM	2	1	12	15	12	0	6	18	16	**162**	18	**196**	3	**144**	1	**148**	**377**
Total Volume	10	3	53	66	71	3	23	97	60	617	69	746	16	548	8	572	1481
% App. Total	15.2	4.5	80.3		73.2	3.1	23.7		8	82.7	9.2		2.8	95.8	1.4		
PHF	.625	.750	.736	.750	.538	.375	.639	.591	.833	.952	.863	.952	.667	.951	.667	.966	.982
Unshifted	10	3	50	63	70	2	22	94	58	577	69	704	14	525	8	547	1408
% Unshifted	100	100	94.3	95.5	98.6	66.7	95.7	96.9	96.7	93.5	100	94.4	87.5	95.8	100	95.6	95.1
Heavy Vehicles	0	0	3	3	1	1	1	3	2	40	0	42	2	23	0	25	73
% Heavy Vehicles	0	0	5.7	4.5	1.4	33.3	4.3	3.1	3.3	6.5	0	5.6	12.5	4.2	0	4.4	4.9



Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

Counter: 16
Counted by: Z. Pierce
Weather: Partly Sunny
Saved as: 2011-04-27 PM72CCS

File Name : 2011-04-27 PM72CCS
Site Code : 00000000
Start Date : 4/27/2011
Page No : 1

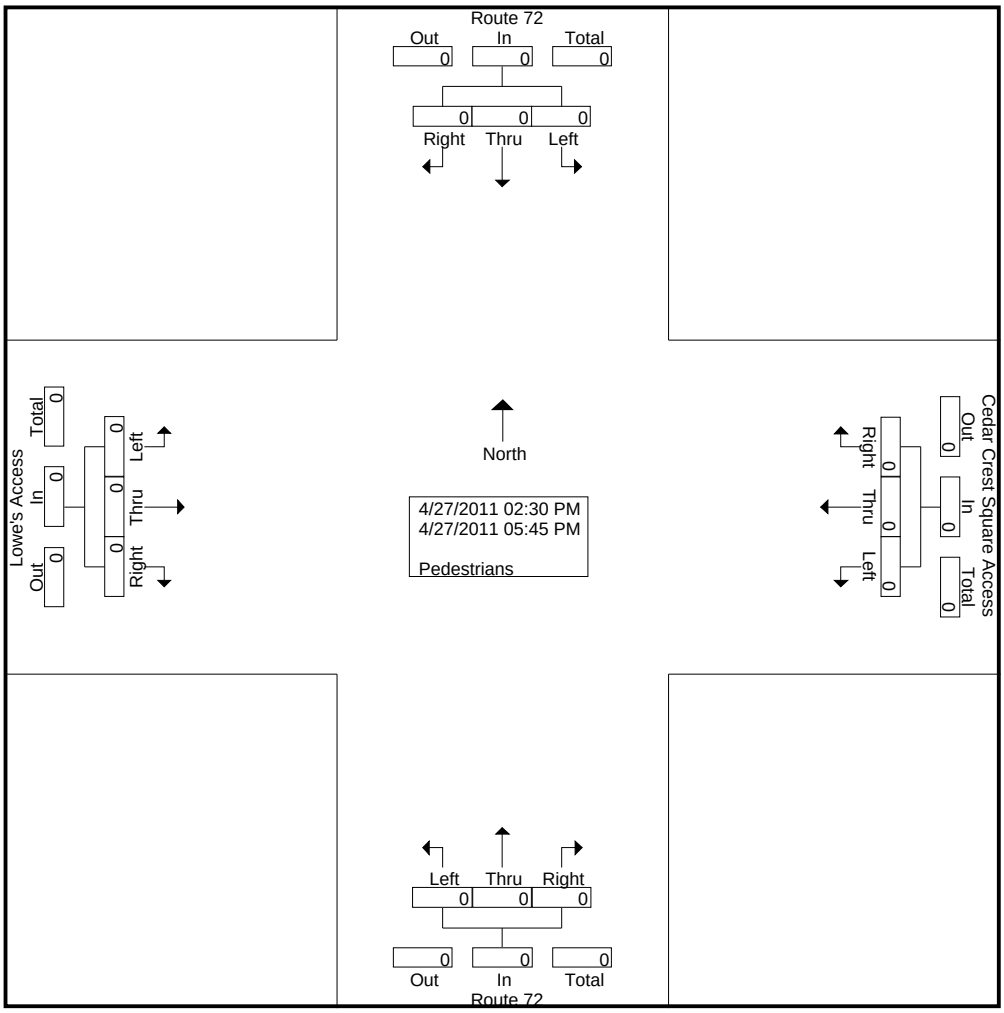
Groups Printed- Pedestrians

	Lowe's Access Eastbound					Cedar Crest Square Access Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	Right On Red	App. Total	Left	Thru	Right	Right On Red	App. Total	Left	Thru	Right	Right On Red	App. Total	Left	Thru	Right	Right On Red	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2	0	2
Apprch %	0	0	0			0	0	0			0	0	0			0	0	0					
Total %																					100	0	

Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-27 PM72CCS
Site Code : 00000000
Start Date : 4/27/2011
Page No : 2

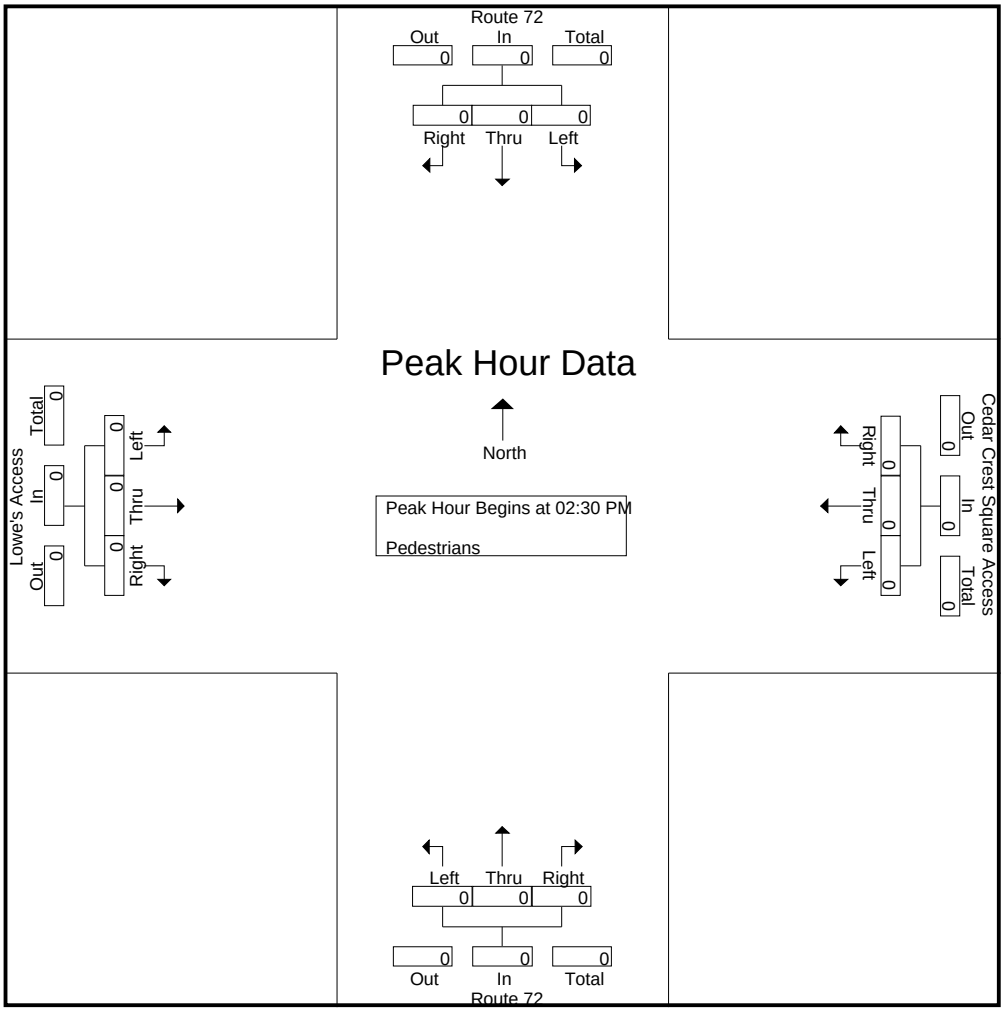


Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-27 PM72CCS
Site Code : 00000000
Start Date : 4/27/2011
Page No : 3

	Lowe's Access Eastbound				Cedar Crest Square Access Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:30 PM																	
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Lowes & Kmart / Cedar Crest Sq. Blvd

Counter: 24
Counted by: E. Farley
Weather: Overcast/Rain
Saved as: 2009-05-27 PM72LKCC

File Name : 2009-05-27 PM72LKCC
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

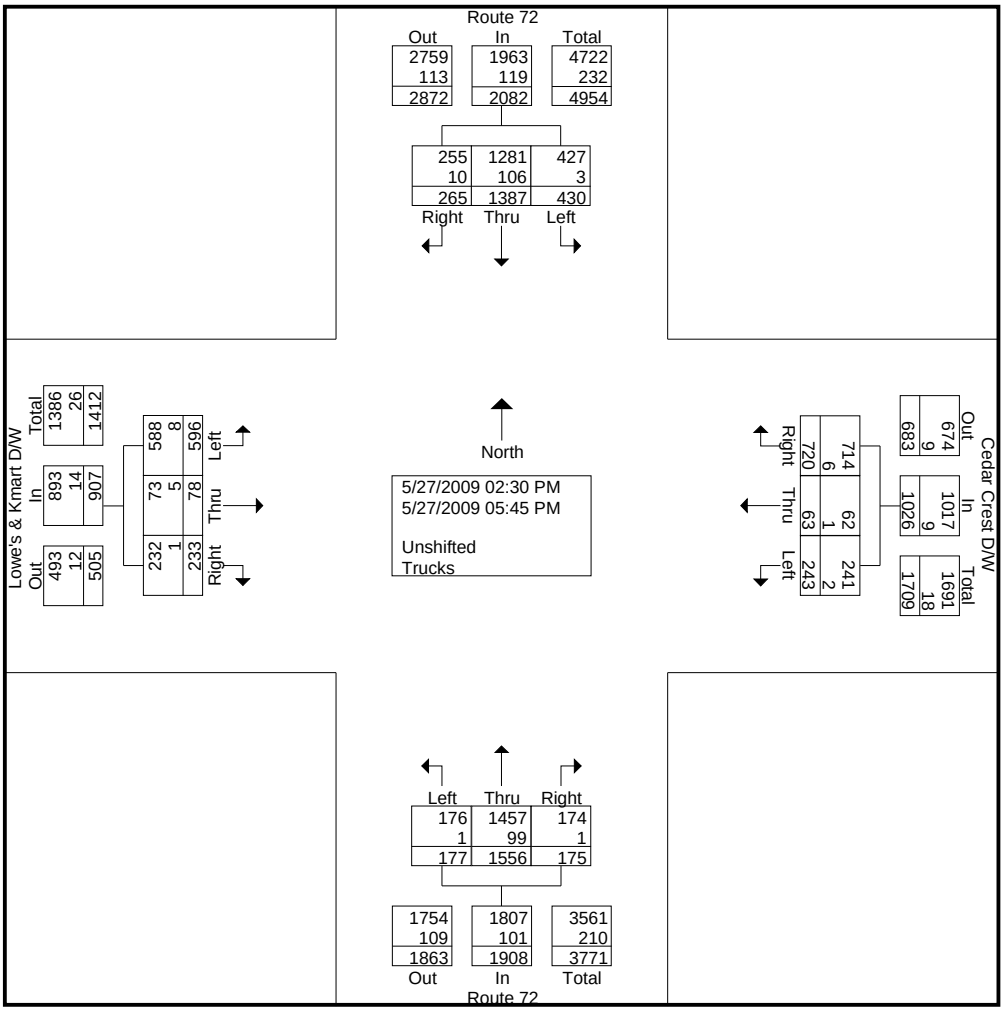
Groups Printed- Unshifted - Trucks

	Route 72 Southbound					Cedar Crest D/W Westbound					Route 72 Northbound					Lowe's & Kmart D/W Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	32	92	33	7	157	13	6	44	10	63	9	92	8	1	109	49	8	13	4	70	22	399	421
02:45 PM	26	93	25	6	144	24	4	38	8	66	16	91	6	1	113	44	7	7	0	58	15	381	396
Total	58	185	58	13	301	37	10	82	18	129	25	183	14	2	222	93	15	20	4	128	37	780	817
03:00 PM	22	92	17	3	131	24	2	54	21	80	11	97	13	0	121	41	5	13	4	59	28	391	419
03:15 PM	28	101	21	2	150	20	4	34	14	58	10	117	13	1	140	47	1	15	6	63	23	411	434
03:30 PM	27	97	10	1	134	14	2	59	17	75	14	102	12	1	128	43	14	18	3	75	22	412	434
03:45 PM	35	104	15	1	154	12	3	58	21	73	10	128	6	0	144	35	4	16	4	55	26	426	452
Total	112	394	63	7	569	70	11	205	73	286	45	444	44	2	533	166	24	62	17	252	99	1640	1739
04:00 PM	40	93	17	2	150	13	6	44	11	63	11	111	13	0	135	48	7	24	7	79	20	427	447
04:15 PM	27	87	16	2	130	16	4	58	21	78	18	124	17	4	159	31	7	23	9	61	36	428	464
04:30 PM	42	96	20	4	158	21	3	91	28	115	10	138	14	3	162	39	3	15	5	57	40	492	532
04:45 PM	35	131	14	2	180	18	3	49	14	70	13	116	14	4	143	44	7	11	2	62	22	455	477
Total	144	407	67	10	618	68	16	242	74	326	52	489	58	11	599	162	24	73	23	259	118	1802	1920
05:00 PM	35	89	19	6	143	24	9	43	10	76	14	86	17	5	117	43	1	16	5	60	26	396	422
05:15 PM	30	124	12	1	166	14	5	62	23	81	12	126	17	5	155	56	8	13	4	77	33	479	512
05:30 PM	23	100	23	4	146	17	9	39	9	65	12	123	15	4	150	43	4	24	9	71	26	432	458
05:45 PM	28	88	23	4	139	13	3	47	17	63	17	105	10	2	132	33	2	25	8	60	31	394	425
Total	116	401	77	15	594	68	26	191	59	285	55	440	59	16	554	175	15	78	26	268	116	1701	1817
Grand Total	430	1387	265	45	2082	243	63	720	224	1026	177	1556	175	31	1908	596	78	233	70	907	370	5923	6293
Apprch %	20.7	66.6	12.7			23.7	6.1	70.2			9.3	81.6	9.2			65.7	8.6	25.7					
Total %	7.3	23.4	4.5		35.2	4.1	1.1	12.2		17.3	3	26.3	3		32.2	10.1	1.3	3.9		15.3	5.9	94.1	
Unshifted	427	1281	255		2008	241	62	714		1241	176	1457	174		1838	588	73	232		963	0	0	6050
% Unshifted	99.3	92.4	96.2	100	94.4	99.2	98.4	99.2	100	99.3	99.4	93.6	99.4	100	94.8	98.7	93.6	99.6	100	98.6	0	0	96.1
Trucks	3	106	10		119	2	1	6		9	1	99	1		101	8	5	1		14	0	0	243
% Trucks	0.7	7.6	3.8	0	5.6	0.8	1.6	0.8	0	0.7	0.6	6.4	0.6	0	5.2	1.3	6.4	0.4	0	1.4	0	0	3.9

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Lowes & Kmart / Cedar Crest Sq. Blvd

File Name : 2009-05-27 PM72LKCC
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

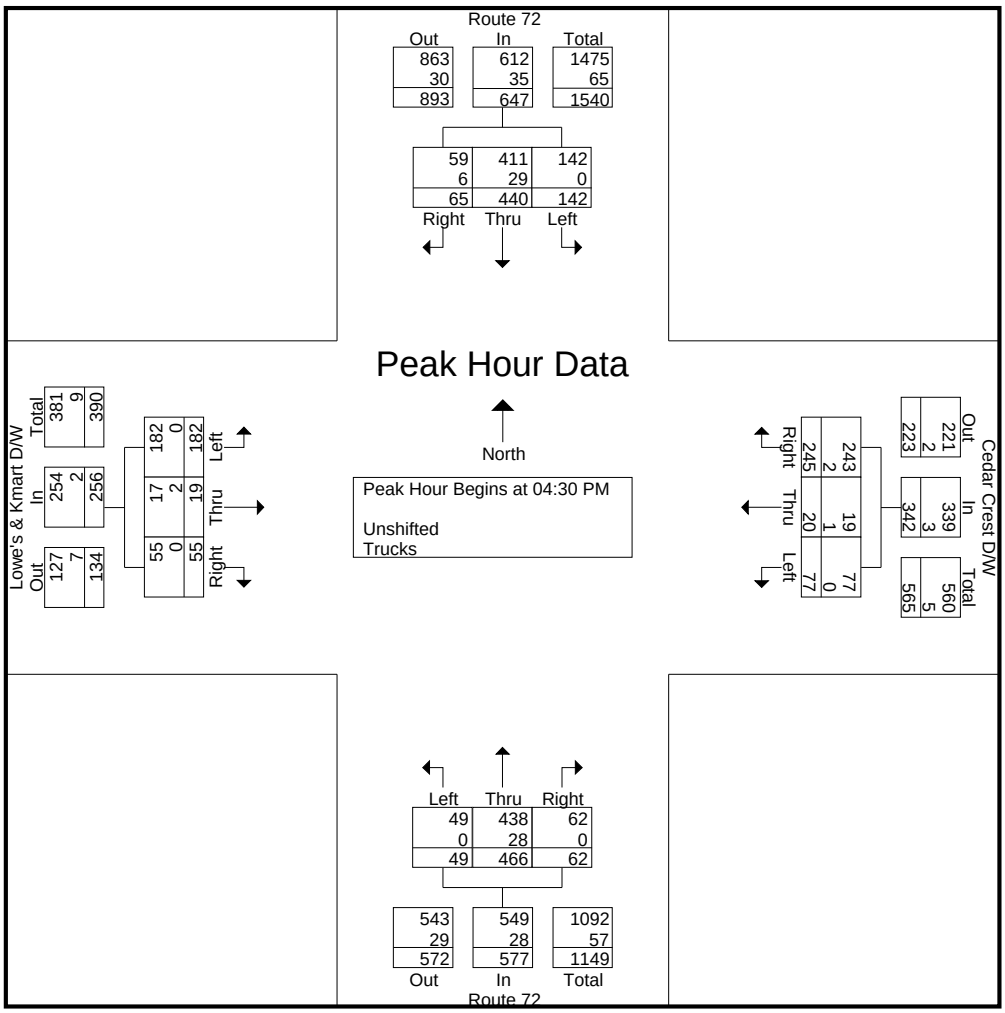


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Lowes & Kmart / Cedar Crest Sq. Blvd

File Name : 2009-05-27 PM72LKCC
Site Code : 00000000
Start Date : 5/27/2009
Page No : 3

	Route 72 Southbound				Cedar Crest D/W Westbound				Route 72 Northbound				Lowe's & Kmart D/W Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	42	96	20	158	21	3	91	115	10	138	14	162	39	3	15	57	492
04:45 PM	35	131	14	180	18	3	49	70	13	116	14	143	44	7	11	62	455
05:00 PM	35	89	19	143	24	9	43	76	14	86	17	117	43	1	16	60	396
05:15 PM	30	124	12	166	14	5	62	81	12	126	17	155	56	8	13	77	479
Total Volume	142	440	65	647	77	20	245	342	49	466	62	577	182	19	55	256	1822
% App. Total	21.9	68	10		22.5	5.8	71.6		8.5	80.8	10.7		71.1	7.4	21.5		
PHF	.845	.840	.813	.899	.802	.556	.673	.743	.875	.844	.912	.890	.813	.594	.859	.831	.926
Unshifted	142	411	59	612	77	19	243	339	49	438	62	549	182	17	55	254	1754
% Unshifted	100	93.4	90.8	94.6	100	95.0	99.2	99.1	100	94.0	100	95.1	100	89.5	100	99.2	96.3
Trucks	0	29	6	35	0	1	2	3	0	28	0	28	0	2	0	2	68
% Trucks	0	6.6	9.2	5.4	0	5.0	0.8	0.9	0	6.0	0	4.9	0	10.5	0	0.8	3.7



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Isabel Drive

Counter: 26
Counted by: S. Hutt
Weather: Sunny
Saved as: 2008-11-18 PM72ID

File Name : 2008-11-18 PM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 1

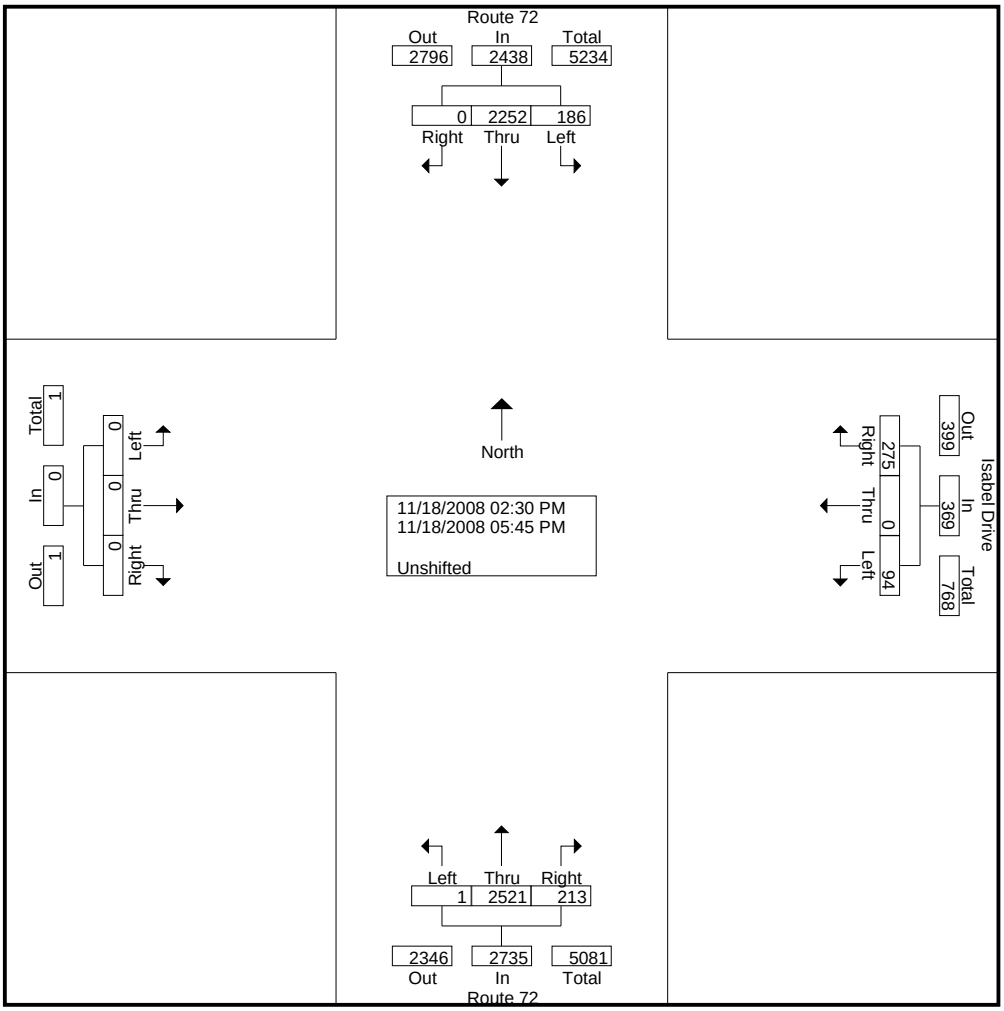
Groups Printed- Unshifted

	Route 72 Southbound					Isabel Drive Westbound					Route 72 Northbound					Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	16	172	0	8	188	6	0	21	0	27	0	168	14	9	182	0	0	0	0	0	17	397	414
02:45 PM	10	155	0	13	165	7	0	22	0	29	0	167	16	11	183	0	0	0	0	0	24	377	401
Total	26	327	0	21	353	13	0	43	0	56	0	335	30	20	365	0	0	0	0	0	41	774	815
03:00 PM	14	152	0	6	166	6	0	18	0	24	0	165	19	8	184	0	0	0	0	0	14	374	388
03:15 PM	9	154	0	15	163	6	0	17	0	23	0	170	17	4	187	0	0	0	0	0	19	373	392
03:30 PM	6	137	0	8	143	8	0	22	2	30	0	180	18	7	198	0	0	0	0	0	17	371	388
03:45 PM	15	184	0	9	199	4	0	22	0	26	0	190	16	8	206	0	0	0	0	0	17	431	448
Total	44	627	0	38	671	24	0	79	2	103	0	705	70	27	775	0	0	0	0	0	67	1549	1616
04:00 PM	12	173	0	9	185	9	0	24	0	33	0	189	19	9	208	0	0	0	0	0	18	426	444
04:15 PM	12	143	0	3	155	2	0	20	1	22	0	195	17	9	212	0	0	0	0	0	13	389	402
04:30 PM	14	166	0	10	180	7	0	25	0	32	0	198	14	4	212	0	0	0	0	0	14	424	438
04:45 PM	12	167	0	6	179	7	0	23	0	30	0	190	18	5	208	0	0	0	0	0	11	417	428
Total	50	649	0	28	699	25	0	92	1	117	0	772	68	27	840	0	0	0	0	0	56	1656	1712
05:00 PM	11	176	0	13	187	10	0	17	0	27	0	198	10	9	208	0	0	0	0	0	22	422	444
05:15 PM	26	175	0	10	201	8	0	21	2	29	1	174	14	1	189	0	0	0	0	0	13	419	432
05:30 PM	18	147	0	7	165	10	0	13	0	23	0	165	12	9	177	0	0	0	0	0	16	365	381
05:45 PM	11	151	0	6	162	4	0	10	1	14	0	172	9	3	181	0	0	0	0	0	10	357	367
Total	66	649	0	36	715	32	0	61	3	93	1	709	45	22	755	0	0	0	0	0	61	1563	1624
Grand Total	186	2252	0	123	2438	94	0	275	6	369	1	2521	213	96	2735	0	0	0	0	0	225	5542	5767
Apprch %	7.6	92.4	0			25.5	0	74.5			0	92.2	7.8			0	0	0					
Total %	3.4	40.6	0		44	1.7	0	5		6.7	0	45.5	3.8		49.4	0	0	0		0	3.9	96.1	

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Isabel Drive

File Name : 2008-11-18 PM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 2

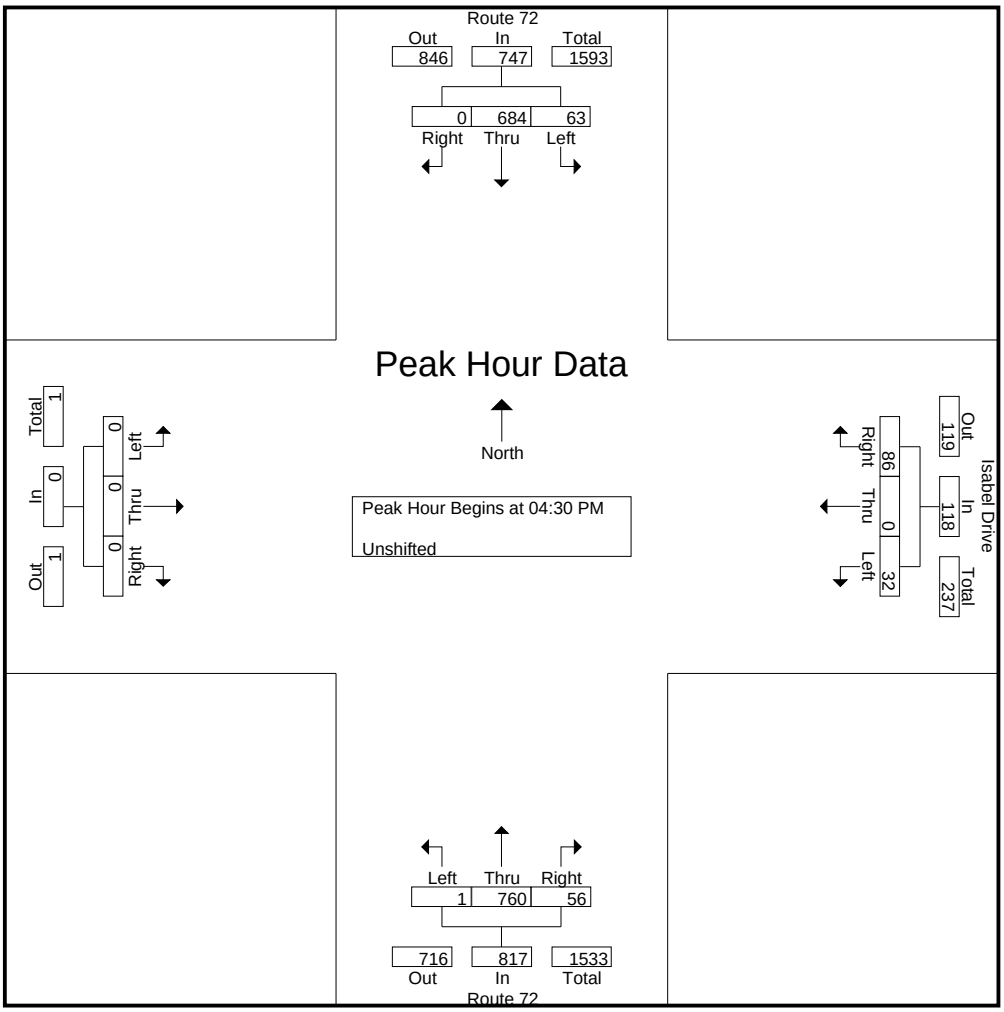


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Isabel Drive

File Name : 2008-11-18 PM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 3

	Route 72 Southbound				Isabel Drive Westbound				Route 72 Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	14	166	0	180	7	0	25	32	0	198	14	212	0	0	0	0	424
04:45 PM	12	167	0	179	7	0	23	30	0	190	18	208	0	0	0	0	417
05:00 PM	11	176	0	187	10	0	17	27	0	198	10	208	0	0	0	0	422
05:15 PM	26	175	0	201	8	0	21	29	1	174	14	189	0	0	0	0	419
Total Volume	63	684	0	747	32	0	86	118	1	760	56	817	0	0	0	0	1682
% App. Total	8.4	91.6	0		27.1	0	72.9		0.1	93	6.9		0	0	0		
PHF	.606	.972	.000	.929	.800	.000	.860	.922	.250	.960	.778	.963	.000	.000	.000	.000	.992



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Isabel Drive

Counter: 26
Counted by: S. Hutt
Weather: Sunny
Saved as: 2008-11-18 PM72ID

File Name : 2008-11-18 PM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 1

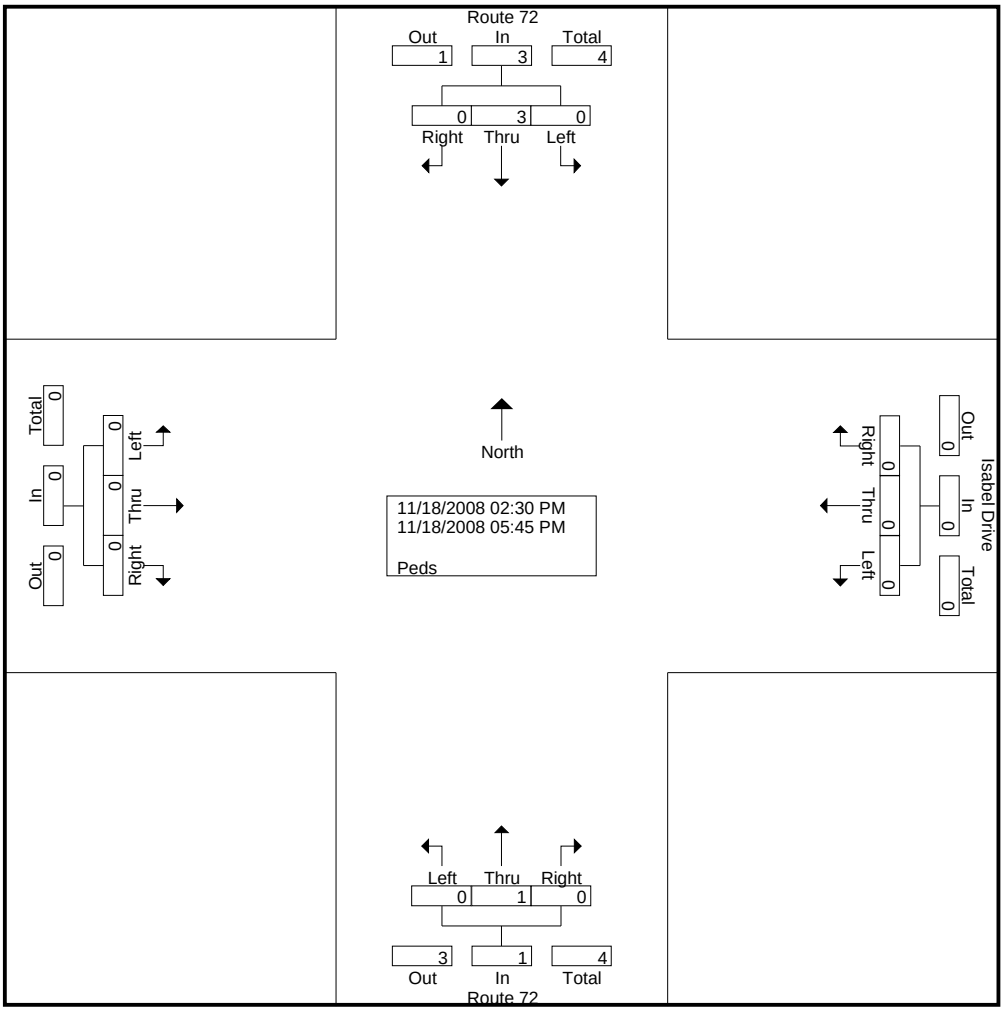
Groups Printed- Peds

	Route 72 Southbound					Isabel Drive Westbound					Route 72 Northbound					Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1
Total	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	3
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Grand Total	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4	4
Apprch %	0	100	0			0	0	0			0	100	0			0	0	0					
Total %	0	75	0		75	0	0	0		0	0	25	0		25	0	0	0		0	0	100	

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Isabel Drive

File Name : 2008-11-18 PM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 2

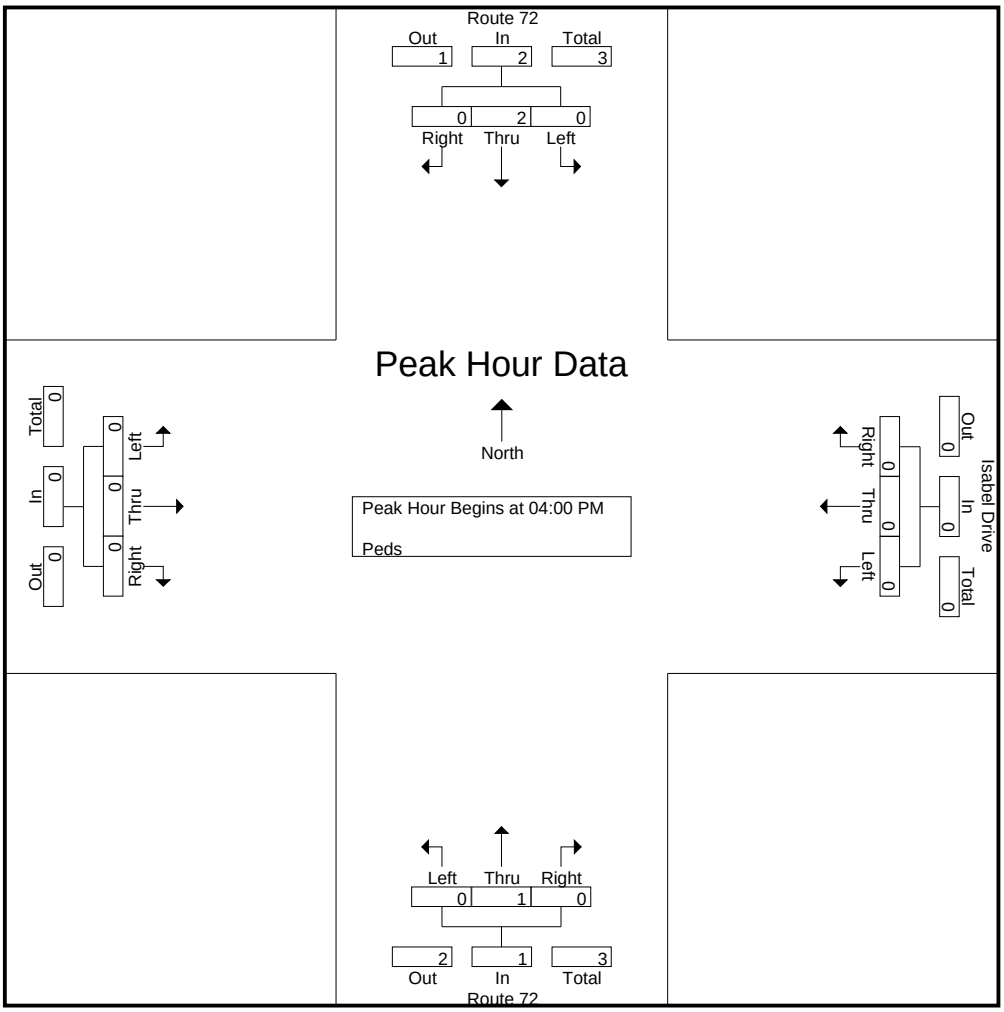


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Isabel Drive

File Name : 2008-11-18 PM72ID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 3

	Route 72 Southbound				Isabel Drive Westbound				Route 72 Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Volume	0	2	0	2	0	0	0	0	0	1	0	1	0	0	0	0	3
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.500	.000	.500	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.750



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464
Route 72 &
York Street/Shopping Center DW

Counter: 11
Counted by: B. Coleman
Weather: Clear
Saved as: 2010-10-21 PM72YSDW

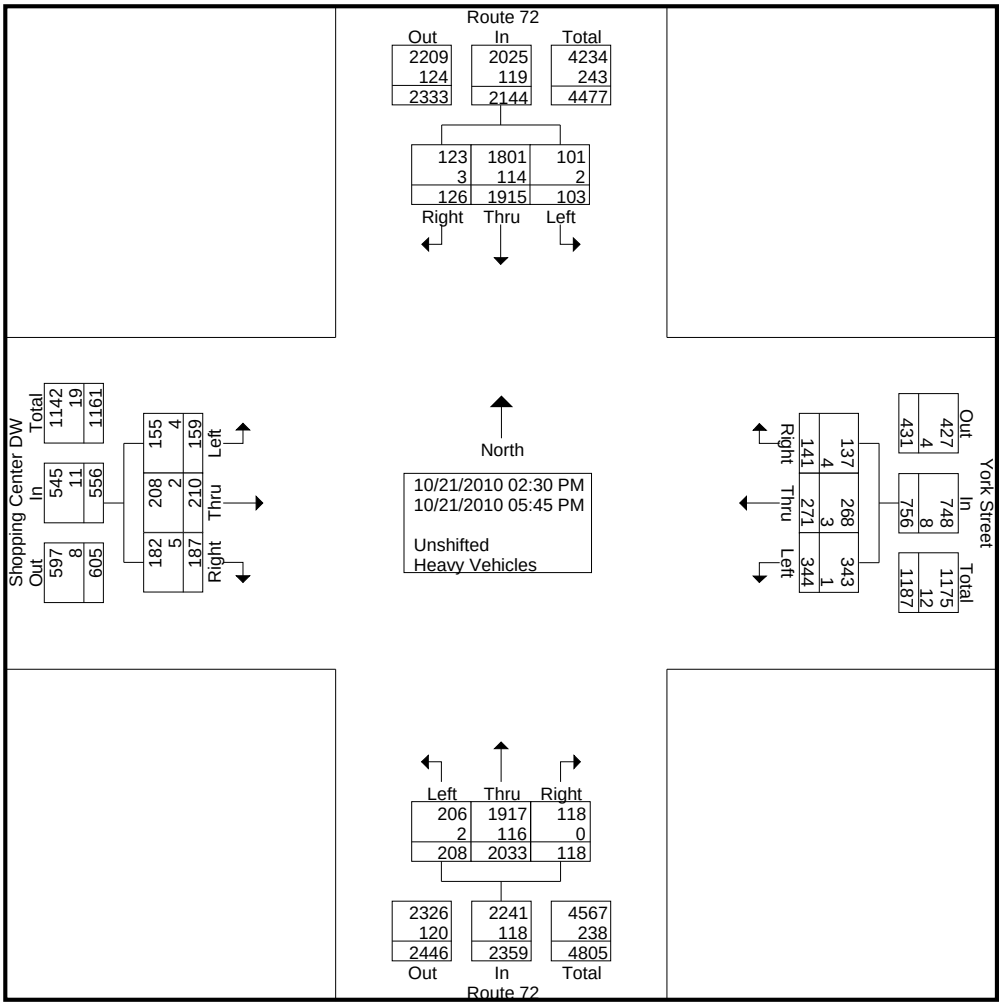
File Name : 2010-10-21 PM72YSDW
Site Code : 00000000
Start Date : 10/21/2010
Page No : 1

Groups Printed- Unshifted - Heavy Vehicles

	Shopping Center DW Eastbound					York Street Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	13	12	14	4	39	24	16	13	2	53	10	133	7	0	150	13	125	6	0	144	6	386	392
02:45 PM	8	12	13	5	33	20	10	11	4	41	15	124	4	0	143	4	143	10	1	157	10	374	384
Total	21	24	27	9	72	44	26	24	6	94	25	257	11	0	293	17	268	16	1	301	16	760	776
03:00 PM	9	19	13	4	41	25	14	10	1	49	16	152	6	0	174	10	148	11	0	169	5	433	438
03:15 PM	15	12	10	6	37	24	19	13	2	56	16	142	11	2	169	6	136	7	0	149	10	411	421
03:30 PM	15	26	16	5	57	20	21	8	2	49	12	118	9	0	139	5	122	5	0	132	7	377	384
03:45 PM	10	18	11	3	39	25	22	7	2	54	16	149	14	0	179	6	140	12	0	158	5	430	435
Total	49	75	50	18	174	94	76	38	7	208	60	561	40	2	661	27	546	35	0	608	27	1651	1678
04:00 PM	12	11	10	4	33	23	17	9	2	49	12	145	9	2	166	8	141	5	0	154	8	402	410
04:15 PM	7	18	13	2	38	19	21	10	2	50	5	147	7	1	159	5	141	14	0	160	5	407	412
04:30 PM	8	16	14	2	38	32	17	14	4	63	29	167	11	0	207	6	119	4	0	129	6	437	443
04:45 PM	13	17	13	4	43	28	29	9	0	66	14	134	14	0	162	9	156	9	1	174	5	445	450
Total	40	62	50	12	152	102	84	42	8	228	60	593	41	3	694	28	557	32	1	617	24	1691	1715
05:00 PM	13	15	10	2	38	31	19	7	3	57	14	170	10	0	194	5	146	12	1	163	6	452	458
05:15 PM	17	6	14	1	37	19	16	11	3	46	15	157	3	0	175	9	135	14	1	158	5	416	421
05:30 PM	9	17	21	8	47	23	30	11	1	64	18	165	6	0	189	8	150	9	1	167	10	467	477
05:45 PM	10	11	15	9	36	31	20	8	4	59	16	130	7	0	153	9	113	8	0	130	13	378	391
Total	49	49	60	20	158	104	85	37	11	226	63	622	26	0	711	31	544	43	3	618	34	1713	1747
Grand Total	159	210	187	59	556	344	271	141	32	756	208	2033	118	5	2359	103	1915	126	5	2144	101	5815	5916
Apprch %	28.6	37.8	33.6			45.5	35.8	18.7			8.8	86.2	5			4.8	89.3	5.9					
Total %	2.7	3.6	3.2		9.6	5.9	4.7	2.4		13	3.6	35	2		40.6	1.8	32.9	2.2		36.9	1.7	98.3	
Unshifted	155	208	182		603	343	268	137		779	206	1917	118		2246	101	1801	123		2030	0	0	5658
% Unshifted	97.5	99	97.3	98.3	98	99.7	98.9	97.2	96.9	98.9	99	94.3	100	100	95	98.1	94	97.6	100	94.5	0	0	95.6
Heavy Vehicles	4	2	5		12	1	3	4		9	2	116	0		118	2	114	3		119	0	0	258
% Heavy Vehicles	2.5	1	2.7	1.7	2	0.3	1.1	2.8	3.1	1.1	1	5.7	0	0	5	1.9	6	2.4	0	5.5	0	0	4.4

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464
Route 72 &
York Street/Shopping Center DW

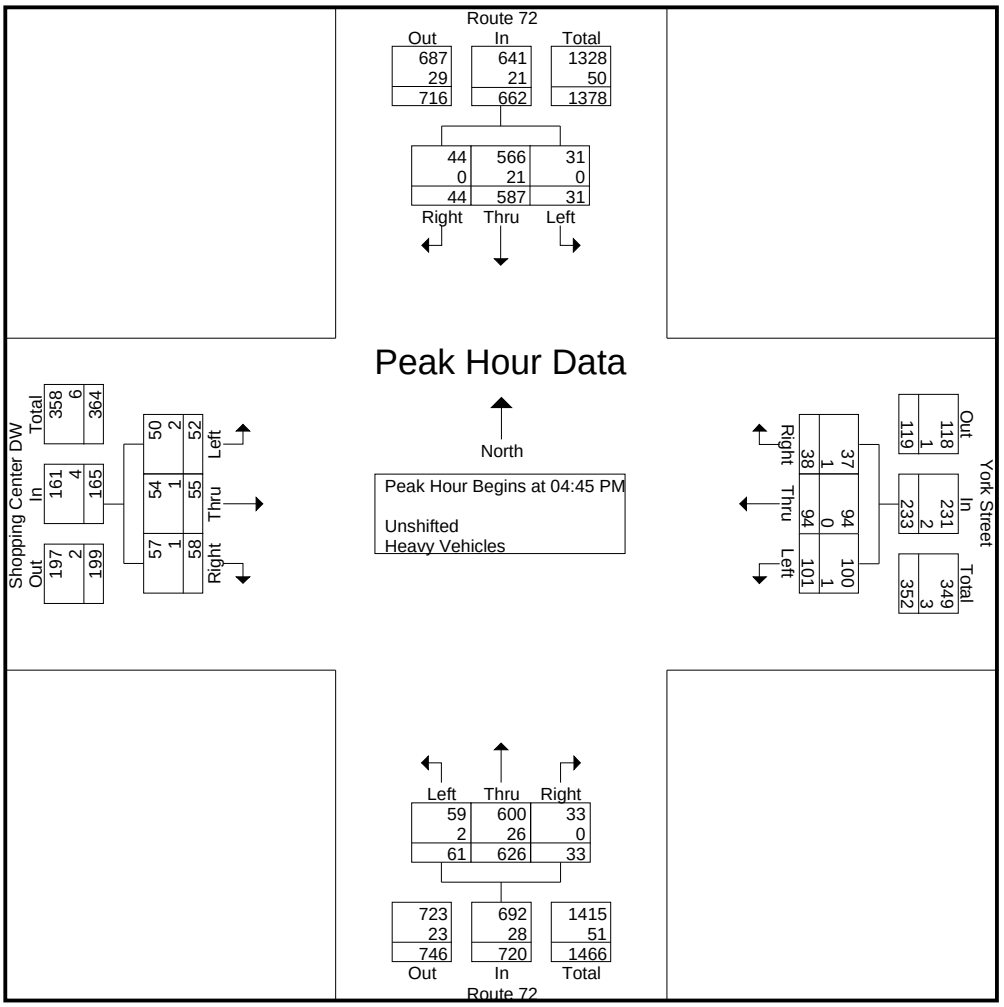
File Name : 2010-10-21 PM72YSDW
Site Code : 00000000
Start Date : 10/21/2010
Page No : 2



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464
Route 72 &
York Street/Shopping Center DW

File Name : 2010-10-21 PM72YSDW
Site Code : 00000000
Start Date : 10/21/2010
Page No : 3

	Shopping Center DW Eastbound				York Street Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	13	**17**	13	43	28	29	9	**66**	14	134	**14**	162	**9**	**156**	9	**174**	445
05:00 PM	13	15	10	38	**31**	19	7	57	14	**170**	10	**194**	5	146	12	163	452
05:15 PM	**17**	6	14	37	19	16	**11**	46	15	157	3	175	9	135	**14**	158	416
05:30 PM	9	17	**21**	**47**	23	**30**	11	64	**18**	165	6	189	8	150	9	167	**467**
Total Volume	52	55	58	165	101	94	38	233	61	626	33	720	31	587	44	662	1780
% App. Total	31.5	33.3	35.2		43.3	40.3	16.3		8.5	86.9	4.6		4.7	88.7	6.6		
PHF	.765	.809	.690	.878	.815	.783	.864	.883	.847	.921	.589	.928	.861	.941	.786	.951	.953
Unshifted	50	54	57	161	100	94	37	231	59	600	33	692	31	566	44	641	1725
% Unshifted	96.2	98.2	98.3	97.6	99.0	100	97.4	99.1	96.7	95.8	100	96.1	100	96.4	100	96.8	96.9
Heavy Vehicles	2	1	1	4	1	0	1	2	2	26	0	28	0	21	0	21	55
% Heavy Vehicles	3.8	1.8	1.7	2.4	1.0	0	2.6	0.9	3.3	4.2	0	3.9	0	3.6	0	3.2	3.1



Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Route 241

Counter: 20
Counted by: E. Farley
Weather: Clear
Saved as: 2010-10-21 PM72241

File Name : 2010-10-21 PM72241
Site Code : 00000000
Start Date : 10/21/2010
Page No : 1

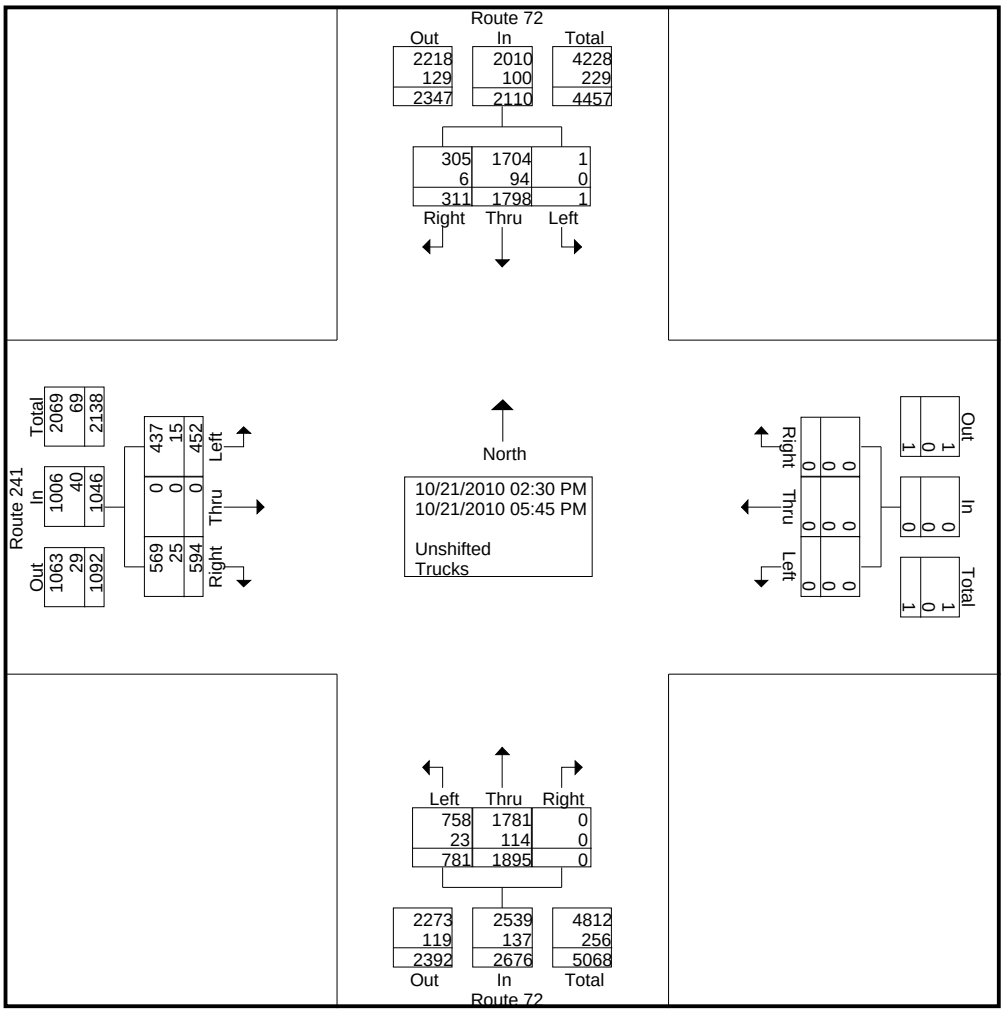
Groups Printed- Unshifted - Trucks

	Route 241 Eastbound					Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	26	0	49	0	75	0	0	0	0	0	56	99	0	0	155	1	88	20	1	109	1	339	340
02:45 PM	19	0	36	0	55	0	0	0	0	0	39	102	0	0	141	0	140	11	1	151	1	347	348
Total	45	0	85	0	130	0	0	0	0	0	95	201	0	0	296	1	228	31	2	260	2	686	688
03:00 PM	25	0	49	0	74	0	0	0	0	0	69	139	0	0	208	0	119	19	0	138	0	420	420
03:15 PM	29	0	41	0	70	0	0	0	0	0	69	130	0	0	199	0	125	19	5	144	5	413	418
03:30 PM	39	0	45	0	84	0	0	0	0	0	56	121	0	1	177	0	129	22	2	151	3	412	415
03:45 PM	36	0	34	0	70	0	0	0	0	0	50	145	0	0	195	0	148	27	0	175	0	440	440
Total	129	0	169	0	298	0	0	0	0	0	244	535	0	1	779	0	521	87	7	608	8	1685	1693
04:00 PM	35	0	44	0	79	0	0	0	0	0	68	143	0	0	211	0	121	29	2	150	2	440	442
04:15 PM	39	0	43	0	82	0	0	0	0	0	55	125	0	0	180	0	135	19	2	154	2	416	418
04:30 PM	39	0	38	0	77	0	0	0	0	0	77	138	0	0	215	0	121	28	0	149	0	441	441
04:45 PM	53	0	35	0	88	0	0	0	0	0	41	145	0	0	186	0	147	26	1	173	1	447	448
Total	166	0	160	0	326	0	0	0	0	0	241	551	0	0	792	0	524	102	5	626	5	1744	1749
05:00 PM	31	0	52	0	83	0	0	0	0	0	60	161	0	0	221	0	133	29	0	162	0	466	466
05:15 PM	32	0	46	0	78	0	0	0	0	0	45	152	0	0	197	0	148	18	1	166	1	441	442
05:30 PM	24	0	39	0	63	0	0	0	0	0	49	149	0	0	198	0	134	23	3	157	3	418	421
05:45 PM	25	0	43	0	68	0	0	0	0	0	47	146	0	0	193	0	110	21	3	131	3	392	395
Total	112	0	180	0	292	0	0	0	0	0	201	608	0	0	809	0	525	91	7	616	7	1717	1724
Grand Total	452	0	594	0	1046	0	0	0	0	0	781	1895	0	1	2676	1	1798	311	21	2110	22	5832	5854
Apprch %	43.2	0	56.8			0	0	0			29.2	70.8	0			0	85.2	14.7					
Total %	7.8	0	10.2		17.9	0	0	0		0	13.4	32.5	0		45.9	0	30.8	5.3		36.2	0.4	99.6	
Unshifted	437	0	569		1006	0	0	0		0	758	1781	0		2540	1	1704	305		2031	0	0	5577
% Unshifted	96.7	0	95.8	0	96.2	0	0	0	0	0	97.1	94	0	100	94.9	100	94.8	98.1	100	95.3	0	0	95.3
Trucks	15	0	25		40	0	0	0		0	23	114	0		137	0	94	6		100	0	0	277
% Trucks	3.3	0	4.2	0	3.8	0	0	0	0	0	2.9	6	0	0	5.1	0	5.2	1.9	0	4.7	0	0	4.7

Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Route 241

File Name : 2010-10-21 PM72241
Site Code : 00000000
Start Date : 10/21/2010
Page No : 2

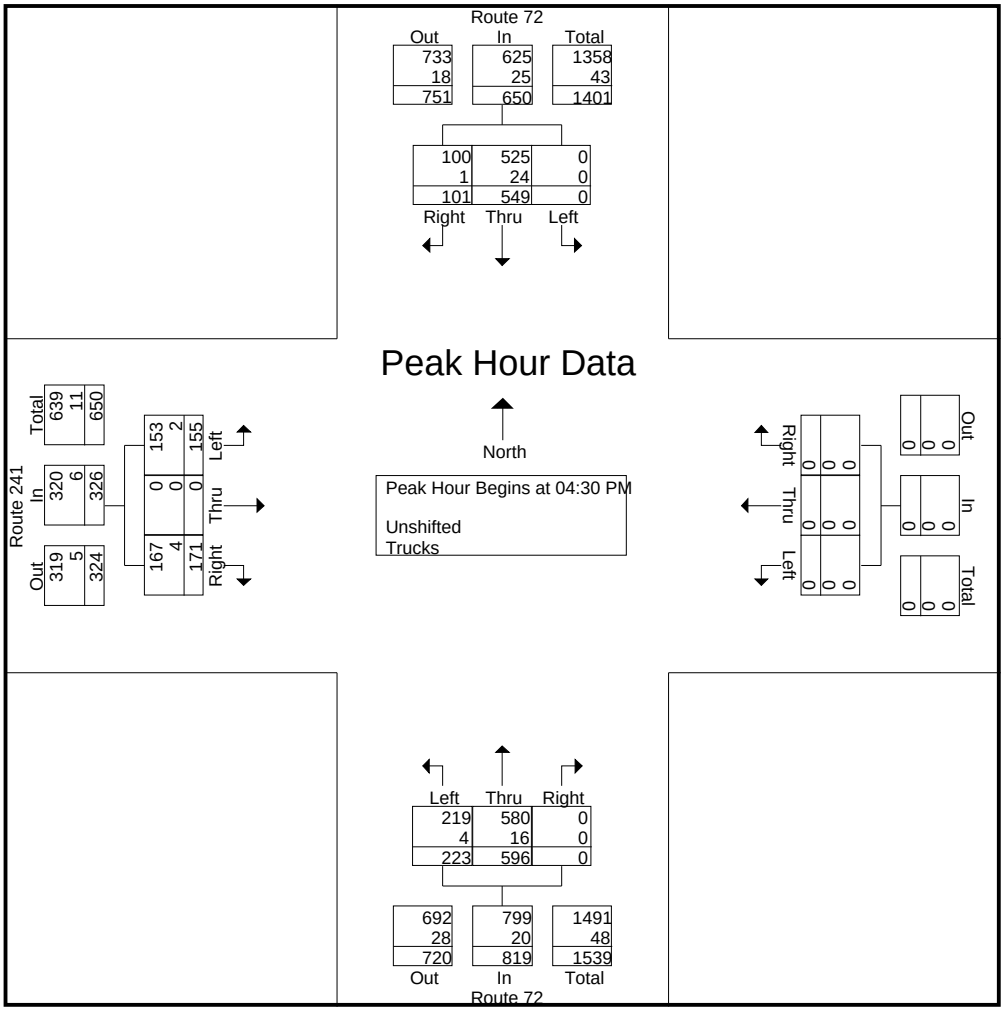


Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Route 241

File Name : 2010-10-21 PM72241
Site Code : 00000000
Start Date : 10/21/2010
Page No : 3

	Route 241 Eastbound				Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	39	0	38	77	0	0	0	0	**77**	138	0	215	0	121	28	149	441
04:45 PM	**53**	0	35	**88**	0	0	0	0	41	145	0	186	0	147	26	**173**	447
05:00 PM	31	0	**52**	83	0	0	0	0	60	**161**	0	**221**	0	133	**29**	162	**466**
05:15 PM	32	0	46	78	0	0	0	0	45	152	0	197	0	**148**	18	166	441
Total Volume	155	0	171	326	0	0	0	0	223	596	0	819	0	549	101	650	1795
% App. Total	47.5	0	52.5		0	0	0		27.2	72.8	0		0	84.5	15.5		
PHF	.731	.000	.822	.926	.000	.000	.000	.000	.724	.925	.000	.926	.000	.927	.871	.939	.963
Unshifted	153	0	167	320	0	0	0	0	219	580	0	799	0	525	100	625	1744
% Unshifted	98.7	0	97.7	98.2	0	0	0	0	98.2	97.3	0	97.6	0	95.6	99.0	96.2	97.2
Trucks	2	0	4	6	0	0	0	0	4	16	0	20	0	24	1	25	51
% Trucks	1.3	0	2.3	1.8	0	0	0	0	1.8	2.7	0	2.4	0	4.4	1.0	3.8	2.8



Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Route 241

Counter: 20
Counted by: E. Farley
Weather: Clear
Saved as: 2010-10-21 PM72241

File Name : 2010-10-21 PM72241
Site Code : 00000000
Start Date : 10/21/2010
Page No : 1

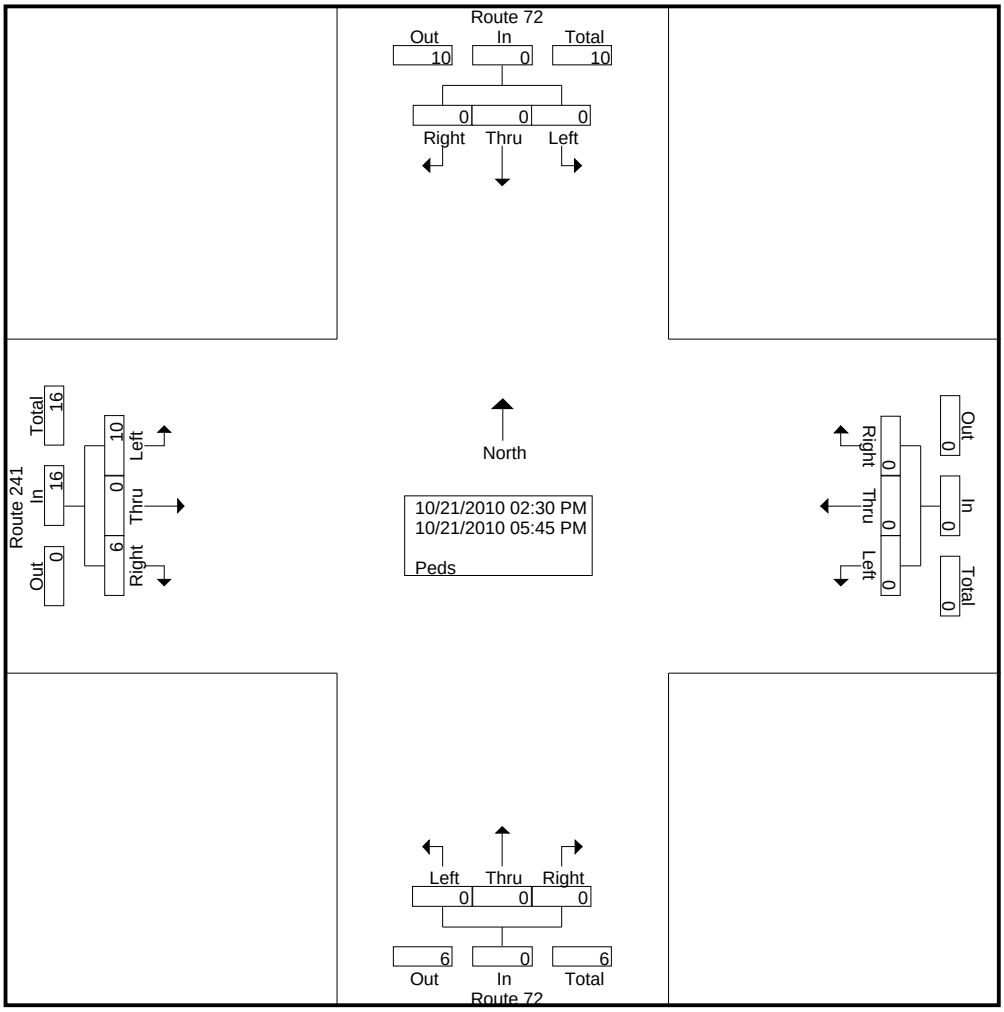
Groups Printed- Peds

	Route 241 Eastbound					Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
02:45 PM	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Total	3	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
03:00 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
04:00 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:15 PM	1	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
04:30 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:45 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	3	0	3	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
05:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
05:15 PM	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
05:30 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
Grand Total	10	0	6	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16
Apprch %	62.5	0	37.5			0	0	0			0	0	0			0	0	0					
Total %	62.5	0	37.5		100	0	0	0		0	0	0	0		0	0	0	0		0	0	100	

Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Route 241

File Name : 2010-10-21 PM72241
Site Code : 00000000
Start Date : 10/21/2010
Page No : 2

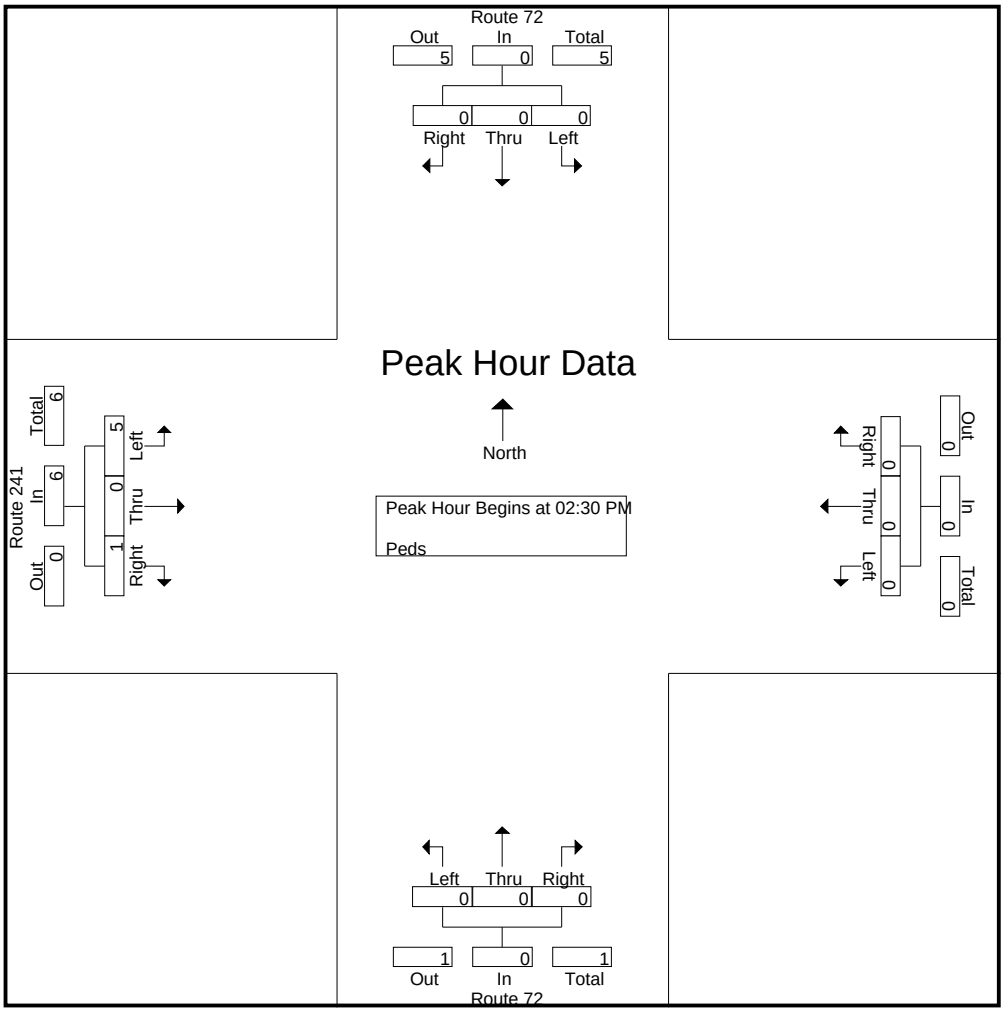


Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Route 241

File Name : 2010-10-21 PM72241
Site Code : 00000000
Start Date : 10/21/2010
Page No : 3

	Route 241 Eastbound				Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:30 PM																	
02:30 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
02:45 PM	**2**	0	**1**	**3**	0	0	0	0	0	0	0	0	0	0	0	0	**3**
03:00 PM	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	5	0	1	6	0	0	0	0	0	0	0	0	0	0	0	0	6
% App. Total	83.3	0	16.7		0	0	0		0	0	0		0	0	0		
PHF	.625	.000	.250	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Rd &
Rocherty Road

Counter: 25
Counted by: S. Hutt
Weather: Overcast/Rain
Saved as: 2009-05-27 PMCRRR

File Name : 2009-05-27 PMCRRR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

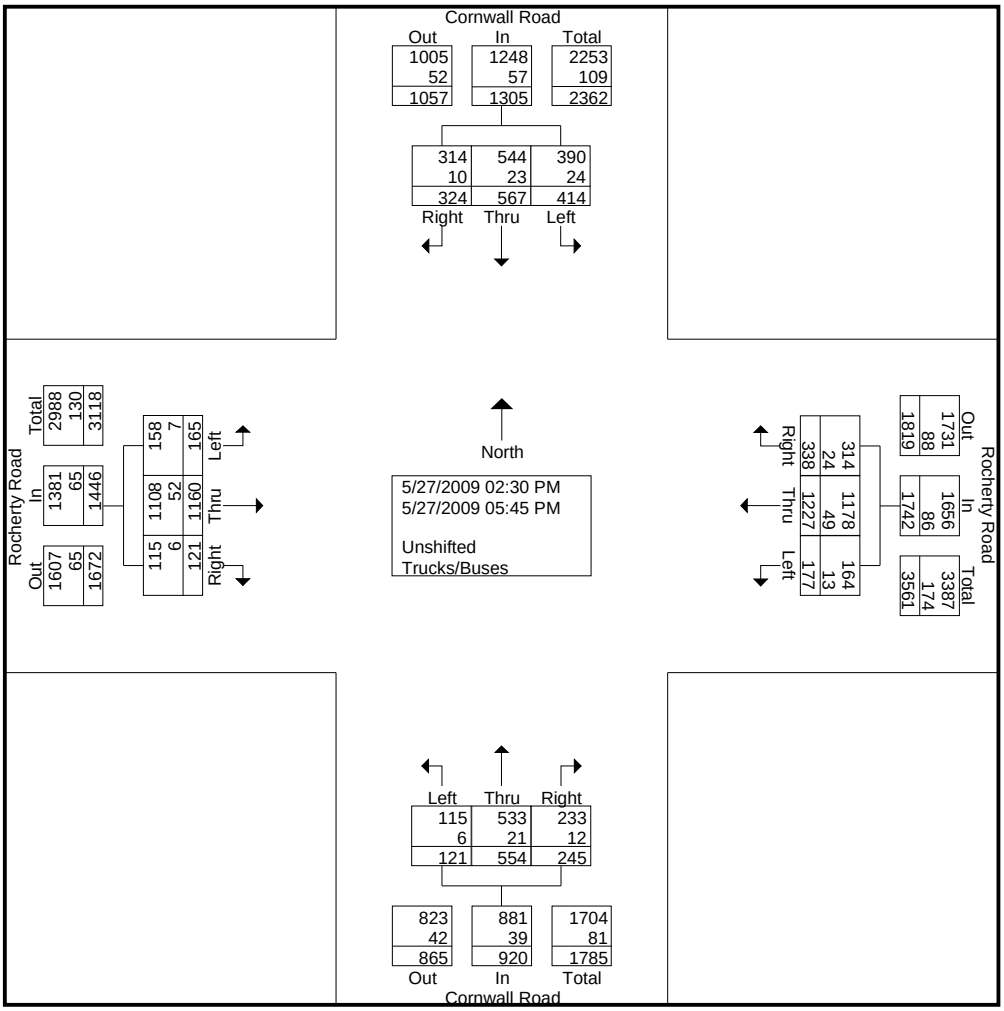
Groups Printed- Unshifted - Trucks/Buses

	Cornwall Road Southbound					Rocherty Road Westbound					Cornwall Road Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	32	30	17	0	79	12	94	38	0	144	7	36	12	0	55	14	52	6	0	72	0	350	350
02:45 PM	31	24	15	2	70	7	69	27	0	103	11	35	19	0	65	10	72	11	0	93	2	331	333
Total	63	54	32	2	149	19	163	65	0	247	18	71	31	0	120	24	124	17	0	165	2	681	683
03:00 PM	26	34	13	0	73	15	90	32	0	137	8	48	17	0	73	15	72	4	0	91	0	374	374
03:15 PM	16	31	23	0	70	10	95	22	0	127	6	41	8	0	55	12	86	10	0	108	0	360	360
03:30 PM	22	36	15	0	73	9	95	21	0	125	8	43	19	0	70	17	98	9	0	124	0	392	392
03:45 PM	33	45	29	0	107	15	92	33	0	140	10	34	24	0	68	18	76	10	0	104	0	419	419
Total	97	146	80	0	323	49	372	108	0	529	32	166	68	0	266	62	332	33	0	427	0	1545	1545
04:00 PM	34	46	24	0	104	14	98	35	0	147	8	46	19	1	73	12	80	5	0	97	1	421	422
04:15 PM	25	48	26	0	99	18	92	22	0	132	12	31	22	0	65	6	92	10	0	108	0	404	404
04:30 PM	44	49	34	0	127	14	119	24	0	157	10	39	20	0	69	16	89	13	0	118	0	471	471
04:45 PM	24	40	25	0	89	8	101	16	0	125	4	52	12	0	68	8	92	10	0	110	0	392	392
Total	127	183	109	0	419	54	410	97	0	561	34	168	73	1	275	42	353	38	0	433	1	1688	1689
05:00 PM	34	49	39	0	122	15	75	11	0	101	14	41	23	0	78	10	89	5	0	104	0	405	405
05:15 PM	26	59	25	0	110	14	79	15	0	108	12	31	15	0	58	7	93	11	0	111	0	387	387
05:30 PM	27	36	21	0	84	16	70	20	0	106	5	35	19	0	59	11	82	9	0	102	0	351	351
05:45 PM	40	40	18	0	98	10	58	22	0	90	6	42	16	0	64	9	87	8	0	104	0	356	356
Total	127	184	103	0	414	55	282	68	0	405	37	149	73	0	259	37	351	33	0	421	0	1499	1499
Grand Total	414	567	324	2	1305	177	1227	338	0	1742	121	554	245	1	920	165	1160	121	0	1446	3	5413	5416
Apprch %	31.7	43.4	24.8			10.2	70.4	19.4			13.2	60.2	26.6			11.4	80.2	8.4					
Total %	7.6	10.5	6		24.1	3.3	22.7	6.2		32.2	2.2	10.2	4.5		17	3	21.4	2.2		26.7	0.1	99.9	
Unshifted	390	544	314		1250	164	1178	314		1656	115	533	233		882	158	1108	115		1381	0	0	5169
% Unshifted	94.2	95.9	96.9	100	95.6	92.7	96	92.9	0	95.1	95	96.2	95.1	100	95.8	95.8	95.5	95	0	95.5	0	0	95.4
Trucks/Buses	24	23	10		57	13	49	24		86	6	21	12		39	7	52	6		65	0	0	247
% Trucks/Buses	5.8	4.1	3.1	0	4.4	7.3	4	7.1	0	4.9	5	3.8	4.9	0	4.2	4.2	4.5	5	0	4.5	0	0	4.6

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Rd &
Rocherty Road

File Name : 2009-05-27 PMCRRR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

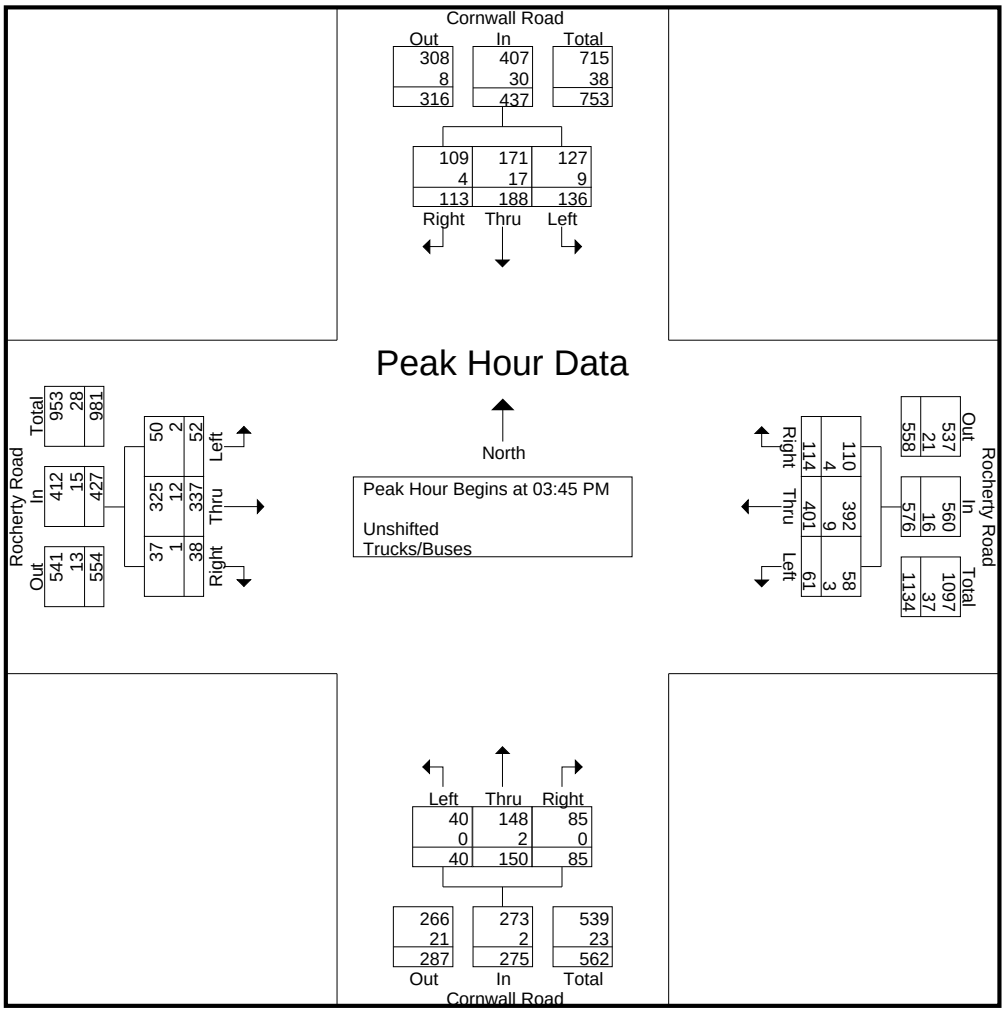


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Rd &
Rocherty Road

File Name : 2009-05-27 PMCRRR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 3

	Cornwall Road Southbound				Rocherty Road Westbound				Cornwall Road Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	33	45	29	107	15	92	33	140	10	34	24	68	18	76	10	104	419
04:00 PM	34	46	24	104	14	98	35	147	8	46	19	73	12	80	5	97	421
04:15 PM	25	48	26	99	18	92	22	132	12	31	22	65	6	92	10	108	404
04:30 PM	44	49	34	127	14	119	24	157	10	39	20	69	16	89	13	118	471
Total Volume	136	188	113	437	61	401	114	576	40	150	85	275	52	337	38	427	1715
% App. Total	31.1	43	25.9		10.6	69.6	19.8		14.5	54.5	30.9		12.2	78.9	8.9		
PHF	.773	.959	.831	.860	.847	.842	.814	.917	.833	.815	.885	.942	.722	.916	.731	.905	.910
Unshifted	127	171	109	407	58	392	110	560	40	148	85	273	50	325	37	412	1652
% Unshifted	93.4	91.0	96.5	93.1	95.1	97.8	96.5	97.2	100	98.7	100	99.3	96.2	96.4	97.4	96.5	96.3
Trucks/Buses	9	17	4	30	3	9	4	16	0	2	0	2	2	12	1	15	63
% Trucks/Buses	6.6	9.0	3.5	6.9	4.9	2.2	3.5	2.8	0	1.3	0	0.7	3.8	3.6	2.6	3.5	3.7



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Rd &
Rocherty Road

Counter: 25
Counted by: S. Hutt
Weather: Overcast/Rain
Saved as: 2009-05-27 PMCRRR

File Name : 2009-05-27 PMCRRR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

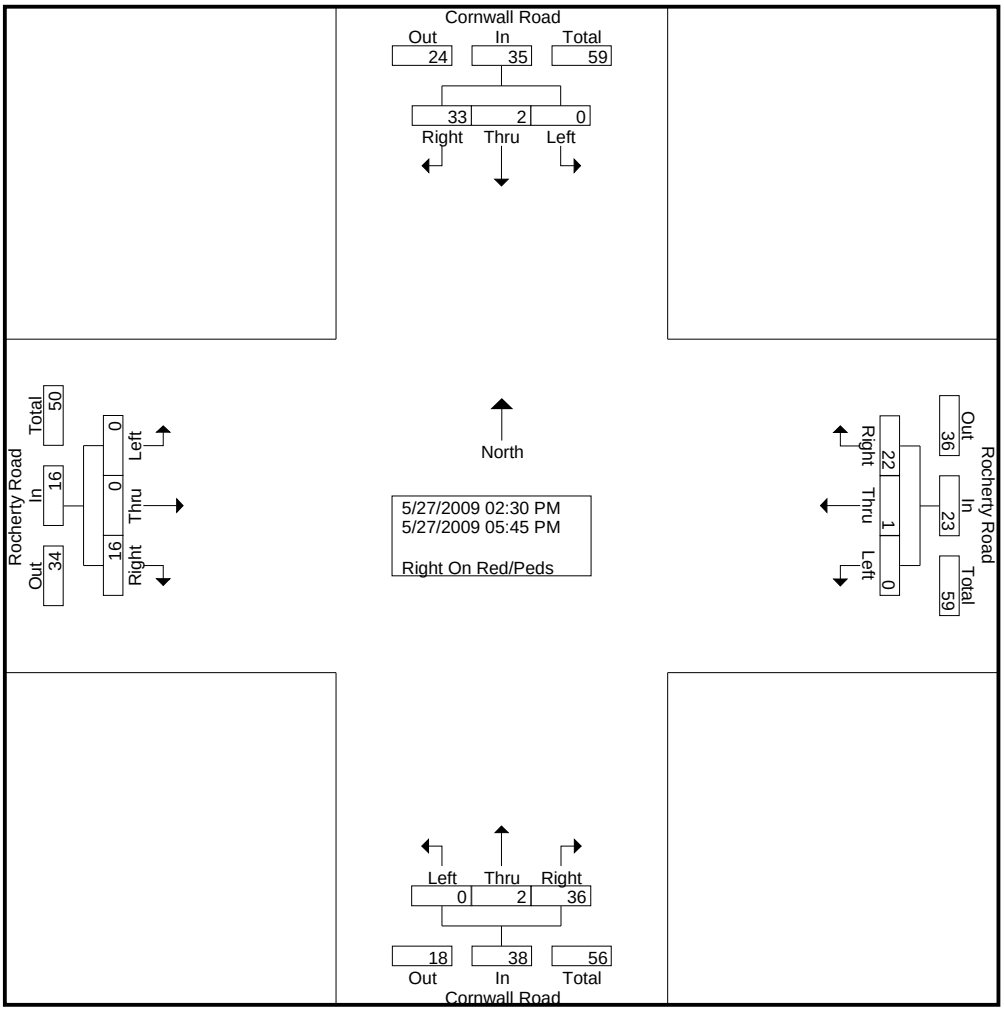
Groups Printed- Right On Red/Peds

	Cornwall Road Southbound					Rocherty Road Westbound					Cornwall Road Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	0	0	2	0	2	0	0	2	0	2	0	0	2	0	2	0	0	0	0	0	0	6	6
02:45 PM	0	0	10	0	10	0	0	1	0	1	0	0	2	0	2	0	0	2	0	2	0	15	15
Total	0	0	12	0	12	0	0	3	0	3	0	0	4	0	4	0	0	2	0	2	0	21	21
03:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	3	3
03:15 PM	0	0	4	0	4	0	0	5	0	5	0	0	0	0	0	0	0	2	0	2	0	11	11
03:30 PM	0	0	3	0	3	0	0	3	0	3	0	0	3	0	3	0	0	0	0	0	0	9	9
03:45 PM	0	0	3	0	3	0	0	1	0	1	0	0	3	0	3	0	0	2	0	2	0	9	9
Total	0	0	11	0	11	0	0	9	0	9	0	0	8	0	8	0	0	4	0	4	0	32	32
04:00 PM	0	0	0	0	0	0	0	1	1	1	0	0	5	0	5	0	0	0	0	0	1	6	7
04:15 PM	0	0	1	0	1	0	0	1	0	1	0	1	4	1	5	0	0	0	0	0	1	7	8
04:30 PM	0	2	3	2	5	0	0	0	0	0	0	0	2	0	2	0	0	1	0	1	2	8	10
04:45 PM	0	0	1	0	1	0	1	1	1	2	0	0	4	0	4	0	0	3	0	3	1	10	11
Total	0	2	5	2	7	0	1	3	2	4	0	1	15	1	16	0	0	4	0	4	5	31	36
05:00 PM	0	0	1	0	1	0	0	1	0	1	0	0	3	0	3	0	0	1	0	1	0	6	6
05:15 PM	0	0	1	0	1	0	0	2	0	2	0	0	1	0	1	0	0	2	0	2	0	6	6
05:30 PM	0	0	0	0	0	0	0	2	0	2	0	0	3	0	3	0	0	2	0	2	0	7	7
05:45 PM	0	0	3	0	3	0	0	2	0	2	0	1	2	1	3	0	0	1	0	1	1	9	10
Total	0	0	5	0	5	0	0	7	0	7	0	1	9	1	10	0	0	6	0	6	1	28	29
Grand Total	0	2	33	2	35	0	1	22	2	23	0	2	36	2	38	0	0	16	0	16	6	112	118
Apprch %	0	5.7	94.3			0	4.3	95.7			0	5.3	94.7			0	0	100					
Total %	0	1.8	29.5		31.2	0	0.9	19.6		20.5	0	1.8	32.1		33.9	0	0	14.3		14.3	5.1	94.9	

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Rd &
Rocherty Road

File Name : 2009-05-27 PMCRRR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

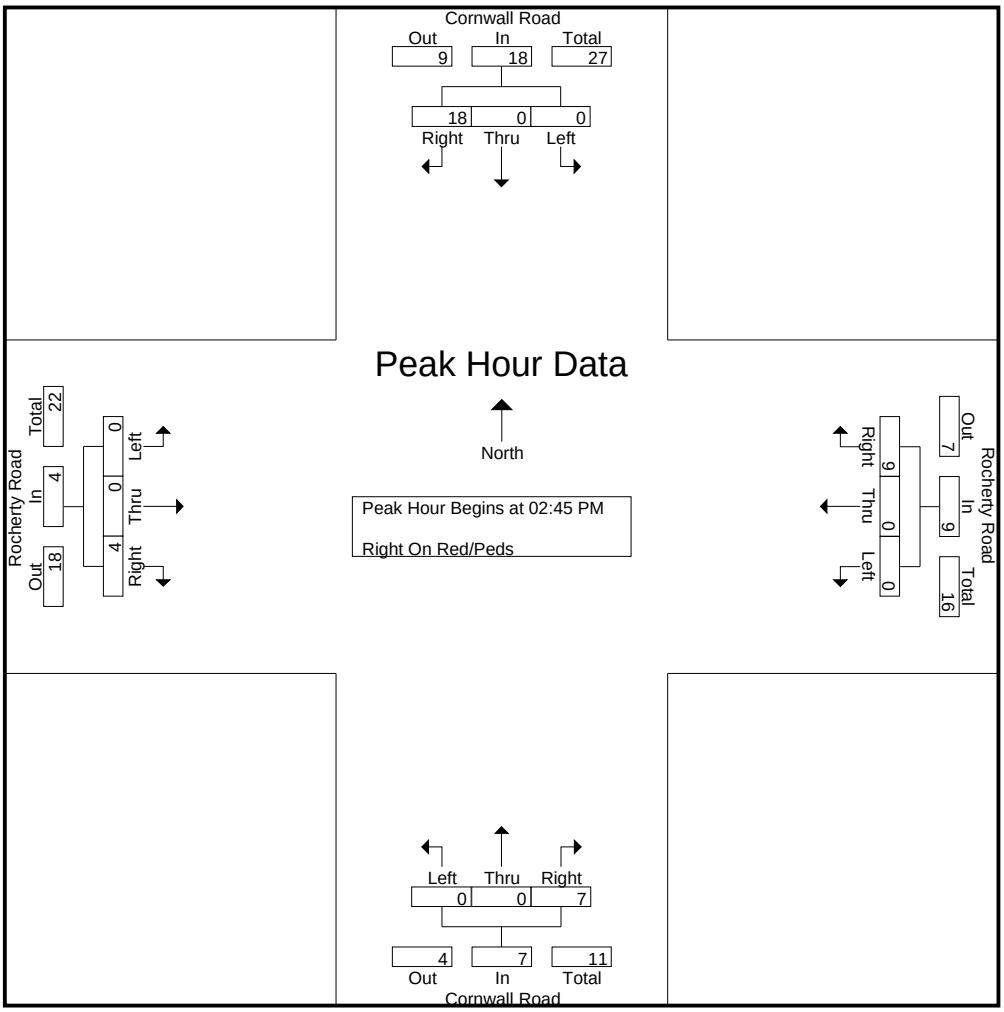


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Rd &
Rocherty Road

File Name : 2009-05-27 PMCRRR
Site Code : 00000000
Start Date : 5/27/2009
Page No : 3

	Cornwall Road Southbound				Rocherty Road Westbound				Cornwall Road Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:45 PM																	
02:45 PM	0	0	10	10	0	0	1	1	0	0	2	2	0	0	2	2	15
03:00 PM	0	0	1	1	0	0	0	0	0	0	2	2	0	0	0	0	3
03:15 PM	0	0	4	4	0	0	5	5	0	0	0	0	0	0	2	2	11
03:30 PM	0	0	3	3	0	0	3	3	0	0	3	3	0	0	0	0	9
Total Volume	0	0	18	18	0	0	9	9	0	0	7	7	0	0	4	4	38
% App. Total	0	0	100		0	0	100		0	0	100		0	0	100		
PHF	.000	.000	.450	.450	.000	.000	.450	.450	.000	.000	.583	.583	.000	.000	.500	.500	.633



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road & Isabel Drive

Counter: 27
Counted by: Z. Pierce
Weather: Overcast
Saved as: 2008-11-18 PMCRID

File Name : 2008-11-18 PMCRID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 1

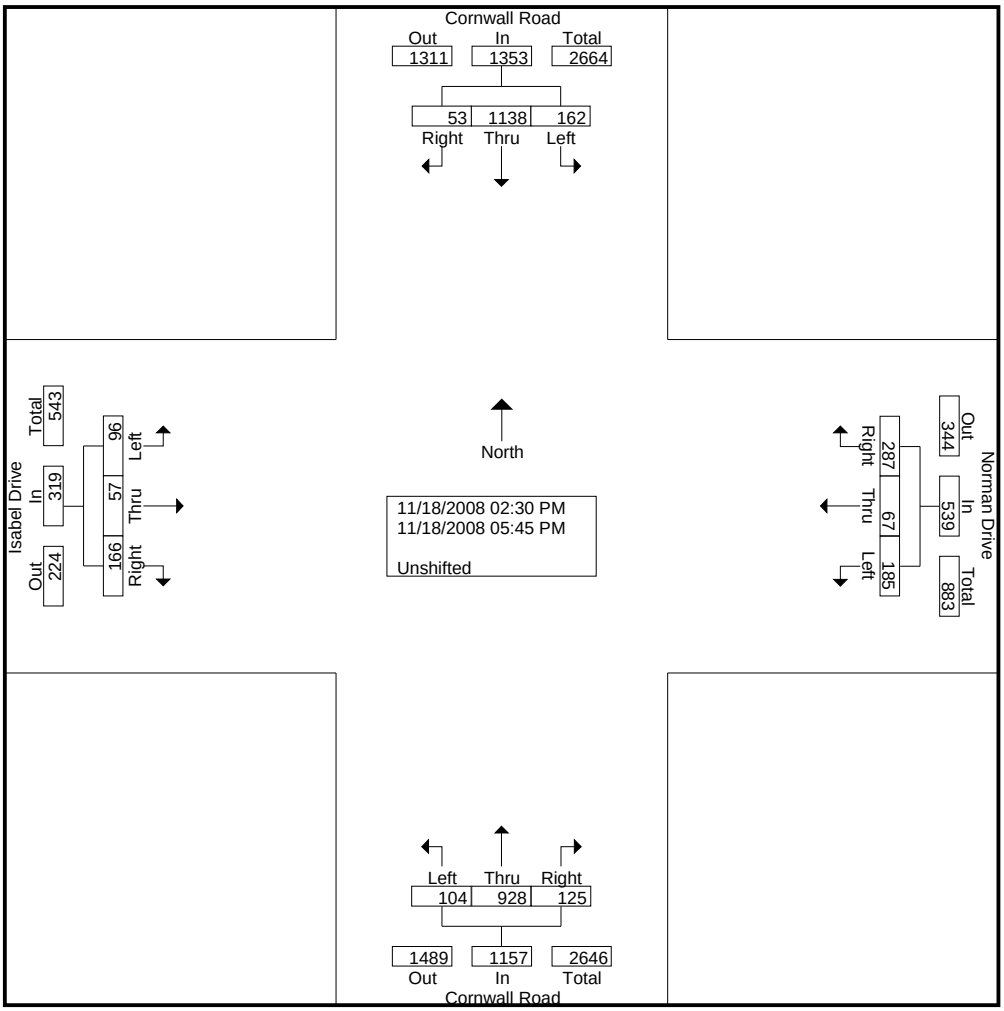
Groups Printed- Unshifted

	Cornwall Road Southbound					Norman Drive Westbound					Cornwall Road Northbound					Isabel Drive Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	11	61	3	4	75	9	4	16	0	29	10	59	8	10	77	7	7	5	1	19	15	200	215
02:45 PM	12	69	4	5	85	6	4	15	0	25	13	70	13	1	96	5	5	7	1	17	7	223	230
Total	23	130	7	9	160	15	8	31	0	54	23	129	21	11	173	12	12	12	2	36	22	423	445
03:00 PM	21	70	7	2	98	17	4	14	0	35	3	78	15	10	96	15	5	14	1	34	13	263	276
03:15 PM	14	67	5	3	86	11	6	15	0	32	10	67	8	2	85	11	7	15	2	33	7	236	243
03:30 PM	17	79	0	8	96	15	8	32	1	55	6	69	12	4	87	4	5	11	1	20	14	258	272
03:45 PM	17	67	4	2	88	13	9	19	0	41	7	78	16	5	101	3	6	12	1	21	8	251	259
Total	69	283	16	15	368	56	27	80	1	163	26	292	51	21	369	33	23	52	5	108	42	1008	1050
04:00 PM	18	89	3	11	110	22	7	22	0	51	10	74	10	1	94	7	5	16	0	28	12	283	295
04:15 PM	10	86	1	4	97	16	2	28	3	46	9	78	10	2	97	5	6	8	0	19	9	259	268
04:30 PM	10	87	7	5	104	20	3	30	0	53	8	64	12	1	84	9	1	11	0	21	6	262	268
04:45 PM	13	109	6	2	128	11	6	33	0	50	8	68	7	0	83	7	4	16	3	27	5	288	293
Total	51	371	17	22	439	69	18	113	3	200	35	284	39	4	358	28	16	51	3	95	32	1092	1124
05:00 PM	7	127	5	2	139	20	6	28	0	54	3	54	5	0	62	7	2	11	0	20	2	275	277
05:15 PM	5	86	2	1	93	8	4	12	0	24	9	53	4	3	66	12	3	14	0	29	4	212	216
05:30 PM	5	68	2	2	75	14	2	13	0	29	4	69	2	0	75	4	1	18	1	23	3	202	205
05:45 PM	2	73	4	1	79	3	2	10	0	15	4	47	3	2	54	0	0	8	0	8	3	156	159
Total	19	354	13	6	386	45	14	63	0	122	20	223	14	5	257	23	6	51	1	80	12	845	857
Grand Total	162	1138	53	52	1353	185	67	287	4	539	104	928	125	41	1157	96	57	166	11	319	108	3368	3476
Apprch %	12	84.1	3.9			34.3	12.4	53.2			9	80.2	10.8			30.1	17.9	52					
Total %	4.8	33.8	1.6		40.2	5.5	2	8.5		16	3.1	27.6	3.7		34.4	2.9	1.7	4.9		9.5	3.1	96.9	

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road & Isabel Drive

File Name : 2008-11-18 PMCRID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 2

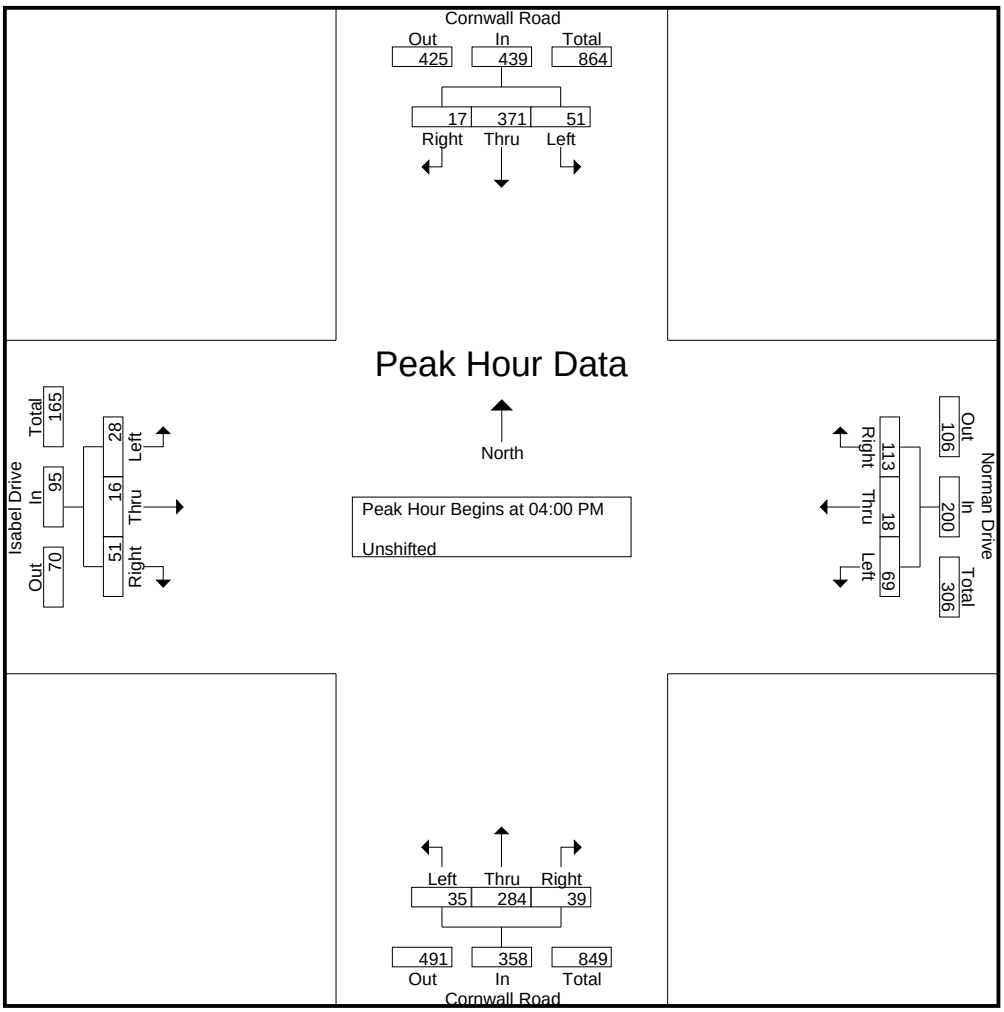


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road & Isabel Drive

File Name : 2008-11-18 PMCRID
Site Code : 00000000
Start Date : 11/18/2008
Page No : 3

	Cornwall Road Southbound				Norman Drive Westbound				Cornwall Road Northbound				Isabel Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	18	89	3	110	22	7	22	51	10	74	10	94	7	5	16	28	283
04:15 PM	10	86	1	97	16	2	28	46	9	78	10	97	5	6	8	19	259
04:30 PM	10	87	7	104	20	3	30	53	8	64	12	84	9	1	11	21	262
04:45 PM	13	109	6	128	11	6	33	50	8	68	7	83	7	4	16	27	288
Total Volume	51	371	17	439	69	18	113	200	35	284	39	358	28	16	51	95	1092
% App. Total	11.6	84.5	3.9		34.5	9	56.5		9.8	79.3	10.9		29.5	16.8	53.7		
PHF	.708	.851	.607	.857	.784	.643	.856	.943	.875	.910	.813	.923	.778	.667	.797	.848	.948



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
York Street

Counter: 27
Counted by: B. Coleman
Weather: Overcast/Rain
Saved as: 2009-05-27 PMCRYS

File Name : 2009-05-27 PMCRYS
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

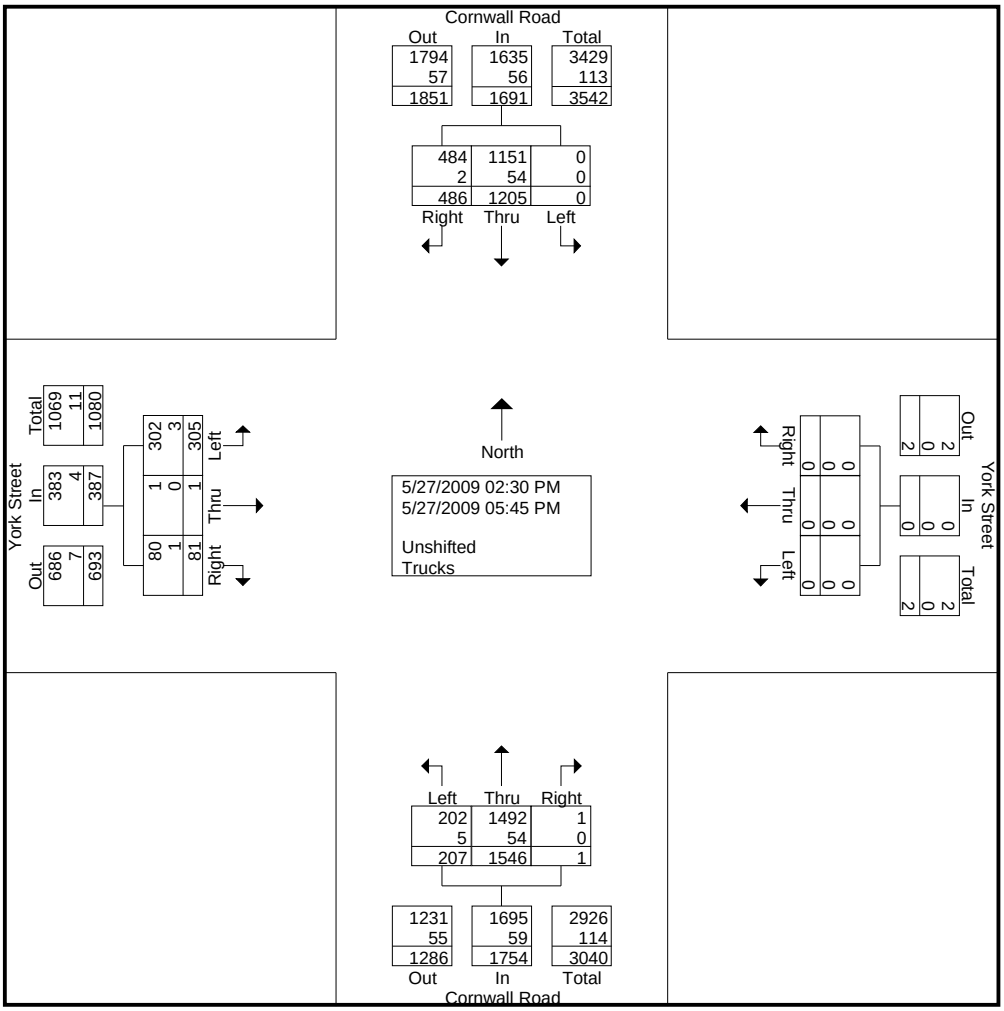
Groups Printed- Unshifted - Trucks

	Cornwall Road Southbound					York Street Westbound					Cornwall Road Northbound					York Street Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	0	87	32	0	119	0	0	0	0	0	15	103	0	0	118	24	0	9	0	33	0	270	270
02:45 PM	0	99	30	0	129	0	0	0	0	0	10	91	0	0	101	24	0	3	0	27	0	257	257
Total	0	186	62	0	248	0	0	0	0	0	25	194	0	0	219	48	0	12	0	60	0	527	527
03:00 PM	0	79	27	0	106	0	0	0	0	0	18	140	0	0	158	20	0	6	0	26	0	290	290
03:15 PM	0	78	44	0	122	0	0	0	0	0	12	101	0	0	113	19	0	9	0	28	0	263	263
03:30 PM	0	73	40	0	113	0	0	0	0	0	16	133	0	0	149	12	0	5	0	17	0	279	279
03:45 PM	0	110	37	0	147	0	0	0	0	0	20	110	0	0	130	24	0	7	0	31	0	308	308
Total	0	340	148	0	488	0	0	0	0	0	66	484	0	0	550	75	0	27	0	102	0	1140	1140
04:00 PM	0	95	31	0	126	0	0	0	0	0	17	131	0	0	148	20	1	5	0	26	0	300	300
04:15 PM	0	91	34	0	125	0	0	0	0	0	12	103	0	0	115	21	0	12	0	33	0	273	273
04:30 PM	0	90	31	0	121	0	0	0	0	0	18	120	1	0	139	33	0	5	0	38	0	298	298
04:45 PM	0	81	47	0	128	0	0	0	0	0	20	118	0	0	138	18	0	2	0	20	0	286	286
Total	0	357	143	0	500	0	0	0	0	0	67	472	1	0	540	92	1	24	0	117	0	1157	1157
05:00 PM	0	85	36	0	121	0	0	0	0	0	15	140	0	0	155	29	0	2	0	31	0	307	307
05:15 PM	0	81	42	0	123	0	0	0	0	0	10	80	0	0	90	25	0	6	0	31	0	244	244
05:30 PM	0	79	28	0	107	0	0	0	0	0	11	90	0	0	101	17	0	4	0	21	0	229	229
05:45 PM	0	77	27	0	104	0	0	0	0	0	13	86	0	0	99	19	0	6	0	25	0	228	228
Total	0	322	133	0	455	0	0	0	0	0	49	396	0	0	445	90	0	18	0	108	0	1008	1008
Grand Total	0	1205	486	0	1691	0	0	0	0	0	207	1546	1	0	1754	305	1	81	0	387	0	3832	3832
Apprch %	0	71.3	28.7			0	0	0			11.8	88.1	0.1			78.8	0.3	20.9					
Total %	0	31.4	12.7		44.1	0	0	0		0	5.4	40.3	0		45.8	8	0	2.1		10.1	0	100	
Unshifted	0	1151	484		1635	0	0	0		0	202	1492	1		1695	302	1	80		383	0	0	3713
% Unshifted	0	95.5	99.6	0	96.7	0	0	0	0	0	97.6	96.5	100	0	96.6	99	100	98.8	0	99	0	0	96.9
Trucks	0	54	2		56	0	0	0		0	5	54	0		59	3	0	1		4	0	0	119
% Trucks	0	4.5	0.4	0	3.3	0	0	0	0	0	2.4	3.5	0	0	3.4	1	0	1.2	0	1	0	0	3.1

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
York Street

File Name : 2009-05-27 PMCRYS
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

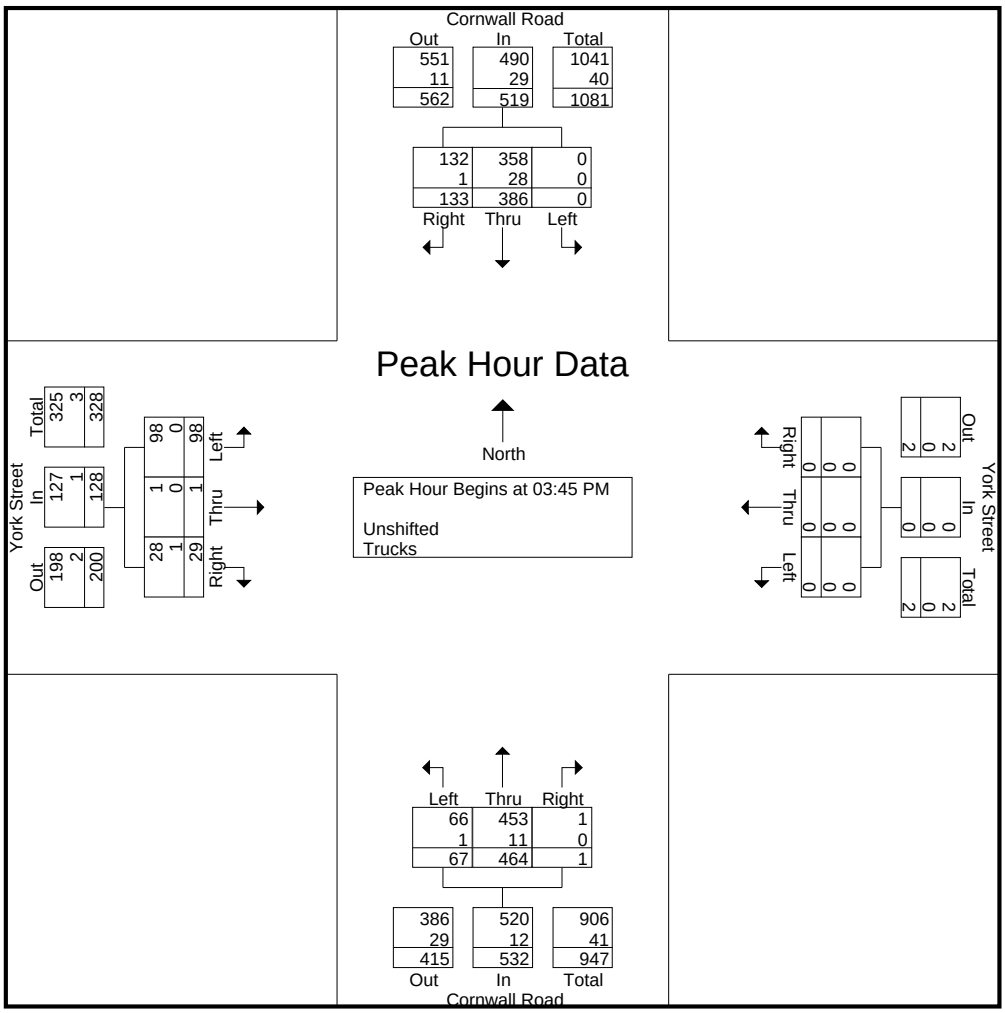


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
York Street

File Name : 2009-05-27 PMCRYS
Site Code : 00000000
Start Date : 5/27/2009
Page No : 3

	Cornwall Road Southbound				York Street Westbound				Cornwall Road Northbound				York Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	0	110	37	147	0	0	0	0	20	110	0	130	24	0	7	31	308
04:00 PM	0	95	31	126	0	0	0	0	17	131	0	148	20	1	5	26	300
04:15 PM	0	91	34	125	0	0	0	0	12	103	0	115	21	0	12	33	273
04:30 PM	0	90	31	121	0	0	0	0	18	120	1	139	33	0	5	38	298
Total Volume	0	386	133	519	0	0	0	0	67	464	1	532	98	1	29	128	1179
% App. Total	0	74.4	25.6		0	0	0		12.6	87.2	0.2		76.6	0.8	22.7		
PHF	.000	.877	.899	.883	.000	.000	.000	.000	.838	.885	.250	.899	.742	.250	.604	.842	.957
Unshifted	0	358	132	490	0	0	0	0	66	453	1	520	98	1	28	127	1137
% Unshifted	0	92.7	99.2	94.4	0	0	0	0	98.5	97.6	100	97.7	100	100	96.6	99.2	96.4
Trucks	0	28	1	29	0	0	0	0	1	11	0	12	0	0	1	1	42
% Trucks	0	7.3	0.8	5.6	0	0	0	0	1.5	2.4	0	2.3	0	0	3.4	0.8	3.6



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
York Street

Counter: 27
Counted by: B. Coleman
Weather: Overcast/Rain
Saved as: 2009-05-27 PMCRYS

File Name : 2009-05-27 PMCRYS
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

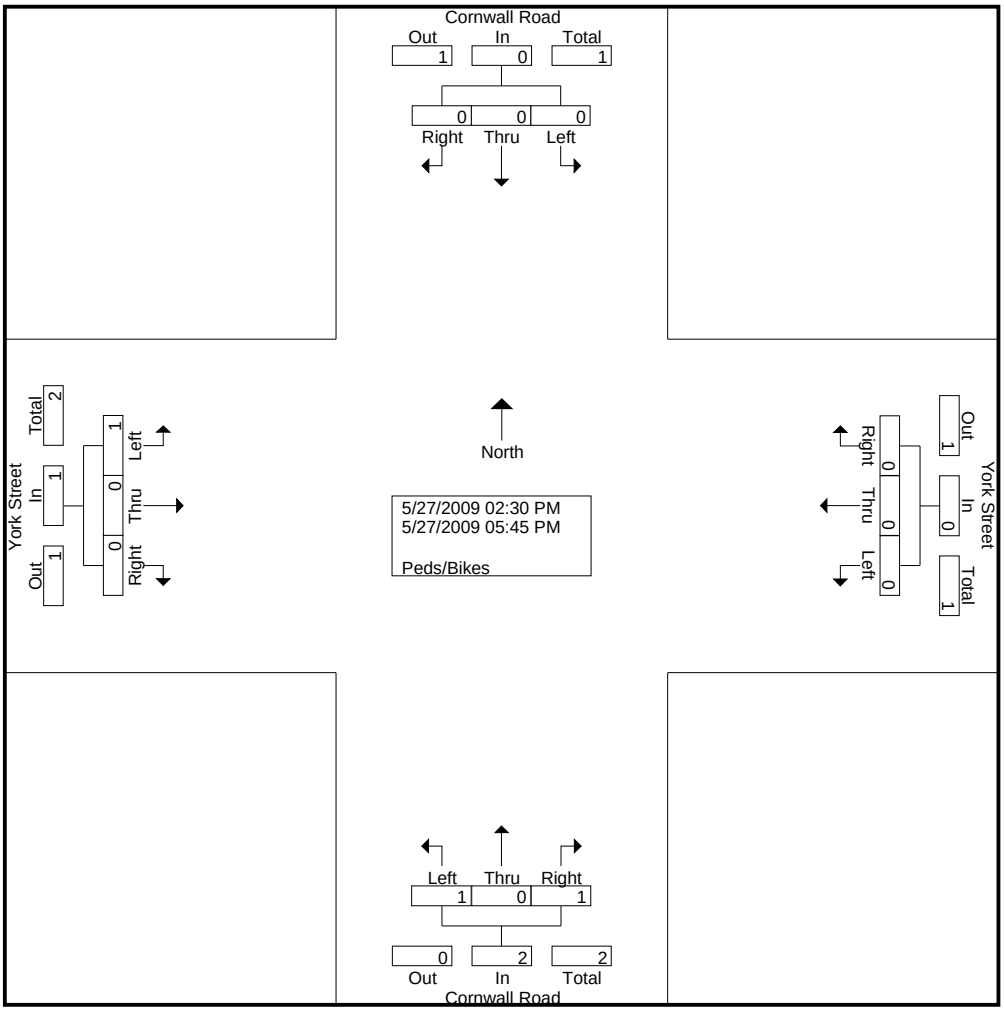
Groups Printed- Peds/Bikes

	Cornwall Road Southbound					York Street Westbound					Cornwall Road Northbound					York Street Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2	1	3
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	1	2
Grand Total	0	0	0	1	0	0	0	0	0	0	1	0	1	0	2	1	0	0	2	1	3	3	6
Apprch %	0	0	0			0	0	0			50	0	50			100	0	0					
Total %	0	0	0		0	0	0	0		0	33.3	0	33.3		66.7	33.3	0	0		33.3	50	50	

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
York Street

File Name : 2009-05-27 PMCRYS
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

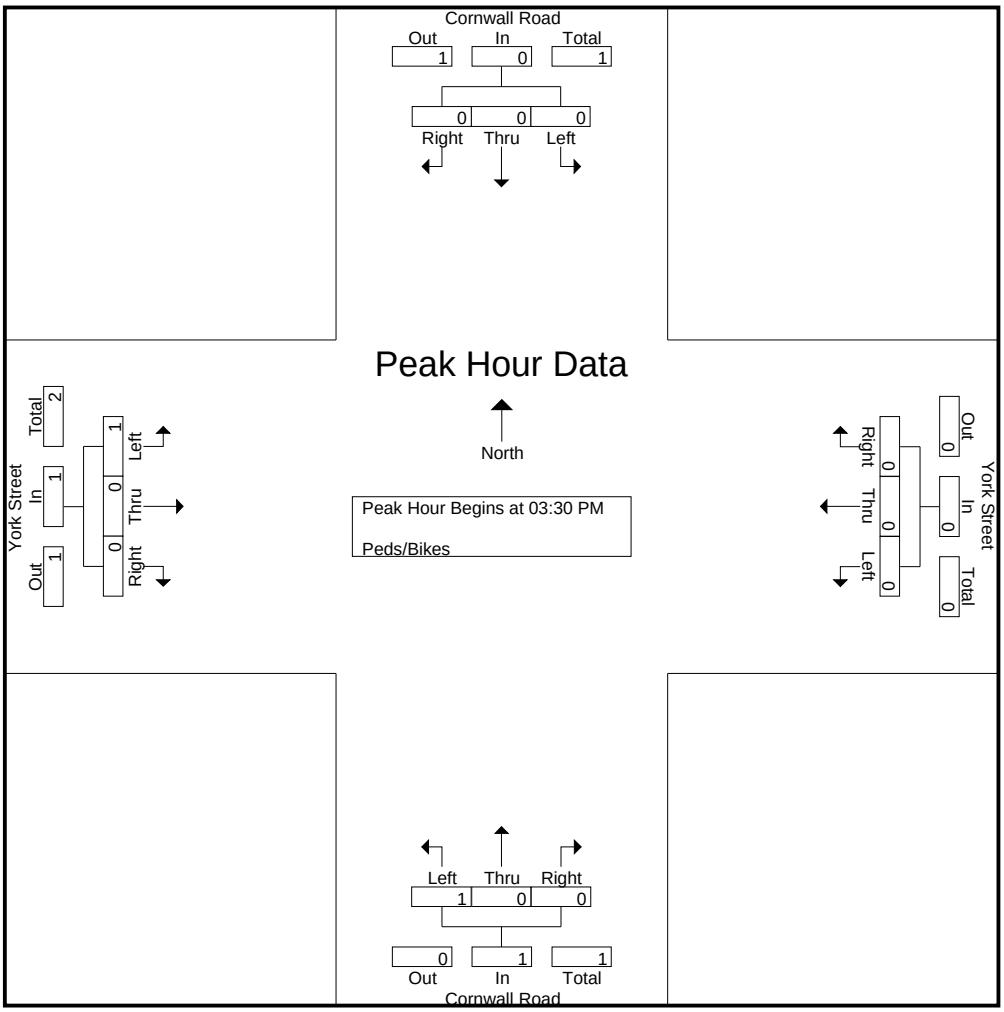


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
York Street

File Name : 2009-05-27 PMCRYS
Site Code : 00000000
Start Date : 5/27/2009
Page No : 3

	Cornwall Road Southbound				York Street Westbound				Cornwall Road Northbound				York Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:30 PM																	
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total Volume	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	2
% App. Total	0	0	0		0	0	0		100	0	0		100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.250	.000	.000	.250	.500



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
Wilhelm Avenue

Counter: 27
Counted by: E. Mountz
Weather: Overcast/Rain
Saved as: 2009-05-27 PMCRWA

File Name : 2009-05-27 PMCRWA
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

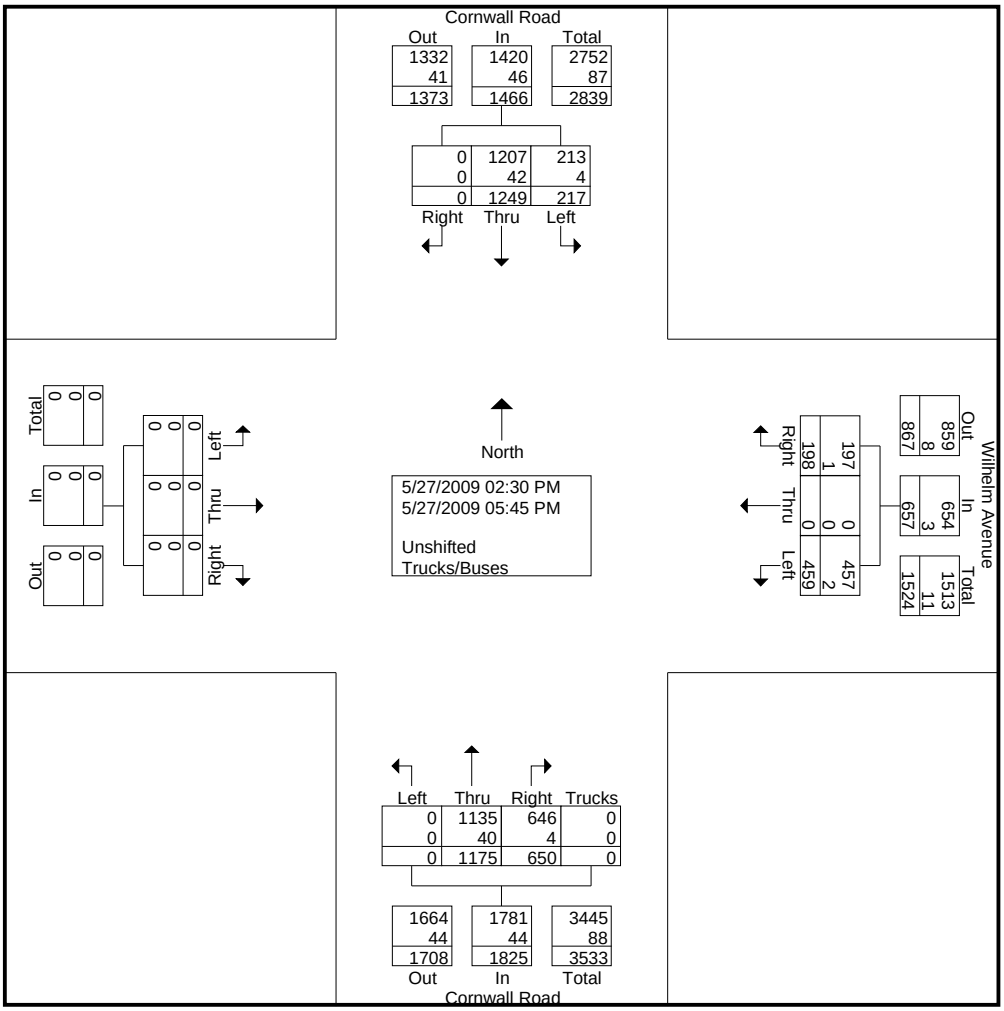
Groups Printed- Unshifted - Trucks/Buses

	Cornwall Road Southbound					Wilhelm Avenue Westbound					Cornwall Road Northbound					Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	14	98	0	0	112	20	0	10	0	30	0	72	43	0	115	0	0	0	0	0	0	257	257
02:45 PM	14	108	0	0	122	26	0	18	0	44	0	81	34	0	115	0	0	0	0	0	0	281	281
Total	28	206	0	0	234	46	0	28	0	74	0	153	77	0	230	0	0	0	0	0	0	538	538
03:00 PM	15	83	0	0	98	21	0	16	0	37	0	111	47	0	158	0	0	0	0	0	0	293	293
03:15 PM	20	93	0	0	113	44	0	10	0	54	0	87	43	0	130	0	0	0	0	0	0	297	297
03:30 PM	11	72	0	0	83	25	0	20	0	45	0	90	37	0	127	0	0	0	0	0	0	255	255
03:45 PM	14	115	0	0	129	39	0	11	0	50	0	75	54	0	129	0	0	0	0	0	0	308	308
Total	60	363	0	0	423	129	0	57	0	186	0	363	181	0	544	0	0	0	0	0	0	1153	1153
04:00 PM	21	98	0	1	119	34	0	14	0	48	0	105	52	0	157	0	0	0	0	0	1	324	325
04:15 PM	14	76	0	0	90	29	0	16	0	45	0	81	44	0	125	0	0	0	0	0	0	260	260
04:30 PM	12	92	0	0	104	39	0	19	0	58	0	90	49	0	139	0	0	0	0	0	0	301	301
04:45 PM	13	91	0	0	104	41	0	14	0	55	0	95	55	0	150	0	0	0	0	0	0	309	309
Total	60	357	0	1	417	143	0	63	0	206	0	371	200	0	571	0	0	0	0	0	1	1194	1195
05:00 PM	21	85	0	0	106	24	0	16	0	40	0	98	58	0	156	0	0	0	0	0	0	302	302
05:15 PM	14	93	0	0	107	42	0	11	0	53	0	70	51	0	121	0	0	0	0	0	0	281	281
05:30 PM	17	72	0	0	89	40	0	15	0	55	0	59	39	0	98	0	0	0	0	0	0	242	242
05:45 PM	17	73	0	0	90	35	0	8	0	43	0	61	44	0	105	0	0	0	0	0	0	238	238
Total	69	323	0	0	392	141	0	50	0	191	0	288	192	0	480	0	0	0	0	0	0	1063	1063
Grand Total	217	1249	0	1	1466	459	0	198	0	657	0	1175	650	0	1825	0	0	0	0	0	1	3948	3949
Apprch %	14.8	85.2	0			69.9	0	30.1			0	64.4	35.6	0		0	0	0					
Total %	5.5	31.6	0		37.1	11.6	0	5		16.6	0	29.8	16.5	0	46.2	0	0	0		0	0	100	
Unshifted	213	1207	0		1421	457	0	197		654	0	1135	646	0	1781	0	0	0		0	0	0	3856
% Unshifted	98.2	96.6	0	100	96.9	99.6	0	99.5	0	99.5	0	96.6	99.4	0	97.6	0	0	0	0	0	0	0	97.6
Trucks/Buses	4	42	0		46	2	0	1		3	0	40	4	0	44	0	0	0		0	0	0	93
% Trucks/Buses	1.8	3.4	0	0	3.1	0.4	0	0.5	0	0.5	0	3.4	0.6	0	2.4	0	0	0	0	0	0	0	2.4

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
Wilhelm Avenue

File Name : 2009-05-27 PMCRWA
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

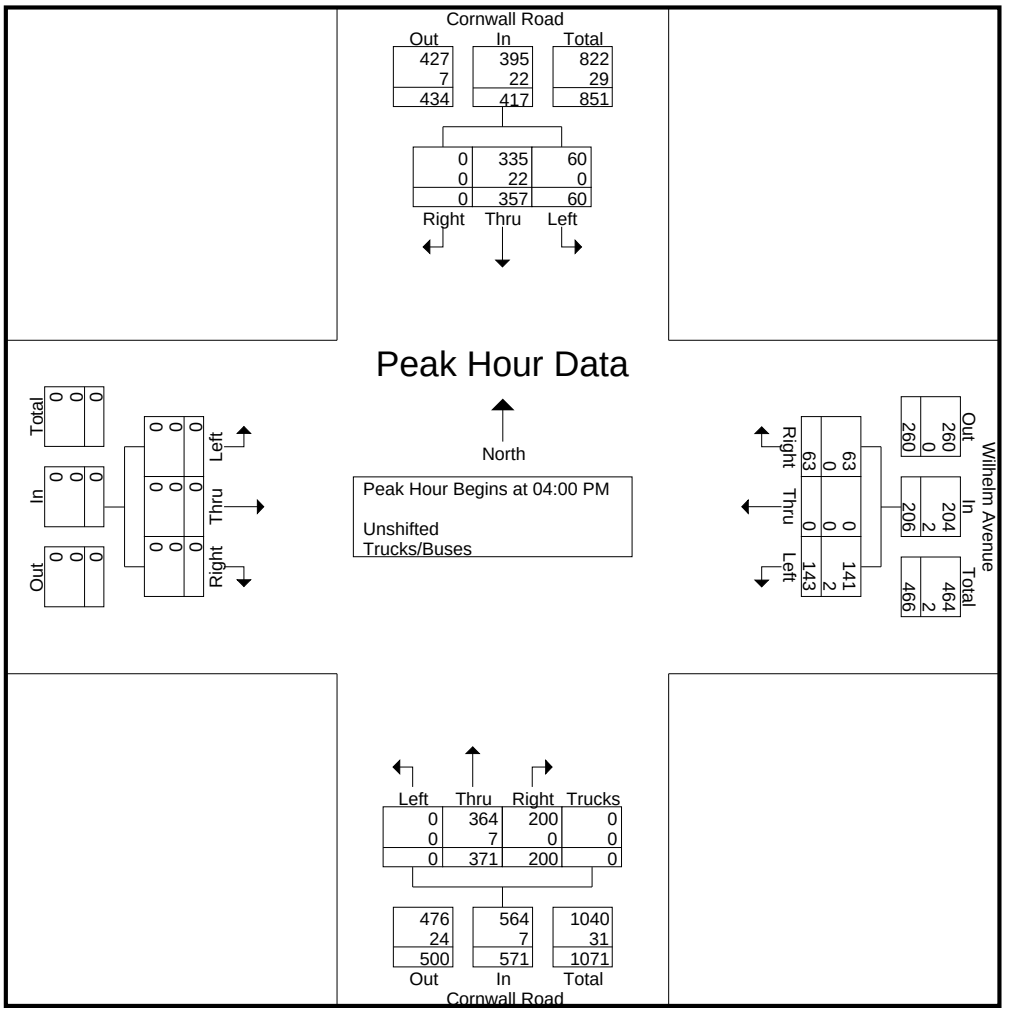


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
Wilhelm Avenue

File Name : 2009-05-27 PMCRWA
Site Code : 00000000
Start Date : 5/27/2009
Page No : 3

	Cornwall Road Southbound				Wilhelm Avenue Westbound				Cornwall Road Northbound					Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 04:00 PM																		
04:00 PM	21	98	0	119	34	0	14	48	0	105	52	0	157	0	0	0	0	324
04:15 PM	14	76	0	90	29	0	16	45	0	81	44	0	125	0	0	0	0	260
04:30 PM	12	92	0	104	39	0	19	58	0	90	49	0	139	0	0	0	0	301
04:45 PM	13	91	0	104	41	0	14	55	0	95	55	0	150	0	0	0	0	309
Total Volume	60	357	0	417	143	0	63	206	0	371	200	0	571	0	0	0	0	1194
% App. Total	14.4	85.6	0		69.4	0	30.6		0	65	35	0		0	0	0		
PHF	.714	.911	.000	.876	.872	.000	.829	.888	.000	.883	.909	.000	.909	.000	.000	.000	.000	.921
Unshifted	60	335	0	395	141	0	63	204	0	364	200	0	564	0	0	0	0	1163
% Unshifted	100	93.8	0	94.7	98.6	0	100	99.0	0	98.1	100	0	98.8	0	0	0	0	97.4
Trucks/Buses	0	22	0	22	2	0	0	2	0	7	0	0	7	0	0	0	0	31
% Trucks/Buses	0	6.2	0	5.3	1.4	0	0	1.0	0	1.9	0	0	1.2	0	0	0	0	2.6



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Lincoln Avenue &
Rocherty Road / Evergreen Road

Counter: 11
Counted by: Z. Pierce
Weather: Overcast/Rain
Saved as: 2009-05-27 PMLARRER

File Name : 2009-05-27 PMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

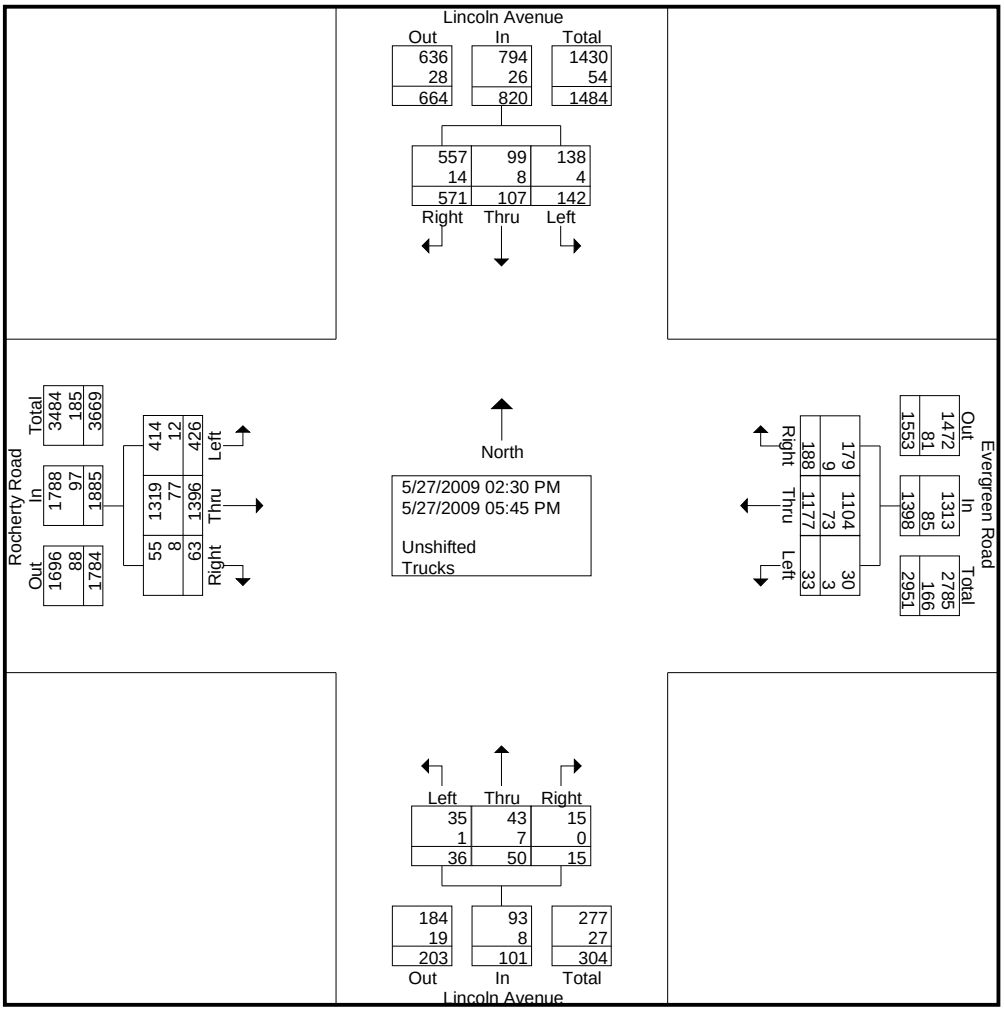
Groups Printed- Unshifted - Trucks

	Lincoln Avenue Southbound					Evergreen Road Westbound					Lincoln Avenue Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	17	5	24	4	46	6	120	49	5	175	1	2	1	1	4	13	69	4	0	86	10	311	321
02:45 PM	17	3	30	11	50	2	87	13	4	102	2	6	2	1	10	35	98	3	0	136	16	298	314
Total	34	8	54	15	96	8	207	62	9	277	3	8	3	2	14	48	167	7	0	222	26	609	635
03:00 PM	9	5	35	2	49	6	104	25	1	135	2	4	1	0	7	27	85	4	0	116	3	307	310
03:15 PM	8	14	37	10	59	6	85	7	0	98	2	3	0	0	5	31	81	4	1	116	11	278	289
03:30 PM	7	11	44	16	62	1	86	16	3	103	4	1	1	0	6	32	99	5	3	136	22	307	329
03:45 PM	7	14	46	10	67	2	87	11	1	100	1	2	3	1	6	35	99	4	1	138	13	311	324
Total	31	44	162	38	237	15	362	59	5	436	9	10	5	1	24	125	364	17	5	506	49	1203	1252
04:00 PM	11	6	50	12	67	2	102	12	2	116	3	9	0	0	12	27	95	10	0	132	14	327	341
04:15 PM	6	5	43	8	54	3	86	8	3	97	1	1	3	1	5	43	113	1	0	157	12	313	325
04:30 PM	7	14	90	27	111	0	74	7	0	81	4	2	0	0	6	38	108	5	2	151	29	349	378
04:45 PM	8	7	50	14	65	2	70	8	0	80	2	0	0	0	2	23	108	2	0	133	14	280	294
Total	32	32	233	61	297	7	332	35	5	374	10	12	3	1	25	131	424	18	2	573	69	1269	1338
05:00 PM	9	9	33	7	51	2	69	8	3	79	5	10	1	0	16	31	110	8	0	149	10	295	305
05:15 PM	13	6	37	12	56	0	69	11	0	80	2	4	0	0	6	27	105	7	0	139	12	281	293
05:30 PM	8	4	26	15	38	1	74	5	1	80	5	2	0	0	7	39	100	4	0	143	16	268	284
05:45 PM	15	4	26	5	45	0	64	8	1	72	2	4	3	1	9	25	126	2	0	153	7	279	286
Total	45	23	122	39	190	3	276	32	5	311	14	20	4	1	38	122	441	21	0	584	45	1123	1168
Grand Total	142	107	571	153	820	33	1177	188	24	1398	36	50	15	5	101	426	1396	63	7	1885	189	4204	4393
Apprch %	17.3	13	69.6			2.4	84.2	13.4			35.6	49.5	14.9			22.6	74.1	3.3					
Total %	3.4	2.5	13.6		19.5	0.8	28	4.5		33.3	0.9	1.2	0.4		2.4	10.1	33.2	1.5		44.8	4.3	95.7	
Unshifted	138	99	557		945	30	1104	179		1337	35	43	15		98	414	1319	55		1792	0	0	4172
% Unshifted	97.2	92.5	97.5	98.7	97.1	90.9	93.8	95.2	100	94	97.2	86	100	100	92.5	97.2	94.5	87.3	57.1	94.7	0	0	95
Trucks	4	8	14		28	3	73	9		85	1	7	0		8	12	77	8		100	0	0	221
% Trucks	2.8	7.5	2.5	1.3	2.9	9.1	6.2	4.8	0	6	2.8	14	0	0	7.5	2.8	5.5	12.7	42.9	5.3	0	0	5

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Lincoln Avenue &
Rocherty Road / Evergreen Road

File Name : 2009-05-27 PMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

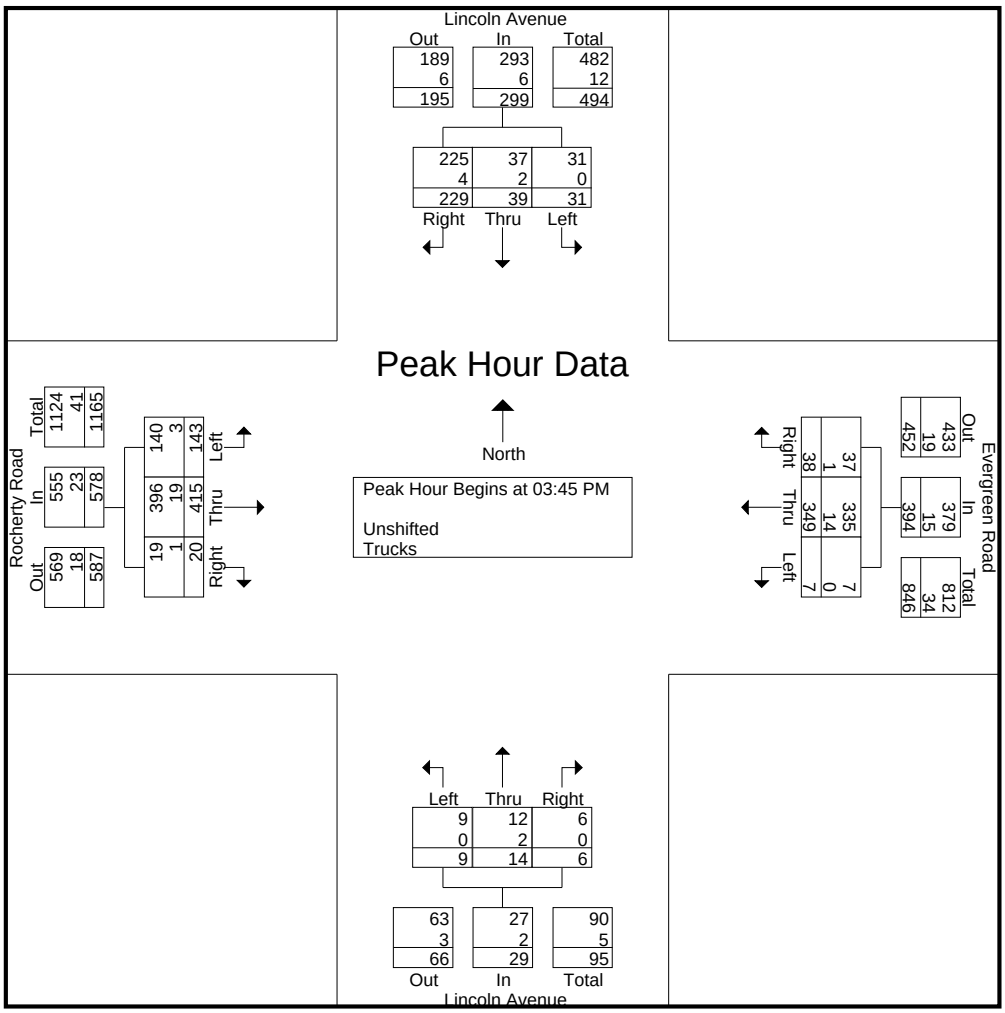


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Lincoln Avenue &
Rocherty Road / Evergreen Road

File Name : 2009-05-27 PMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 3

	Lincoln Avenue Southbound				Evergreen Road Westbound				Lincoln Avenue Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	7	14	46	67	2	87	11	100	1	2	3	6	35	99	4	138	311
04:00 PM	11	6	50	67	2	102	12	116	3	9	0	12	27	95	10	132	327
04:15 PM	6	5	43	54	3	86	8	97	1	1	3	5	43	113	1	157	313
04:30 PM	7	14	90	111	0	74	7	81	4	2	0	6	38	108	5	151	349
Total Volume	31	39	229	299	7	349	38	394	9	14	6	29	143	415	20	578	1300
% App. Total	10.4	13	76.6		1.8	88.6	9.6		31	48.3	20.7		24.7	71.8	3.5		
PHF	.705	.696	.636	.673	.583	.855	.792	.849	.563	.389	.500	.604	.831	.918	.500	.920	.931
Unshifted	31	37	225	293	7	335	37	379	9	12	6	27	140	396	19	555	1254
% Unshifted	100	94.9	98.3	98.0	100	96.0	97.4	96.2	100	85.7	100	93.1	97.9	95.4	95.0	96.0	96.5
Trucks	0	2	4	6	0	14	1	15	0	2	0	2	3	19	1	23	46
% Trucks	0	5.1	1.7	2.0	0	4.0	2.6	3.8	0	14.3	0	6.9	2.1	4.6	5.0	4.0	3.5



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Lincoln Avenue &
Rocherty Road / Evergreen Road

Counter: 11
Counted by: Z. Pierce
Weather: Overcast/Rain
Saved as: 2009-05-27 PMLARRER

File Name : 2009-05-27 PMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 1

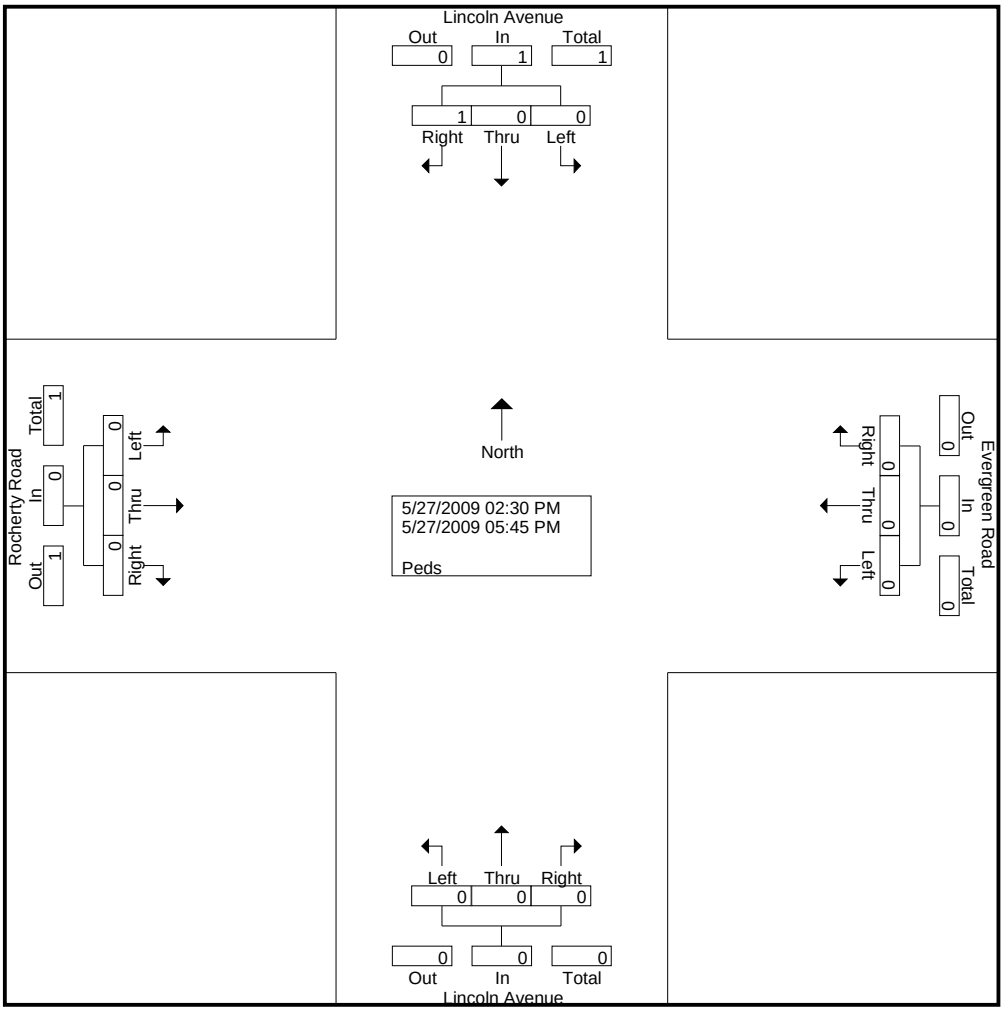
Groups Printed- Peds

	Lincoln Avenue Southbound					Evergreen Road Westbound					Lincoln Avenue Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
04:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Grand Total	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	3
Apprch %	0	0	100			0	0	0			0	0	0			0	0	0					
Total %	0	0	100		100	0	0	0		0	0	0	0		0	0	0	0		0	66.7	33.3	

Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Lincoln Avenue &
Rocherty Road / Evergreen Road

File Name : 2009-05-27 PMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 2

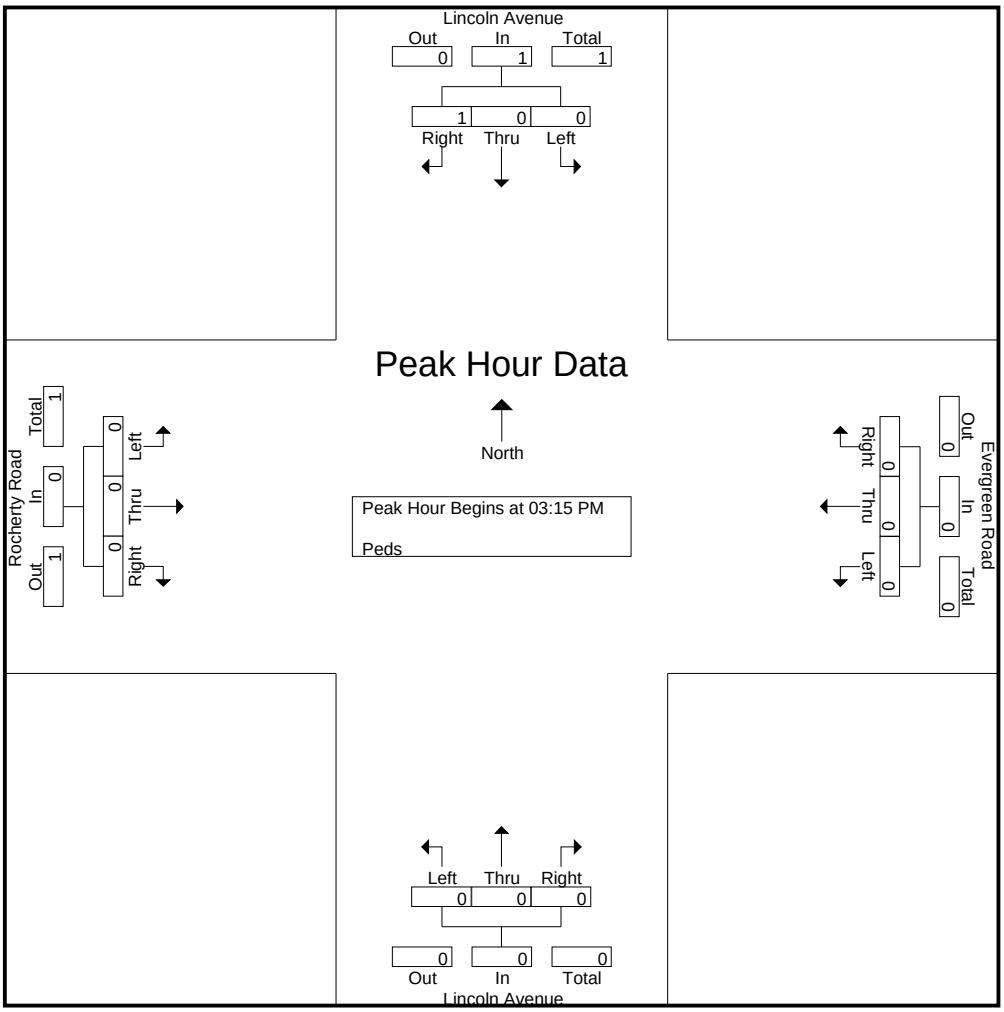


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Lincoln Avenue &
Rocherty Road / Evergreen Road

File Name : 2009-05-27 PMLARRER
Site Code : 00000000
Start Date : 5/27/2009
Page No : 3

	Lincoln Avenue Southbound				Evergreen Road Westbound				Lincoln Avenue Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% App. Total	0	0	100		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250



Traffic Planning & Design, Inc.
4647 Saucon Creek Road, Suite 201
Center Valley, PA 18034

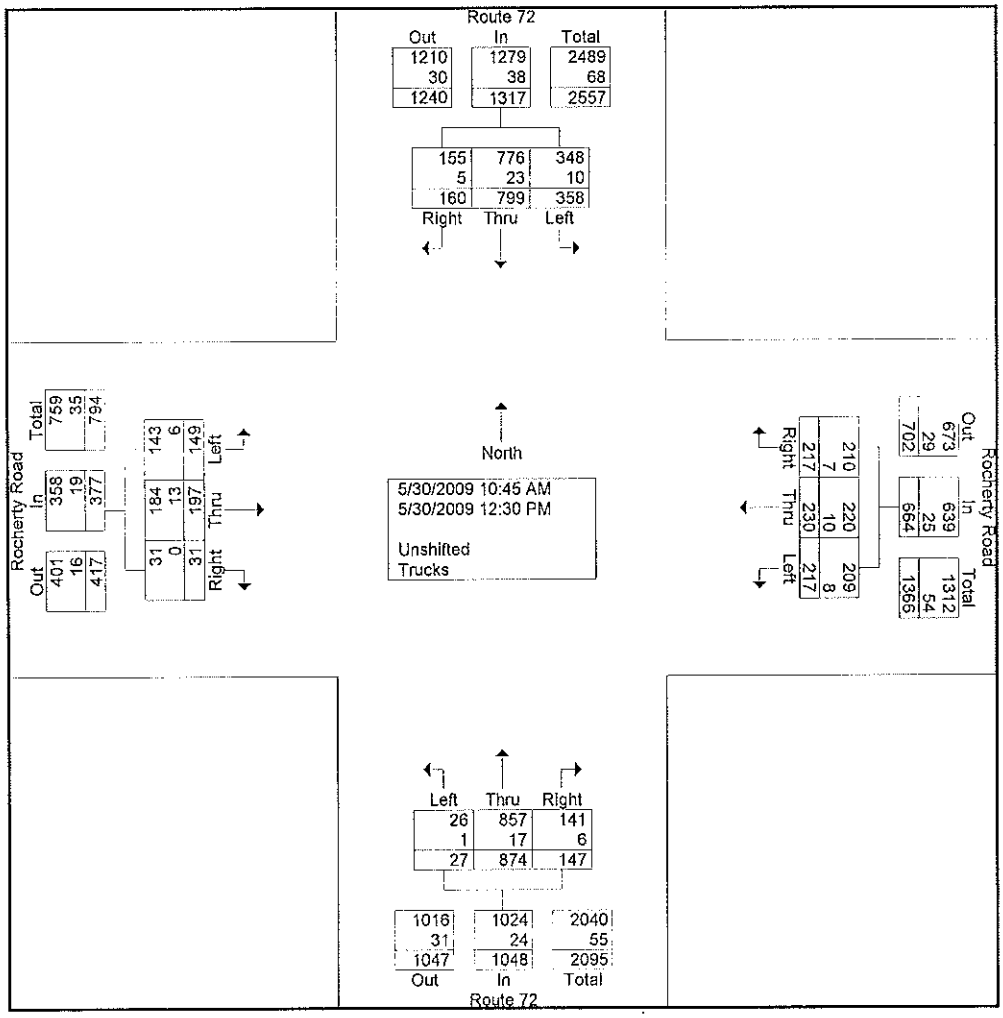
Route 72 & Rocherty Road

Job #: BLAC.A.00001
Counted By: TMK
Counter: 20
Weather: Sunny

File Name : 2009-05-30_SAT72RR
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Route 72 Southbound					Rocherty Road Westbound					Route 72 Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App Total	Left	Thru	Right	RTOR	App Total	Exclu Total	Inclu Total	Int Total
10:45 AM	51	90	17	2	158	27	26	32	4	85	5	114	25	0	144	19	22	5	0	46	6	433	439
Total	51	90	17	2	158	27	26	32	4	85	5	114	25	0	144	19	22	5	0	46	6	433	439
11:00 AM	40	91	20	2	151	26	31	37	2	94	0	102	13	0	115	19	23	7	1	49	5	409	414
11:15 AM	41	92	15	2	148	30	31	24	9	85	3	116	17	0	136	20	25	2	0	47	11	416	427
11:30 AM	43	102	17	0	162	34	25	36	7	95	4	113	20	0	137	22	27	5	0	54	7	448	455
11:45 AM	44	107	22	5	173	32	34	26	1	92	3	99	18	1	120	21	26	5	0	52	7	437	444
Total	168	392	74	9	634	122	121	123	19	366	10	430	68	1	508	82	101	19	1	202	30	1710	1740
12:00 PM	48	94	22	0	164	26	28	24	9	78	6	105	16	0	127	14	26	4	1	44	10	413	423
12:15 PM	50	121	33	0	204	25	22	12	4	59	4	102	16	1	122	15	21	1	1	37	6	422	428
12:30 PM	41	102	14	1	157	17	33	26	5	76	2	123	22	0	147	19	27	2	0	48	6	428	434
Grand Total	358	799	160	12	1317	217	230	217	41	664	27	874	147	2	1048	149	197	31	3	377	58	3406	3464
Apprch %	27.2	60.7	12.1			32.7	34.6	32.7			2.6	83.4	14			39.5	52.3	8.2					
Total %	10.5	23.5	4.7		38.7	6.4	6.8	6.4		19.5	0.8	25.7	4.3		30.8	4.4	5.8	0.9		11.1	1.7	98.3	
Unshifted	348	776	155		1290	209	220	210		679	26	857	141		1026	143	184	31		361	0	0	3356
% Unshifted	97.2	97.1	96.9	91.7	97.1	96.3	95.7	96.8	97.6	96.3	96.3	98.1	95.9	100	97.7	96	93.4	100	100	95	0	0	96.9
Trucks	10	23	5		39	8	10	7		26	1	17	6		24	6	13	0		19	0	0	108
% Trucks	2.8	2.9	3.1	8.3	2.9	3.7	4.3	3.2	2.4	3.7	3.7	1.9	4.1	0	2.3	4	6.6	0	0	5	0	0	3.1



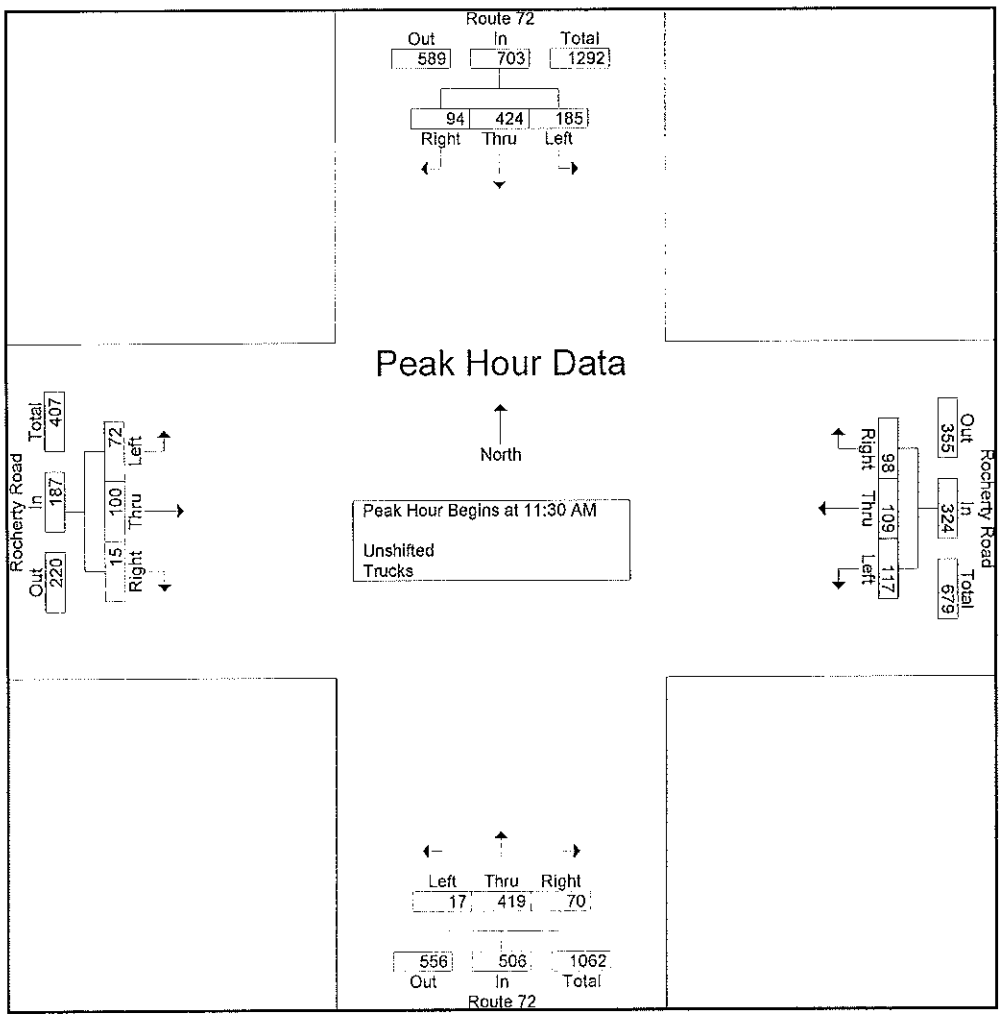
Traffic Planning & Design, Inc.
4647 Saucon Creek Road, Suite 201
Center Valley, PA 18034

Route 72 & Rocherty Road

Job #: BLAC.A.00001
Counted By: TMK
Counter: 20
Weather: Sunny

File Name : 2009-05-30_SAT72RR
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Route 72 Southbound				Rocherty Road Westbound				Route 72 Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	43	102	17	162	34	25	36	95	4	113	20	137	22	27	5	54	448
11:45 AM	44	107	22	173	32	34	26	92	3	99	18	120	21	26	5	52	437
12:00 PM	48	94	22	164	26	28	24	78	6	105	16	127	14	26	4	44	413
12:15 PM	50	121	33	204	25	22	12	59	4	102	16	122	15	21	1	37	422
Total Volume	185	424	94	703	117	109	98	324	17	419	70	506	72	100	15	187	1720
% App. Total	26.3	60.3	13.4		36.1	33.6	30.2		3.4	82.8	13.8		38.5	53.5	8		
PHF	.925	.876	.712	.862	.860	.801	.681	.853	.708	.927	.875	.923	.818	.926	.750	.866	.960



Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

Counter: 16
Counted by: M. Bressler
Weather: Cloudy
Saved as: 2011-04-30 SAT72CCS

File Name : 2011-04-30 SAT72CCS
Site Code : 00000000
Start Date : 4/30/2011
Page No : 1

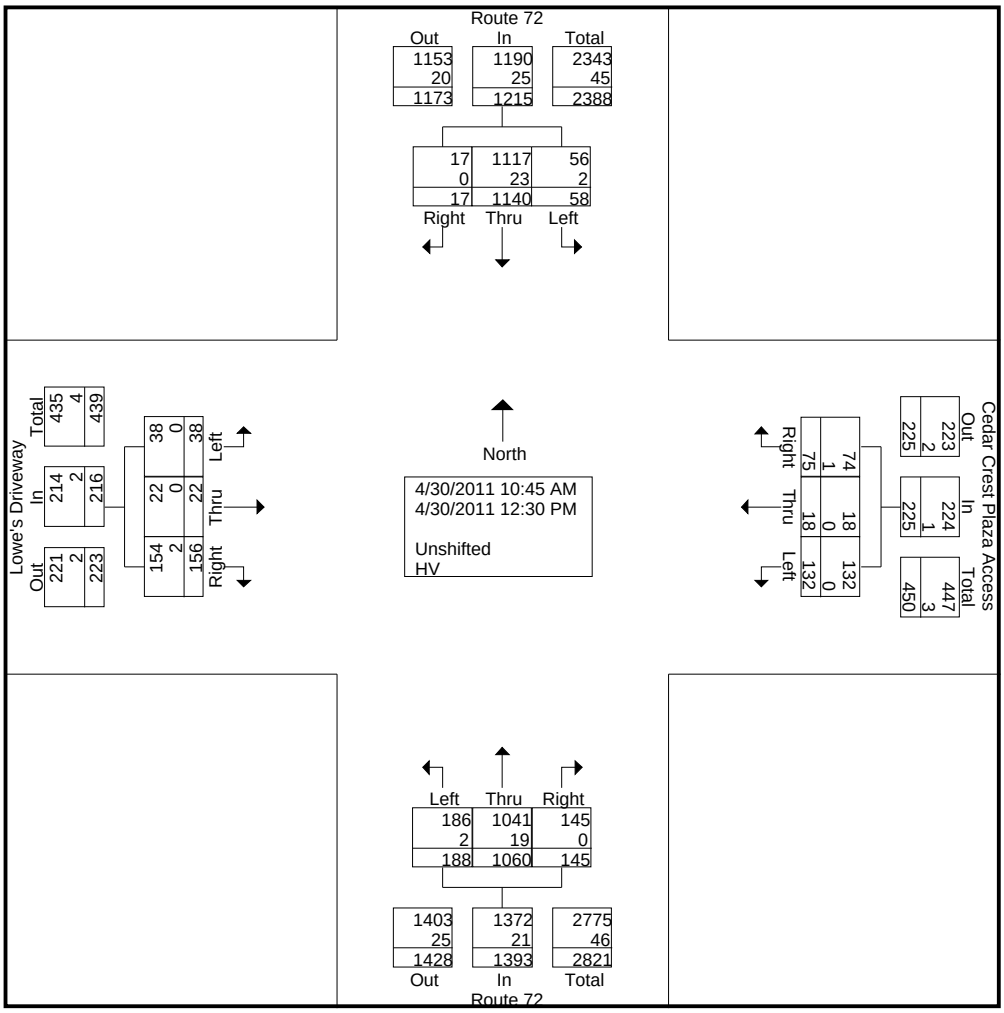
Groups Printed- Unshifted - HV

	Lowe's Driveway Eastbound					Cedar Crest Plaza Access Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	4	5	21	11	30	10	2	9	3	21	26	123	18	4	167	6	141	2	0	149	18	367	385
Total	4	5	21	11	30	10	2	9	3	21	26	123	18	4	167	6	141	2	0	149	18	367	385
11:00 AM	3	2	27	14	32	13	2	10	3	25	23	130	17	2	170	9	134	1	0	144	19	371	390
11:15 AM	2	3	11	7	16	14	2	9	4	25	33	128	19	1	180	10	156	4	0	170	12	391	403
11:30 AM	2	4	19	10	25	19	1	13	6	33	31	133	20	3	184	5	164	3	0	172	19	414	433
11:45 AM	6	0	15	5	21	21	3	11	2	35	20	132	12	1	164	12	149	3	0	164	8	384	392
Total	13	9	72	36	94	67	8	43	15	118	107	523	68	7	698	36	603	11	0	650	58	1560	1618
12:00 PM	3	2	21	8	26	11	4	7	1	22	20	148	19	8	187	6	140	3	0	149	17	384	401
12:15 PM	8	3	23	7	34	24	3	6	3	33	18	130	22	10	170	6	130	0	0	136	20	373	393
12:30 PM	10	3	19	9	32	20	1	10	4	31	17	136	18	2	171	4	126	1	0	131	15	365	380
Grand Total	38	22	156	71	216	132	18	75	26	225	188	1060	145	31	1393	58	1140	17	0	1215	128	3049	3177
Apprch %	17.6	10.2	72.2			58.7	8	33.3			13.5	76.1	10.4			4.8	93.8	1.4					
Total %	1.2	0.7	5.1		7.1	4.3	0.6	2.5		7.4	6.2	34.8	4.8		45.7	1.9	37.4	0.6		39.8	4	96	
Unshifted	38	22	154		283	132	18	74		250	186	1041	145		1403	56	1117	17		1190	0	0	3126
% Unshifted	100	100	98.7	97.2	98.6	100	100	98.7	100	99.6	98.9	98.2	100	100	98.5	96.6	98	100	0	97.9	0	0	98.4
HV	0	0	2		4	0	0	1		1	2	19	0		21	2	23	0		25	0	0	51
% HV	0	0	1.3	2.8	1.4	0	0	1.3	0	0.4	1.1	1.8	0	0	1.5	3.4	2	0	0	2.1	0	0	1.6

Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-30 SAT72CCS
Site Code : 00000000
Start Date : 4/30/2011
Page No : 2

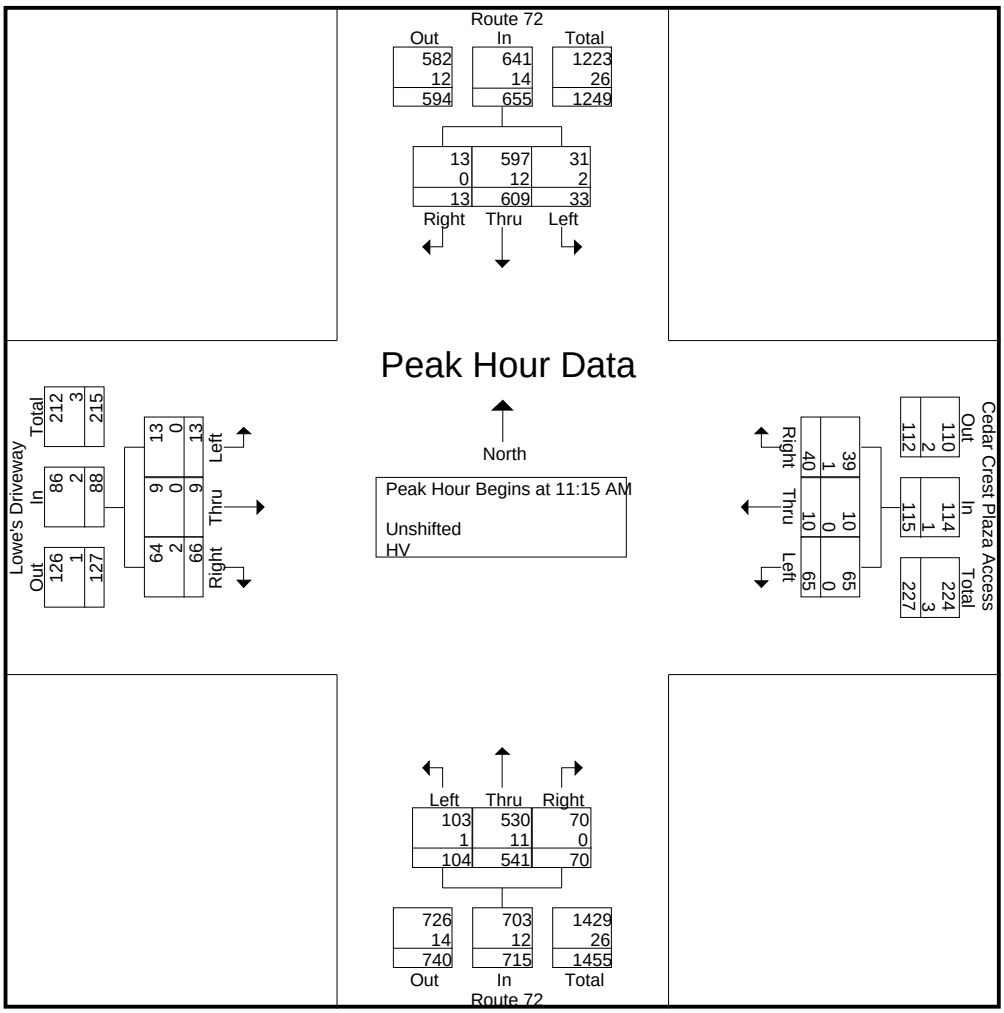


Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-30 SAT72CCS
Site Code : 00000000
Start Date : 4/30/2011
Page No : 3

	Lowe's Driveway Eastbound				Cedar Crest Plaza Access Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	2	3	11	16	14	2	9	25	**33**	128	19	180	10	156	**4**	170	391
11:30 AM	2	**4**	19	25	19	1	**13**	33	31	133	**20**	184	5	**164**	3	**172**	**414**
11:45 AM	**6**	0	15	21	**21**	3	11	**35**	20	132	12	164	**12**	149	3	164	384
12:00 PM	3	2	**21**	**26**	11	**4**	7	22	20	**148**	19	**187**	6	140	3	149	384
Total Volume	13	9	66	88	65	10	40	115	104	541	70	715	33	609	13	655	1573
% App. Total	14.8	10.2	75		56.5	8.7	34.8		14.5	75.7	9.8		5	93	2		
PHF	.542	.563	.786	.846	.774	.625	.769	.821	.788	.914	.875	.956	.688	.928	.813	.952	.950
Unshifted	13	9	64	86	65	10	39	114	103	530	70	703	31	597	13	641	1544
% Unshifted	100	100	97.0	97.7	100	100	97.5	99.1	99.0	98.0	100	98.3	93.9	98.0	100	97.9	98.2
HV	0	0	2	2	0	0	1	1	1	11	0	12	2	12	0	14	29
% HV	0	0	3.0	2.3	0	0	2.5	0.9	1.0	2.0	0	1.7	6.1	2.0	0	2.1	1.8



Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

Counter: 16
Counted by: M. Bressler
Weather: Cloudy
Saved as: 2011-04-30 SAT72CCS

File Name : 2011-04-30 SAT72CCS
Site Code : 00000000
Start Date : 4/30/2011
Page No : 1

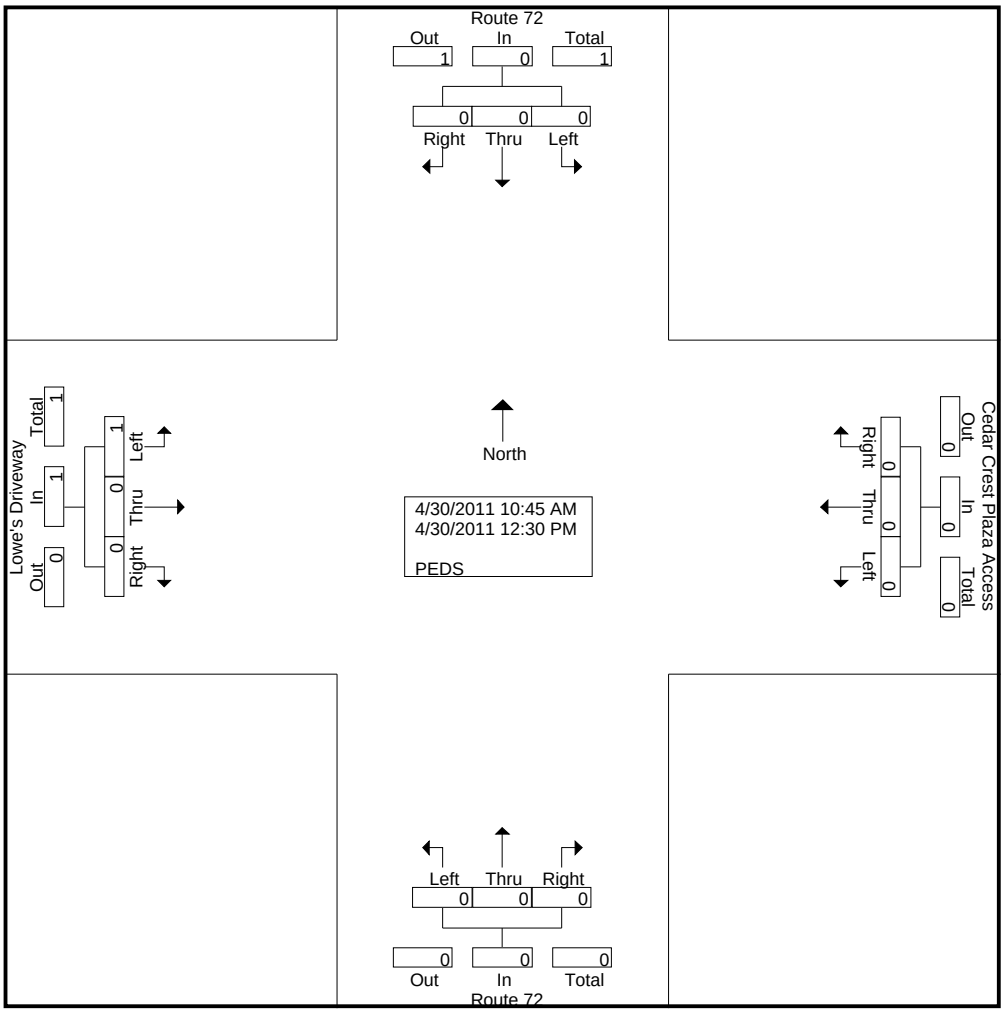
Groups Printed- PEDS

	Lowe's Driveway Eastbound					Cedar Crest Plaza Access Westbound					Route 72 Northbound					Route 72 Southbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Apprch %	100	0	0			0	0	0			0	0	0			0	0	0					
Total %	100	0	0		100	0	0	0		0	0	0	0		0	0	0	0		0	0	100	

Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-30 SAT72CCS
Site Code : 00000000
Start Date : 4/30/2011
Page No : 2

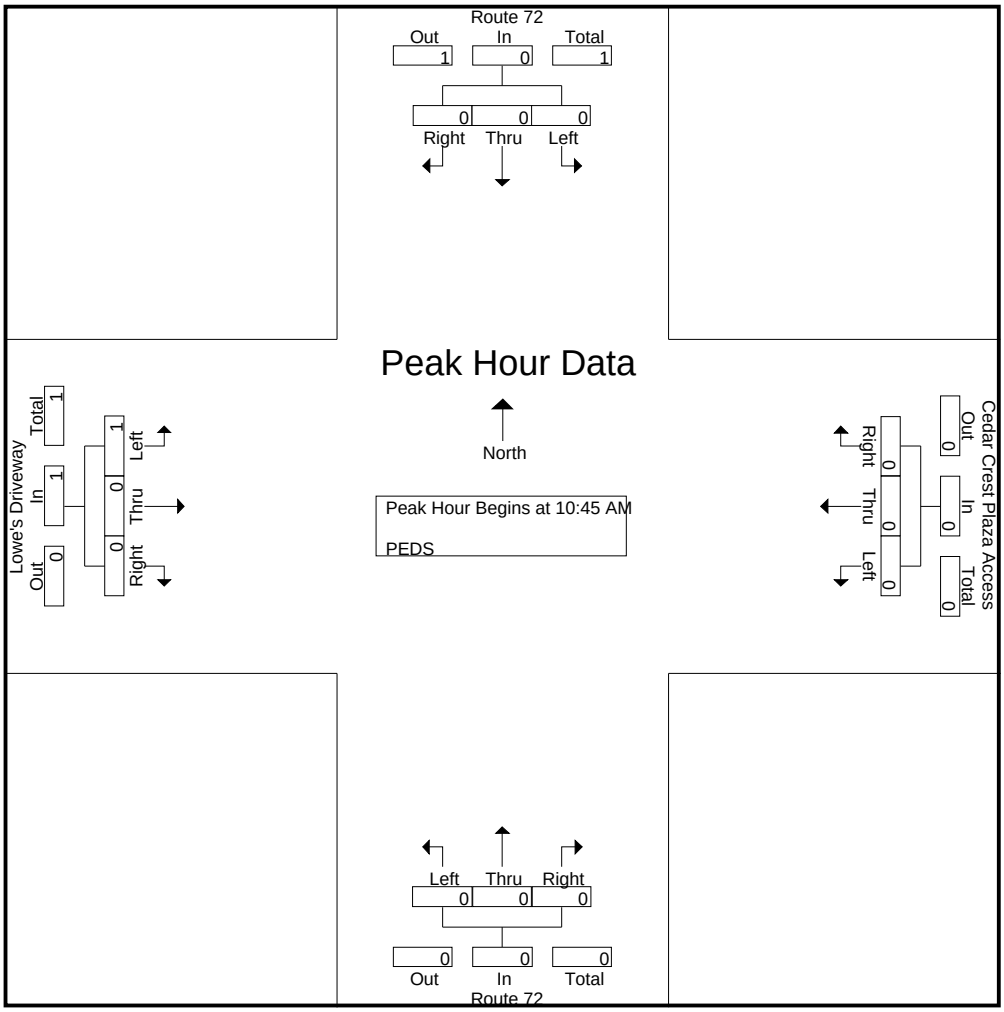


Traffic Planning & Design, Inc.
2500 E. High Street
Pottstown, PA 19464

Route 72 & Lowe's/Cedar Crest Square Access

File Name : 2011-04-30 SAT72CCS
Site Code : 00000000
Start Date : 4/30/2011
Page No : 3

	Lowe's Driveway Eastbound				Cedar Crest Plaza Access Westbound				Route 72 Northbound				Route 72 Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:45 AM																	
10:45 AM	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% App. Total	100	0	0		0	0	0		0	0	0		0	0	0		
PHF	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

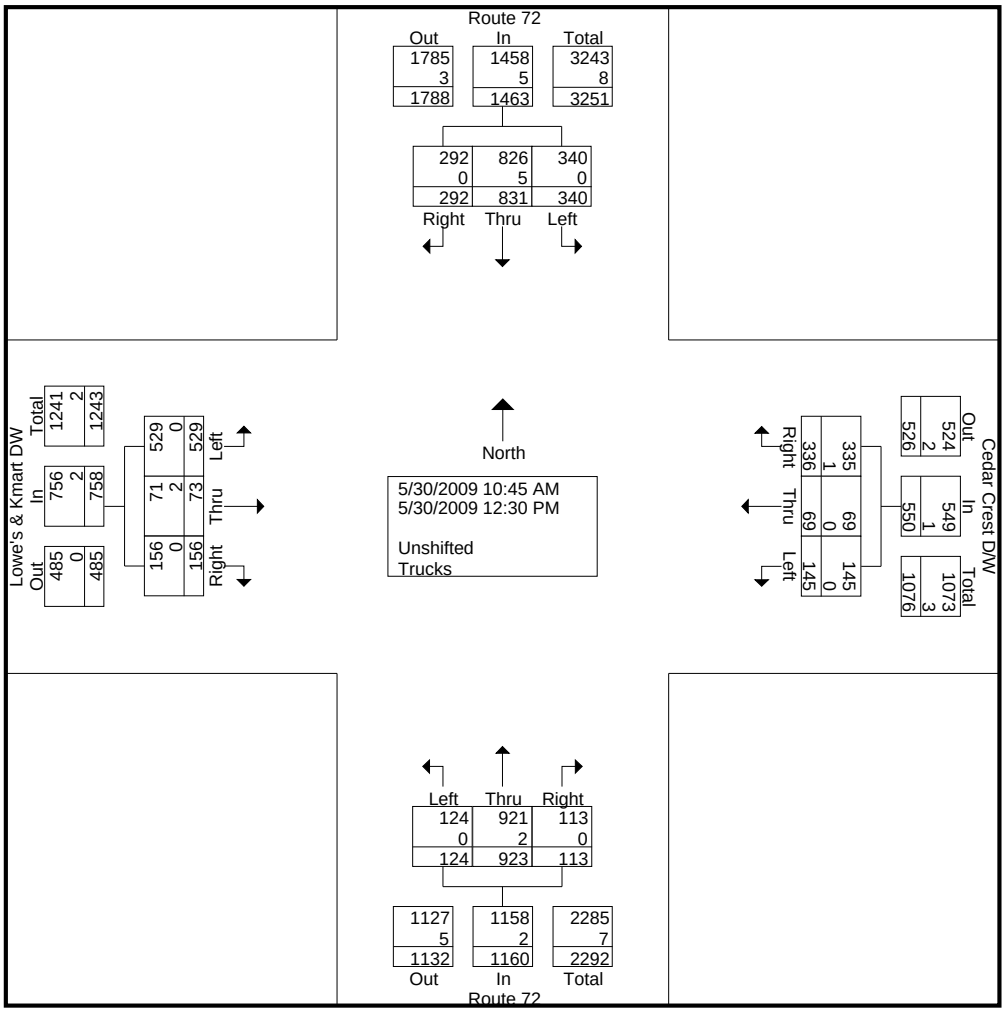
Route 72 &
Lowes/Kmart & Cedar Crest D/W

Counter: 26
Counted by: E. Royer
Weather: Sunny
Saved as: 2009-05-30 SATLKCCDW

File Name : 2009-05-30 SATLKCCDW
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Route 72 Southbound					Cedar Crest D/W Westbound					Route 72 Northbound					Lowe's & Kmart DW Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	46	92	32	4	170	9	8	31	15	48	20	117	7	0	144	57	8	16	9	81	28	443	471
Total	46	92	32	4	170	9	8	31	15	48	20	117	7	0	144	57	8	16	9	81	28	443	471
11:00 AM	49	90	41	3	180	11	13	32	8	56	15	124	16	0	155	79	6	24	7	109	18	500	518
11:15 AM	48	113	40	7	201	14	8	43	15	65	10	134	26	1	170	76	10	18	6	104	29	540	569
11:30 AM	44	103	39	12	186	33	12	50	25	95	17	109	19	10	145	66	15	21	6	102	53	528	581
11:45 AM	51	111	34	9	196	23	7	53	27	83	14	101	11	2	126	56	6	26	10	88	48	493	541
Total	192	417	154	31	763	81	40	178	75	299	56	468	72	13	596	277	37	89	29	403	148	2061	2209
12:00 PM	39	100	37	18	176	21	6	57	20	84	15	106	12	5	133	54	11	23	5	88	48	481	529
12:15 PM	31	118	41	18	190	20	3	37	16	60	16	115	10	4	141	76	8	13	8	97	46	488	534
12:30 PM	32	104	28	13	164	14	12	33	16	59	17	117	12	5	146	65	9	15	9	89	43	458	501
Grand Total	340	831	292	84	1463	145	69	336	142	550	124	923	113	27	1160	529	73	156	60	758	313	3931	4244
Apprch %	23.2	56.8	20			26.4	12.5	61.1			10.7	79.6	9.7			69.8	9.6	20.6					
Total %	8.6	21.1	7.4		37.2	3.7	1.8	8.5		14	3.2	23.5	2.9		29.5	13.5	1.9	4		19.3	7.4	92.6	
Unshifted	340	826	292		1542	145	69	335		691	124	921	113		1183	529	71	156		814	0	0	4230
% Unshifted	100	99.4	100	100	99.7	100	100	99.7	100	99.9	100	99.8	100	92.6	99.7	100	97.3	100	96.7	99.5	0	0	99.7
Trucks	0	5	0		5	0	0	1		1	0	2	0		4	0	2	0		4	0	0	14
% Trucks	0	0.6	0	0	0.3	0	0	0.3	0	0.1	0	0.2	0	7.4	0.3	0	2.7	0	3.3	0.5	0	0	0.3

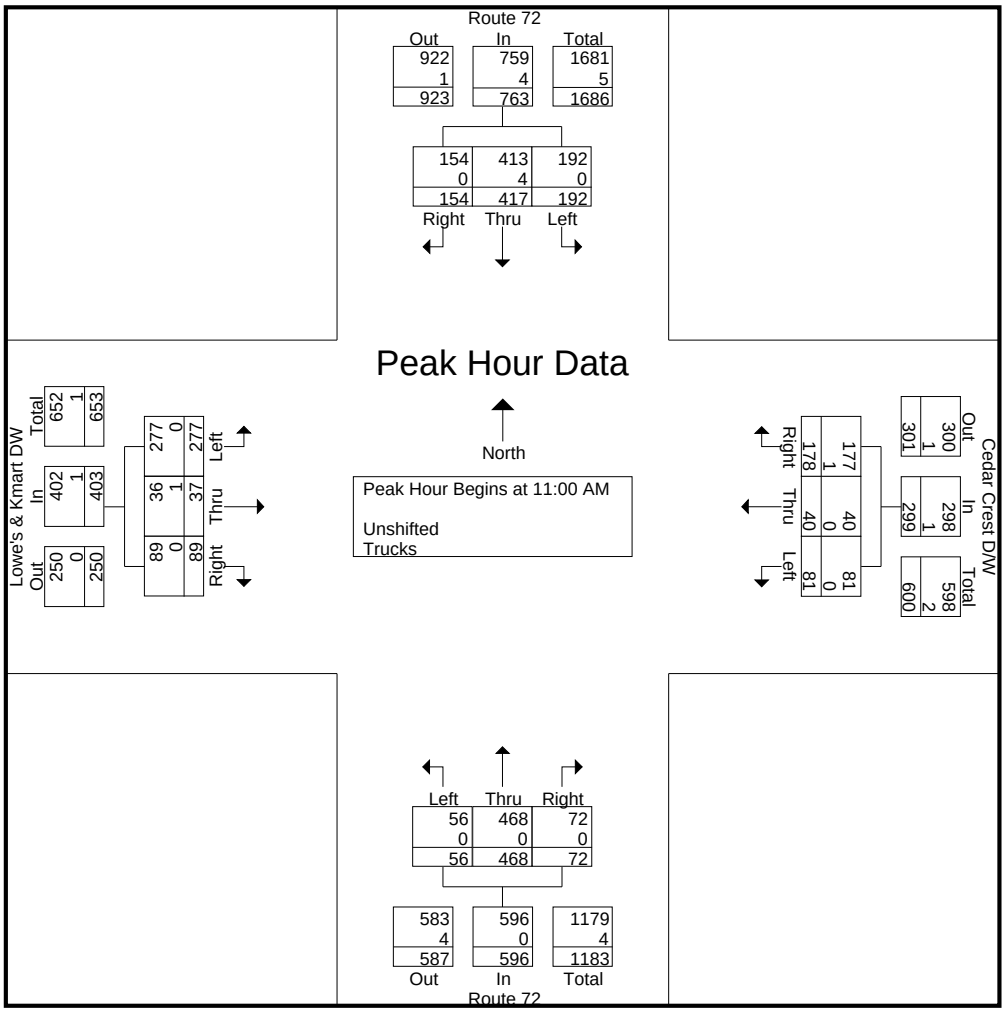


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Lowes/Kmart & Cedar Crest D/W

File Name : 2009-05-30 SATLKCCDW
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Route 72 Southbound				Cedar Crest D/W Westbound				Route 72 Northbound				Lowe's & Kmart DW Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	49	90	41	180	11	13	32	56	15	124	16	155	79	6	24	109	500
11:15 AM	48	113	40	201	14	8	43	65	10	134	26	170	76	10	18	104	540
11:30 AM	44	103	39	186	33	12	50	95	17	109	19	145	66	15	21	102	528
11:45 AM	51	111	34	196	23	7	53	83	14	101	11	126	56	6	26	88	493
Total Volume	192	417	154	763	81	40	178	299	56	468	72	596	277	37	89	403	2061
% App. Total	25.2	54.7	20.2		27.1	13.4	59.5		9.4	78.5	12.1		68.7	9.2	22.1		
PHF	.941	.923	.939	.949	.614	.769	.840	.787	.824	.873	.692	.876	.877	.617	.856	.924	.954
Unshifted	192	413	154	759	81	40	177	298	56	468	72	596	277	36	89	402	2055
% Unshifted	100	99.0	100	99.5	100	100	99.4	99.7	100	100	100	100	100	97.3	100	99.8	99.7
Trucks	0	4	0	4	0	0	1	1	0	0	0	0	0	1	0	1	6
% Trucks	0	1.0	0	0.5	0	0	0.6	0.3	0	0	0	0	0	2.7	0	0.2	0.3



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

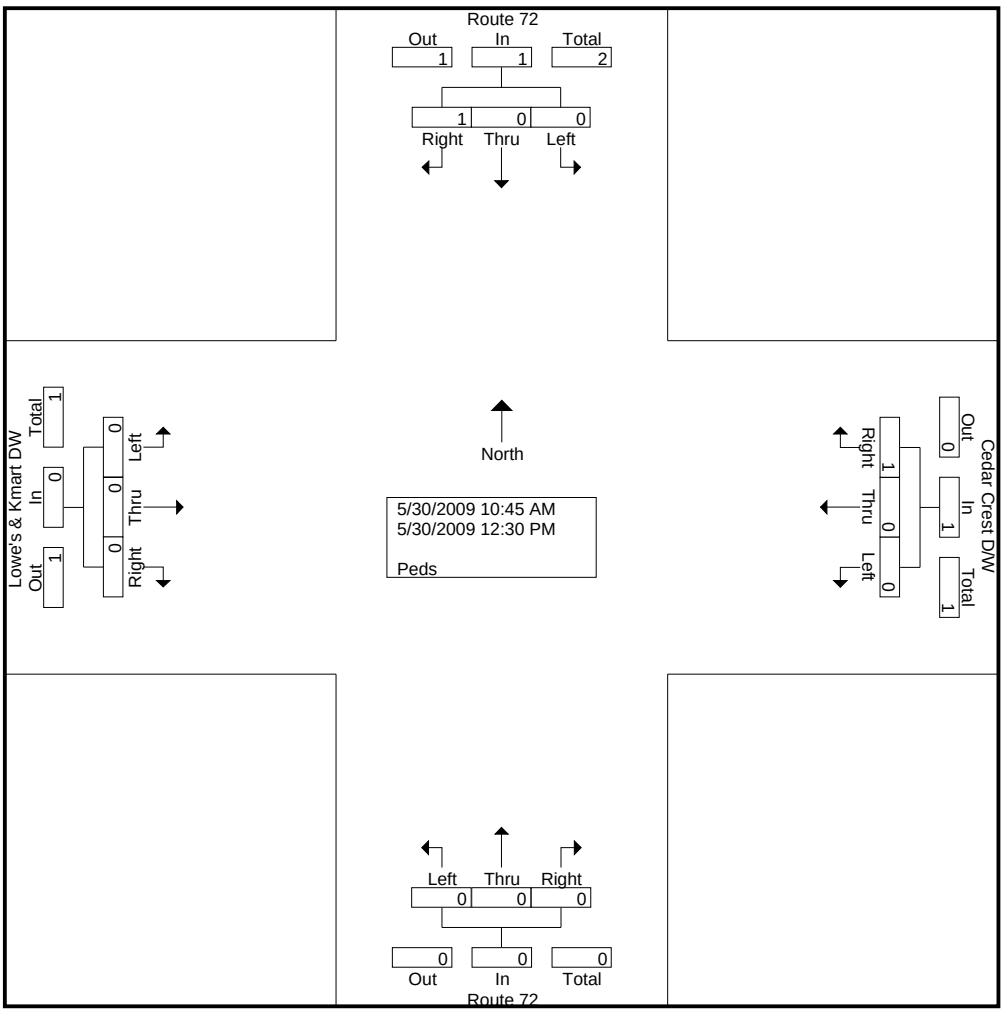
Route 72 &
Lowes/Kmart & Cedar Crest D/W

Counter: 26
Counted by: E. Royer
Weather: Sunny
Saved as: 2009-05-30 SATLKCCDW

File Name : 2009-05-30 SATLKCCDW
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Peds

	Route 72 Southbound					Cedar Crest D/W Westbound					Route 72 Northbound					Lowe's & Kmart DW Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	2
Grand Total	0	0	1	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	2	3
Apprch %	0	0	100			0	0	100			0	0	0			0	0	0					
Total %	0	0	50		50	0	0	50		50	0	0	0		0	0	0	0		0	33.3	66.7	

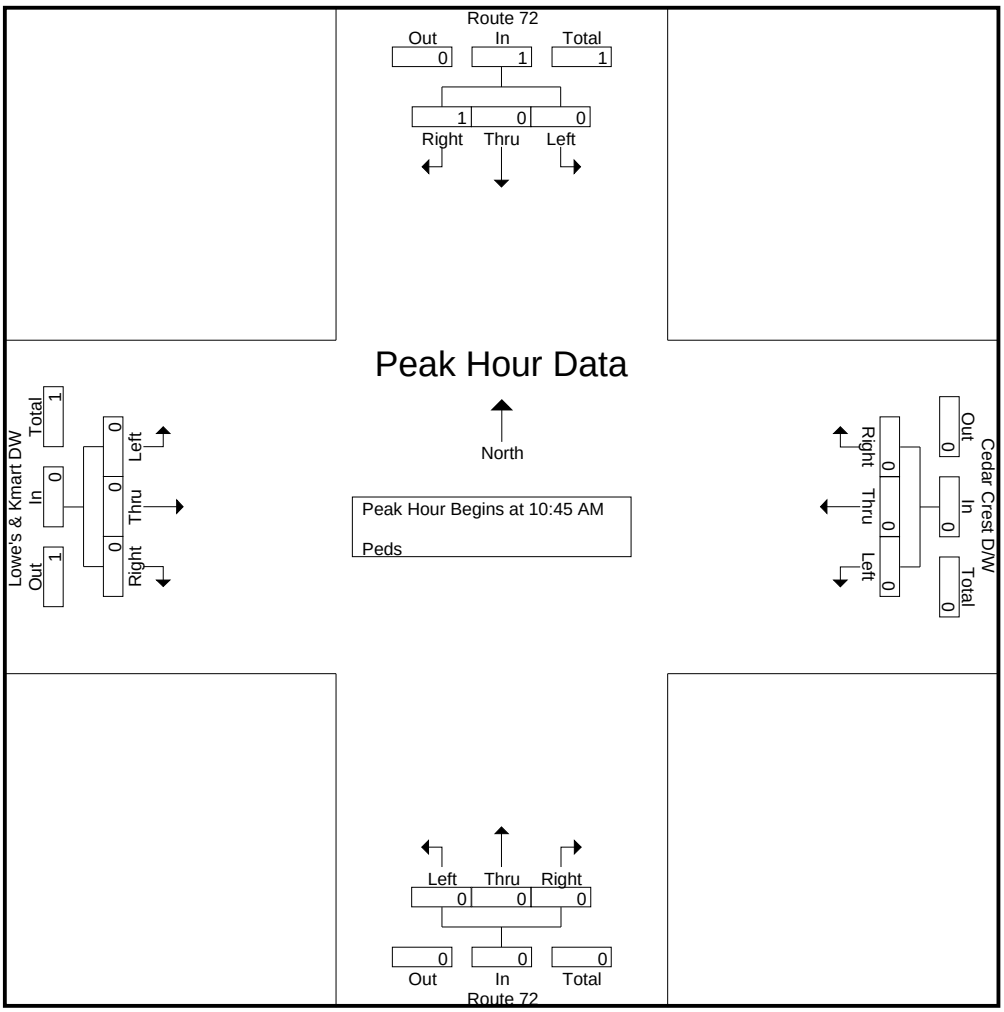


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Lowes/Kmart & Cedar Crest D/W

File Name : 2009-05-30 SATLKCCDW
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Route 72 Southbound				Cedar Crest D/W Westbound				Route 72 Northbound				Lowe's & Kmart DW Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:45 AM																	
10:45 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% App. Total	0	0	100		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

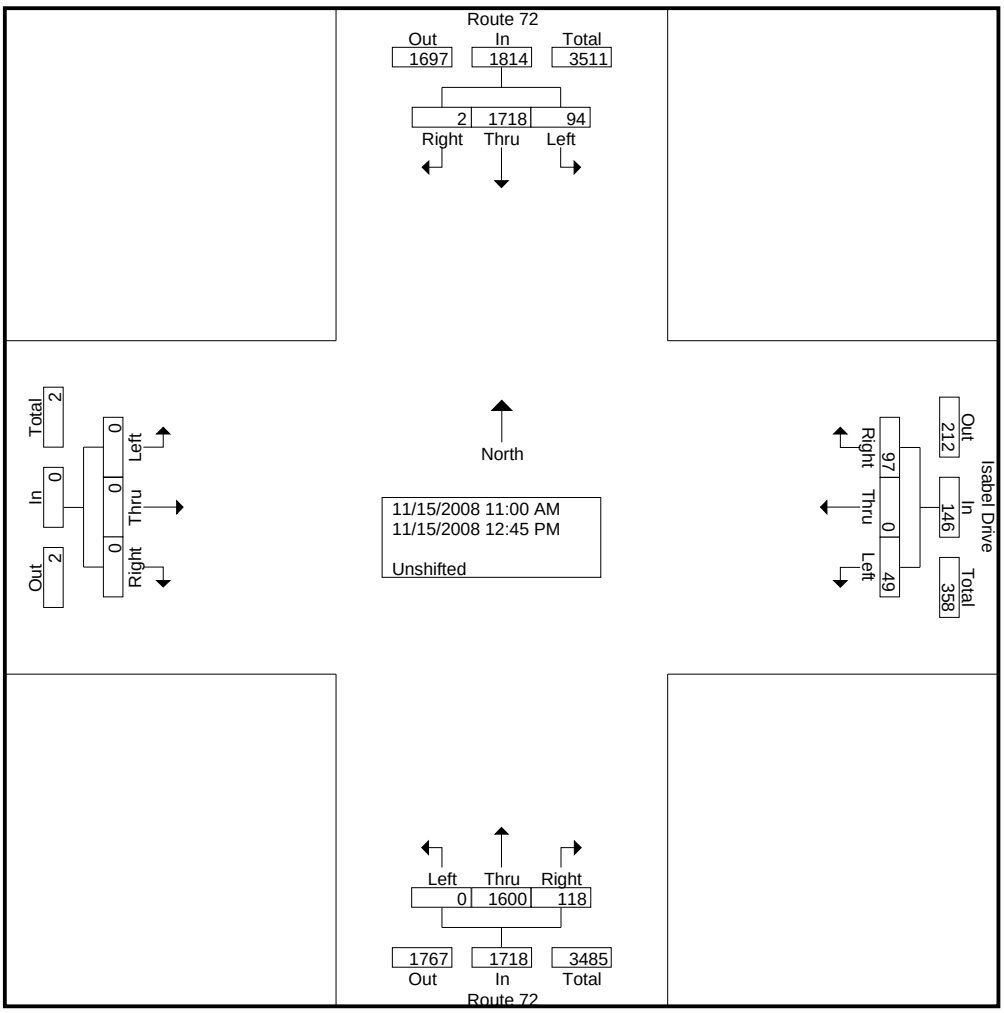
Route 72 & Isabel Drive

Counter: 26
Counted by: B. Callahan
Weather: Cloudy
Saved as: 2008-11-15 SAT72ID

File Name : 2008-11-15 SAT72ID
Site Code : 00000000
Start Date : 11/15/2008
Page No : 1

Groups Printed- Unshifted

	Route 72 Southbound					Isabel Drive Westbound					Route 72 Northbound					Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	14	211	0	0	225	7	0	9	0	16	0	203	15	0	218	0	0	0	0	0	0	459	459
11:15 AM	14	198	0	0	212	8	0	12	0	20	0	193	19	3	212	0	0	0	0	0	3	444	447
11:30 AM	9	215	0	2	224	8	0	11	0	19	0	235	16	1	251	0	0	0	0	0	3	494	497
11:45 AM	15	236	0	1	251	7	0	11	0	18	0	193	16	0	209	0	0	0	0	0	1	478	479
Total	52	860	0	3	912	30	0	43	0	73	0	824	66	4	890	0	0	0	0	0	7	1875	1882
12:00 PM	9	219	1	2	229	5	0	13	0	18	0	197	17	0	214	0	0	0	0	0	2	461	463
12:15 PM	8	220	1	0	229	5	0	15	0	20	0	190	11	2	201	0	0	0	0	0	2	450	452
12:30 PM	16	219	0	1	235	4	0	11	0	15	0	189	14	0	203	0	0	0	0	0	1	453	454
12:45 PM	9	200	0	1	209	5	0	15	0	20	0	200	10	1	210	0	0	0	0	0	2	439	441
Total	42	858	2	4	902	19	0	54	0	73	0	776	52	3	828	0	0	0	0	0	7	1803	1810
Grand Total	94	1718	2	7	1814	49	0	97	0	146	0	1600	118	7	1718	0	0	0	0	0	14	3678	3692
Apprch %	5.2	94.7	0.1			33.6	0	66.4			0	93.1	6.9			0	0	0					
Total %	2.6	46.7	0.1		49.3	1.3	0	2.6		4	0	43.5	3.2		46.7	0	0	0		0	0.4	99.6	

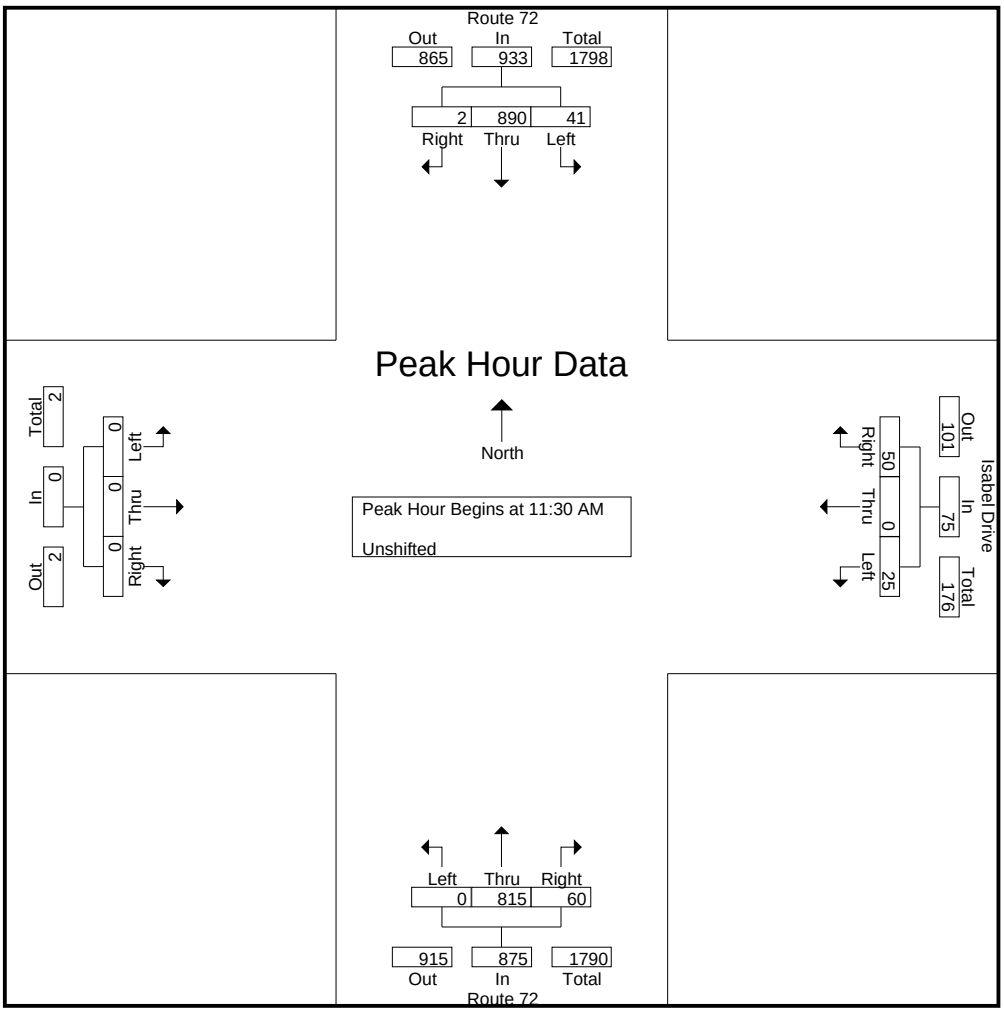


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Route 72 &
Isabel Drive

File Name : 2008-11-15 SAT72ID
Site Code : 00000000
Start Date : 11/15/2008
Page No : 2

	Route 72 Southbound				Isabel Drive Westbound				Route 72 Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	9	215	0	224	8	0	11	19	0	235	16	251	0	0	0	0	494
11:45 AM	15	236	0	251	7	0	11	18	0	193	16	209	0	0	0	0	478
12:00 PM	9	219	1	229	5	0	13	18	0	197	17	214	0	0	0	0	461
12:15 PM	8	220	1	229	5	0	15	20	0	190	11	201	0	0	0	0	450
Total Volume	41	890	2	933	25	0	50	75	0	815	60	875	0	0	0	0	1883
% App. Total	4.4	95.4	0.2		33.3	0	66.7		0	93.1	6.9		0	0	0		
PHF	.683	.943	.500	.929	.781	.000	.833	.938	.000	.867	.882	.872	.000	.000	.000	.000	.953



Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & York Street/Lebanon Plaza Mall Driveway

Counter: TPD 8
Counted By: J. Neal
Weather: sunny
Saved As: 20101016

File Name : SAT_QR74_YS_LPMDW
Site Code : 20101015
Start Date : 10/16/2010
Page No : 1

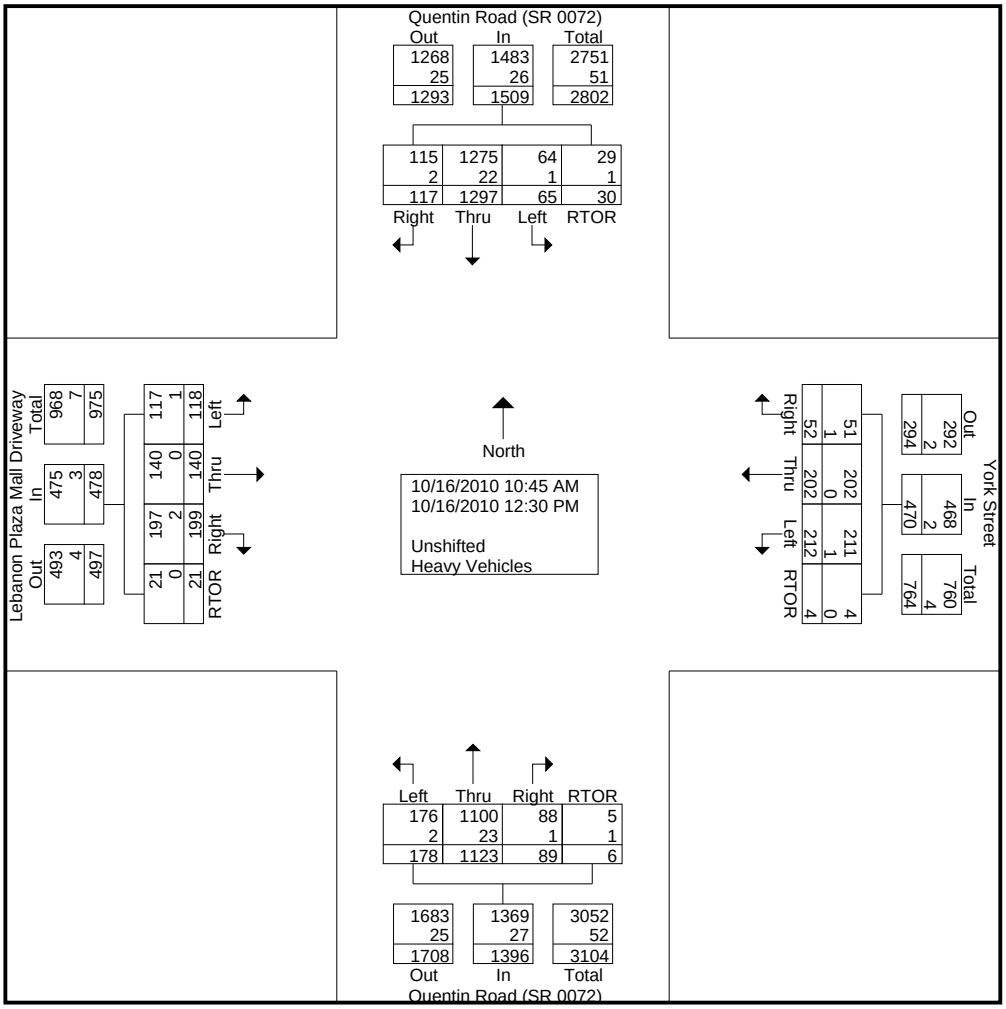
Groups Printed- Unshifted - Heavy Vehicles

	Lebanon Plaza Mall Driveway Eastbound					York Street Westbound					Quentin Road (SR 0072) Northbound					Quentin Road (SR 0072) Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
10:45 AM	12	17	24	2	55	28	39	10	1	78	28	132	6	0	166	7	177	9	3	196	495
Total	12	17	24	2	55	28	39	10	1	78	28	132	6	0	166	7	177	9	3	196	495
11:00 AM	13	16	21	1	51	22	29	5	1	57	22	166	11	1	200	11	184	10	1	206	514
11:15 AM	10	12	32	0	54	36	23	9	0	68	20	137	17	0	174	12	171	29	6	218	514
11:30 AM	15	19	32	7	73	28	20	4	0	52	26	128	11	0	165	4	153	13	4	174	464
11:45 AM	12	16	22	0	50	34	30	5	0	69	24	143	7	1	175	8	156	15	2	181	475
Total	50	63	107	8	228	120	102	23	1	246	92	574	46	2	714	35	664	67	13	779	1967
12:00 PM	18	18	18	3	57	26	20	6	0	52	12	157	13	0	182	8	153	9	3	173	464
12:15 PM	19	22	25	4	70	17	18	8	1	44	30	131	13	4	178	10	162	18	4	194	486
12:30 PM	19	20	25	4	68	21	23	5	1	50	16	129	11	0	156	5	141	14	7	167	441
Grand Total	118	140	199	21	478	212	202	52	4	470	178	1123	89	6	1396	65	1297	117	30	1509	3853
Apprch %	24.7	29.3	41.6	4.4		45.1	43	11.1	0.9		12.8	80.4	6.4	0.4		4.3	86	7.8	2		
Total %	3.1	3.6	5.2	0.5	12.4	5.5	5.2	1.3	0.1	12.2	4.6	29.1	2.3	0.2	36.2	1.7	33.7	3	0.8	39.2	
Unshifted	117	140	197	21	475	211	202	51	4	468	176	1100	88	5	1369	64	1275	115	29	1483	3795
% Unshifted	99.2	100	99	100	99.4	99.5	100	98.1	100	99.6	98.9	98	98.9	83.3	98.1	98.5	98.3	98.3	96.7	98.3	98.5
Heavy Vehicles	1	0	2	0	3	1	0	1	0	2	2	23	1	1	27	1	22	2	1	26	58
% Heavy Vehicles	0.8	0	1	0	0.6	0.5	0	1.9	0	0.4	1.1	2	1.1	16.7	1.9	1.5	1.7	1.7	3.3	1.7	1.5

Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & York Street/Lebanon Plaza Mall Driveway

File Name : SAT_QR74_YS_LPMDW
Site Code : 20101015
Start Date : 10/16/2010
Page No : 2

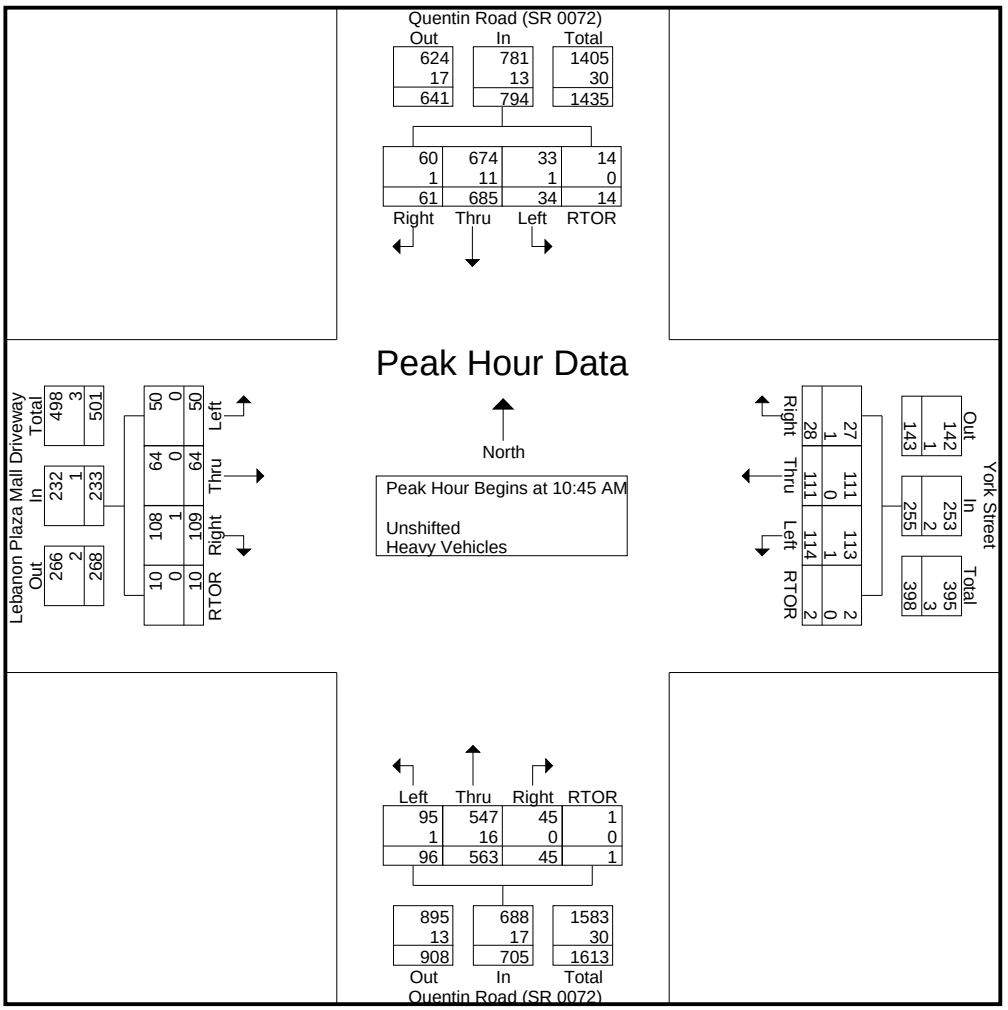


Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & York Street/Lebanon Plaza Mall Driveway

File Name : SAT_QR74_YS_LPMDW
Site Code : 20101015
Start Date : 10/16/2010
Page No : 3

	Lebanon Plaza Mall Driveway Eastbound					York Street Westbound					Quentin Road (SR 0072) Northbound					Quentin Road (SR 0072) Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 10:45 AM																					
10:45 AM	12	17	24	2	55	28	**39**	**10**	**1**	**78**	**28**	132	6	0	166	7	177	9	3	196	495
11:00 AM	13	16	21	1	51	22	29	5	1	57	22	**166**	11	**1**	**200**	11	**184**	10	1	206	**514**
11:15 AM	10	12	**32**	0	54	**36**	23	9	0	68	20	137	**17**	0	174	**12**	171	**29**	**6**	**218**	514
11:30 AM	**15**	**19**	32	**7**	**73**	28	20	4	0	52	26	128	11	0	165	4	153	13	4	174	464
Total Volume	50	64	109	10	233	114	111	28	2	255	96	563	45	1	705	34	685	61	14	794	1987
% App. Total	21.5	27.5	46.8	4.3		44.7	43.5	11	0.8		13.6	79.9	6.4	0.1		4.3	86.3	7.7	1.8		
PHF	.833	.842	.852	.357	.798	.792	.712	.700	.500	.817	.857	.848	.662	.250	.881	.708	.931	.526	.583	.911	.966
Unshifted	50	64	108	10	232	113	111	27	2	253	95	547	45	1	688	33	674	60	14	781	1954
% Unshifted	100	100	99.1	100	99.6	99.1	100	96.4	100	99.2	99.0	97.2	100	100	97.6	97.1	98.4	98.4	100	98.4	98.3
Heavy Vehicles	0	0	1	0	1	1	0	1	0	2	1	16	0	0	17	1	11	1	0	13	33
% Heavy Vehicles	0	0	0.9	0	0.4	0.9	0	3.6	0	0.8	1.0	2.8	0	0	2.4	2.9	1.6	1.6	0	1.6	1.7



Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & York Street/Lebanon Plaza Mall Driveway

Counter: TPD 8
Counted By: J. Neal
Weather: sunny
Saved As: 20101016

File Name : SAT_QR74_YS_LPMDW
Site Code : 20101015
Start Date : 10/16/2010
Page No : 1

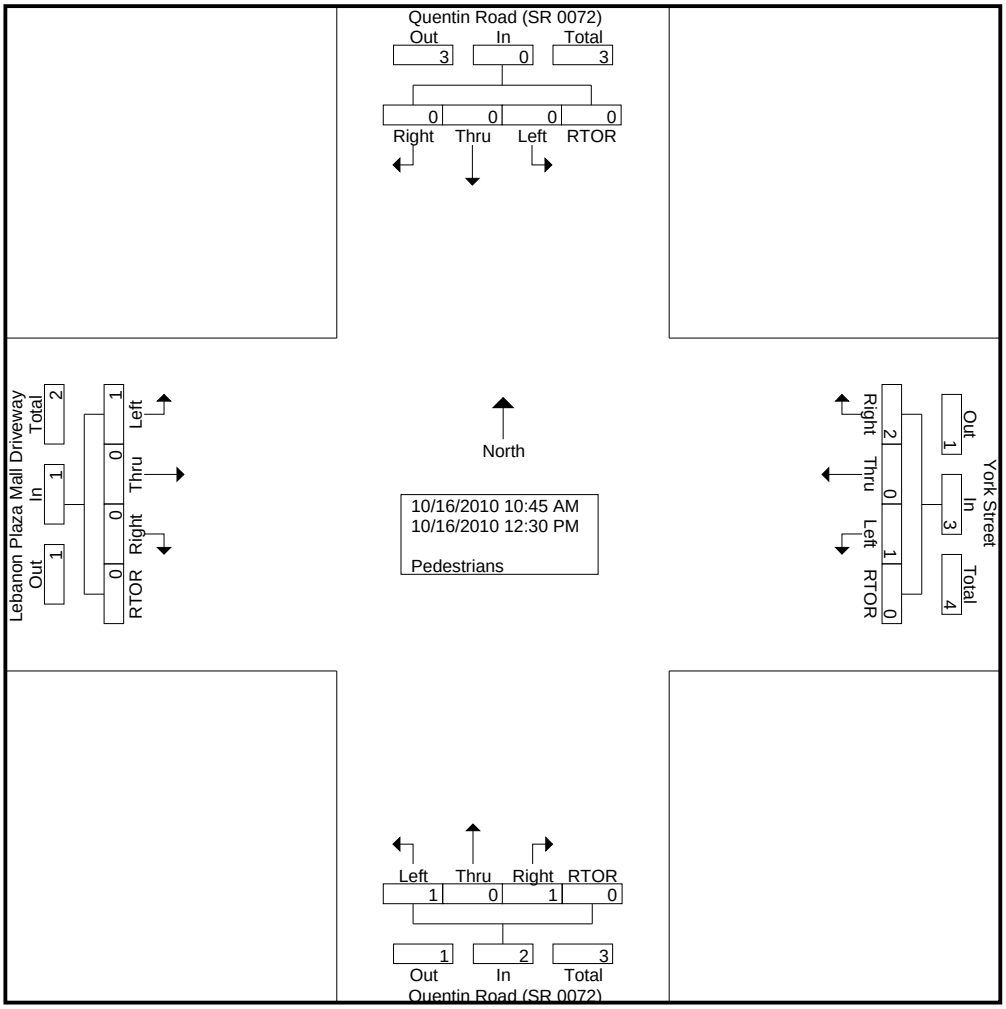
Groups Printed- Pedestrians

	Lebanon Plaza Mall Driveway Eastbound					York Street Westbound					Quentin Road (SR 0072) Northbound					Quentin Road (SR 0072) Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	2
12:30 PM	1	0	0	0	1	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	3
Grand Total	1	0	0	0	1	1	0	2	0	3	1	0	1	0	2	0	0	0	0	0	6
Apprch %	100	0	0	0		33.3	0	66.7	0		50	0	50	0		0	0	0	0		
Total %	16.7	0	0	0	16.7	16.7	0	33.3	0	50	16.7	0	16.7	0	33.3	0	0	0	0	0	

Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & York Street/Lebanon Plaza Mall Driveway

File Name : SAT_QR74_YS_LPMDW
Site Code : 20101015
Start Date : 10/16/2010
Page No : 2

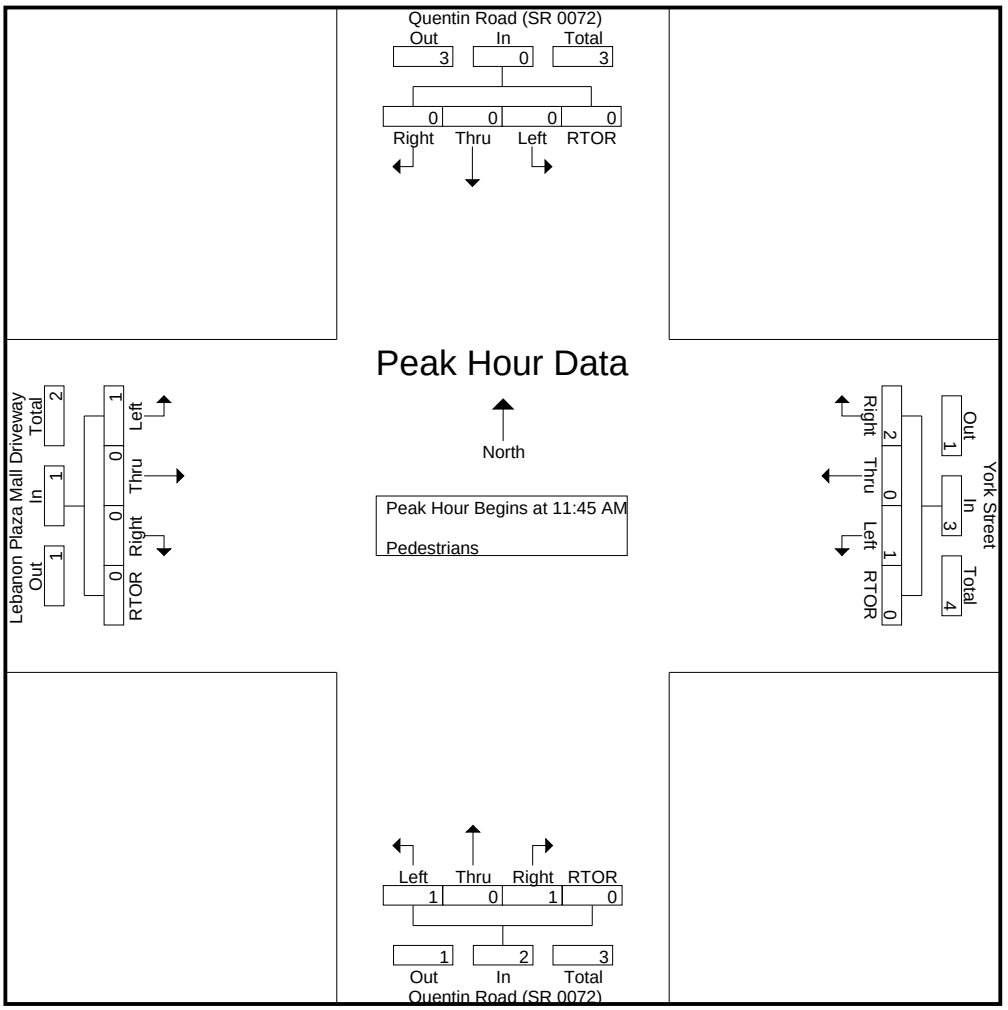


Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & York Street/Lebanon Plaza Mall Driveway

File Name : SAT_QR74_YS_LPMDW
Site Code : 20101015
Start Date : 10/16/2010
Page No : 3

	Lebanon Plaza Mall Driveway Eastbound					York Street Westbound					Quentin Road (SR 0072) Northbound					Quentin Road (SR 0072) Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	0	0	0	0	**1**	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	**1**	0	1	0	0	**1**	0	**1**	0	0	0	0	0	2
12:30 PM	**1**	0	0	0	**1**	0	0	1	0	1	**1**	0	0	0	1	0	0	0	0	0	**3**
Total Volume	1	0	0	0	1	1	0	2	0	3	1	0	1	0	2	0	0	0	0	0	6
% App. Total	100	0	0	0		33.3	0	66.7	0		50	0	50	0		0	0	0	0		
PHF	.250	.000	.000	.000	.250	.250	.000	.500	.000	.750	.250	.000	.250	.000	.500	.000	.000	.000	.000	.000	.500



Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & Colebrook Road (SR 0241)

Counter: D4-4414
Counted By: S. Lech
Weather: partly cloudy, windy
Saved As: 10101602

File Name : SAT_QR74_CR241
Site Code : 10101602
Start Date : 10/16/2010
Page No : 1

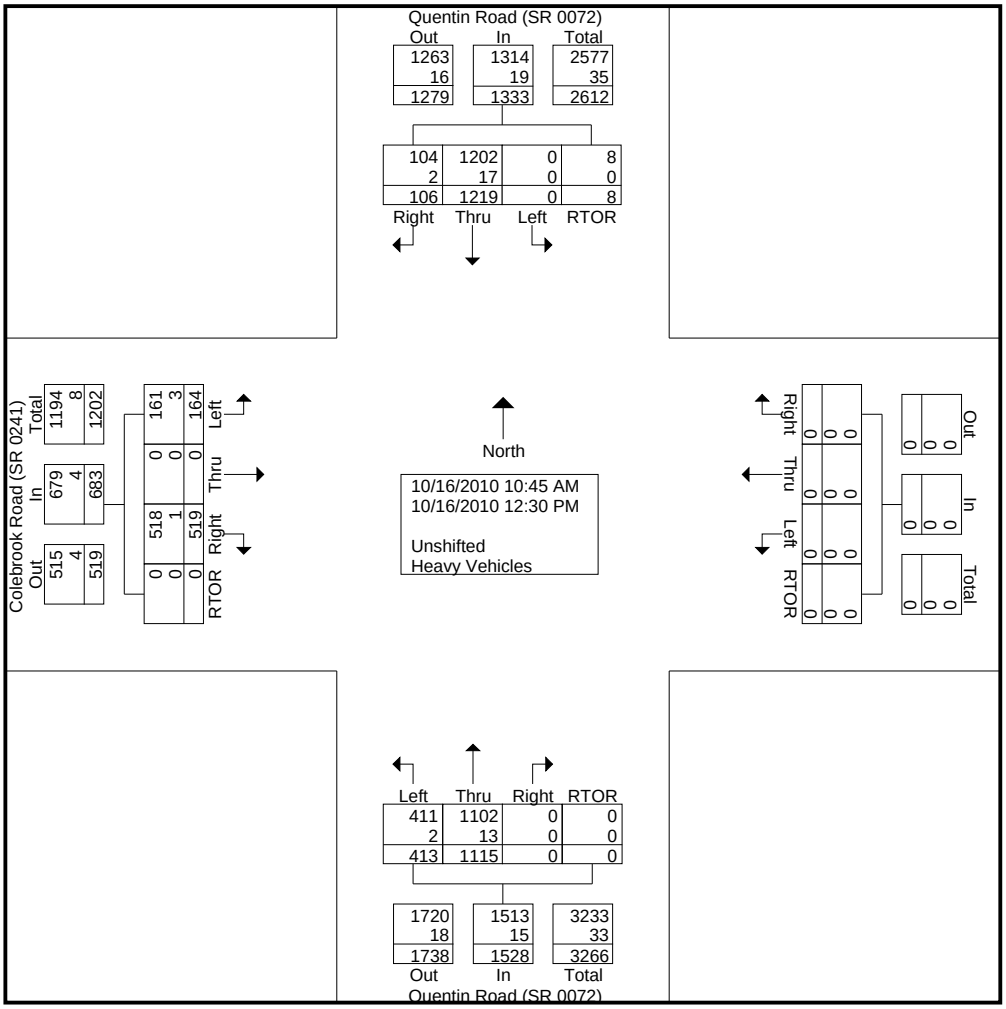
Groups Printed- Unshifted - Heavy Vehicles

	Colebrook Road (SR 0241) Eastbound					Westbound					Quentin Road (SR 0072) Northbound					Quentin Road (SR 0072) Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
10:45 AM	15	0	69	0	84	0	0	0	0	0	46	138	0	0	184	0	159	11	0	170	438
Total	15	0	69	0	84	0	0	0	0	0	46	138	0	0	184	0	159	11	0	170	438
11:00 AM	19	0	68	0	87	0	0	0	0	0	57	146	0	0	203	0	165	8	0	173	463
11:15 AM	24	0	66	0	90	0	0	0	0	0	50	132	0	0	182	0	166	13	0	179	451
11:30 AM	17	0	68	0	85	0	0	0	0	0	42	137	0	0	179	0	161	8	0	169	433
11:45 AM	25	0	64	0	89	0	0	0	0	0	55	140	0	0	195	0	146	20	2	168	452
Total	85	0	266	0	351	0	0	0	0	0	204	555	0	0	759	0	638	49	2	689	1799
12:00 PM	19	0	62	0	81	0	0	0	0	0	51	145	0	0	196	0	153	13	2	168	445
12:15 PM	22	0	59	0	81	0	0	0	0	0	52	144	0	0	196	0	143	16	0	159	436
12:30 PM	23	0	63	0	86	0	0	0	0	0	60	133	0	0	193	0	126	17	4	147	426
Grand Total	164	0	519	0	683	0	0	0	0	0	413	1115	0	0	1528	0	1219	106	8	1333	3544
Apprch %	24	0	76	0		0	0	0	0		27	73	0	0		0	91.4	8	0.6		
Total %	4.6	0	14.6	0	19.3	0	0	0	0	0	11.7	31.5	0	0	43.1	0	34.4	3	0.2	37.6	
Unshifted	161	0	518	0	679	0	0	0	0	0	411	1102	0	0	1513	0	1202	104	8	1314	3506
% Unshifted	98.2	0	99.8	0	99.4	0	0	0	0	0	99.5	98.8	0	0	99	0	98.6	98.1	100	98.6	98.9
Heavy Vehicles	3	0	1	0	4	0	0	0	0	0	2	13	0	0	15	0	17	2	0	19	38
% Heavy Vehicles	1.8	0	0.2	0	0.6	0	0	0	0	0	0.5	1.2	0	0	1	0	1.4	1.9	0	1.4	1.1

Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & Colebrook Road (SR 0241)

File Name : SAT_QR74_CR241
Site Code : 10101602
Start Date : 10/16/2010
Page No : 2

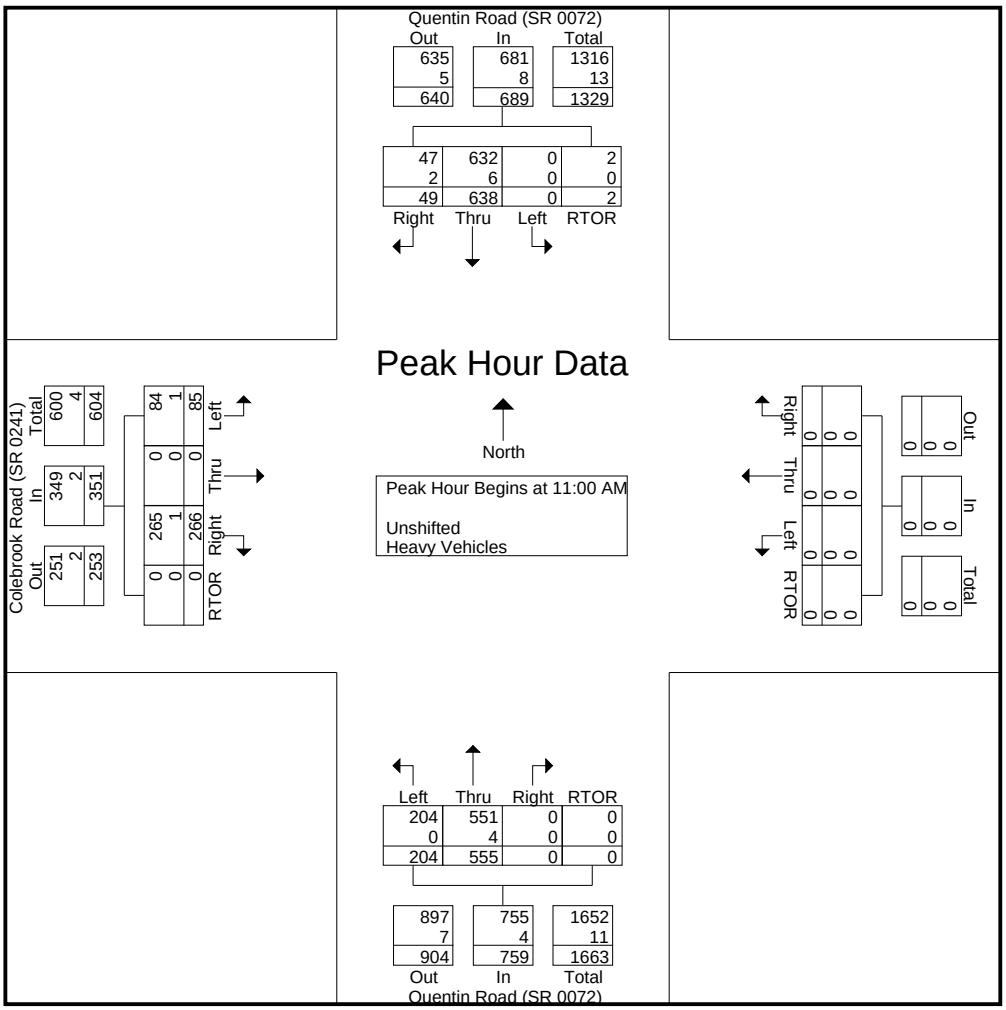


Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & Colebrook Road (SR 0241)

File Name : SAT_QR74_CR241
Site Code : 10101602
Start Date : 10/16/2010
Page No : 3

	Colebrook Road (SR 0241) Eastbound					Westbound					Quentin Road (SR 0072) Northbound					Quentin Road (SR 0072) Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:00 AM																					
11:00 AM	19	0	**68**	0	87	0	0	0	0	0	**57**	**146**	0	0	**203**	0	165	8	0	173	**463**
11:15 AM	24	0	66	0	**90**	0	0	0	0	0	50	132	0	0	182	0	**166**	13	0	**179**	451
11:30 AM	17	0	68	0	85	0	0	0	0	0	42	137	0	0	179	0	161	8	0	169	433
11:45 AM	**25**	0	64	0	89	0	0	0	0	0	55	140	0	0	195	0	146	**20**	**2**	168	452
Total Volume	85	0	266	0	351	0	0	0	0	0	204	555	0	0	759	0	638	49	2	689	1799
% App. Total	24.2	0	75.8	0		0	0	0	0		26.9	73.1	0	0		0	92.6	7.1	0.3		
PHF	.850	.000	.978	.000	.975	.000	.000	.000	.000	.000	.895	.950	.000	.000	.935	.000	.961	.613	.250	.962	.971
Unshifted	84	0	265	0	349	0	0	0	0	0	204	551	0	0	755	0	632	47	2	681	1785
% Unshifted	98.8	0	99.6	0	99.4	0	0	0	0	0	100	99.3	0	0	99.5	0	99.1	95.9	100	98.8	99.2
Heavy Vehicles	1	0	1	0	2	0	0	0	0	0	0	4	0	0	4	0	6	2	0	8	14
% Heavy Vehicles	1.2	0	0.4	0	0.6	0	0	0	0	0	0	0.7	0	0	0.5	0	0.9	4.1	0	1.2	0.8



Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & Colebrook Road (SR 0241)

Counter: D4-4414
Counted By: S. Lech
Weather: partly cloudy, windy
Saved As: 10101602

File Name : SAT_QR74_CR241
Site Code : 10101602
Start Date : 10/16/2010
Page No : 1

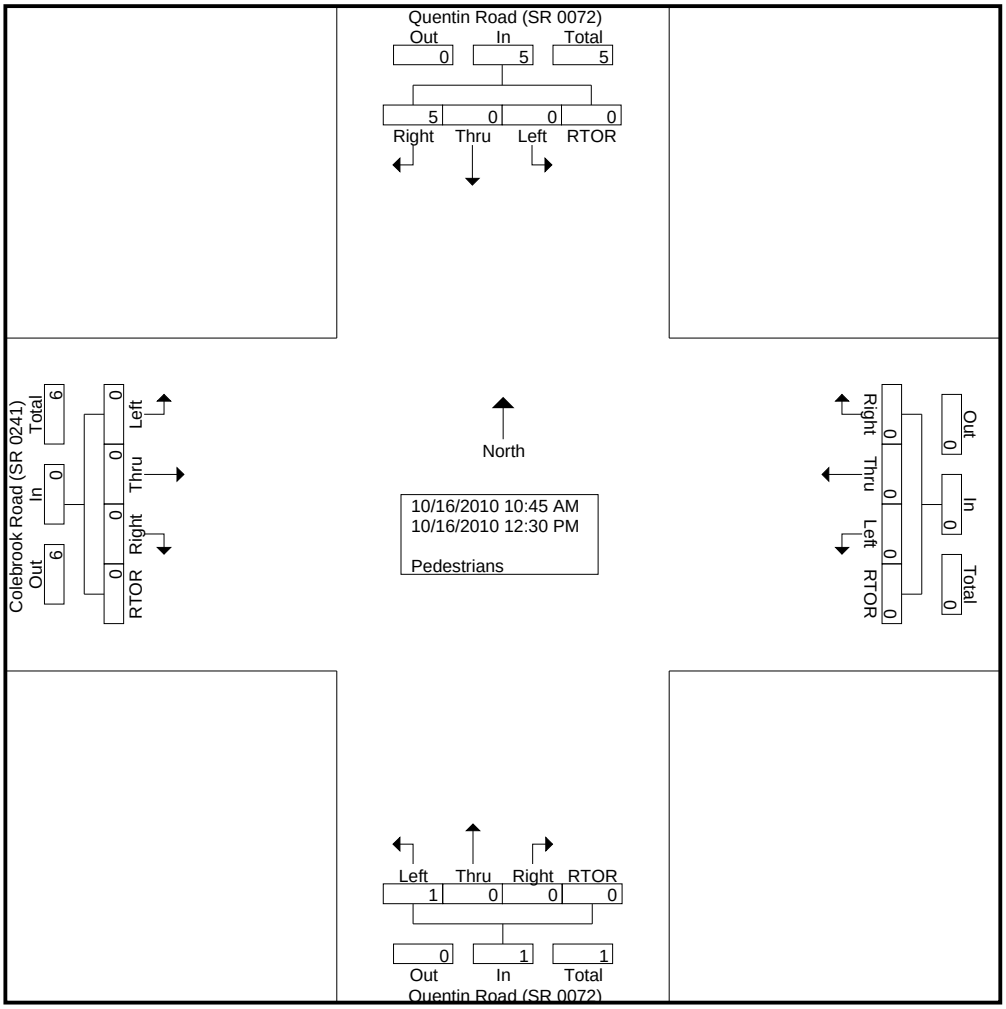
Groups Printed- Pedestrians

	Colebrook Road (SR 0241) Eastbound					Westbound					Quentin Road (SR 0072) Northbound					Quentin Road (SR 0072) Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	4
12:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
Grand Total	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	5	0	5	6
Apprch %	0	0	0	0		0	0	0	0		100	0	0	0		0	0	100	0		
Total %	0	0	0	0	0	0	0	0	0	0	16.7	0	0	0	16.7	0	0	83.3	0	83.3	

Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & Colebrook Road (SR 0241)

File Name : SAT_QR74_CR241
Site Code : 10101602
Start Date : 10/16/2010
Page No : 2

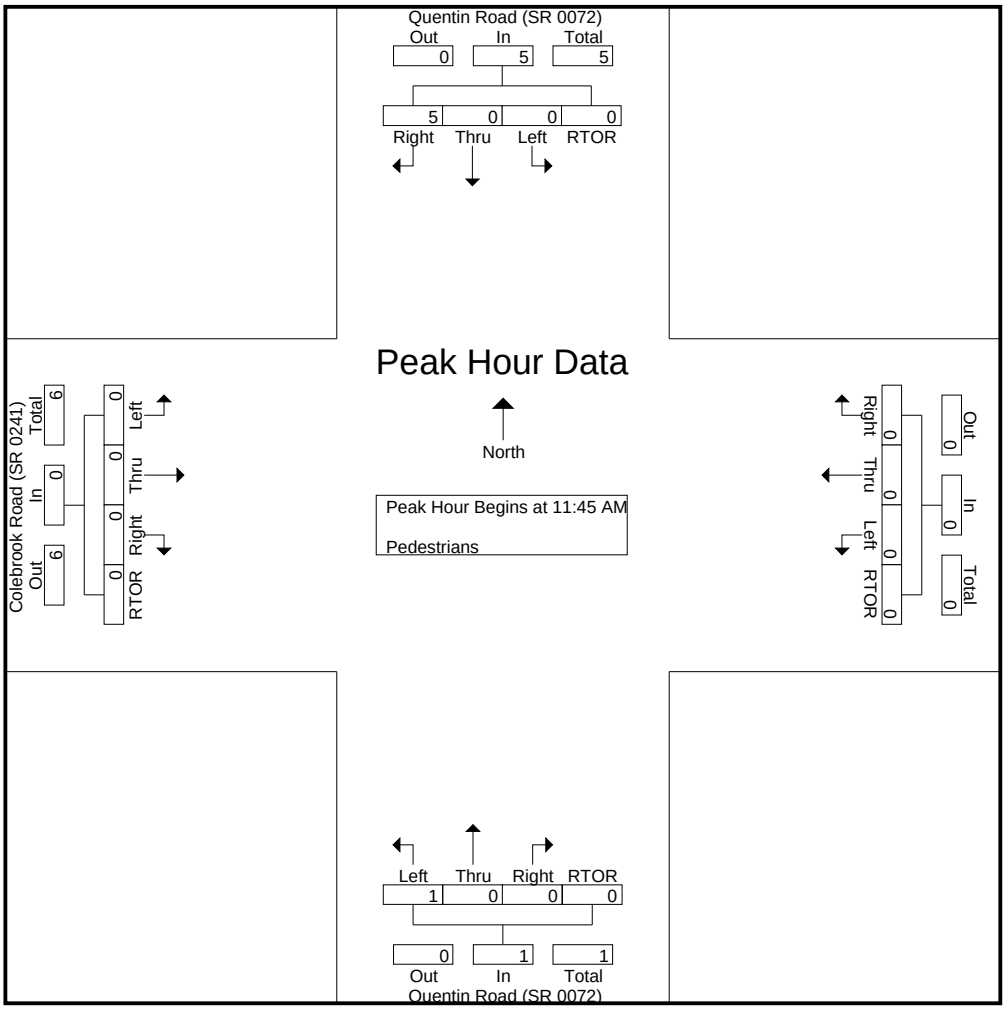


Traffic Planning and Design, Inc.
4507 North Front Street, Suite 202
Harrisburg, PA 17110

Quentin Road (SR 0072) & Colebrook Road (SR 0241)

File Name : SAT_QR74_CR241
Site Code : 10101602
Start Date : 10/16/2010
Page No : 3

	Colebrook Road (SR 0241) Eastbound					Westbound					Quentin Road (SR 0072) Northbound					Quentin Road (SR 0072) Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**	0	**4**	**4**
12:30 PM	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	**1**	0	0	0	0	0	1
Total Volume	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	5	0	5	6
% App. Total	0	0	0	0		0	0	0	0		100	0	0	0		0	0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.000	.250	.000	.000	.313	.000	.313	.375



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

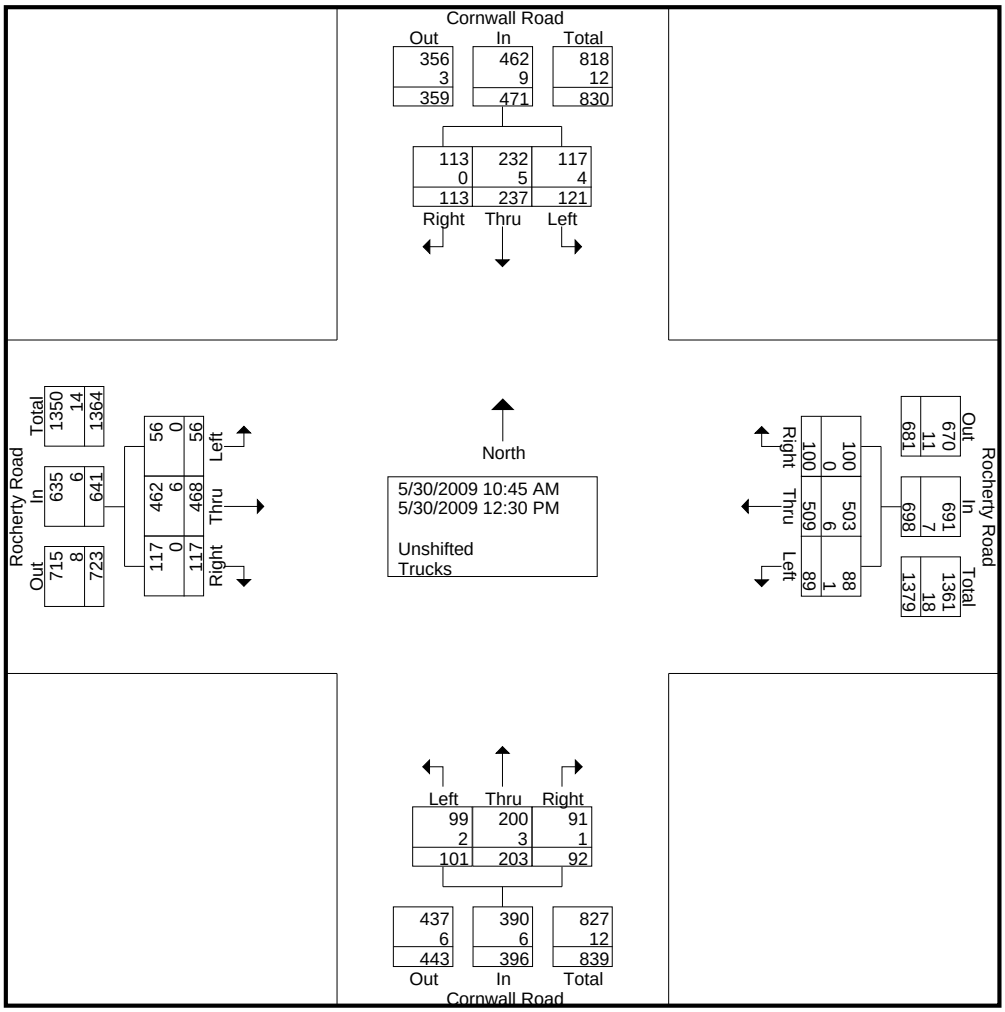
Cornwall Road & Rocherty Road

Counter: 11
Counted by: G. Schaaf
Weather: Sunny
Saved as: 2009-05-30 SATCRRR

File Name : 2009-05-30 SATCRRR
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Cornwall Road Southbound					Rocherty Road Westbound					Cornwall Road Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	13	26	17	7	56	5	73	12	1	90	9	31	15	3	55	4	62	20	3	86	14	287	301
Total	13	26	17	7	56	5	73	12	1	90	9	31	15	3	55	4	62	20	3	86	14	287	301
11:00 AM	16	25	20	5	61	6	80	9	0	95	11	15	14	4	40	6	54	11	1	71	10	267	277
11:15 AM	11	28	17	4	56	16	59	18	1	93	10	30	8	3	48	16	45	12	4	73	12	270	282
11:30 AM	13	30	15	3	58	7	74	8	1	89	12	16	16	7	44	6	63	15	5	84	16	275	291
11:45 AM	14	30	16	3	60	13	64	15	1	92	10	25	16	8	51	7	60	16	7	83	19	286	305
Total	54	113	68	15	235	42	277	50	3	369	43	86	54	22	183	35	222	54	17	311	57	1098	1155
12:00 PM	17	31	8	1	56	19	64	12	4	95	19	23	5	1	47	5	69	16	5	90	11	288	299
12:15 PM	18	30	11	5	59	18	43	13	1	74	13	32	7	1	52	3	62	13	3	78	10	263	273
12:30 PM	19	37	9	3	65	5	52	13	0	70	17	31	11	3	59	9	53	14	3	76	9	270	279
Grand Total	121	237	113	31	471	89	509	100	9	698	101	203	92	30	396	56	468	117	31	641	101	2206	2307
Apprch %	25.7	50.3	24			12.8	72.9	14.3			25.5	51.3	23.2			8.7	73	18.3					
Total %	5.5	10.7	5.1		21.4	4	23.1	4.5		31.6	4.6	9.2	4.2		18	2.5	21.2	5.3		29.1	4.4	95.6	
Unshifted	117	232	113		493	88	503	100		700	99	200	91		420	56	462	117		666	0	0	2279
% Unshifted	96.7	97.9	100	100	98.2	98.9	98.8	100	100	99	98	98.5	98.9	100	98.6	100	98.7	100	100	99.1	0	0	98.8
Trucks	4	5	0		9	1	6	0		7	2	3	1		6	0	6	0		6	0	0	28
% Trucks	3.3	2.1	0	0	1.8	1.1	1.2	0	0	1	2	1.5	1.1	0	1.4	0	1.3	0	0	0.9	0	0	1.2

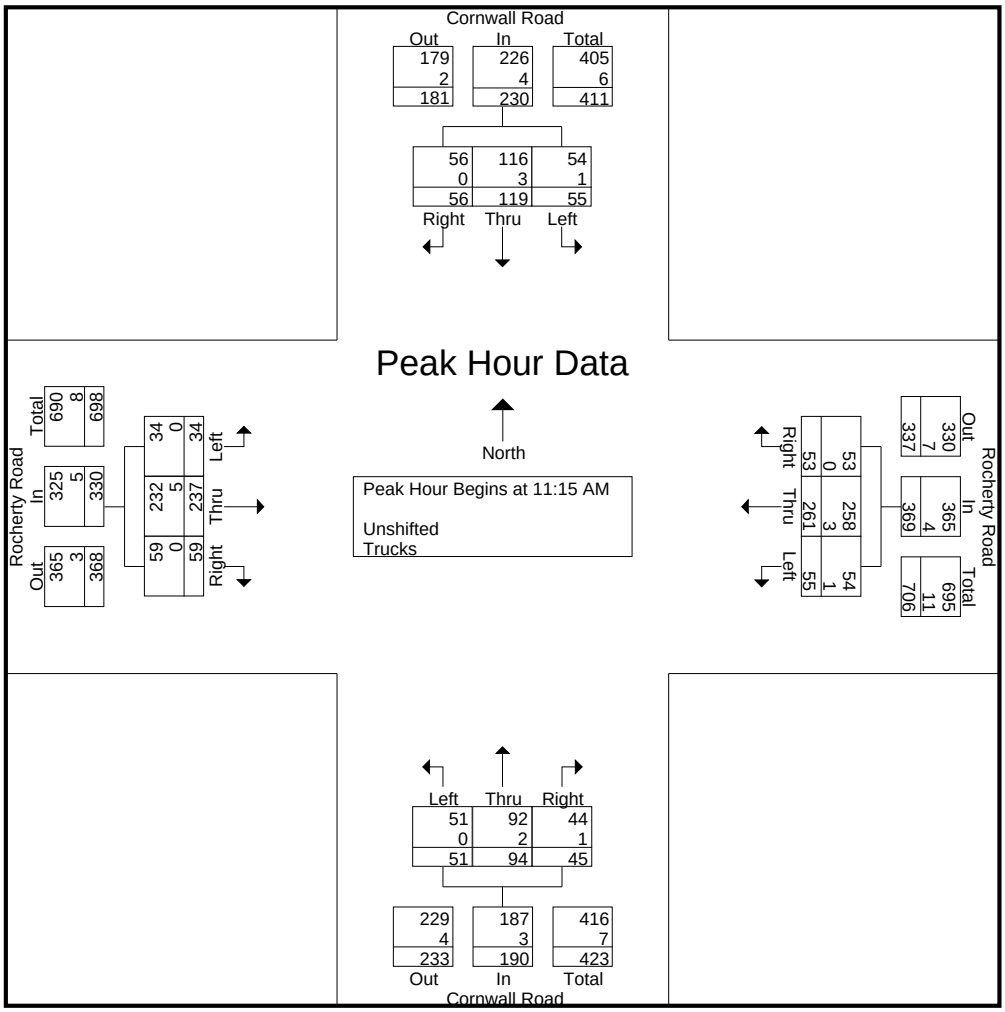


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
Rocherty Road

File Name : 2009-05-30 SATCRRR
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Cornwall Road Southbound				Rocherty Road Westbound				Cornwall Road Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	11	28	17	56	16	59	18	93	10	30	8	48	16	45	12	73	270
11:30 AM	13	30	15	58	7	74	8	89	12	16	16	44	6	63	15	84	275
11:45 AM	14	30	16	60	13	64	15	92	10	25	16	51	7	60	16	83	286
12:00 PM	17	31	8	56	19	64	12	95	19	23	5	47	5	69	16	90	288
Total Volume	55	119	56	230	55	261	53	369	51	94	45	190	34	237	59	330	1119
% App. Total	23.9	51.7	24.3		14.9	70.7	14.4		26.8	49.5	23.7		10.3	71.8	17.9		
PHF	.809	.960	.824	.958	.724	.882	.736	.971	.671	.783	.703	.931	.531	.859	.922	.917	.971
Unshifted	54	116	56	226	54	258	53	365	51	92	44	187	34	232	59	325	1103
% Unshifted	98.2	97.5	100	98.3	98.2	98.9	100	98.9	100	97.9	97.8	98.4	100	97.9	100	98.5	98.6
Trucks	1	3	0	4	1	3	0	4	0	2	1	3	0	5	0	5	16
% Trucks	1.8	2.5	0	1.7	1.8	1.1	0	1.1	0	2.1	2.2	1.6	0	2.1	0	1.5	1.4



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

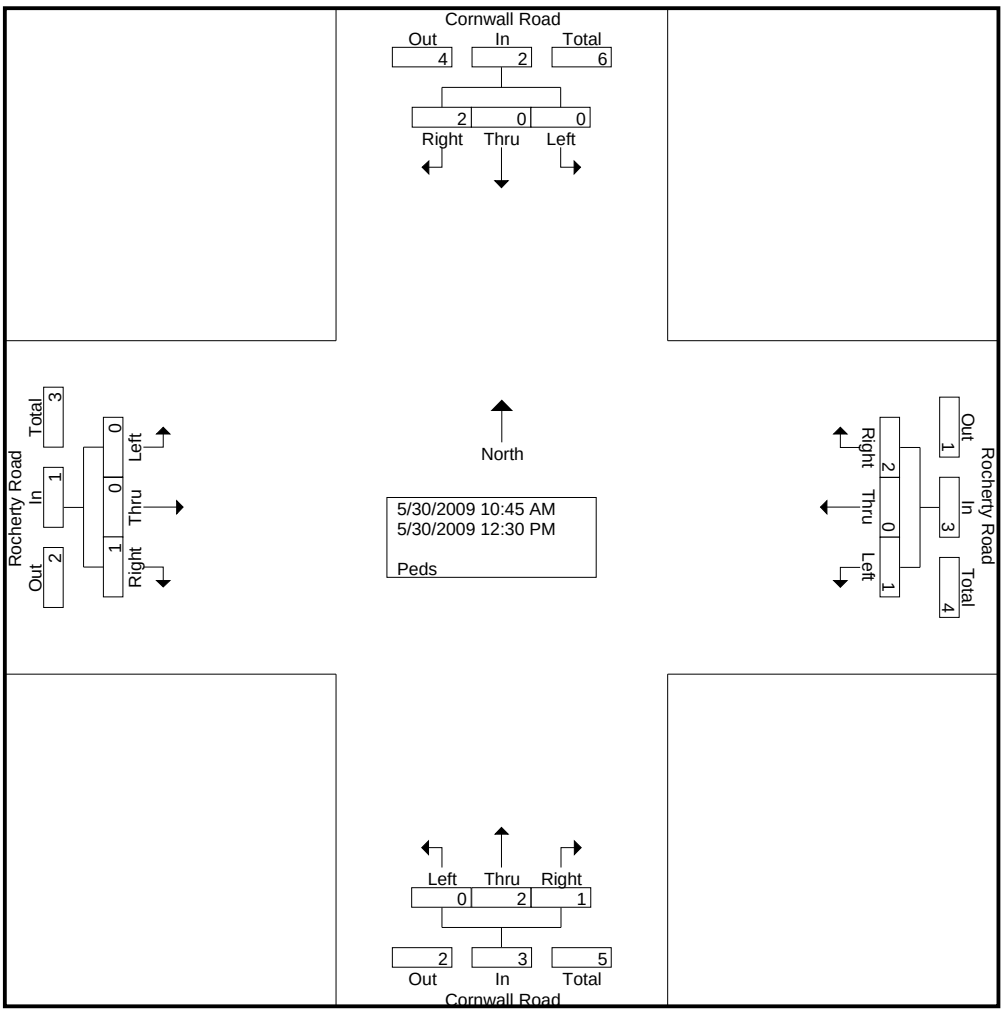
Cornwall Road & Rocherty Road

Counter: 11
Counted by: G. Schaaf
Weather: Sunny
Saved as: 2009-05-30 SATCRRR

File Name : 2009-05-30 SATCRRR
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Peds

	Cornwall Road Southbound					Rocherty Road Westbound					Cornwall Road Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	2	2
Total	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	2	2
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
11:30 AM	0	0	0	0	0	1	0	1	0	2	0	1	0	0	1	0	0	0	0	0	0	3	3
11:45 AM	0	0	1	0	1	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	3	3
Total	0	0	2	0	2	1	0	1	0	2	0	2	1	0	3	0	0	0	0	0	0	7	7
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	2	0	2	1	0	2	0	3	0	2	1	0	3	0	0	1	0	1	0	9	9
Apprch %	0	0	100			33.3	0	66.7			0	66.7	33.3			0	0	100					
Total %	0	0	22.2		22.2	11.1	0	22.2		33.3	0	22.2	11.1		33.3	0	0	11.1		11.1	0	100	

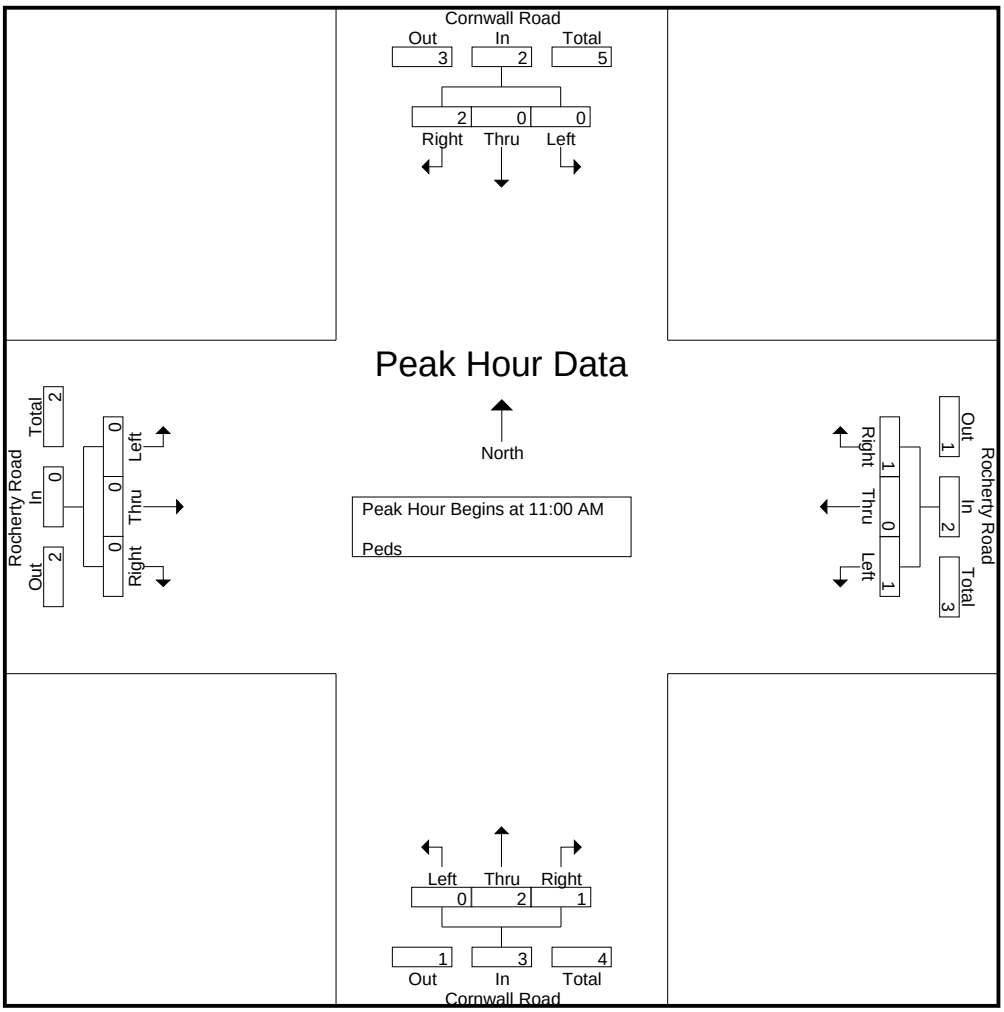


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
Rocherty Road

File Name : 2009-05-30 SATCRRR
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Cornwall Road Southbound				Rocherty Road Westbound				Cornwall Road Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
11:30 AM	0	0	0	0	1	0	1	2	0	1	0	1	0	0	0	0	3
11:45 AM	0	0	1	1	0	0	0	0	0	1	1	2	0	0	0	0	3
Total Volume	0	0	2	2	1	0	1	2	0	2	1	3	0	0	0	0	7
% App. Total	0	0	100		50	0	50		0	66.7	33.3		0	0	0		
PHF	.000	.000	.500	.500	.250	.000	.250	.250	.000	.500	.250	.375	.000	.000	.000	.000	.583



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

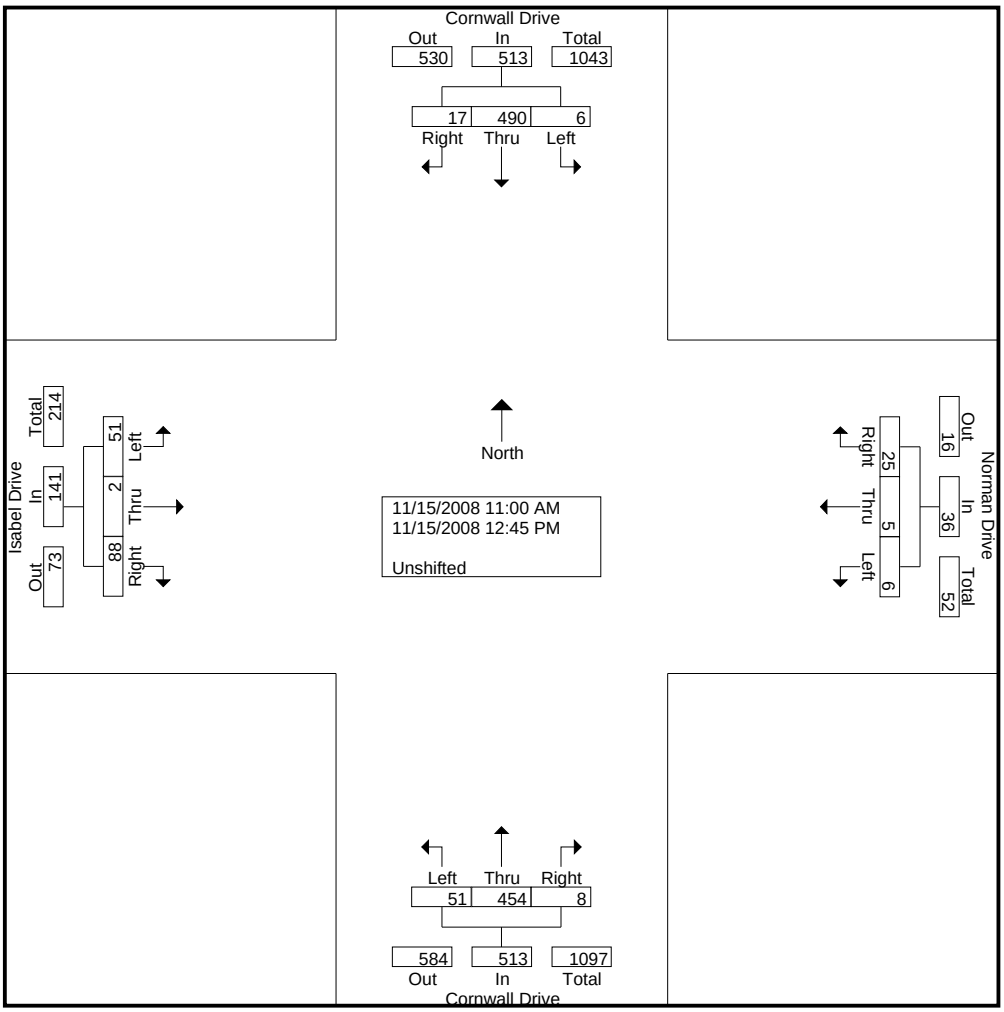
Cornwall Road & Isabel Drive / Norman Drive

Counter: 27
Counted by: Z. Pierce
Weather: Overcast
Saved as: 2008-11-15 SATCRID

File Name : 2008-11-15 SATCRID
Site Code : 00000000
Start Date : 11/15/2008
Page No : 1

Groups Printed- Unshifted

	Cornwall Drive Southbound					Norman Drive Westbound					Cornwall Drive Northbound					Isabel Drive Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	2	63	1	1	66	2	0	4	0	6	6	80	2	1	88	3	0	12	0	15	2	175	177
11:15 AM	3	66	5	3	74	2	1	5	1	8	7	49	2	0	58	3	1	16	0	20	4	160	164
11:30 AM	1	49	3	0	53	1	1	6	0	8	10	56	0	0	66	4	0	7	1	11	1	138	139
11:45 AM	0	54	4	3	58	0	0	3	0	3	10	64	1	0	75	10	1	10	0	21	3	157	160
Total	6	232	13	7	251	5	2	18	1	25	33	249	5	1	287	20	2	45	1	67	10	630	640
12:00 PM	0	96	2	1	98	0	3	1	0	4	6	67	0	1	73	9	0	11	0	20	2	195	197
12:15 PM	0	59	0	0	59	0	0	3	0	3	6	52	2	0	60	9	0	9	0	18	0	140	140
12:30 PM	0	37	1	0	38	0	0	3	0	3	3	45	0	0	48	7	0	9	0	16	0	105	105
12:45 PM	0	66	1	2	67	1	0	0	0	1	3	41	1	0	45	6	0	14	2	20	4	133	137
Total	0	258	4	3	262	1	3	7	0	11	18	205	3	1	226	31	0	43	2	74	6	573	579
Grand Total	6	490	17	10	513	6	5	25	1	36	51	454	8	2	513	51	2	88	3	141	16	1203	1219
Apprch %	1.2	95.5	3.3			16.7	13.9	69.4			9.9	88.5	1.6			36.2	1.4	62.4					
Total %	0.5	40.7	1.4		42.6	0.5	0.4	2.1		3	4.2	37.7	0.7		42.6	4.2	0.2	7.3		11.7	1.3	98.7	

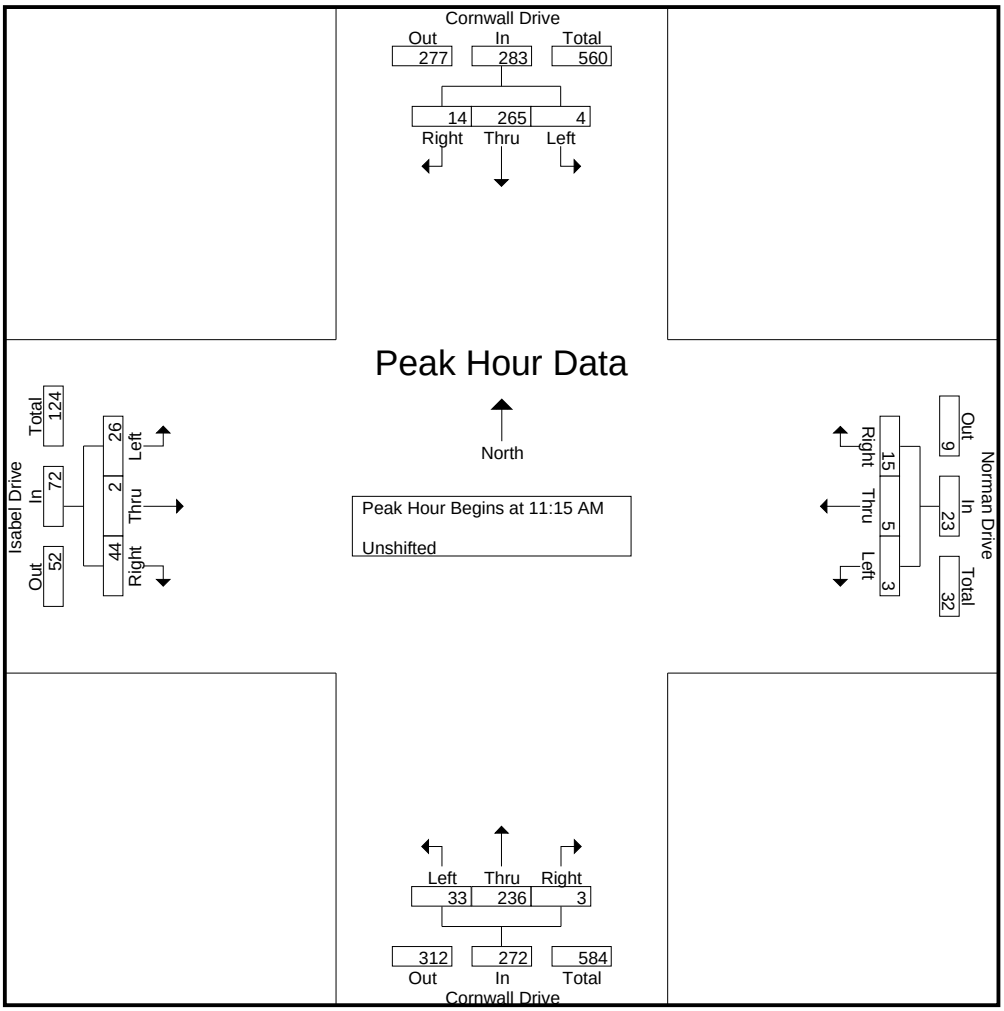


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road & Isabel Drive / Norman Drive

File Name : 2008-11-15 SATCRID
Site Code : 00000000
Start Date : 11/15/2008
Page No : 2

	Cornwall Drive Southbound				Norman Drive Westbound				Cornwall Drive Northbound				Isabel Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	3	66	5	74	2	1	5	8	7	49	2	58	3	1	16	20	160
11:30 AM	1	49	3	53	1	1	6	8	10	56	0	66	4	0	7	11	138
11:45 AM	0	54	4	58	0	0	3	3	10	64	1	75	10	1	10	21	157
12:00 PM	0	96	2	98	0	3	1	4	6	67	0	73	9	0	11	20	195
Total Volume	4	265	14	283	3	5	15	23	33	236	3	272	26	2	44	72	650
% App. Total	1.4	93.6	4.9		13	21.7	65.2		12.1	86.8	1.1		36.1	2.8	61.1		
PHF	.333	.690	.700	.722	.375	.417	.625	.719	.825	.881	.375	.907	.650	.500	.688	.857	.833



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

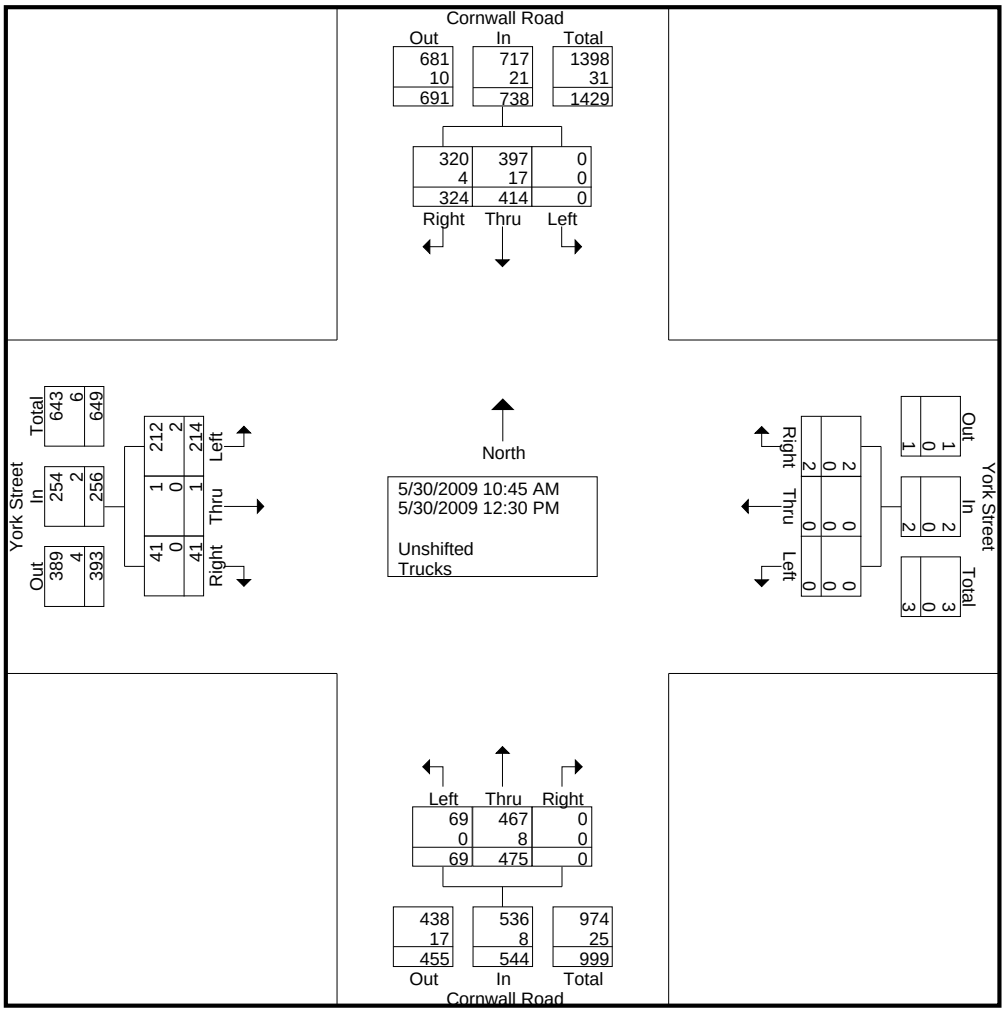
Cornwall Road & York Street

Counter: 25
Counted by: C. Lincoln
Weather: Sunny
Saved as: 2009-05-30 SATCRYS

File Name : 2009-05-30 SATCRYS
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Cornwall Road Southbound					York Street Westbound					Cornwall Road Northbound					York Street Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	0	62	42	0	104	0	0	0	0	0	8	58	0	0	66	26	0	6	0	32	0	202	202
Total	0	62	42	0	104	0	0	0	0	0	8	58	0	0	66	26	0	6	0	32	0	202	202
11:00 AM	0	49	47	0	96	0	0	1	0	1	6	63	0	0	69	25	0	4	0	29	0	195	195
11:15 AM	0	48	43	1	91	0	0	1	0	1	10	57	0	0	67	29	0	5	0	34	1	193	194
11:30 AM	0	57	32	0	89	0	0	0	0	0	7	59	0	1	66	36	0	6	0	42	1	197	198
11:45 AM	0	52	43	0	95	0	0	0	0	0	12	57	0	1	69	27	0	4	0	31	1	195	196
Total	0	206	165	1	371	0	0	2	0	2	35	236	0	2	271	117	0	19	0	136	3	780	783
12:00 PM	0	39	41	0	80	0	0	0	0	0	10	63	0	0	73	27	0	4	0	31	0	184	184
12:15 PM	0	65	42	0	107	0	0	0	0	0	11	57	0	0	68	24	1	5	0	30	0	205	205
12:30 PM	0	42	34	1	76	0	0	0	0	0	5	61	0	0	66	20	0	7	0	27	1	169	170
Grand Total	0	414	324	2	738	0	0	2	0	2	69	475	0	2	544	214	1	41	0	256	4	1540	1544
Apprch %	0	56.1	43.9			0	0	100			12.7	87.3	0			83.6	0.4	16					
Total %	0	26.9	21		47.9	0	0	0.1		0.1	4.5	30.8	0		35.3	13.9	0.1	2.7		16.6	0.3	99.7	
Unshifted	0	397	320		719	0	0	2		2	69	467	0		538	212	1	41		254	0	0	1513
% Unshifted	0	95.9	98.8	100	97.2	0	0	100	0	100	100	98.3	0	100	98.5	99.1	100	100	0	99.2	0	0	98
Trucks	0	17	4		21	0	0	0		0	0	8	0		8	2	0	0		2	0	0	31
% Trucks	0	4.1	1.2	0	2.8	0	0	0	0	0	0	1.7	0	0	1.5	0.9	0	0	0	0.8	0	0	2

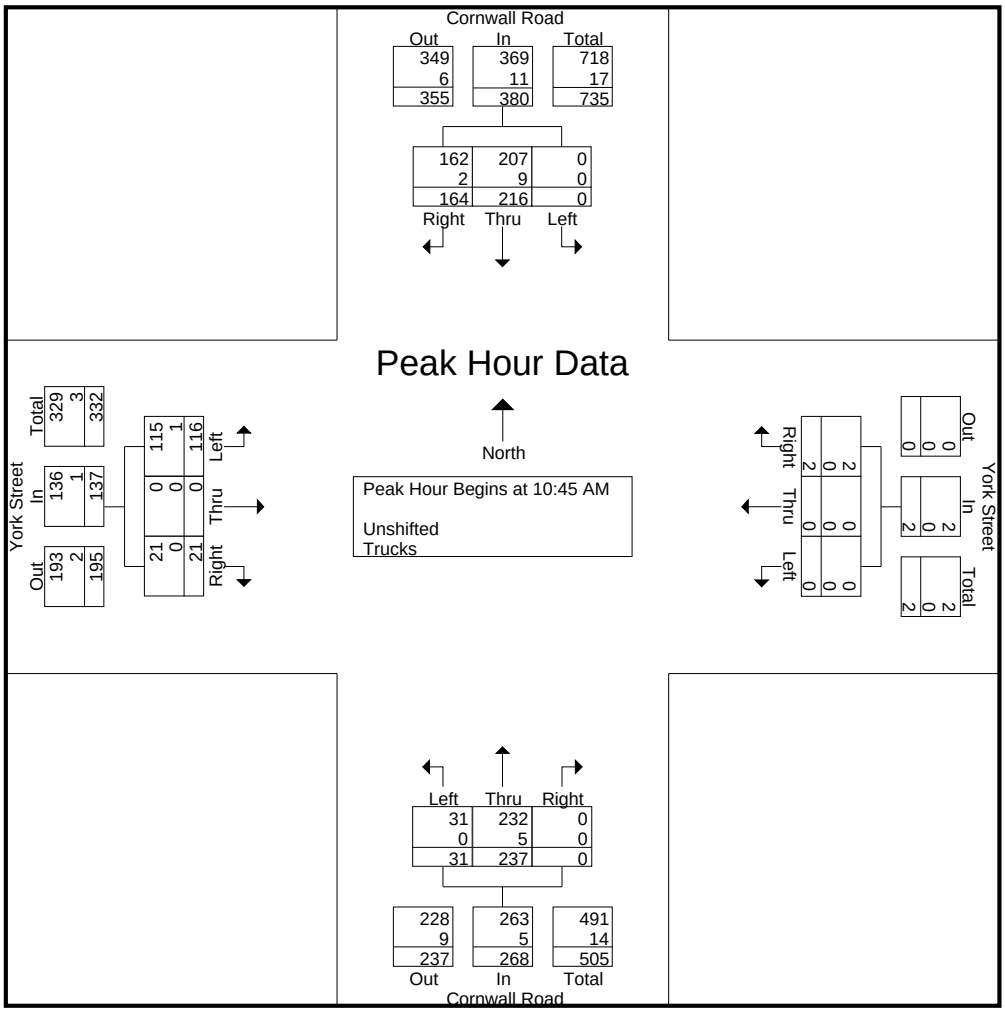


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
York Street

File Name : 2009-05-30 SATCRYS
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Cornwall Road Southbound				York Street Westbound				Cornwall Road Northbound				York Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:45 AM																	
10:45 AM	0	62	42	104	0	0	0	0	8	58	0	66	26	0	6	32	202
11:00 AM	0	49	47	96	0	0	1	1	6	63	0	69	25	0	4	29	195
11:15 AM	0	48	43	91	0	0	1	1	10	57	0	67	29	0	5	34	193
11:30 AM	0	57	32	89	0	0	0	0	7	59	0	66	36	0	6	42	197
Total Volume	0	216	164	380	0	0	2	2	31	237	0	268	116	0	21	137	787
% App. Total	0	56.8	43.2		0	0	100		11.6	88.4	0		84.7	0	15.3		
PHF	.000	.871	.872	.913	.000	.000	.500	.500	.775	.940	.000	.971	.806	.000	.875	.815	.974
Unshifted	0	207	162	369	0	0	2	2	31	232	0	263	115	0	21	136	770
% Unshifted	0	95.8	98.8	97.1	0	0	100	100	100	97.9	0	98.1	99.1	0	100	99.3	97.8
Trucks	0	9	2	11	0	0	0	0	0	5	0	5	1	0	0	1	17
% Trucks	0	4.2	1.2	2.9	0	0	0	0	0	2.1	0	1.9	0.9	0	0	0.7	2.2



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

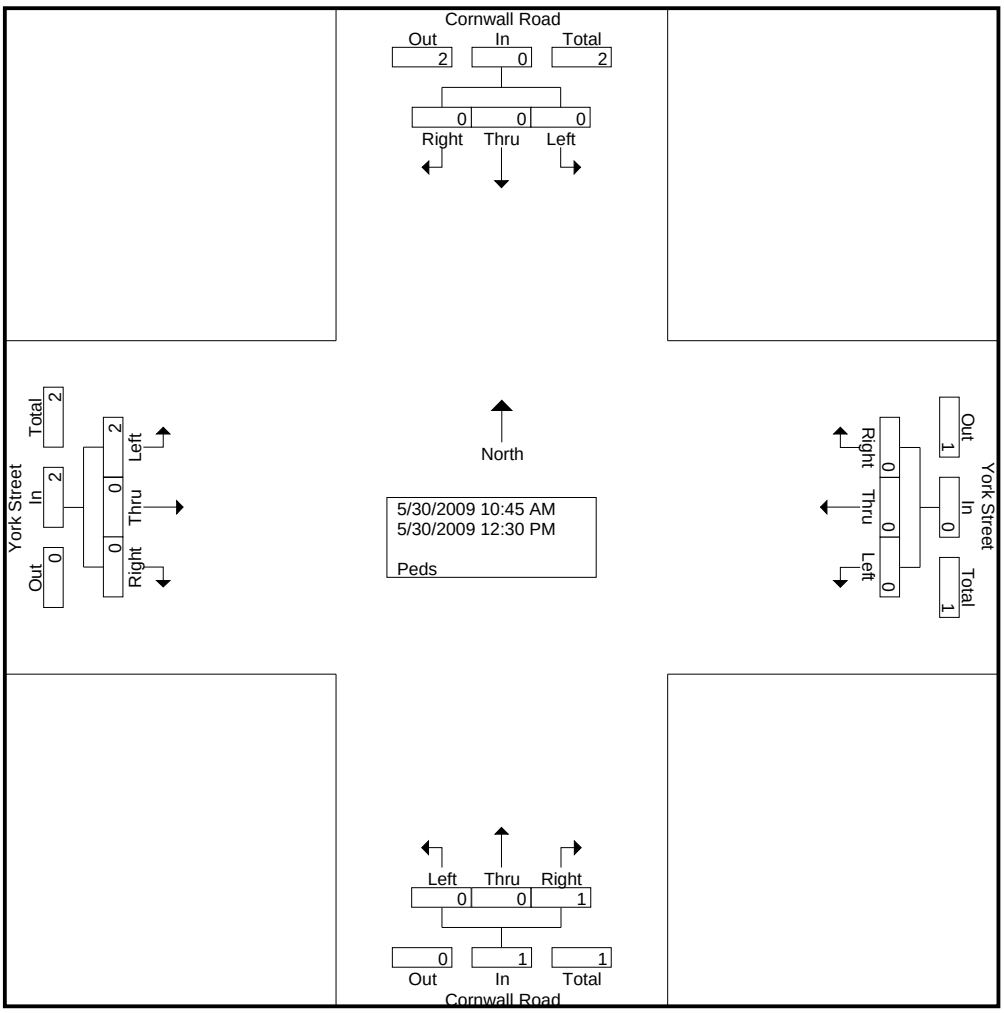
Cornwall Road & York Street

Counter: 25
Counted by: C. Lincoln
Weather: Sunny
Saved as: 2009-05-30 SATCRYS

File Name : 2009-05-30 SATCRYS
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Peds

	Cornwall Road Southbound					York Street Westbound					Cornwall Road Northbound					York Street Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	2	2
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	2	0	3	3
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	2	0	3	3
Apprch %	0	0	0			0	0	0			0	0	100			100	0	0					
Total %	0	0	0		0	0	0	0		0	0	0	33.3		33.3	66.7	0	0		66.7	0	100	

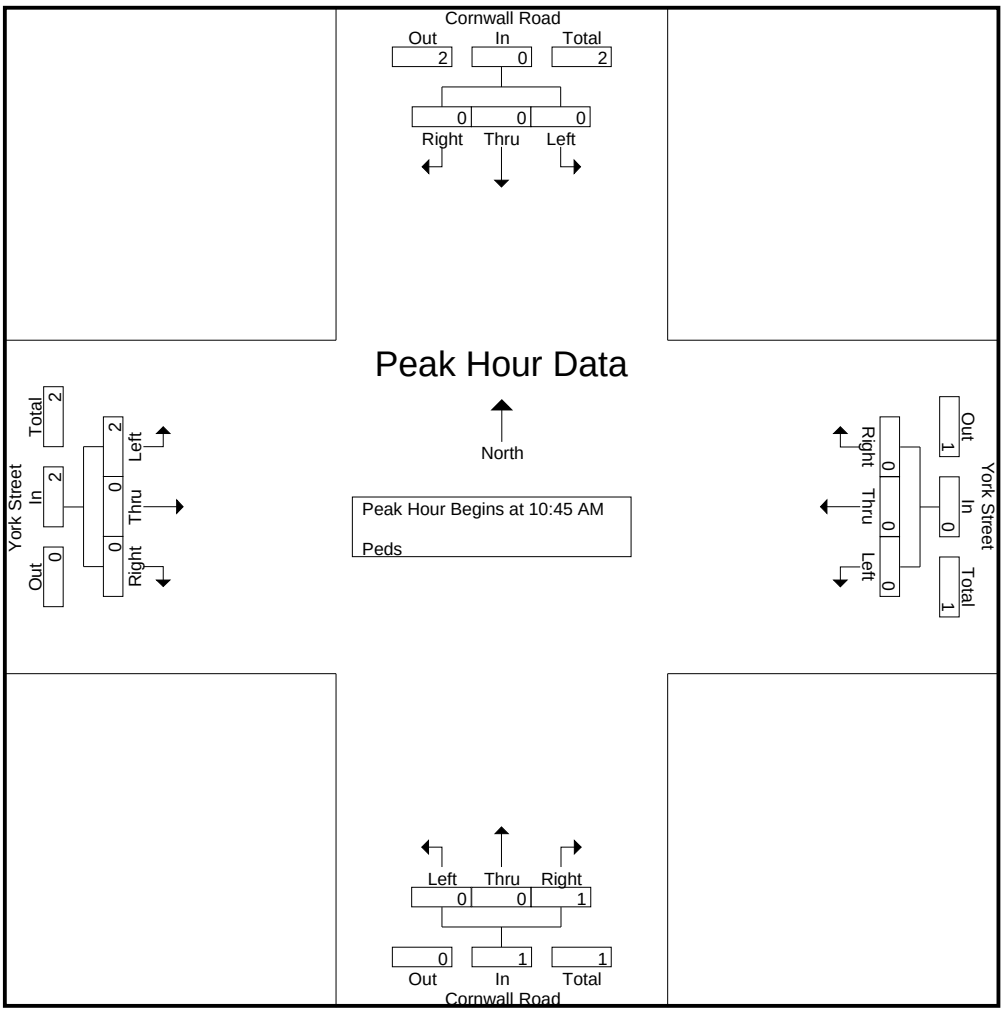


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Cornwall Road &
York Street

File Name : 2009-05-30 SATCRYS
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Cornwall Road Southbound				York Street Westbound				Cornwall Road Northbound				York Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:45 AM																	
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	2	3
% App. Total	0	0	0		0	0	0		0	0	100		100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.250	.000	.000	.250	.375



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

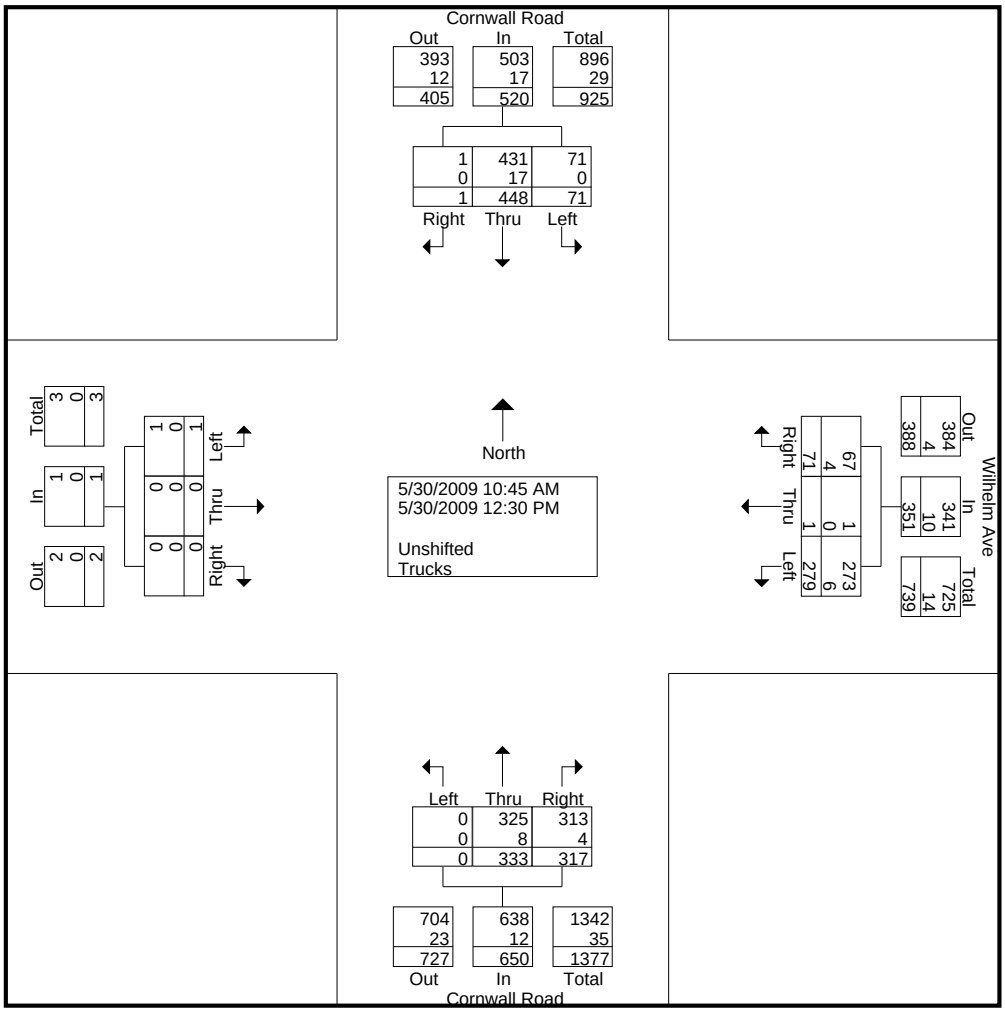
N. Cornwall Road & Wilhelm Ave

Counter: 27
Counted by: S. Hutt
Weather: Sunny
Saved as: 2009-05-30 SATCRWA

File Name : 2009-05-30 SATCRWA
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Cornwall Road Southbound					Wilhelm Ave Westbound					Cornwall Road Northbound					Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	7	71	0	0	78	33	0	10	0	43	0	48	35	0	83	0	0	0	0	0	0	204	204
Total	7	71	0	0	78	33	0	10	0	43	0	48	35	0	83	0	0	0	0	0	0	204	204
11:00 AM	13	66	0	0	79	24	0	7	0	31	0	46	42	0	88	0	0	0	0	0	0	198	198
11:15 AM	6	51	0	0	57	53	0	11	0	64	0	34	44	0	78	0	0	0	0	0	0	199	199
11:30 AM	2	33	0	0	35	40	1	8	0	49	0	29	39	5	68	0	0	0	0	0	5	152	157
11:45 AM	8	55	0	0	63	27	0	6	0	33	0	39	49	0	88	0	0	0	0	0	0	184	184
Total	29	205	0	0	234	144	1	32	0	177	0	148	174	5	322	0	0	0	0	0	5	733	738
12:00 PM	15	49	0	0	64	35	0	6	0	41	0	51	32	0	83	0	0	0	0	0	0	188	188
12:15 PM	9	60	0	0	69	35	0	12	0	47	0	44	40	0	84	0	0	0	0	0	0	200	200
12:30 PM	11	63	1	0	75	32	0	11	0	43	0	42	36	0	78	1	0	0	0	1	0	197	197
Grand Total	71	448	1	0	520	279	1	71	0	351	0	333	317	5	650	1	0	0	0	1	5	1522	1527
Apprch %	13.7	86.2	0.2			79.5	0.3	20.2			0	51.2	48.8			100	0	0					
Total %	4.7	29.4	0.1		34.2	18.3	0.1	4.7		23.1	0	21.9	20.8		42.7	0.1	0	0		0.1	0.3	99.7	
Unshifted	71	431	1		503	273	1	67		341	0	325	313		643	1	0	0		1	0	0	1488
% Unshifted	100	96.2	100	0	96.7	97.8	100	94.4	0	97.2	0	97.6	98.7	100	98.2	100	0	0	0	100	0	0	97.4
Trucks	0	17	0		17	6	0	4		10	0	8	4		12	0	0	0		0	0	0	39
% Trucks	0	3.8	0	0	3.3	2.2	0	5.6	0	2.8	0	2.4	1.3	0	1.8	0	0	0	0	0	0	0	2.6

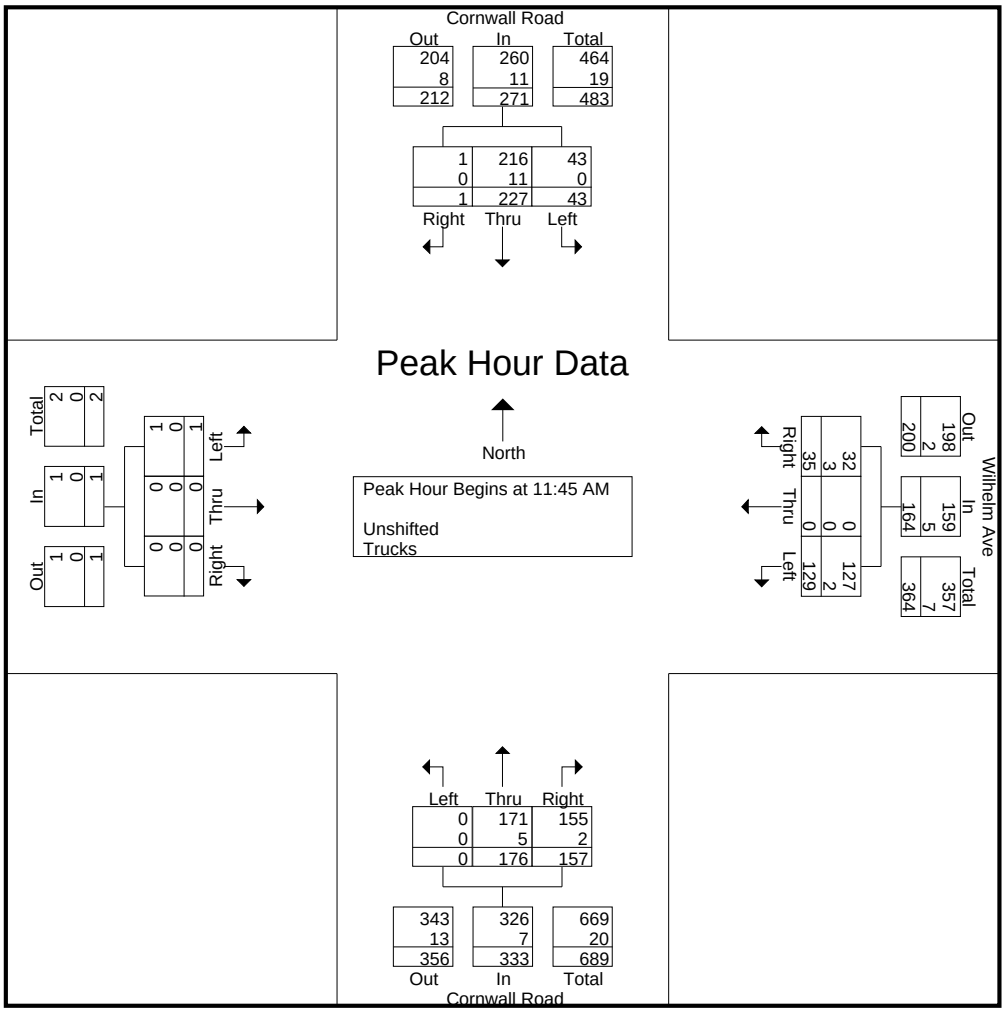


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

N. Cornwall Road & Wilhelm Ave

File Name : 2009-05-30 SATCRWA
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Cornwall Road Southbound				Wilhelm Ave Westbound				Cornwall Road Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	8	55	0	63	27	0	6	33	0	39	49	88	0	0	0	0	184
12:00 PM	15	49	0	64	35	0	6	41	0	51	32	83	0	0	0	0	188
12:15 PM	9	60	0	69	35	0	12	47	0	44	40	84	0	0	0	0	200
12:30 PM	11	63	1	75	32	0	11	43	0	42	36	78	1	0	0	1	197
Total Volume	43	227	1	271	129	0	35	164	0	176	157	333	1	0	0	1	769
% App. Total	15.9	83.8	0.4		78.7	0	21.3		0	52.9	47.1		100	0	0		
PHF	.717	.901	.250	.903	.921	.000	.729	.872	.000	.863	.801	.946	.250	.000	.000	.250	.961
Unshifted	43	216	1	260	127	0	32	159	0	171	155	326	1	0	0	1	746
% Unshifted	100	95.2	100	95.9	98.4	0	91.4	97.0	0	97.2	98.7	97.9	100	0	0	100	97.0
Trucks	0	11	0	11	2	0	3	5	0	5	2	7	0	0	0	0	23
% Trucks	0	4.8	0	4.1	1.6	0	8.6	3.0	0	2.8	1.3	2.1	0	0	0	0	3.0



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

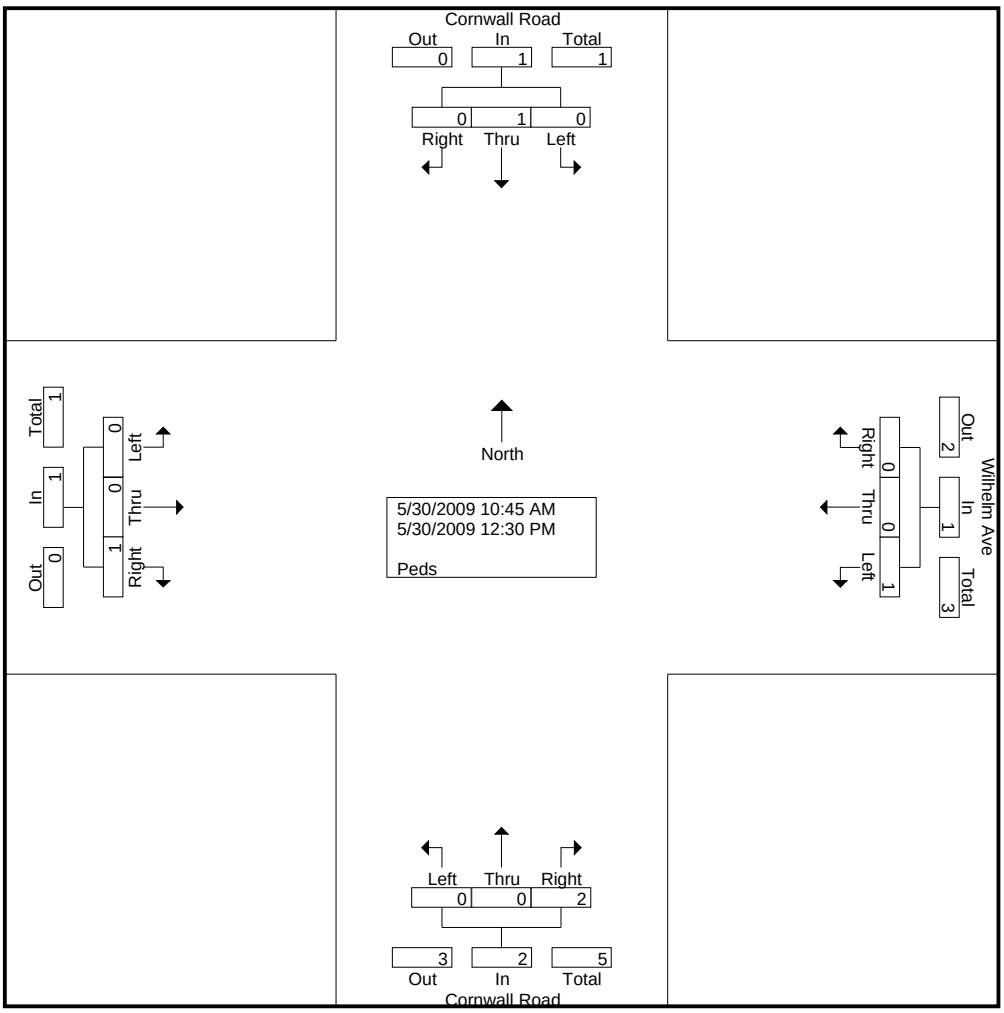
N. Cornwall Road & Wilhelm Ave

Counter: 27
Counted by: S. Hutt
Weather: Sunny
Saved as: 2009-05-30 SATCRWA

File Name : 2009-05-30 SATCRWA
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Peds

	Cornwall Road Southbound					Wilhelm Ave Westbound					Cornwall Road Northbound					Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Total	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	2	3
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	0	0	1	0	0	2	0	2	0	0	1	1	1	1	4	5
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	1	0	1	1	1	0	0	0	1	0	0	2	0	2	0	0	1	1	1	2	5	7
Apprch %	0	100	0			100	0	0			0	0	100			0	0	100					
Total %	0	20	0		20	20	0	0		20	0	0	40		40	0	0	20		20	28.6	71.4	

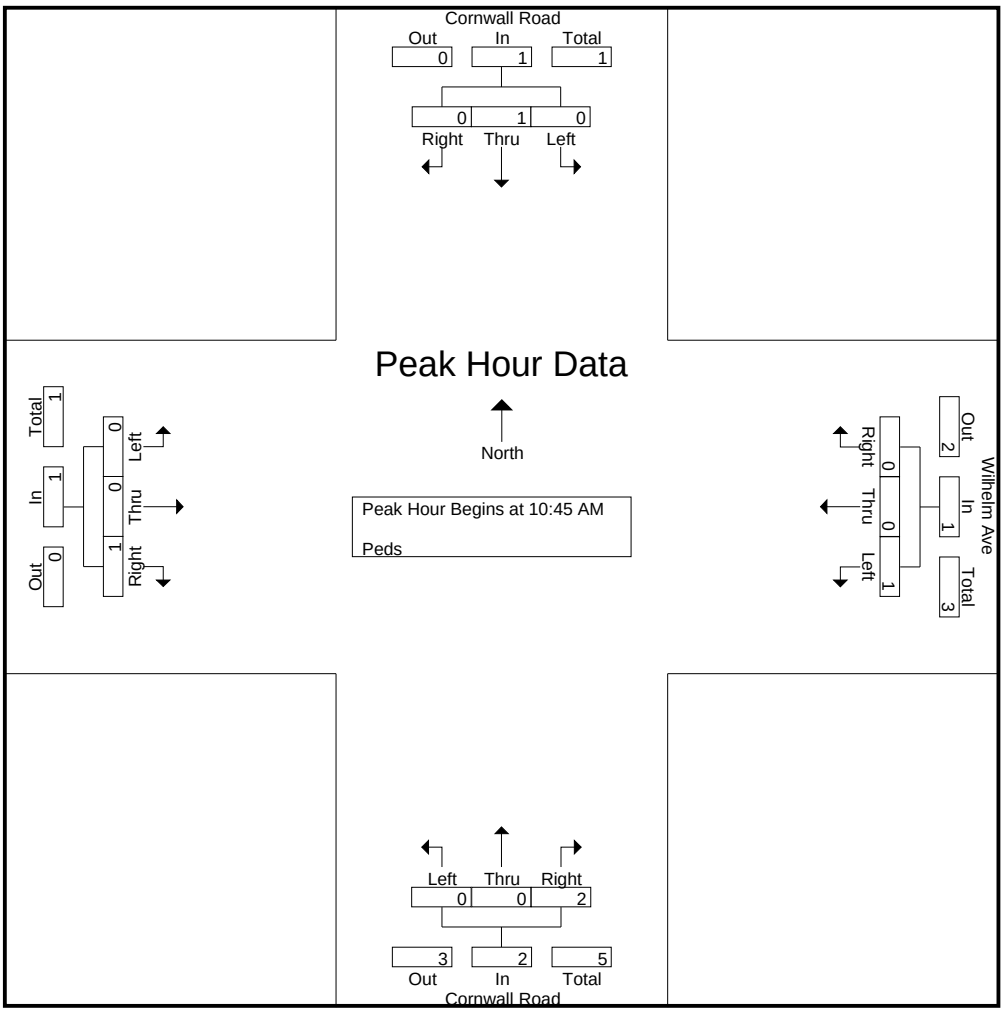


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

N. Cornwall Road & Wilhelm Ave

File Name : 2009-05-30 SATCRWA
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Cornwall Road Southbound				Wilhelm Ave Westbound				Cornwall Road Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:45 AM																	
10:45 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	2
11:30 AM	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2
Total Volume	0	1	0	1	1	0	0	1	0	0	2	2	0	0	1	1	5
% App. Total	0	100	0		100	0	0		0	0	100		0	0	100		
PHF	.000	.250	.000	.250	.250	.000	.000	.250	.000	.000	.250	.250	.000	.000	.250	.250	.625



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

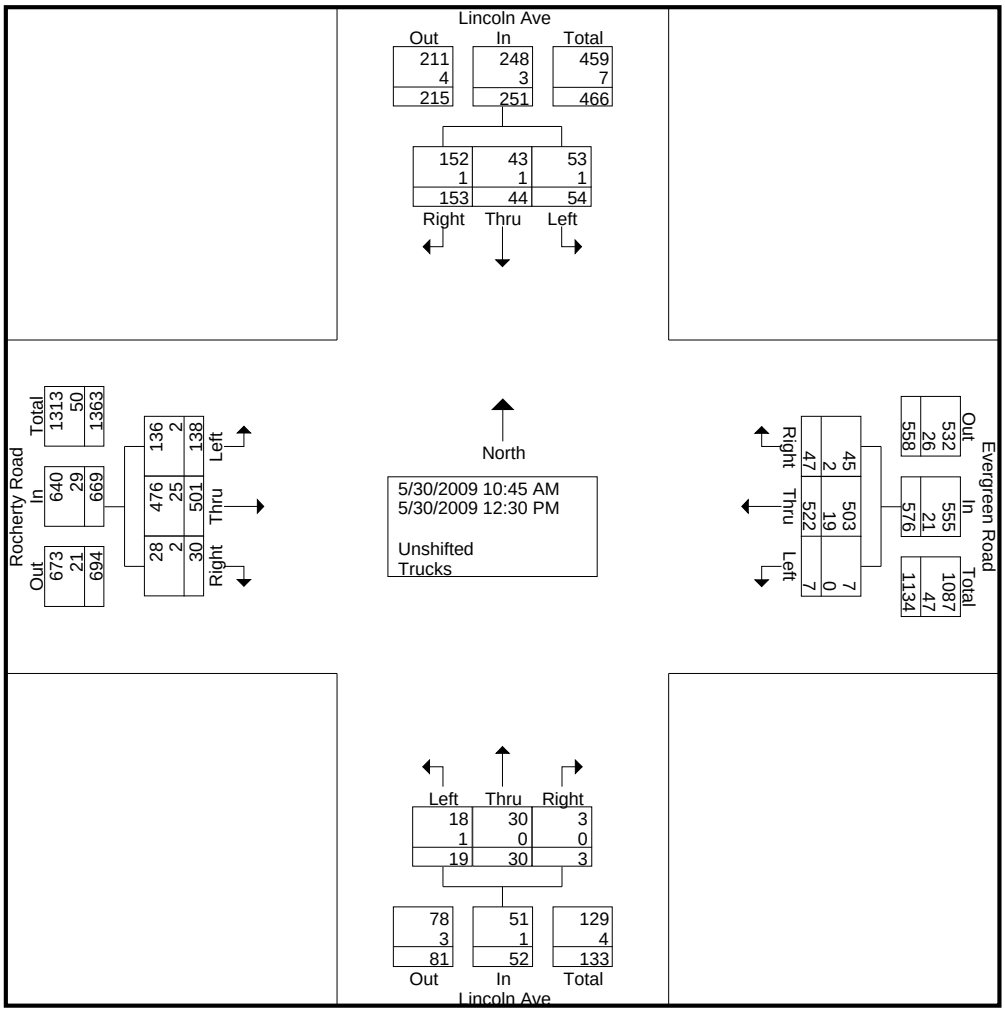
Lincoln Ave & Rocherty Rd/Evergreen Road

Counter: 5
Counted by: S. Stanton
Weather: Sunny
Saved as: 2009-05-30 SATLARRER

File Name : 2009-05-30 SATLARRER
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Unshifted - Trucks

	Lincoln Ave Southbound					Evergreen Road Westbound					Lincoln Ave Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	8	4	26	0	38	2	70	1	0	73	3	3	0	0	6	20	63	3	0	86	0	203	203
Total	8	4	26	0	38	2	70	1	0	73	3	3	0	0	6	20	63	3	0	86	0	203	203
11:00 AM	9	3	17	0	29	0	62	6	0	68	2	4	1	0	7	19	61	6	0	86	0	190	190
11:15 AM	9	7	22	0	38	2	76	12	0	90	2	6	0	0	8	10	42	3	0	55	0	191	191
11:30 AM	5	4	18	0	27	0	61	6	0	67	4	0	1	0	5	20	70	4	0	94	0	193	193
11:45 AM	5	7	22	0	34	1	67	2	0	70	4	4	0	0	8	11	79	3	0	93	0	205	205
Total	28	21	79	0	128	3	266	26	0	295	12	14	2	0	28	60	252	16	0	328	0	779	779
12:00 PM	6	10	17	0	33	1	74	7	0	82	2	2	0	0	4	22	64	3	0	89	0	208	208
12:15 PM	6	3	16	0	25	0	53	6	0	59	2	7	0	0	9	16	67	4	0	87	0	180	180
12:30 PM	6	6	15	2	27	1	59	7	0	67	0	4	1	0	5	20	55	4	0	79	2	178	180
Grand Total	54	44	153	2	251	7	522	47	0	576	19	30	3	0	52	138	501	30	0	669	2	1548	1550
Apprch %	21.5	17.5	61			1.2	90.6	8.2			36.5	57.7	5.8			20.6	74.9	4.5					
Total %	3.5	2.8	9.9		16.2	0.5	33.7	3		37.2	1.2	1.9	0.2		3.4	8.9	32.4	1.9		43.2	0.1	99.9	
Unshifted	53	43	152		250	7	503	45		555	18	30	3		51	136	476	28		640	0	0	1496
% Unshifted	98.1	97.7	99.3	100	98.8	100	96.4	95.7	0	96.4	94.7	100	100	0	98.1	98.6	95	93.3	0	95.7	0	0	96.5
Trucks	1	1	1		3	0	19	2		21	1	0	0		1	2	25	2		29	0	0	54
% Trucks	1.9	2.3	0.7	0	1.2	0	3.6	4.3	0	3.6	5.3	0	0	0	1.9	1.4	5	6.7	0	4.3	0	0	3.5

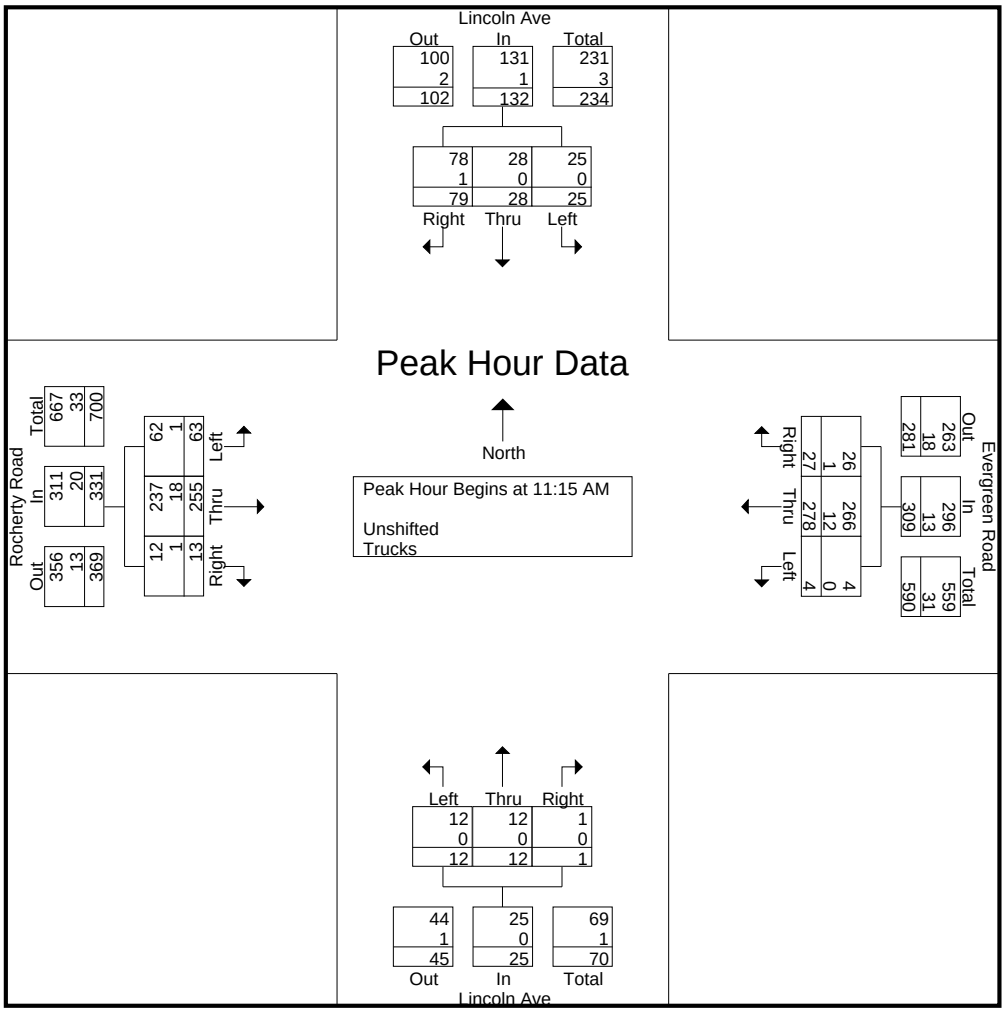


Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

Lincoln Ave &
Rocherty Rd/Evergreen Road

File Name : 2009-05-30 SATLARRER
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Lincoln Ave Southbound				Evergreen Road Westbound				Lincoln Ave Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	9	7	22	38	2	76	12	90	2	6	0	8	10	42	3	55	191
11:30 AM	5	4	18	27	0	61	6	67	4	0	1	5	20	70	4	94	193
11:45 AM	5	7	22	34	1	67	2	70	4	4	0	8	11	79	3	93	205
12:00 PM	6	10	17	33	1	74	7	82	2	2	0	4	22	64	3	89	208
Total Volume	25	28	79	132	4	278	27	309	12	12	1	25	63	255	13	331	797
% App. Total	18.9	21.2	59.8		1.3	90	8.7		48	48	4		19	77	3.9		
PHF	.694	.700	.898	.868	.500	.914	.563	.858	.750	.500	.250	.781	.716	.807	.813	.880	.958
Unshifted	25	28	78	131	4	266	26	296	12	12	1	25	62	237	12	311	763
% Unshifted	100	100	98.7	99.2	100	95.7	96.3	95.8	100	100	100	100	98.4	92.9	92.3	94.0	95.7
Trucks	0	0	1	1	0	12	1	13	0	0	0	0	1	18	1	20	34
% Trucks	0	0	1.3	0.8	0	4.3	3.7	4.2	0	0	0	0	1.6	7.1	7.7	6.0	4.3



Traffic Planning & Design
2500 E. High Street
Pottstown, PA 19464

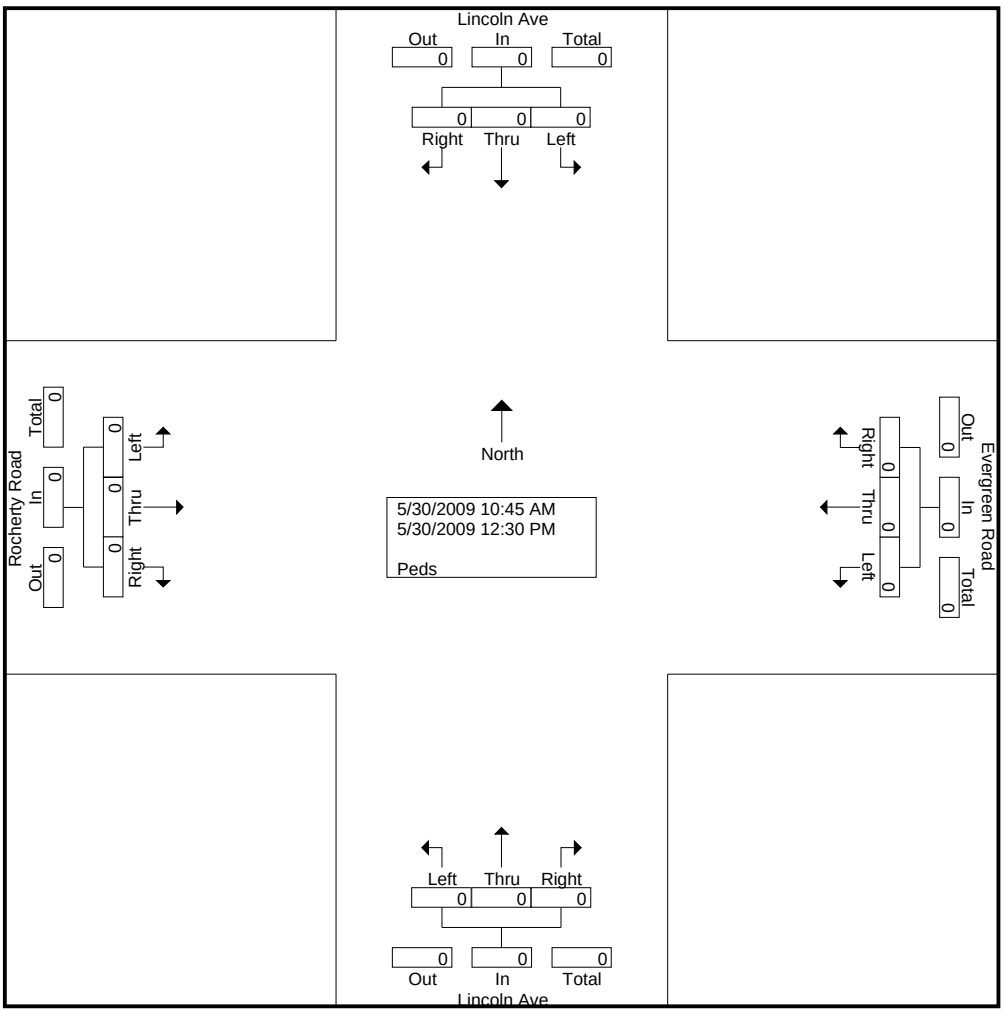
Lincoln Ave &
Rocherty Rd/Evergreen Road

Counter: 5
Counted by: S. Stanton
Weather: Sunny
Saved as: 2009-05-30 SATLARRER

File Name : 2009-05-30 SATLARRER
Site Code : 00000000
Start Date : 5/30/2009
Page No : 1

Groups Printed- Peds

	Lincoln Ave Southbound					Evergreen Road Westbound					Lincoln Ave Northbound					Rocherty Road Eastbound							
Start Time	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Left	Thru	Right	Trucks	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3	0	3
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3	0	3
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
Total	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2	0	2
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0	0	0	0	1	0	5	0	5
Apprch %	0	0	0			0	0	0			0	0	0			0	0	0					
Total %																					100	0	



Traffic Planning & Design
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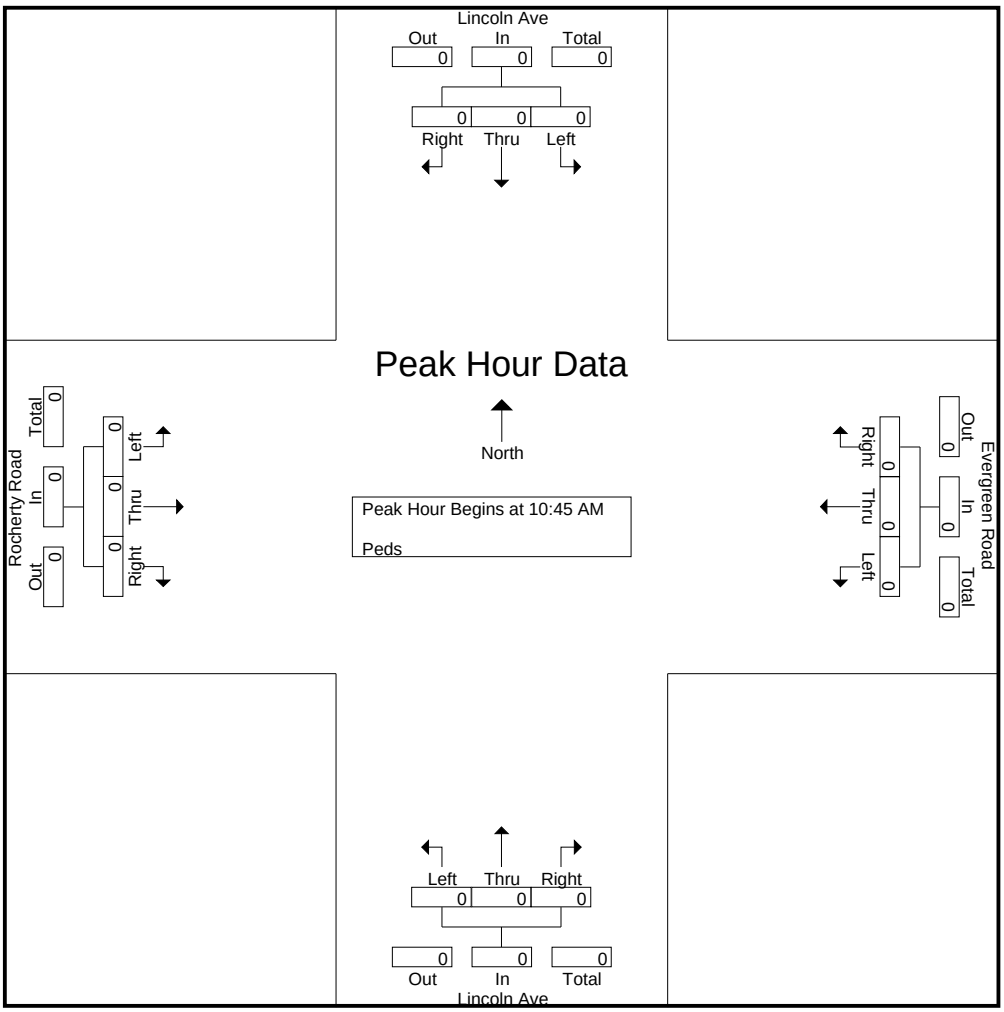
Lincoln Ave &
Rocherty Rd/Evergreen Road

File Name : 2009-05-30 SATLARRER
Site Code : 00000000
Start Date : 5/30/2009
Page No : 2

	Lincoln Ave Southbound				Evergreen Road Westbound				Lincoln Ave Northbound				Rocherty Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:45 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:45 AM																	
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



APPENDIX F

TRIP DISTRIBUTIONS: BACKGROUND DEVELOPMENTS

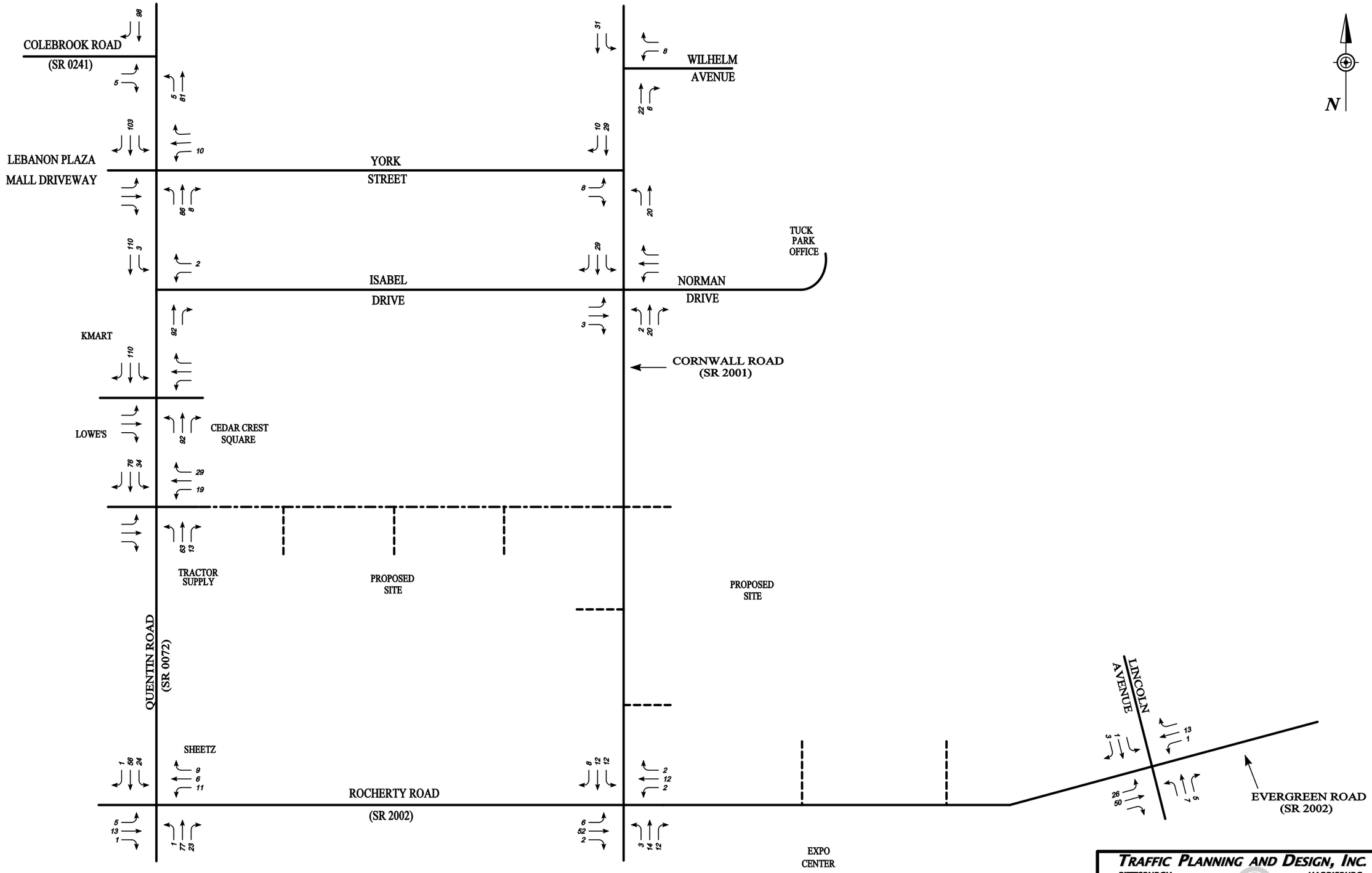


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FIGURE F-1

TOTAL NEARBY DEVELOPMENTS - 2025 CONDITIONS
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION

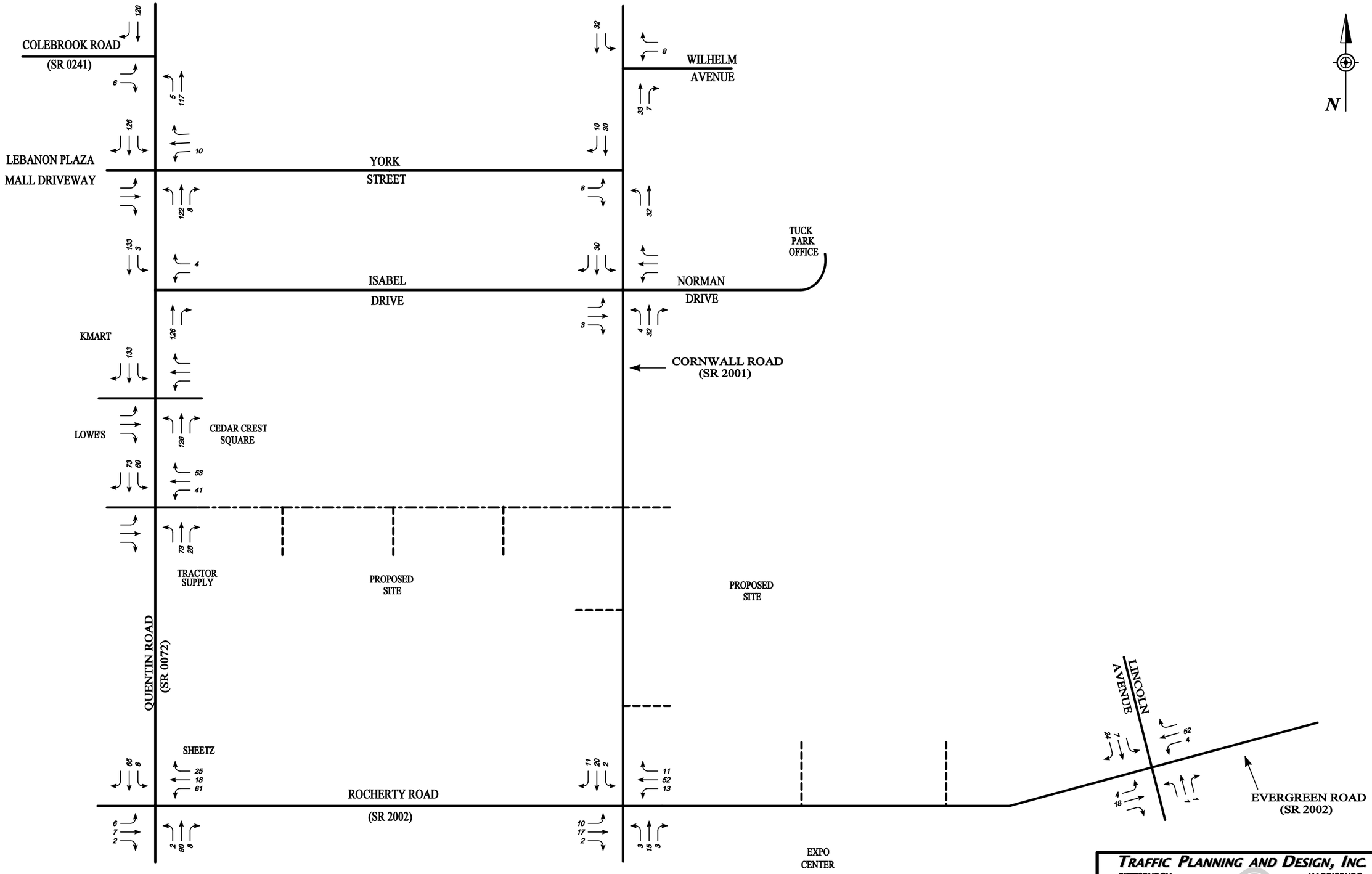

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FIGURE F-2

TOTAL NEARBY DEVELOPMENTS - 2025 CONDITIONS
WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION

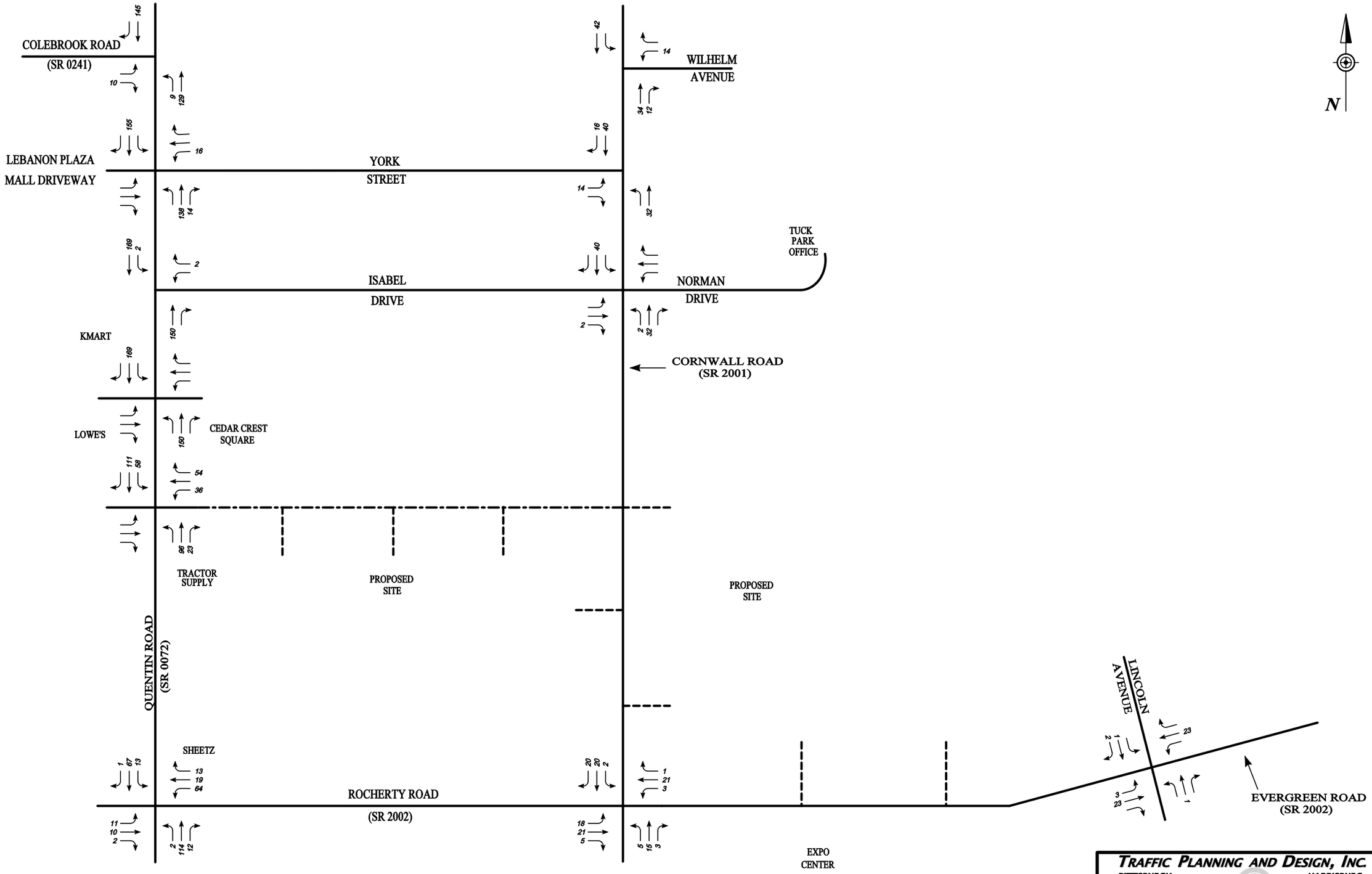

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FIGURE F-3

TOTAL NEARBY DEVELOPMENTS - 2025 CONDITIONS
SATURDAY MIDDAY PEAK HOUR
TRIP DISTRIBUTION

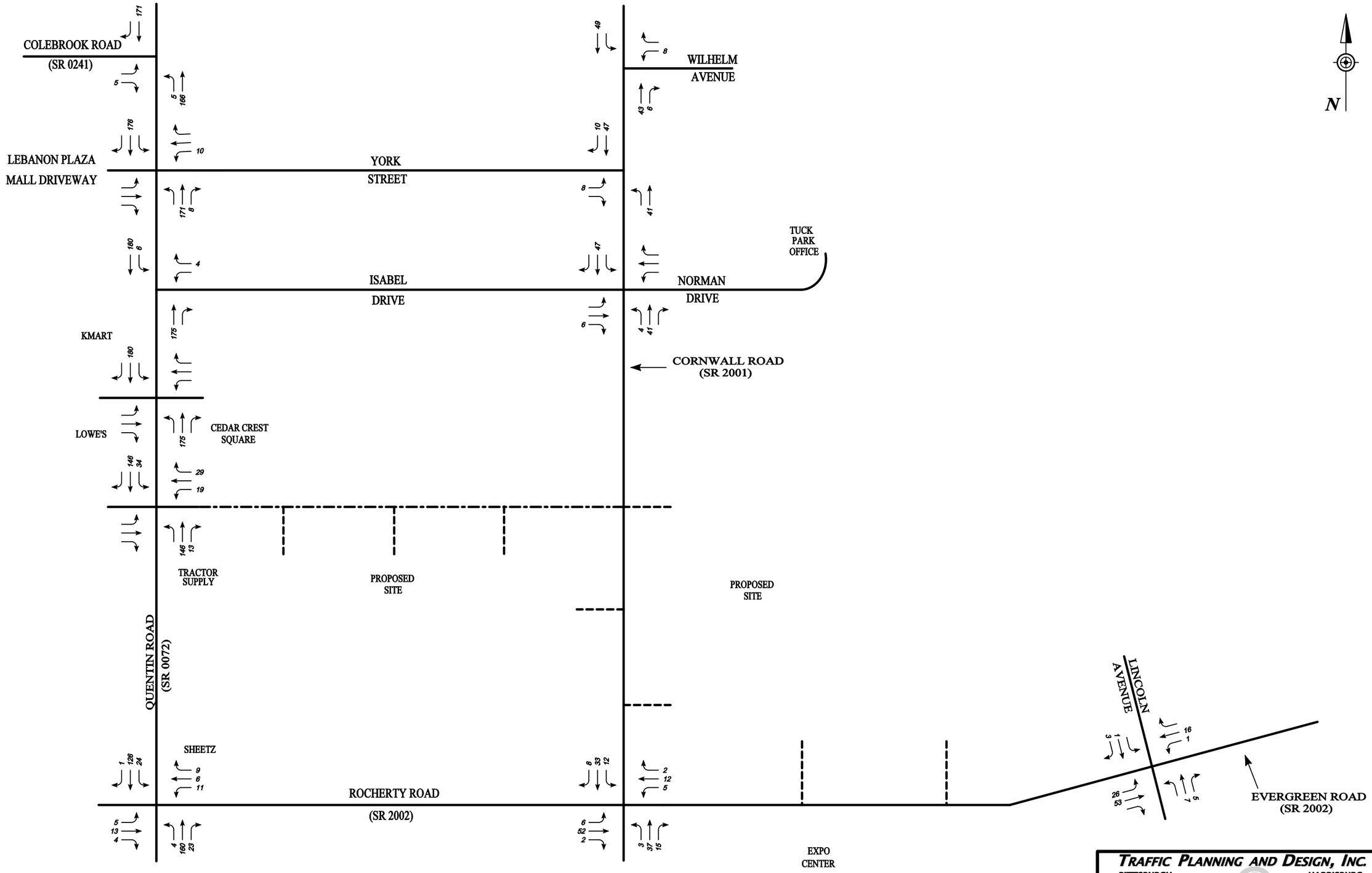

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FIGURE F-4

TOTAL NEARBY DEVELOPMENTS - 2035 CONDITIONS
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION

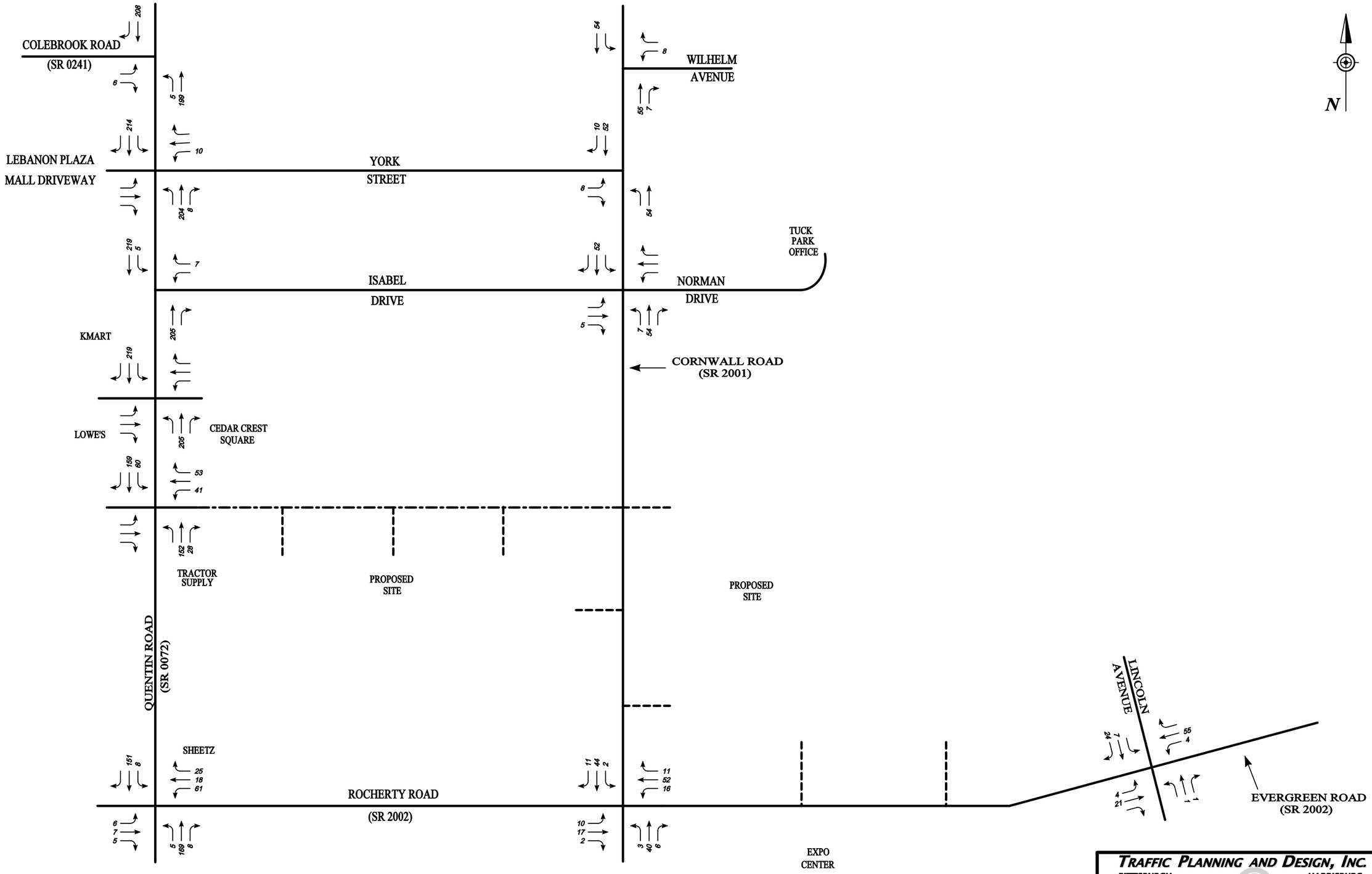

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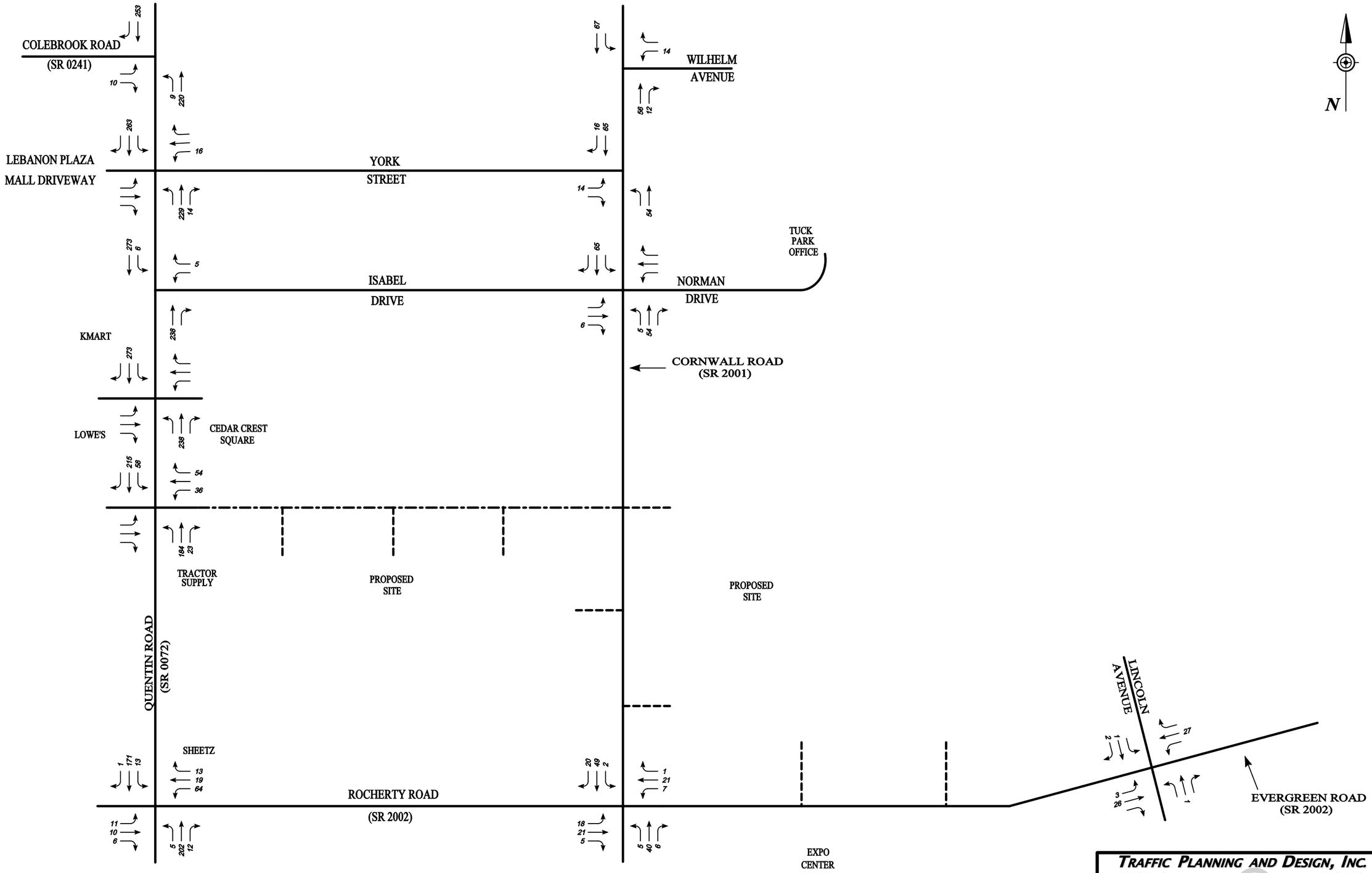
FIGURE F-5

TOTAL NEARBY DEVELOPMENTS - 2035 CONDITIONS
WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION



KEY:

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PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

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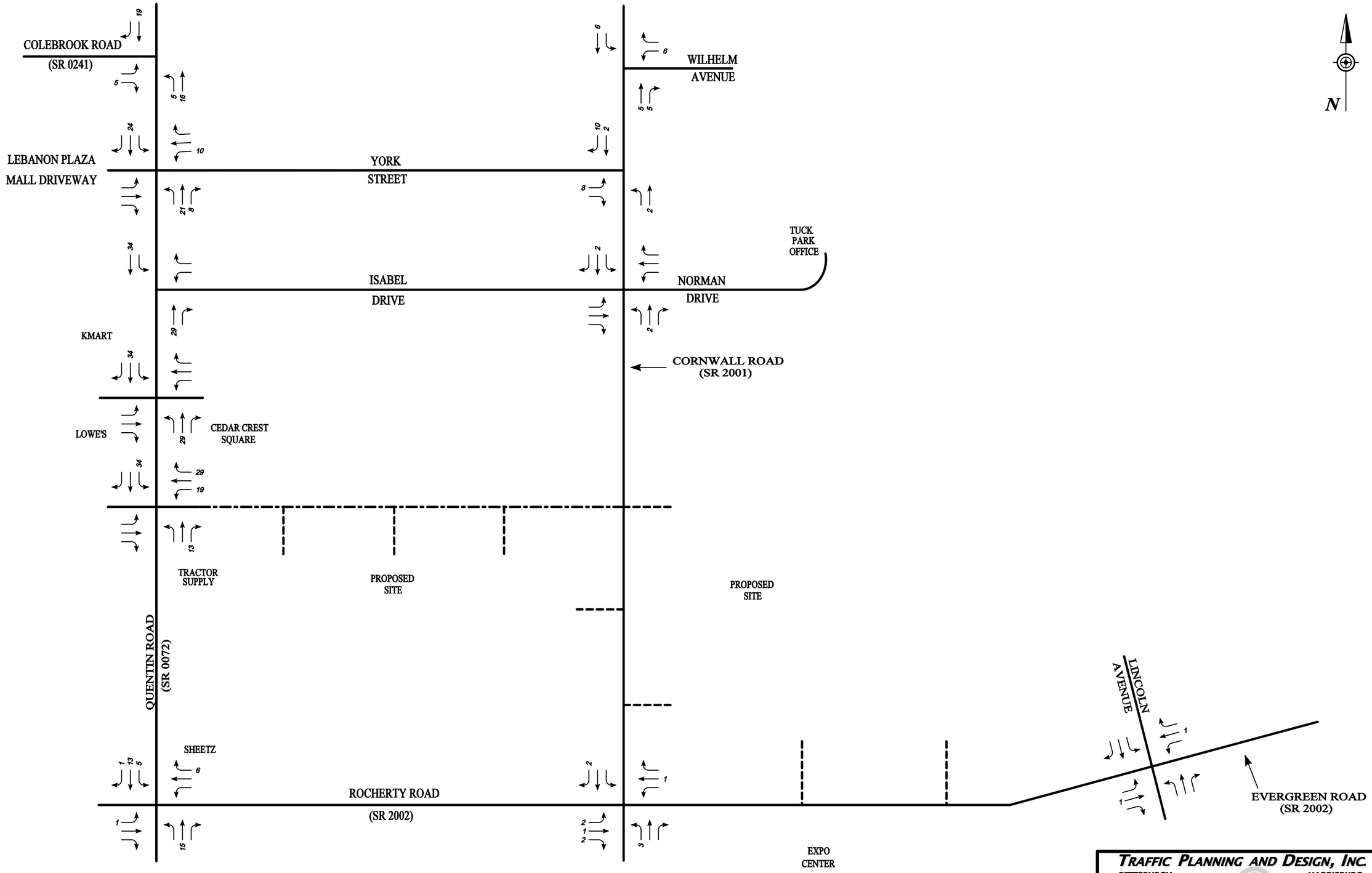
FIGURE F-6

TOTAL NEARBY DEVELOPMENTS - 2035 CONDITIONS
SATURDAY MIDDAY PEAK HOUR
TRIP DISTRIBUTION



KEY:

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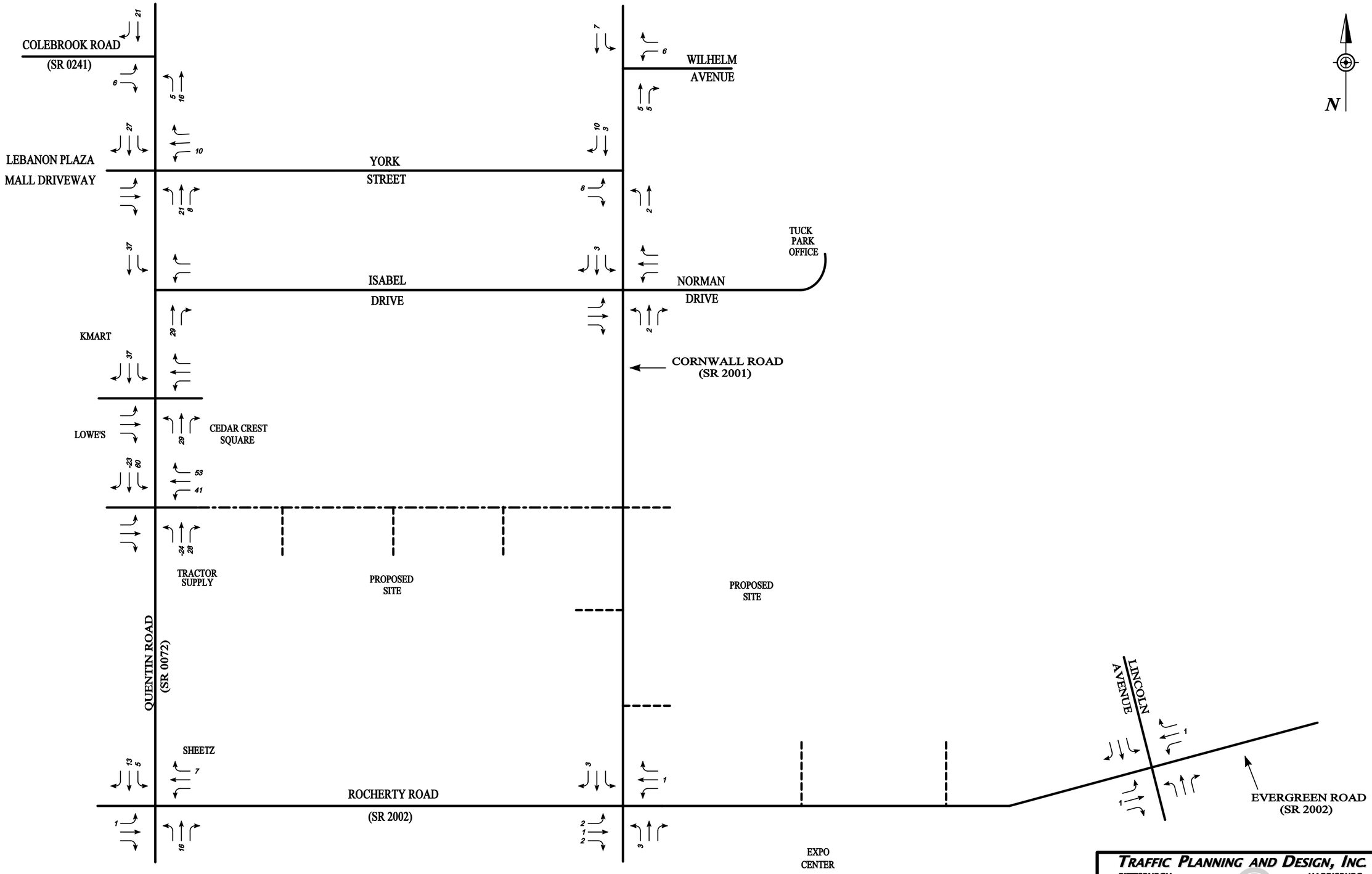
FIGURE F-7

TRACTOR SUPPLY OUTPARCELS
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION



KEY:

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SCHEMATIC DRAWING:NOT TO SCALE

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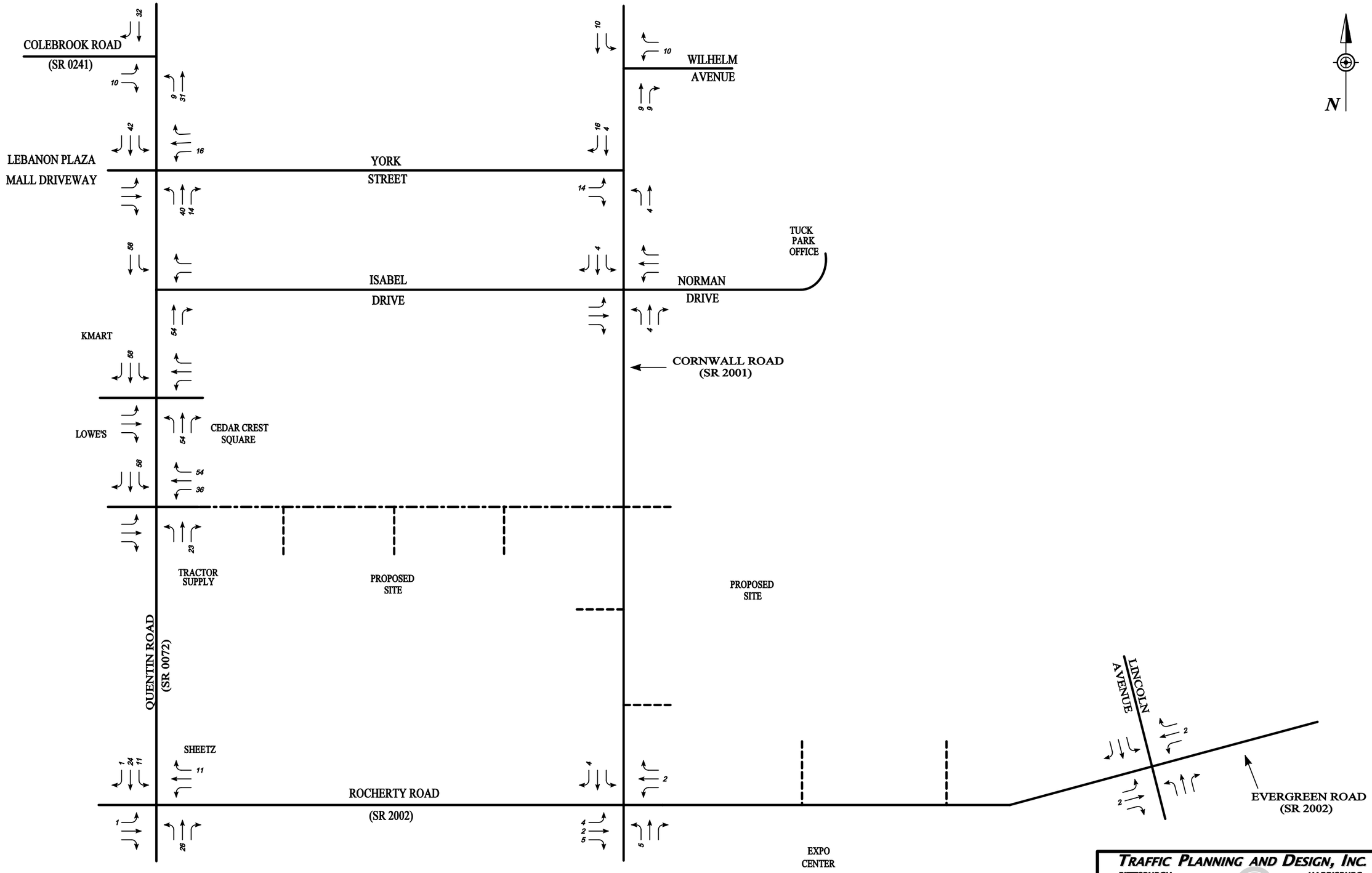
FIGURE F-8

TRACTOR SUPPLY OUTPARCELS
WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION



KEY:

PROPOSED ROADWAY

PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

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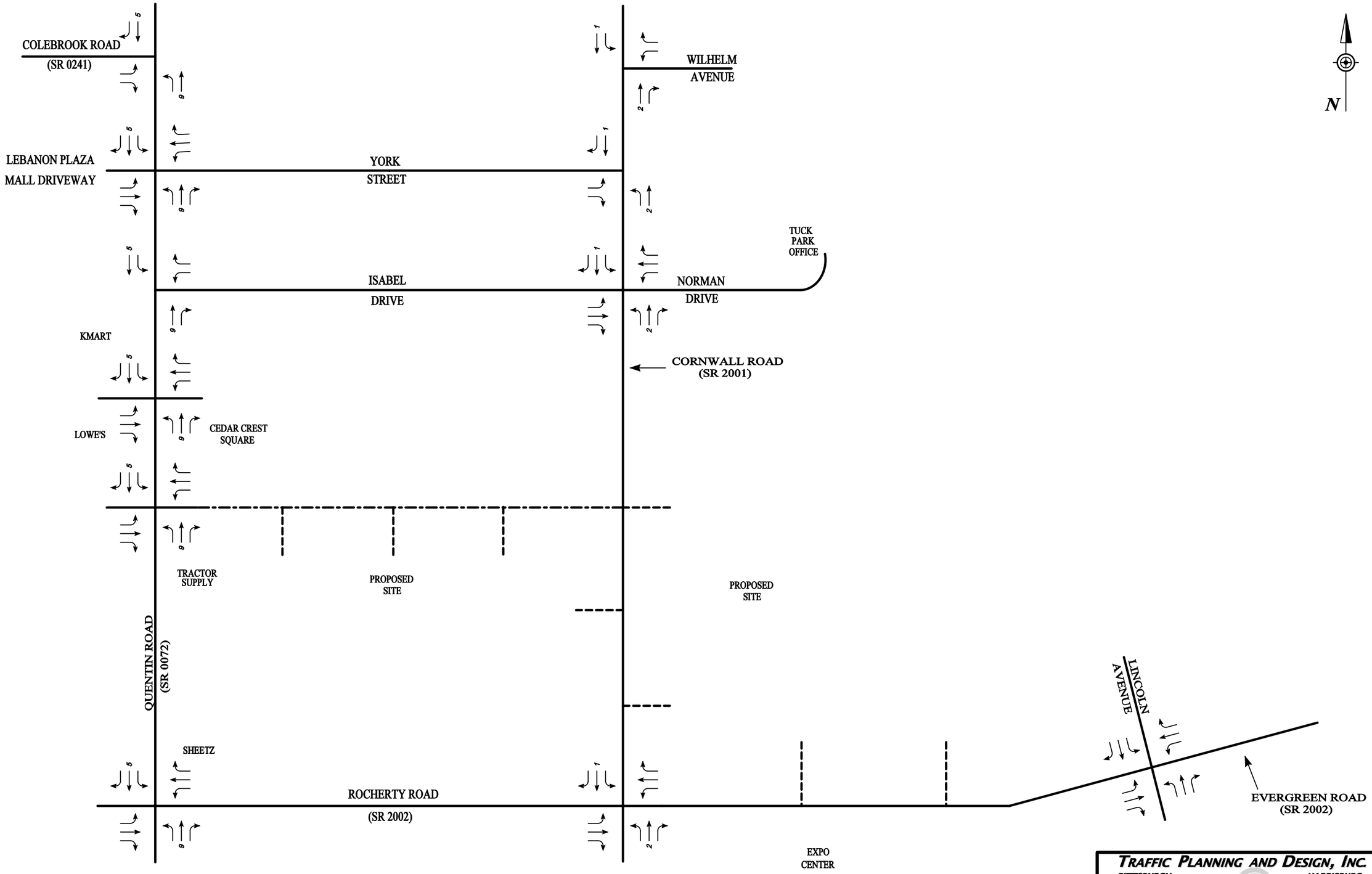
FIGURE F-9

TRACTOR SUPPLY OUTPARCELS
SATURDAY MIDDAY PEAK HOUR
TRIP DISTRIBUTION



KEY:

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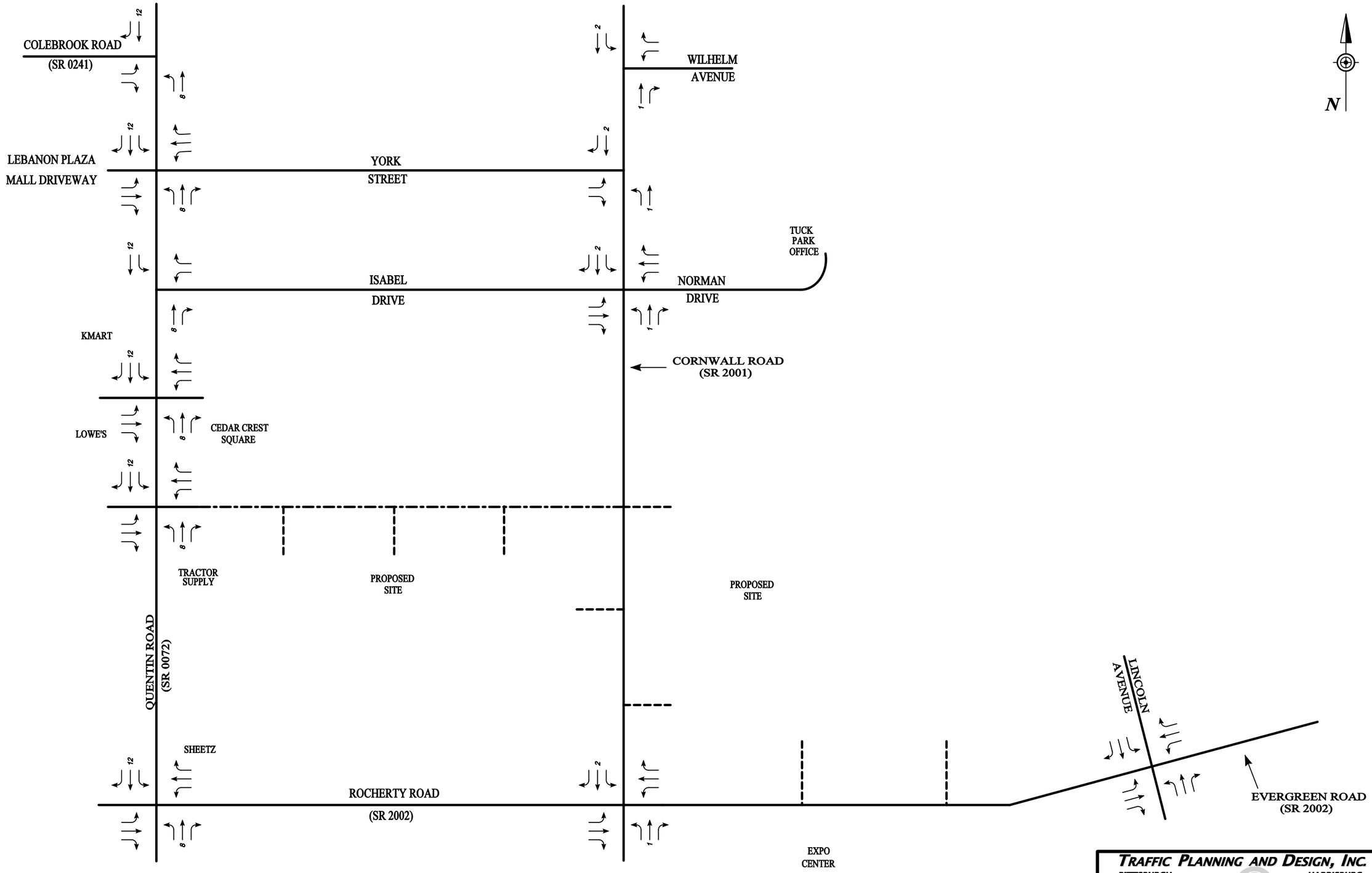
FIGURE F-10

ALDEN PLACE
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION



KEY:

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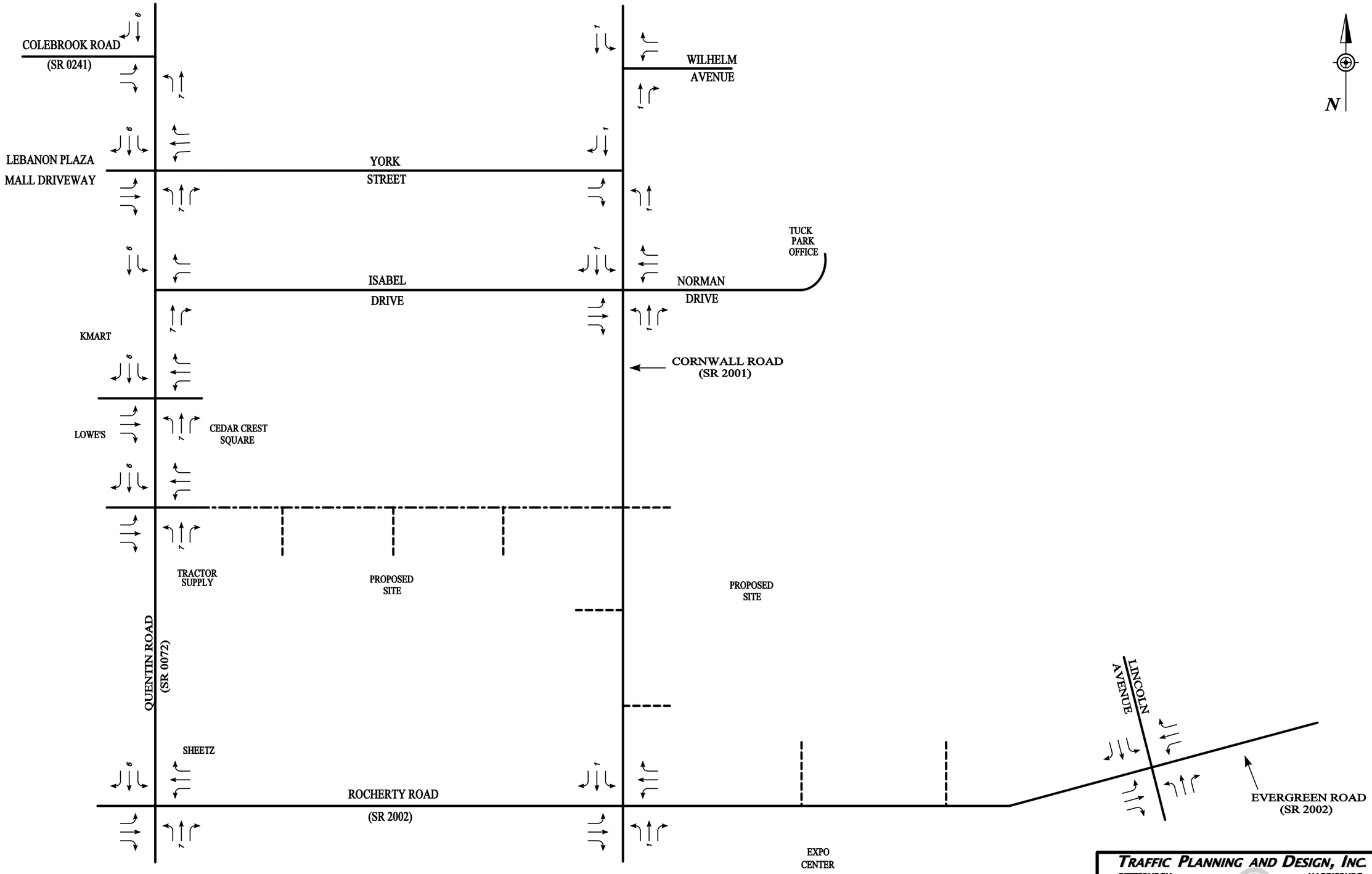
FIGURE F-11

ALDEN PLACE
WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION



KEY:

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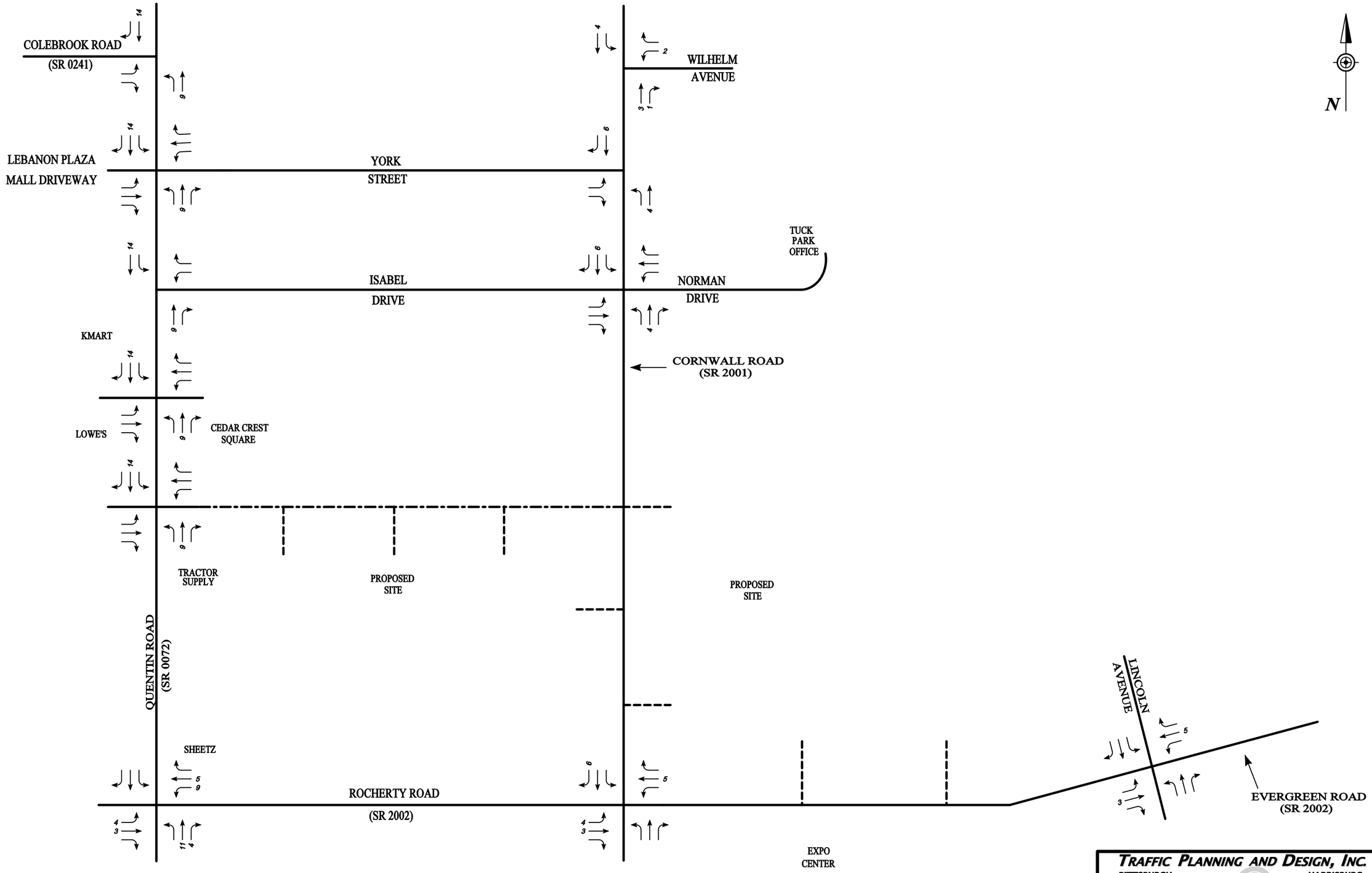
FIGURE F-12

ALDEN PLACE
SATURDAY MIDDAY PEAK HOUR
TRIP DISTRIBUTION



KEY:

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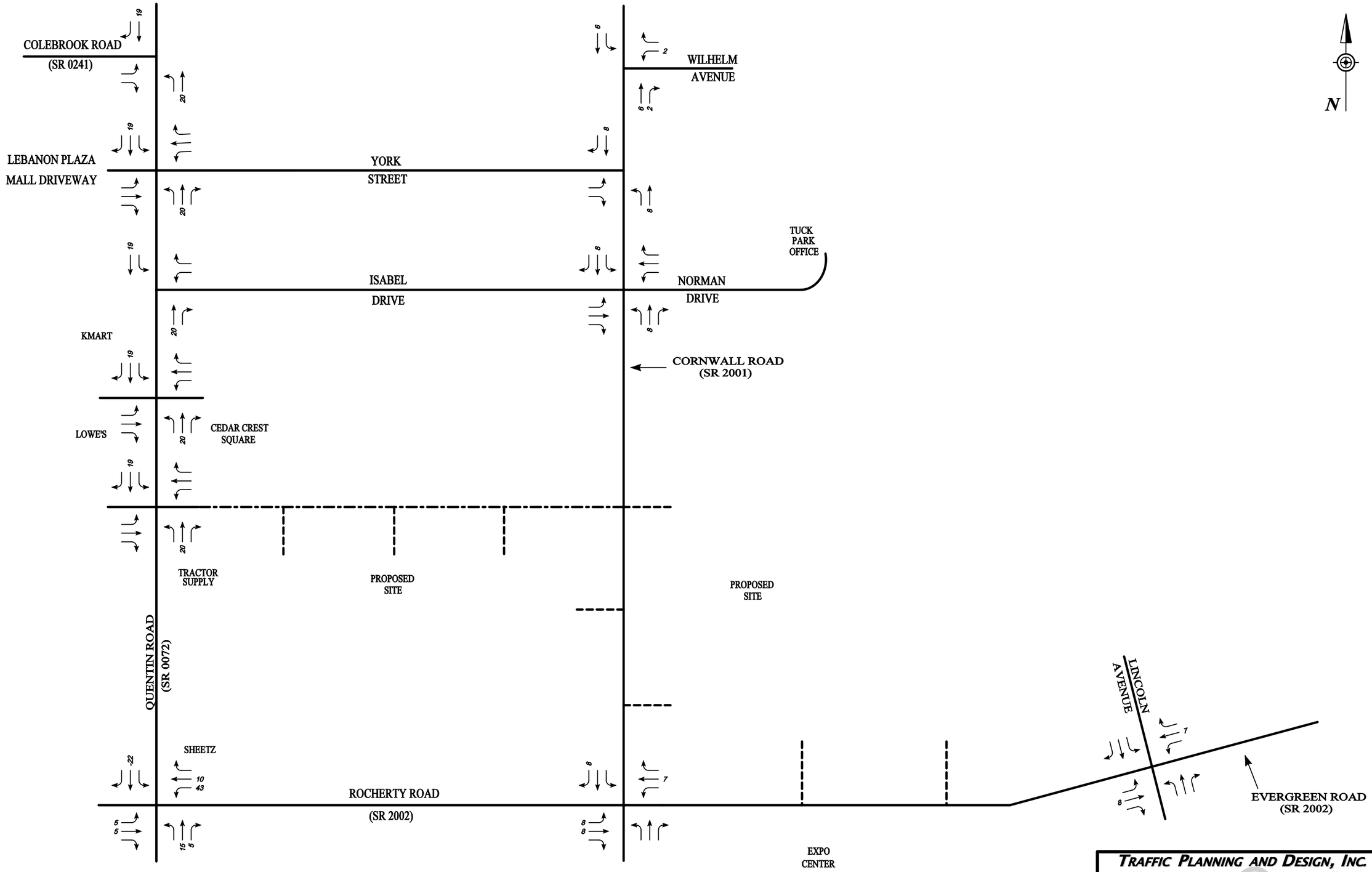
FIGURE F-13

SHEETZ OUTPARCELS
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION



KEY:

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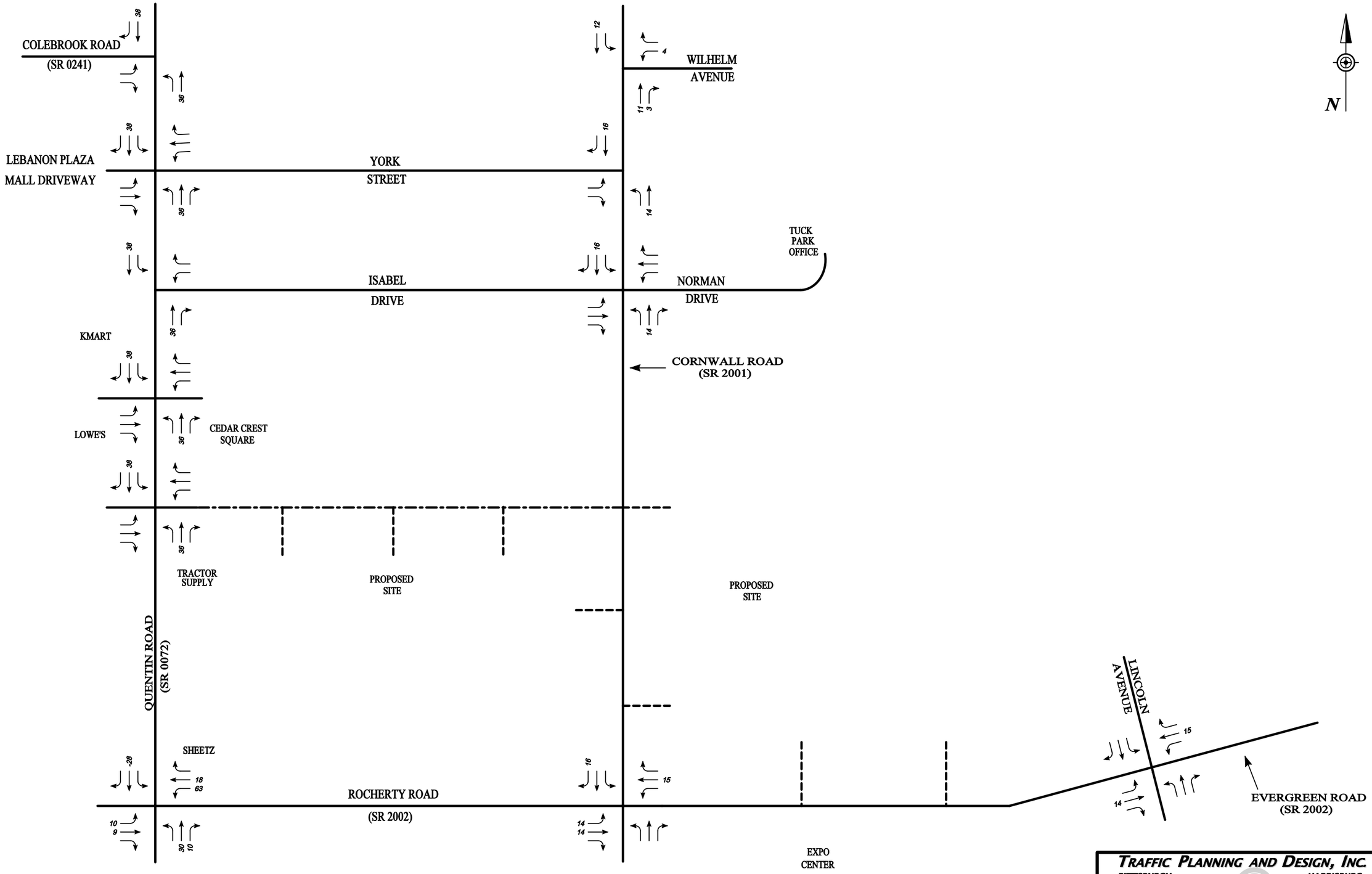
FIGURE F-14

SHEETZ OUTPARCELS
WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION



KEY:

PROPOSED ROADWAY

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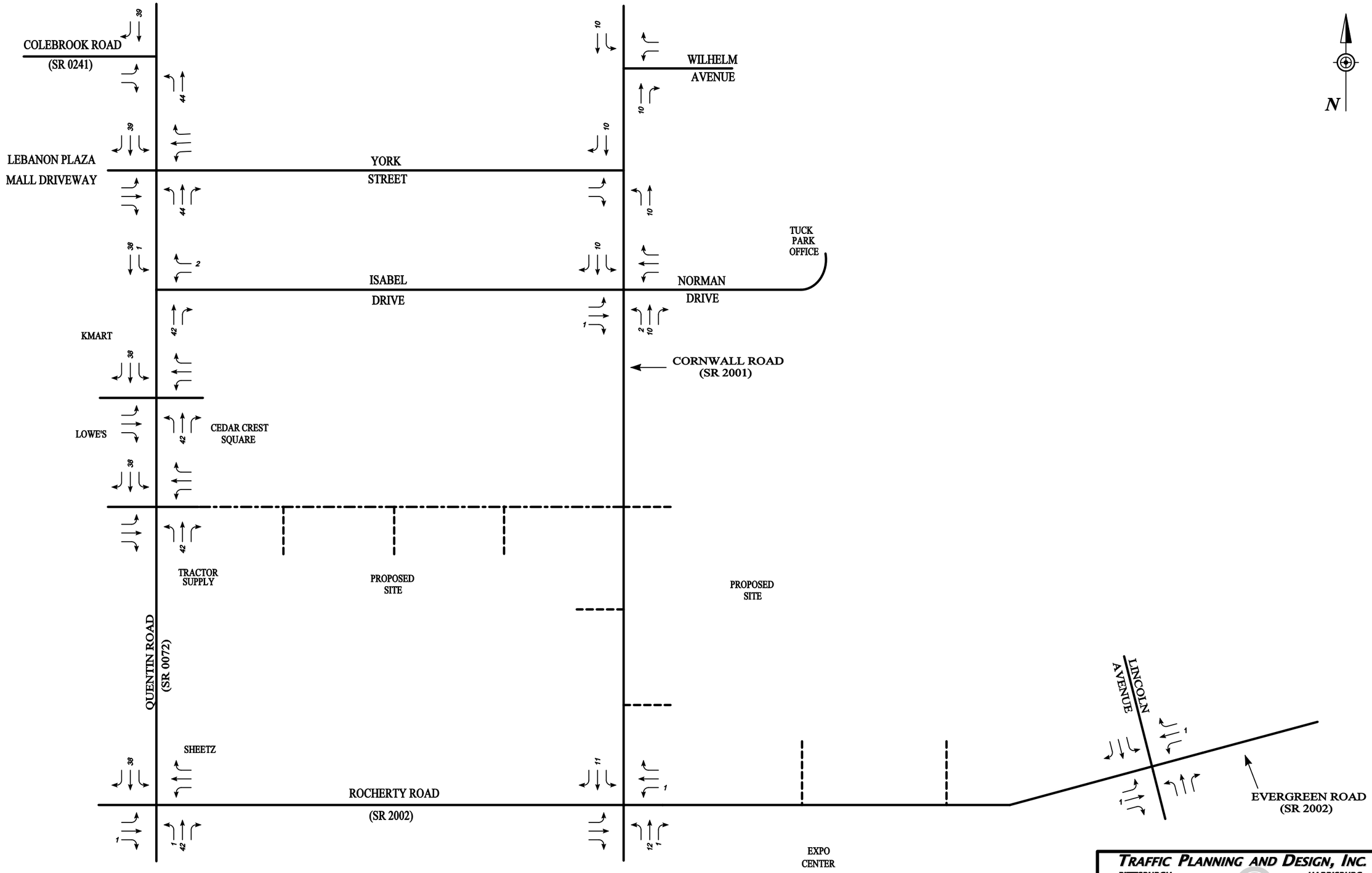
FIGURE F-15

SHEETZ OUTPARCELS
SATURDAY MIDDAY PEAK HOUR
TRIP DISTRIBUTION



KEY:

PROPOSED ROADWAY

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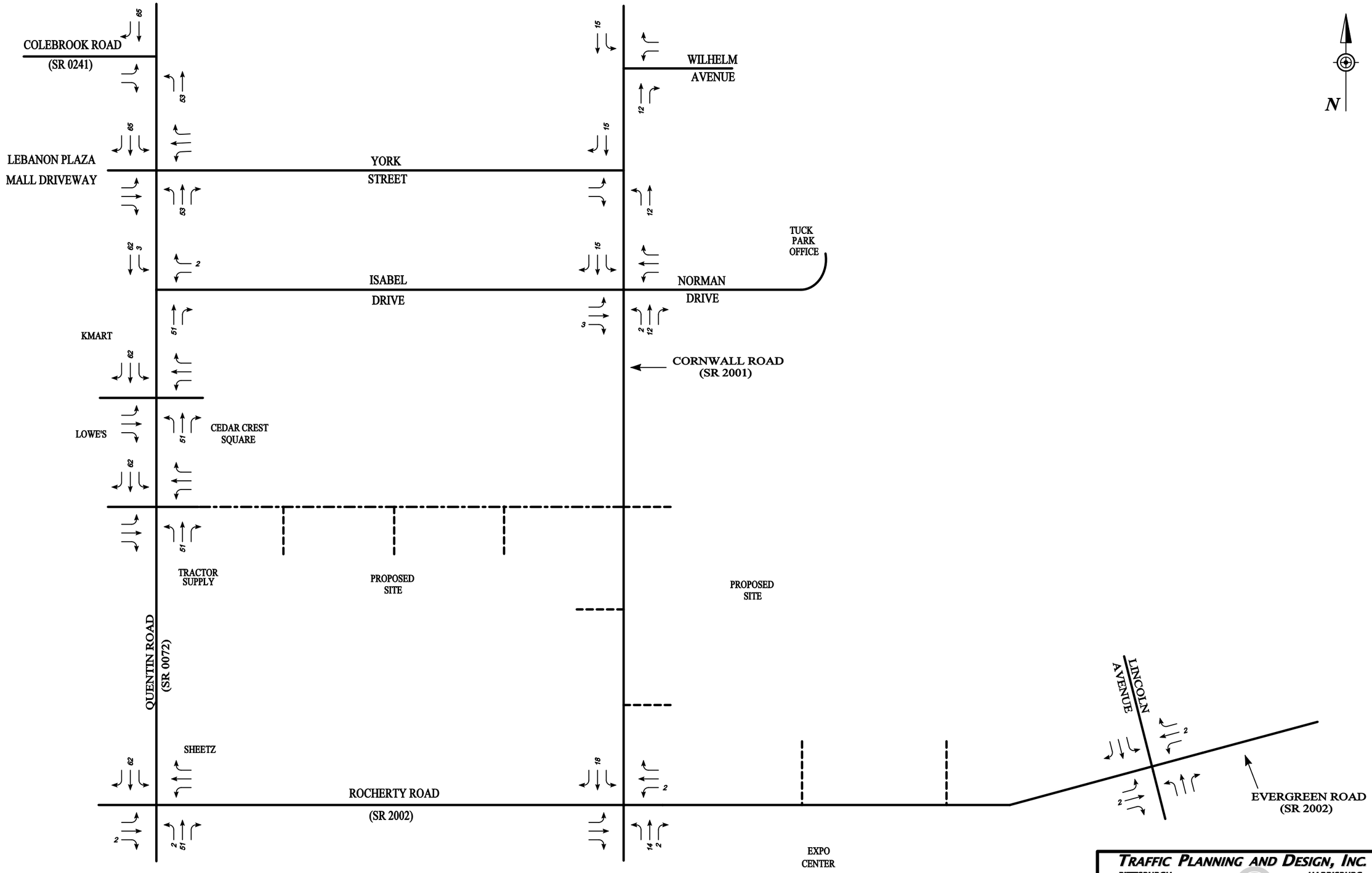
FIGURE F-16

CORNWALL VILLAGE - 2025 CONDITIONS
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION



KEY:

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FIGURE F-17

CORNWALL VILLAGE - 2025 CONDITIONS
WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION

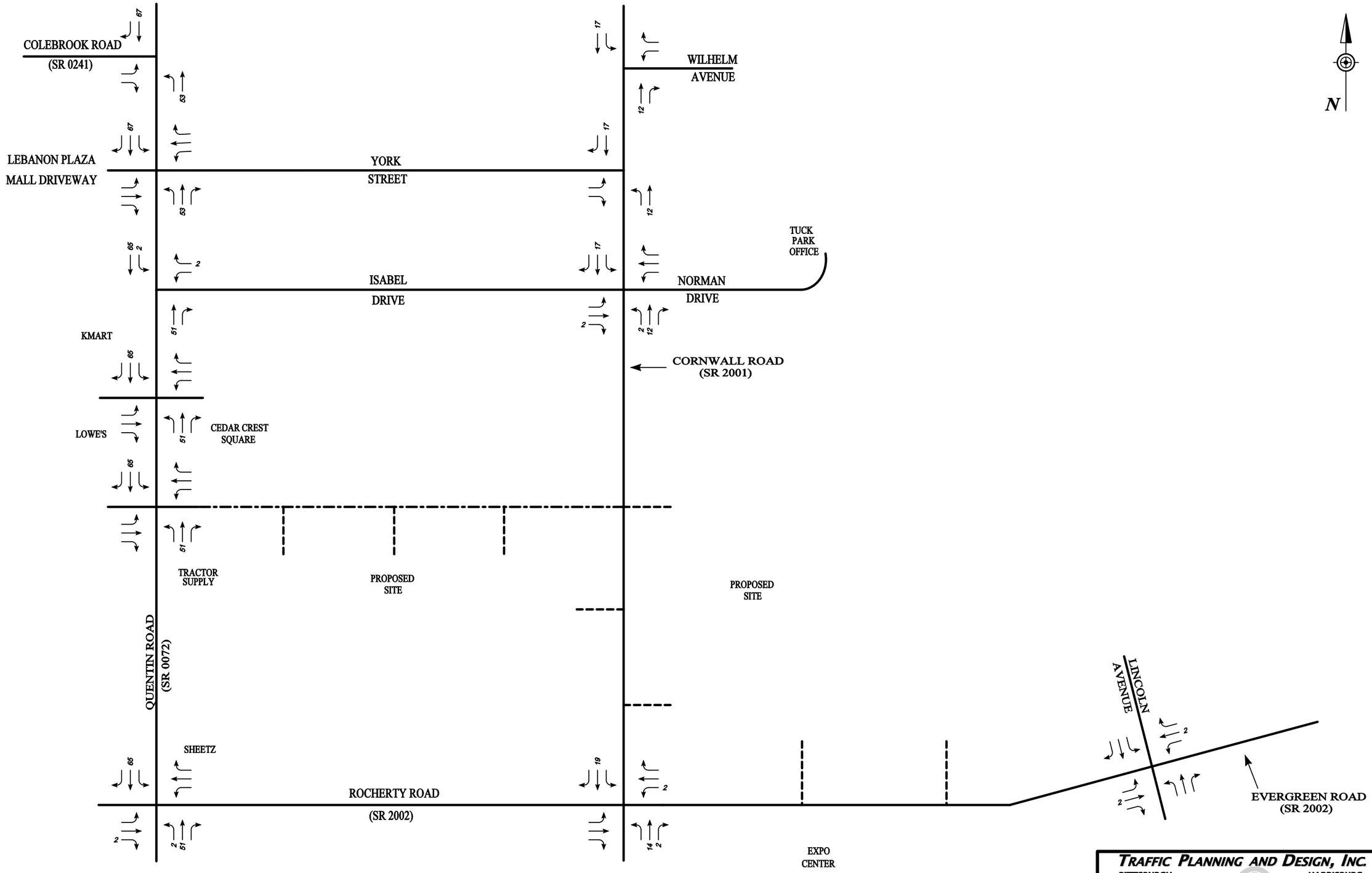

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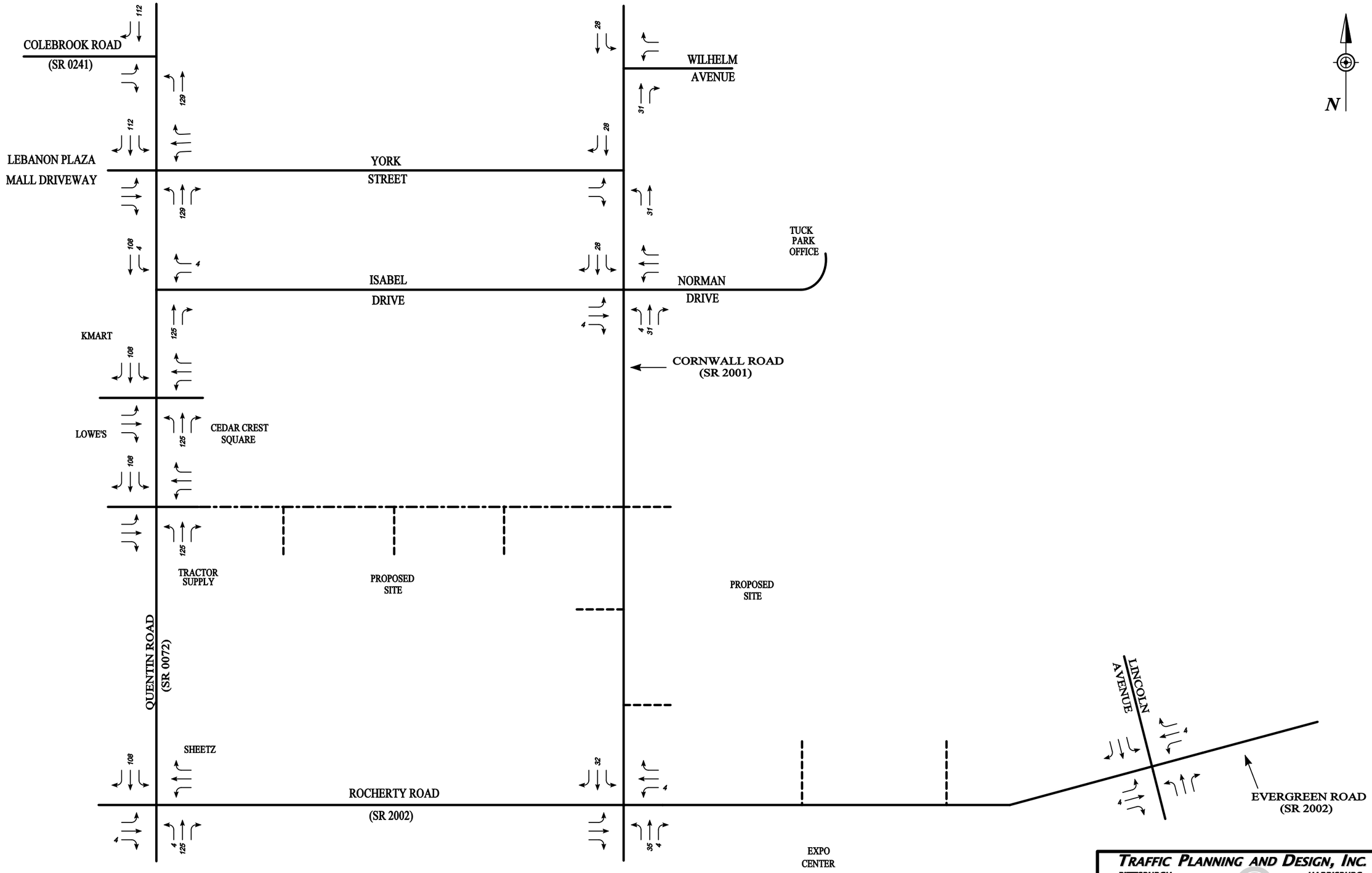
FIGURE F-18

CORNWALL VILLAGE - 2025 CONDITIONS
SATURDAY MIDDAY PEAK HOUR
TRIP DISTRIBUTION



KEY:

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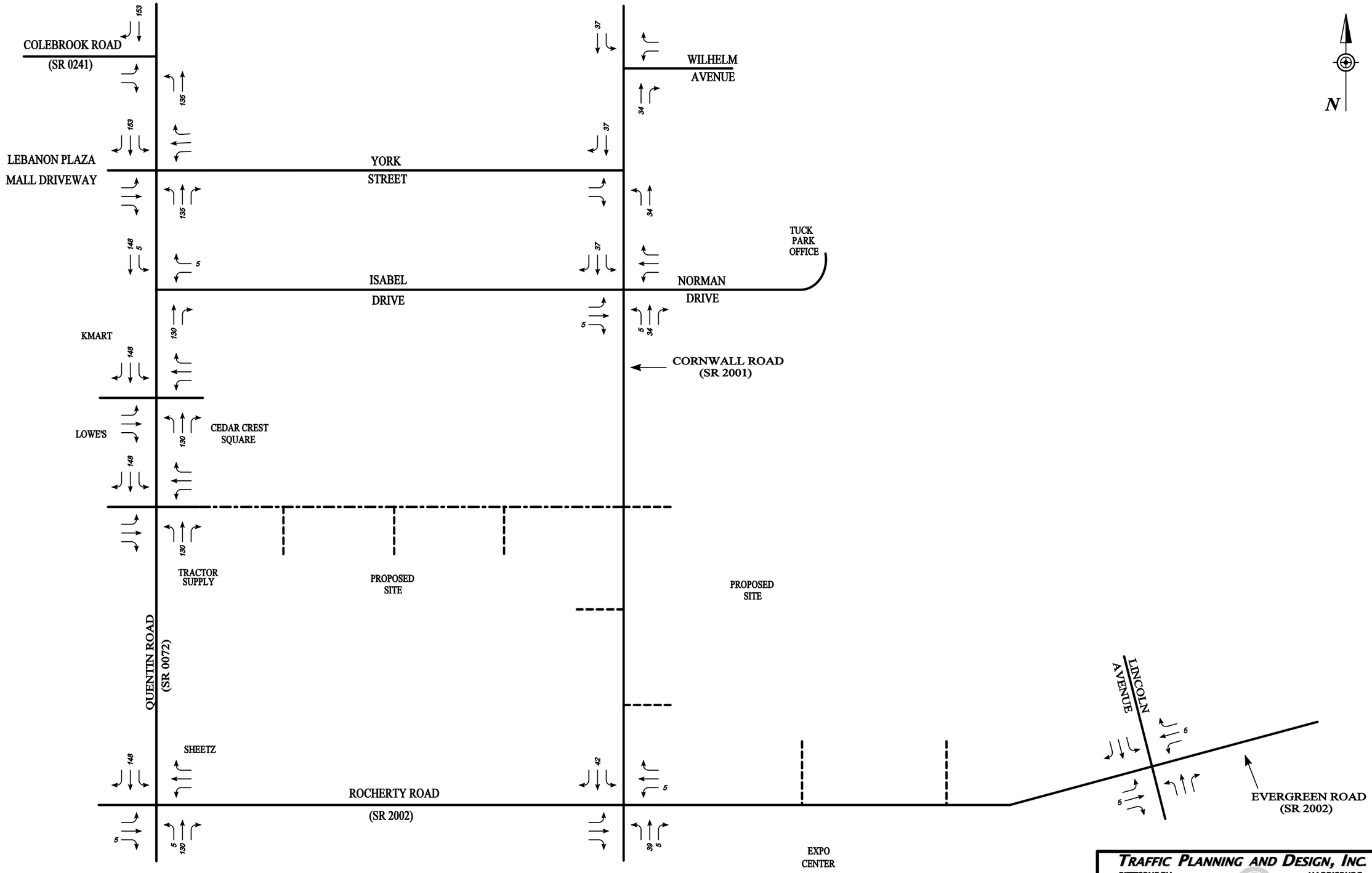
FIGURE F-19

CORNWALL VILLAGE - 2035 CONDITIONS
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION



KEY:

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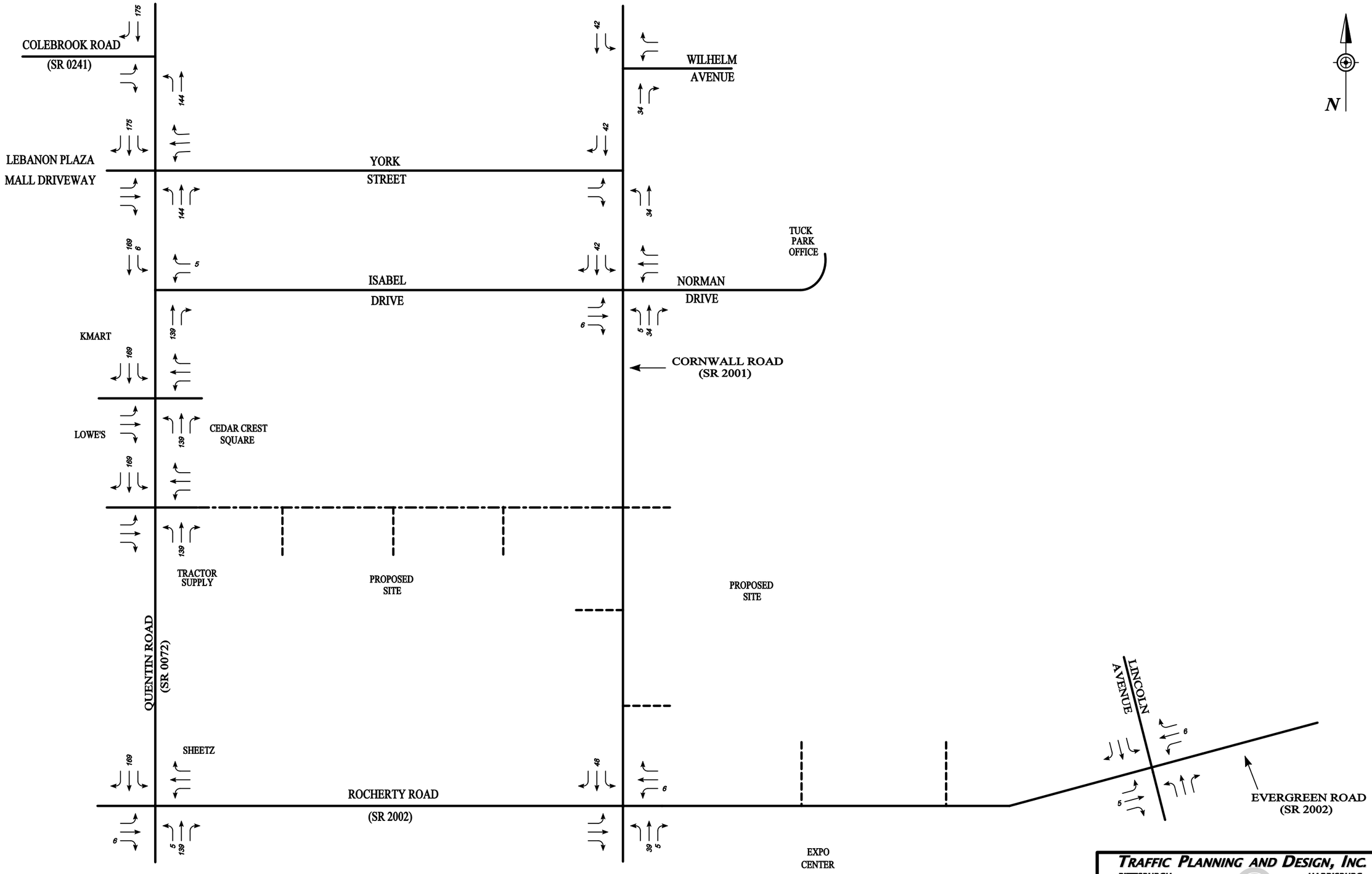
FIGURE F-20

CORNWALL VILLAGE - 2035 CONDITIONS
WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION



KEY:

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FIGURE F-21

CORNWALL VILLAGE - 2035 CONDITIONS
SATURDAY MIDDAY PEAK HOUR
TRIP DISTRIBUTION

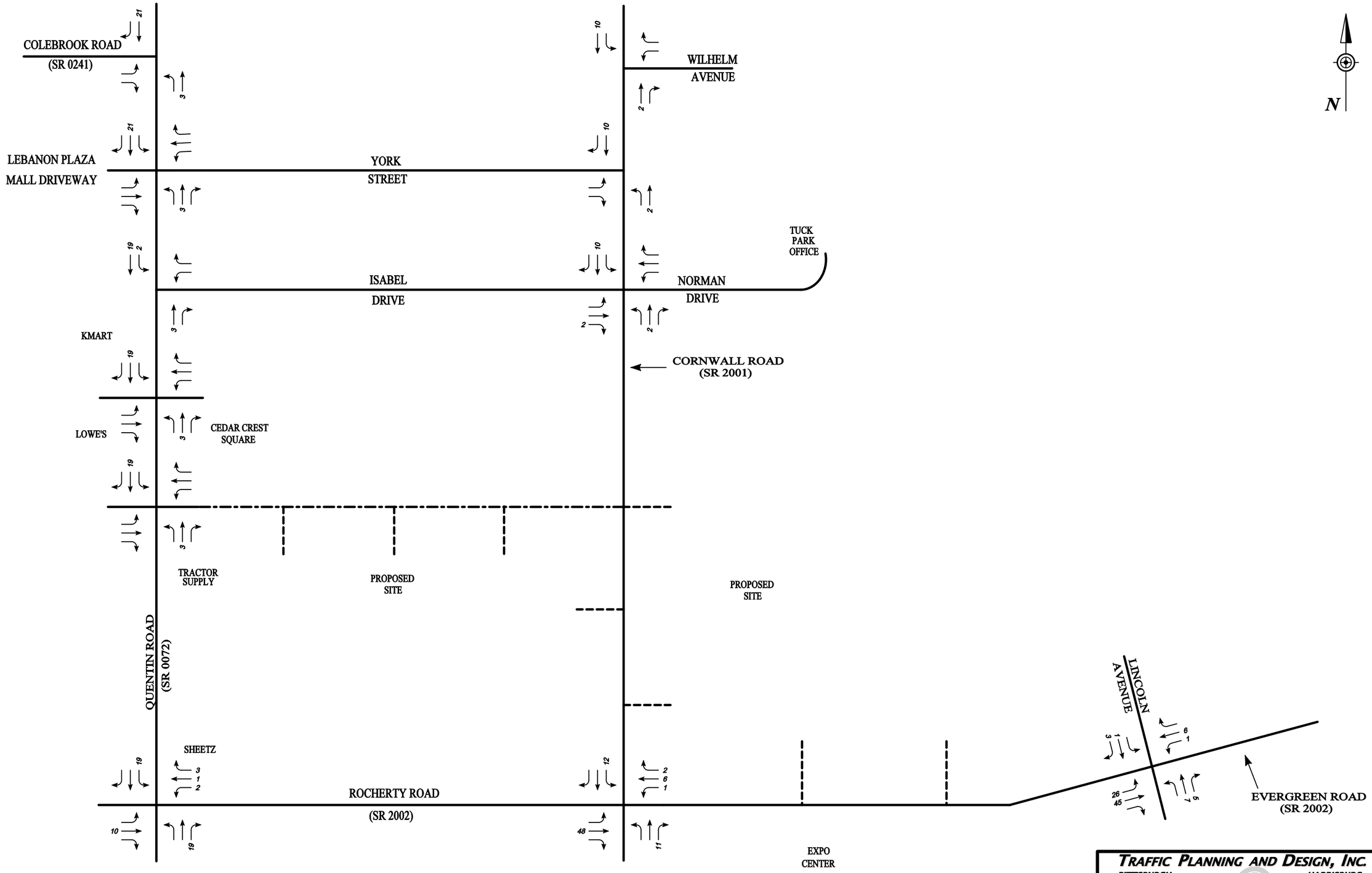

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FIGURE F-22

VA MEDICAL CENTER
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION

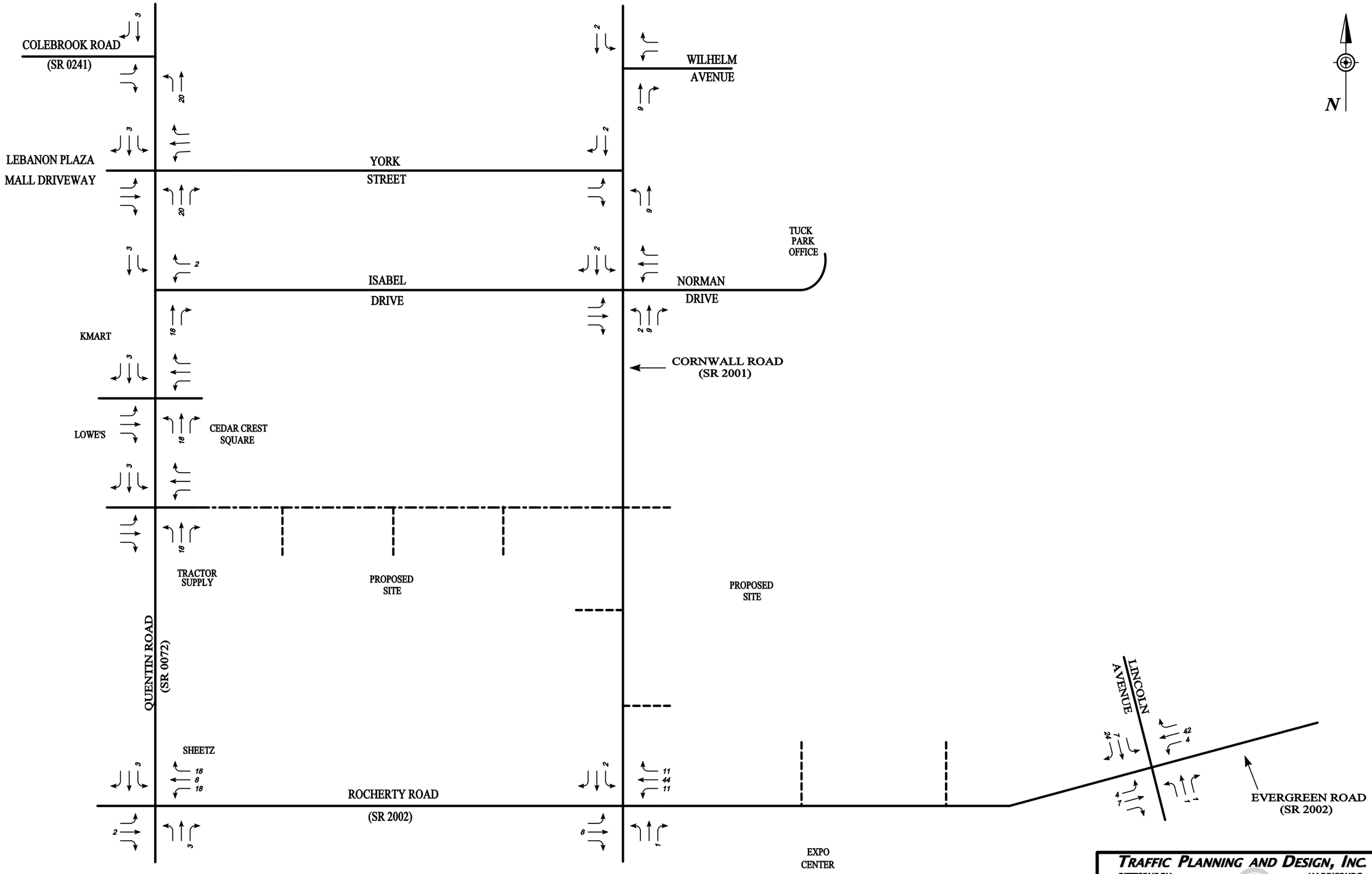

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FIGURE F-23

VA MEDICAL CENTER
WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION

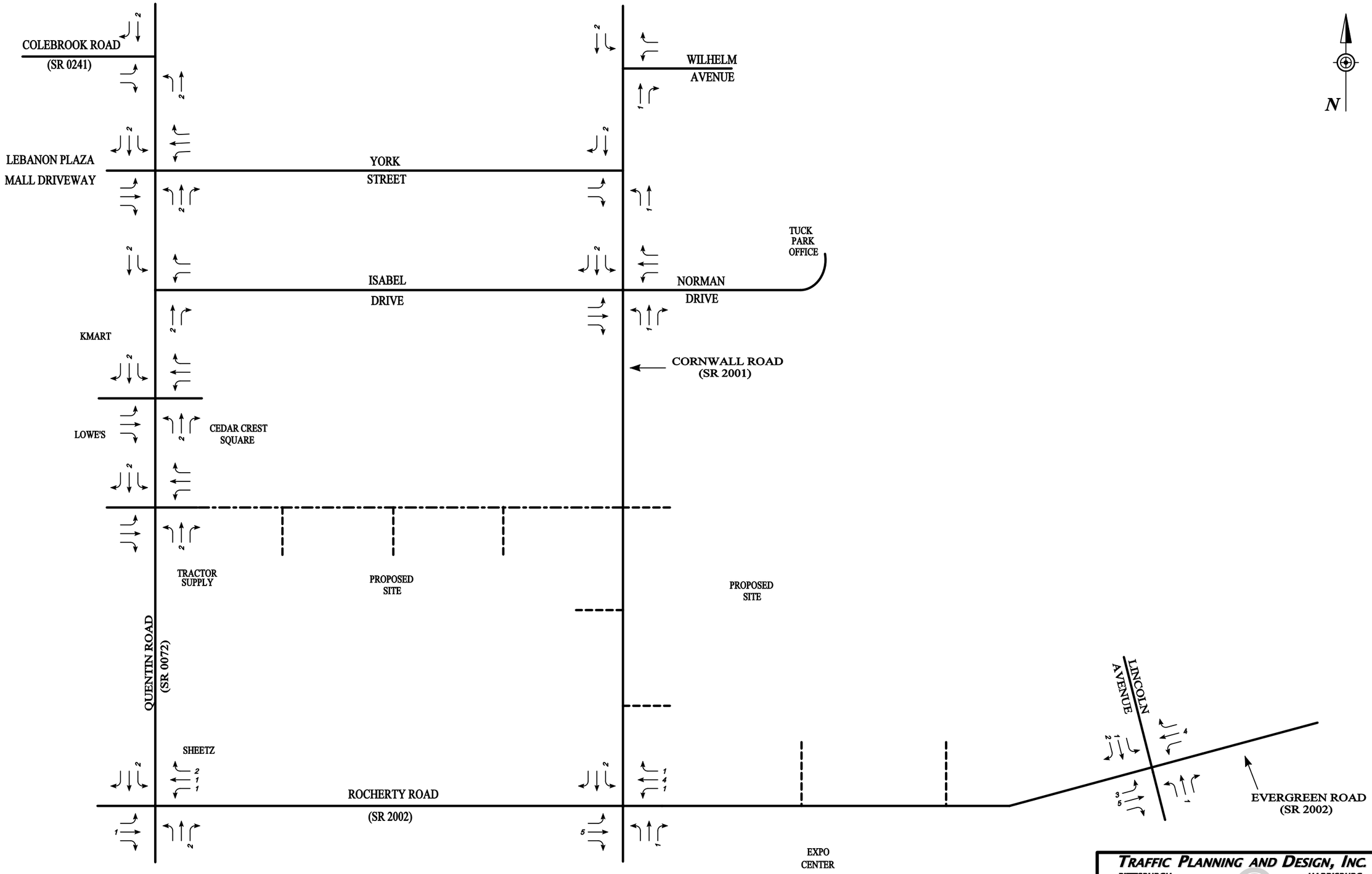

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FIGURE F-24

VA MEDICAL CENTER
SATURDAY MIDDAY PEAK HOUR
TRIP DISTRIBUTION

APPENDIX G

TRIP DISTRIBUTION/ASSIGNMENT DATA

GRAVITY MODEL ANALYSES

Office/Residential
Distribution Percentages

Live	Work	Count	Percentage	Route To/From Proposed Office Development						
				To/From North via Route 72	To/From North via Cornwall Rd	To/From North via Wilhelm Ave	To/From South via Route 72	To/From South via Cornwall Rd	To/From East via Rocherty Rd	To/From West via Rocherty Rd
Bethel Twp. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	41	1.3%	25%	50%	25%				
Cumru Twp. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	6	0.2%	5%	15%	5%	75%			
Heidelberg Twp. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	2	0.1%	25%	50%	25%				
Jefferson Twp. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	2	0.1%	25%	50%	25%				
Marion Twp. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	15	0.5%	25%	50%	25%				
Robesonia bor. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	5	0.2%	25%	50%	25%				
South Heidelberg Twp. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	8	0.3%	25%	50%	25%				
Spring Twp. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	8	0.3%	25%	50%	25%				
Strausstown bor. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	2	0.1%	25%	50%	25%				
Tulpehocken Twp. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	30	1.0%	25%	50%	25%				
Upper Tulpehocken Twp. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	2	0.1%	25%	50%	25%				
Womelsdorf bor. Berks Co. PA	North Cornwall Twp. Lebanon Co. PA	8	0.3%	25%	50%	25%				
West Sadsbury Twp. Chester Co. PA	North Cornwall Twp. Lebanon Co. PA	2	0.1%				100%			
East Pennsboro Twp. Cumberland Co. PA	North Cornwall Twp. Lebanon Co. PA	17	0.6%				100%			
Hampden Twp. Cumberland Co. PA	North Cornwall Twp. Lebanon Co. PA	21	0.7%				100%			
Mount Holly Springs bor. Cumberland Co.	North Cornwall Twp. Lebanon Co. PA	4	0.1%				100%			
Conewago Twp. Dauphin Co. PA	North Cornwall Twp. Lebanon Co. PA	5	0.2%				100%			
Derry Twp. Dauphin Co. PA	North Cornwall Twp. Lebanon Co. PA	6	0.2%				100%			
East Hanover Twp. Dauphin Co. PA	North Cornwall Twp. Lebanon Co. PA	6	0.2%		100%					
Londonderry Twp. Dauphin Co. PA	North Cornwall Twp. Lebanon Co. PA	11	0.4%				100%			
Lower Paxton Twp. Dauphin Co. PA	North Cornwall Twp. Lebanon Co. PA	17	0.6%				100%			
South Hanover Twp. Dauphin Co. PA	North Cornwall Twp. Lebanon Co. PA	6	0.2%				100%			
Williamstown bor. Dauphin Co. PA	North Cornwall Twp. Lebanon Co. PA	3	0.1%		100%					
Monroe Twp. Juniata Co. PA	North Cornwall Twp. Lebanon Co. PA	2	0.1%				100%			
Clay Twp. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	19	0.6%					100%		
East Earl Twp. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	9	0.3%					100%		
East Hempfield Twp. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	5	0.2%				100%			
Elizabethtown bor. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	8	0.3%				100%			
Ephrata bor. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	2	0.1%					100%		
Fulton Twp. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	5	0.2%				100%			
Lancaster city Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	7	0.2%				100%			
Lititz bor. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	17	0.6%					100%		
Manheim bor. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	9	0.3%				100%			
Manheim Twp. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	5	0.2%				100%			
Rapho Twp. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	7	0.2%				100%			
Warwick Twp. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	14	0.5%					100%		
West Donegal Twp. Lancaster Co. PA	North Cornwall Twp. Lebanon Co. PA	7	0.2%				100%			
Annville Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	46	1.5%	20%	80%					
Bethel Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	92	3.0%		90%	10%				
Cleona bor. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	63	2.1%	20%	80%					
Cornwall bor. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	119	3.9%				50%	50%		
East Hanover Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	32	1.1%	25%	75%					
Heidelberg Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	90	3.0%						100%	
Jackson Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	65	2.1%		75%	25%				
Jonestown bor. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	10	0.3%	25%	75%					
Lebanon city Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	741	24.4%	25%	50%	25%				
Millcreek Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	18	0.6%	25%	75%					
Mount Gretna bor. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	2	0.1%				100%			
Myerstown bor. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	22	0.7%	25%	50%	25%				
North Annville Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	35	1.2%	20%	80%					
North Cornwall Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	430	14.1%	40%	10%		5%	5%		40%
North Lebanon Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	291	9.6%	25%	50%	25%				
North Londonderry Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	15	0.5%	5%	20%		75%			
Palmyra bor. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	45	1.5%	5%	20%		75%			
Richland bor. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	17	0.6%					100%		
South Annville Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	63	2.1%				50%			50%
South Lebanon Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	172	5.7%			20%	40%		40%	
South Londonderry Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	104	3.4%				100%			
Swatara Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	36	1.2%	25%	75%					
Union Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	25	0.8%	25%	75%					
West Cornwall Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	50	1.6%				75%			25%
West Lebanon Twp. Lebanon Co. PA	North Cornwall Twp. Lebanon Co. PA	42	1.4%	25%	75%					
Shamokin city Northumberland Co. PA	North Cornwall Twp. Lebanon Co. PA	7	0.2%	25%	75%					
Hegins Twp. Schuylkill Co. PA	North Cornwall Twp. Lebanon Co. PA	6	0.2%	25%	75%					
North Manheim Twp. Schuylkill Co. PA	North Cornwall Twp. Lebanon Co. PA	5	0.2%	25%	75%					
Pine Grove bor. Schuylkill Co. PA	North Cornwall Twp. Lebanon Co. PA	10	0.3%	25%	75%					
Pine Grove Twp. Schuylkill Co. PA	North Cornwall Twp. Lebanon Co. PA	19	0.6%	25%	75%					
Porter Twp. Schuylkill Co. PA	North Cornwall Twp. Lebanon Co. PA	7	0.2%	25%	75%					
Mount Pleasant bor. Westmoreland Co. PA	North Cornwall Twp. Lebanon Co. PA	7	0.2%				100%			
Manchester Twp. York Co. PA	North Cornwall Twp. Lebanon Co. PA	5	0.2%				100%			
Monaghan Twp. York Co. PA	North Cornwall Twp. Lebanon Co. PA	8	0.3%				100%			
Totals		**3,042**	**100.8%**	**18.2%**	**35.1%**	**11.7%**	**18.0%**	**5.4%**	**5.3%**	**7.1%**

Gravity Model Analysis For Retail Trip Distribution Percentages

Municipality	2000 Population	Centroid Distance (CD) (miles)	Weighted Population	Relative %
Annville Township	4518	6.9	655	2.4%
Cornwall Borough	3486	2.4	1453	5.3%
Cleona Borough	2148	5.1	421	1.5%
Heidelberg Township	3832	8.7	440	1.6%
Jackson Township	6338	8.8	720	2.6%
Lebanon City	24461	2.9	8435	30.9%
North Annville Township	2279	9.3	245	0.9%
North Cornwall Township	6403	1.0	6403	23.4%
North Lebanon Township	10629	4.6	2311	8.5%
South Annville Township	2946	7.0	421	1.5%
South Lebanon Township	8383	1.7	4931	18.1%
West Lebanon Township	836	3.4	246	0.9%
West Cornwall Township	1909	3.0	636	2.3%
Totals	**78168**		**27317**	**100.0%**

Percentage Using Routes

Municipality	1	2	3	4	5	6	7	8	Total
Annville Township	20%	80%							100%
Cornwall Borough				50%	50%				100%
Cleona Borough	20%	80%							100%
Heidelberg Township						25%	75%		100%
Jackson Township		100%							100%
Lebanon City	25%	50%	25%						100%
North Annville Township	20%	80%							100%
North Cornwall Township	40%	10%		5%	5%			40%	100%
North Lebanon Township	25%	50%	25%						100%
South Annville Township			20%	40%				40%	100%
South Lebanon Township				50%			50%		100%
West Lebanon Township	25%	75%							100%
West Cornwall Township				75%				25%	100%
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	

Relative Percentage Using Routes

Municipality	1	2	3	4	5	6	7	8	Total
Annville Township	0.5%	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%
Cornwall Borough	0.0%	0.0%	0.0%	2.7%	2.7%	0.0%	0.0%	0.0%	5.3%
Cleona Borough	0.3%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%
Heidelberg Township	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	1.2%	0.0%	1.6%
Jackson Township	0.0%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%
Lebanon City	7.7%	15.4%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	30.9%
North Annville Township	0.2%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%
North Cornwall Township	9.4%	2.3%	0.0%	1.2%	1.2%	0.0%	0.0%	9.4%	23.4%
North Lebanon Township	2.1%	4.2%	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	8.5%
South Annville Township	0.0%	0.0%	0.3%	0.6%	0.0%	0.0%	0.0%	0.6%	1.5%
South Lebanon Township	0.0%	0.0%	0.0%	9.0%	0.0%	0.0%	9.0%	0.0%	18.1%
West Lebanon Township	0.2%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%
West Cornwall Township	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.6%	2.3%
	1	**2**	**3**	**4**	**5**	**6**	**7**	**9**	100.0%
	20.4%	**29.2%**	**10.1%**	**15.2%**	**3.8%**	**0.4%**	**10.2%**	**10.6%**	**100.0%**

Description	Route	Gravity Model Distribution %
North via Route 72	1	20.4%
North via Cornwall Road	2	29.2%
East via Wilhelm Avenue	3	10.1%
South via Route 72	4	15.2%
South via Cornwall Road	5	3.8%
South via Lincoln Avenue	6	0.4%
East via Rocherty Road	7	10.2%
West via Rocherty Road	8	10.6%
		100.0%

TRIP DISTRIBUTION: INDIVIDUAL PHASES

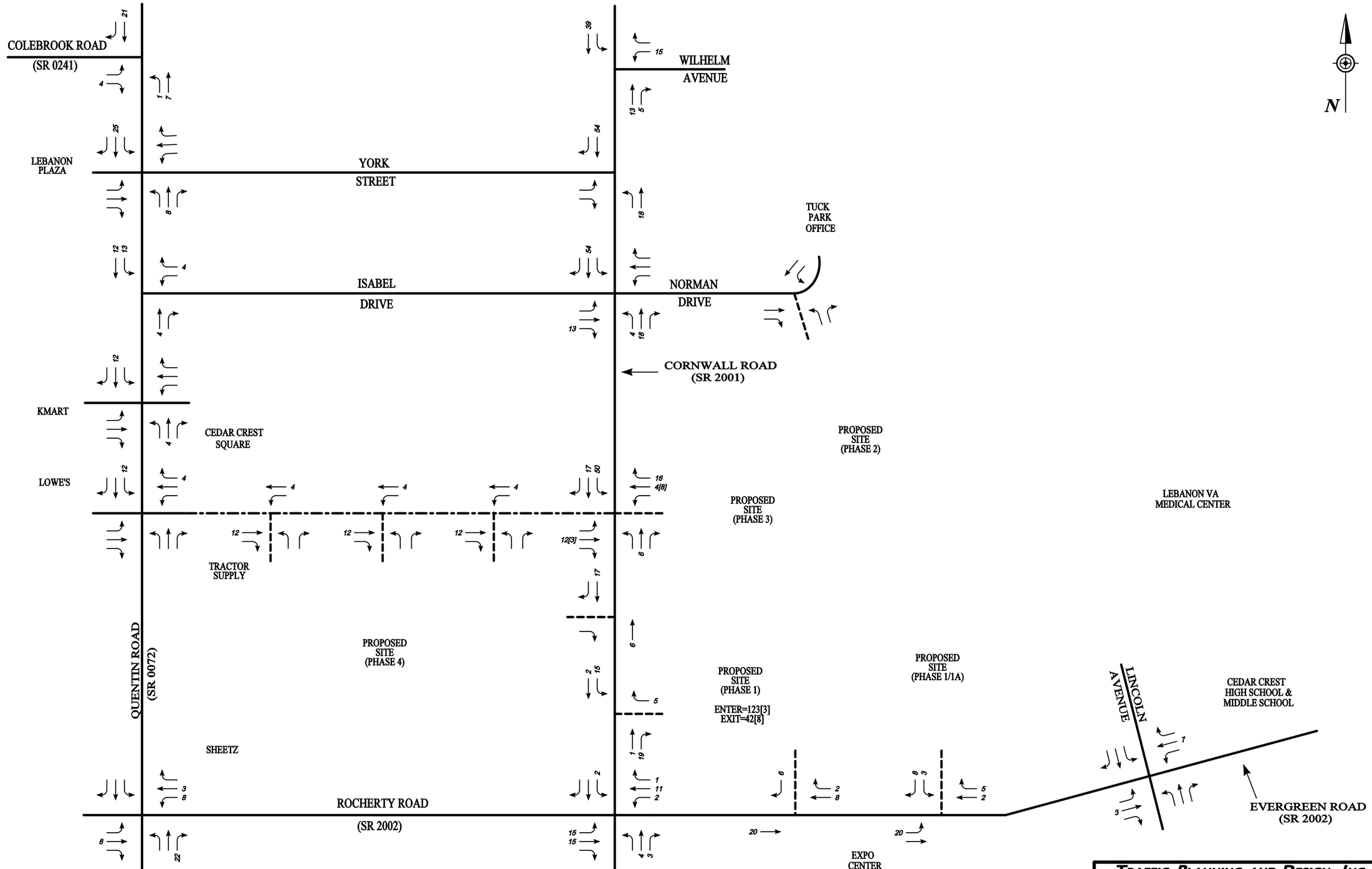

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FIGURE G-1

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 1)
WEEKDAY AM PEAK HOUR

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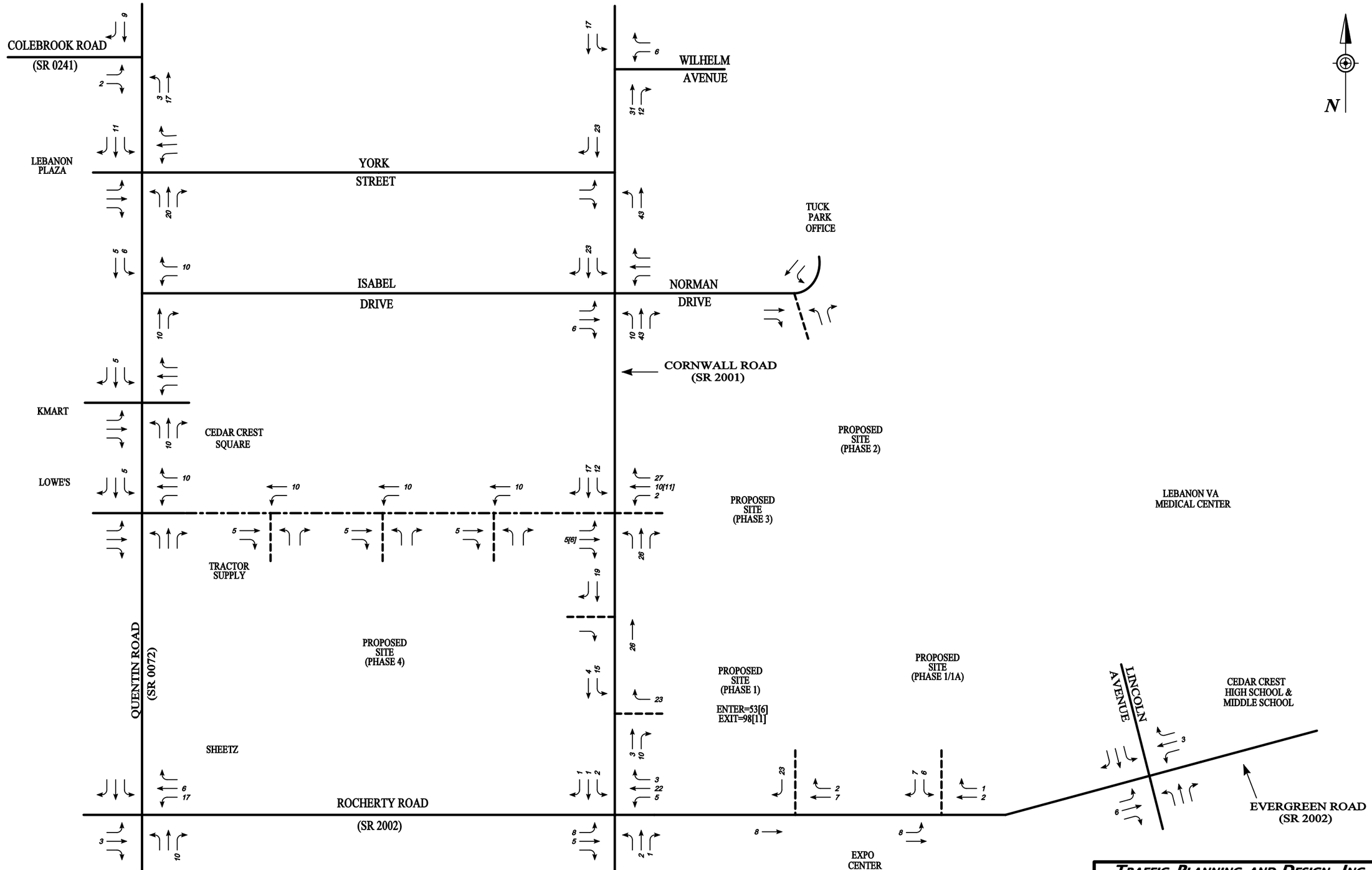

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FIGURE G-2

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 1)
WEEKDAY PM PEAK HOUR

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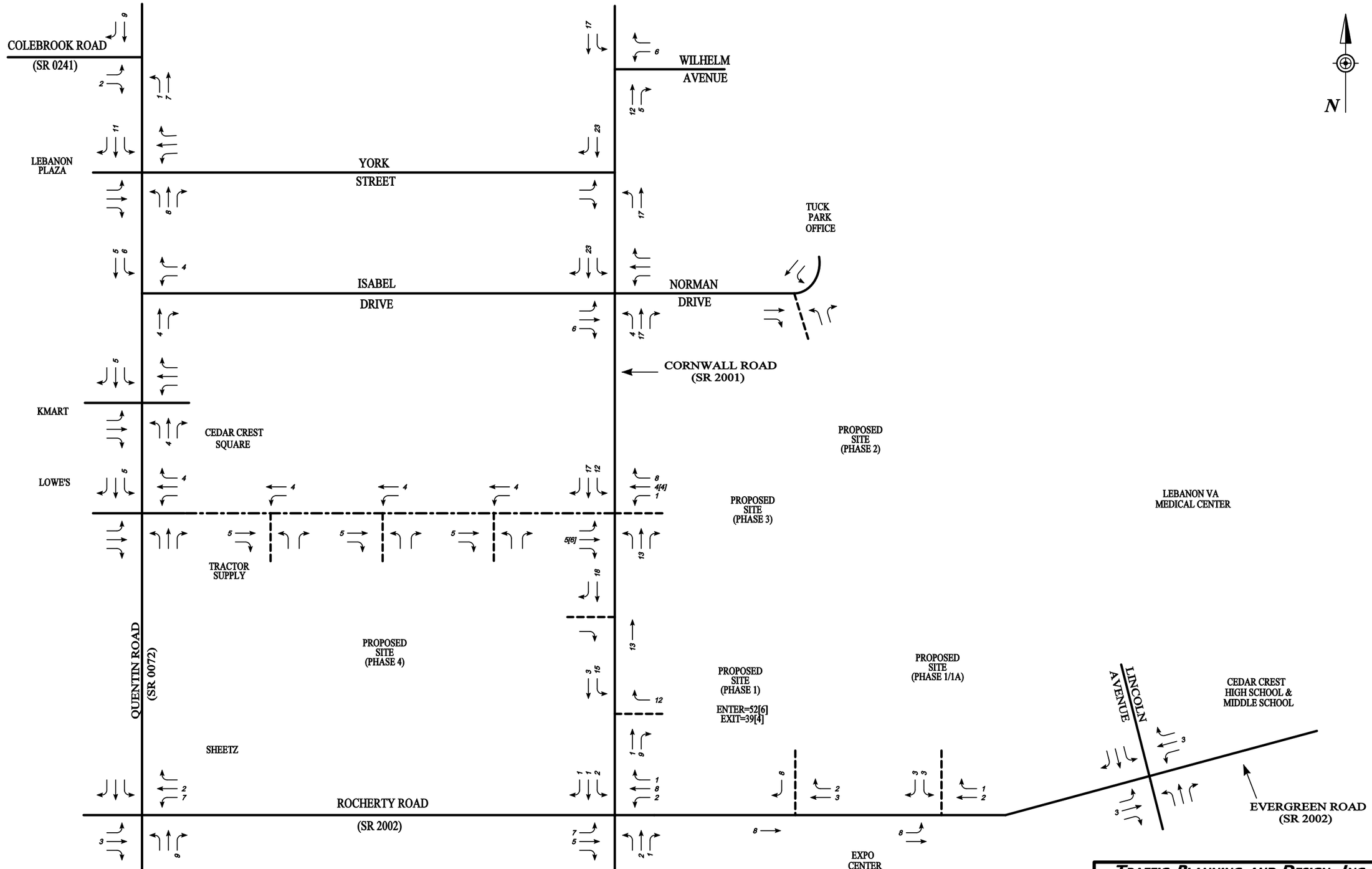

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FIGURE G-3

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 1)
SATURDAY MIDDAY PEAK HOUR

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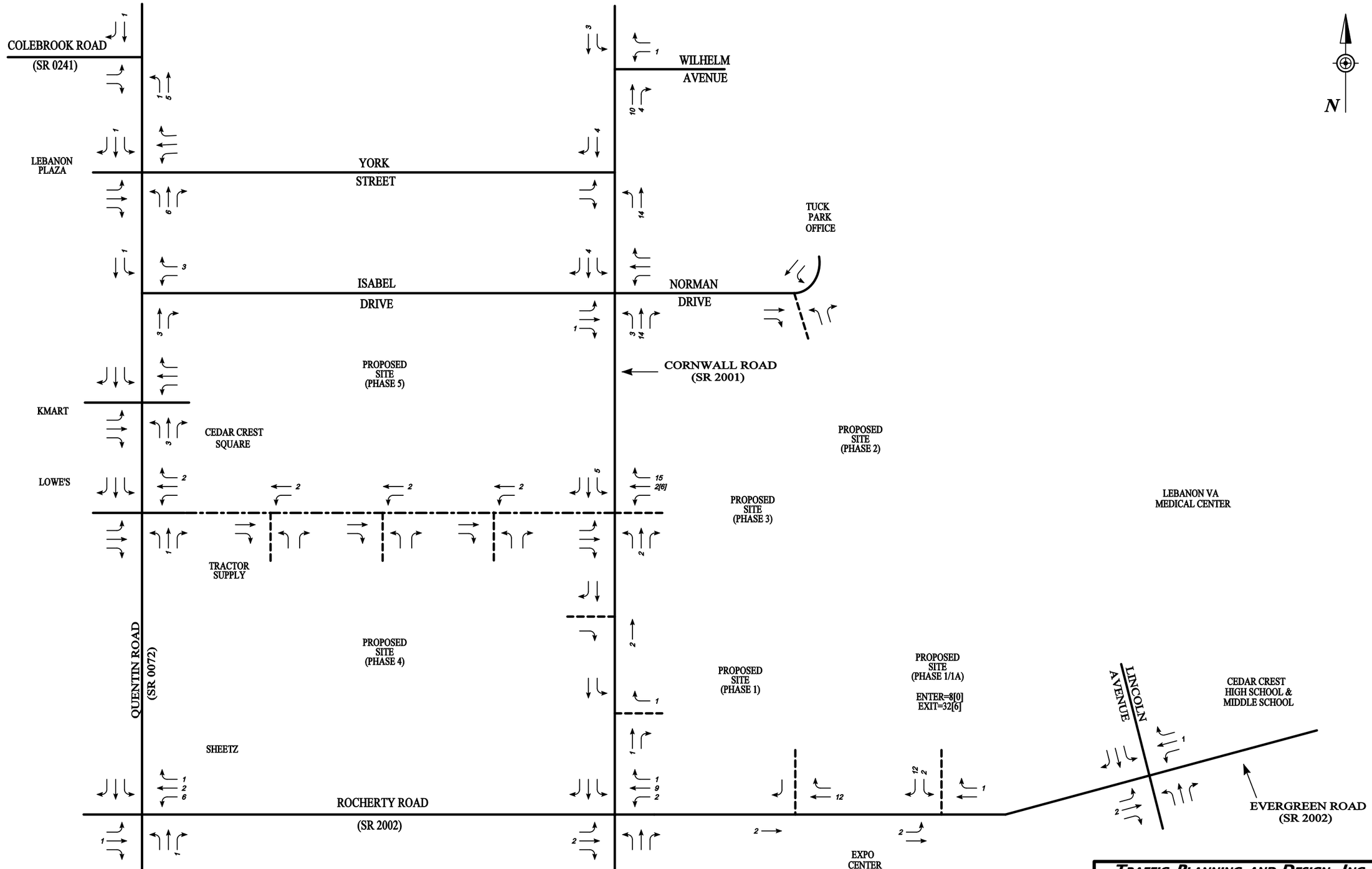

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FIGURE G-4

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 1A)
WEEKDAY AM PEAK HOUR

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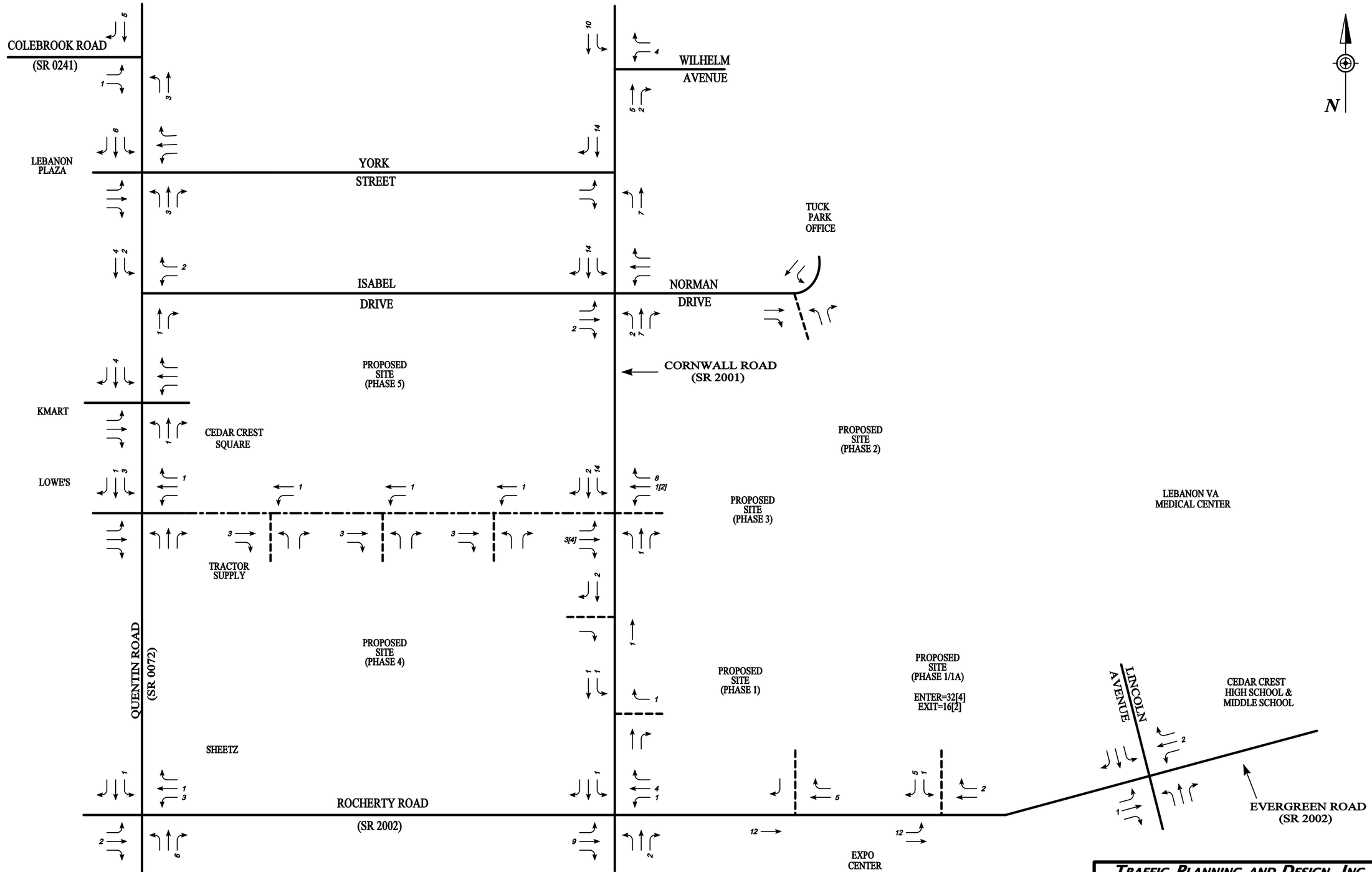

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FIGURE G-5

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 1A)
WEEKDAY PM PEAK HOUR

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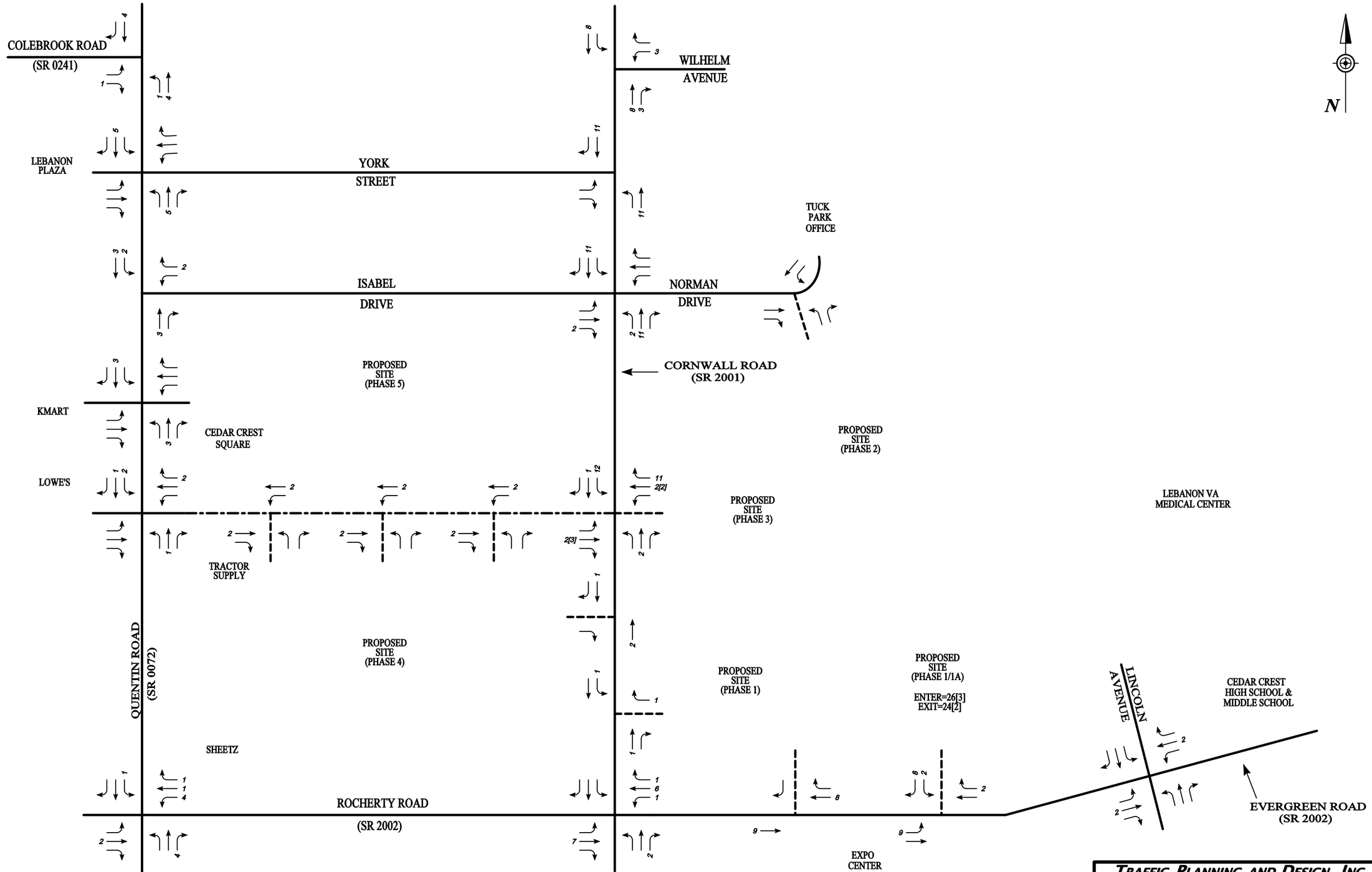

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FIGURE G-6

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 1A)
SATURDAY MIDDAY PEAK HOUR

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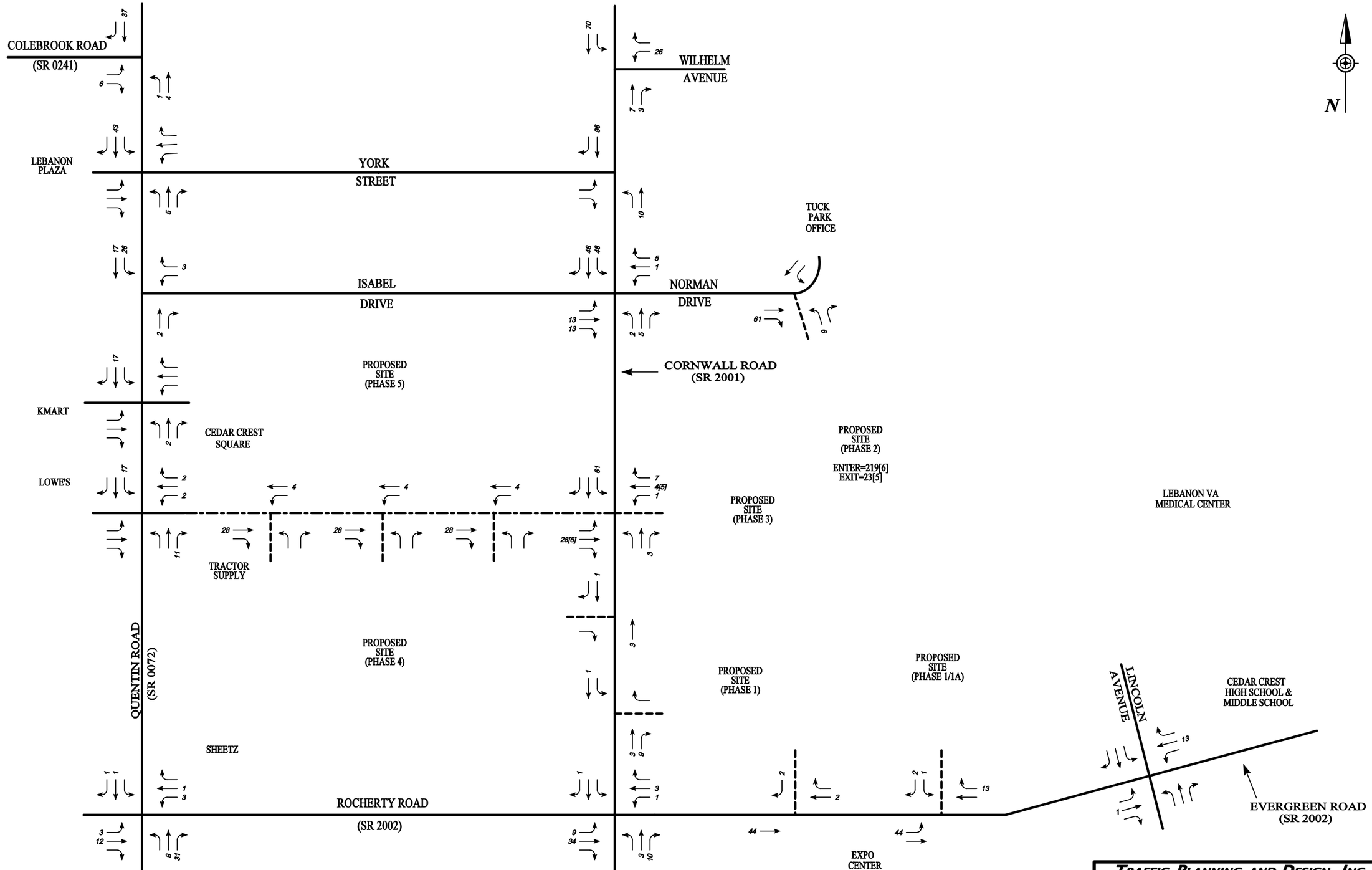

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FIGURE G-7

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 2)
WEEKDAY AM PEAK HOUR

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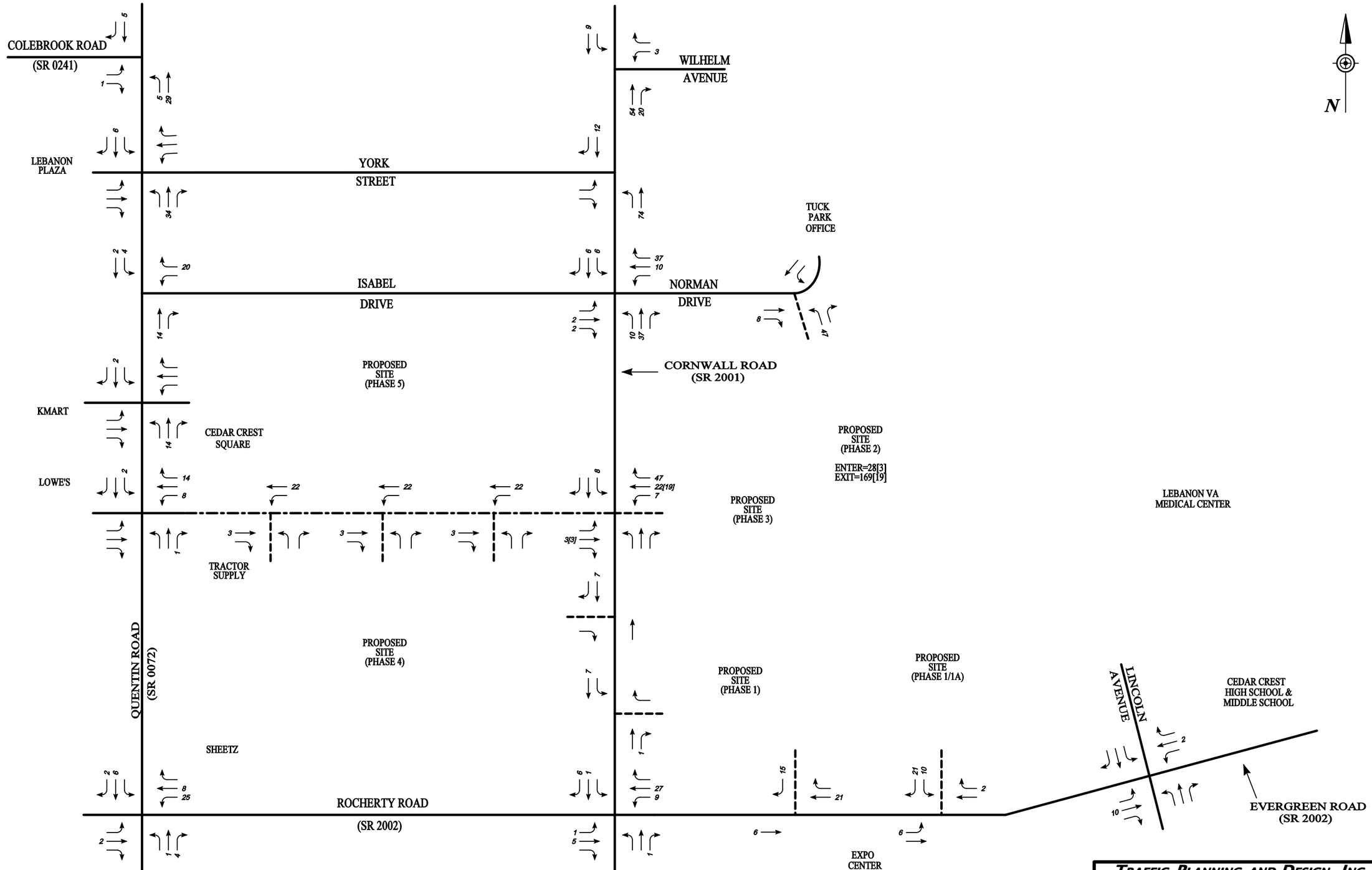

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FIGURE G-8

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 2)
WEEKDAY PM PEAK HOUR

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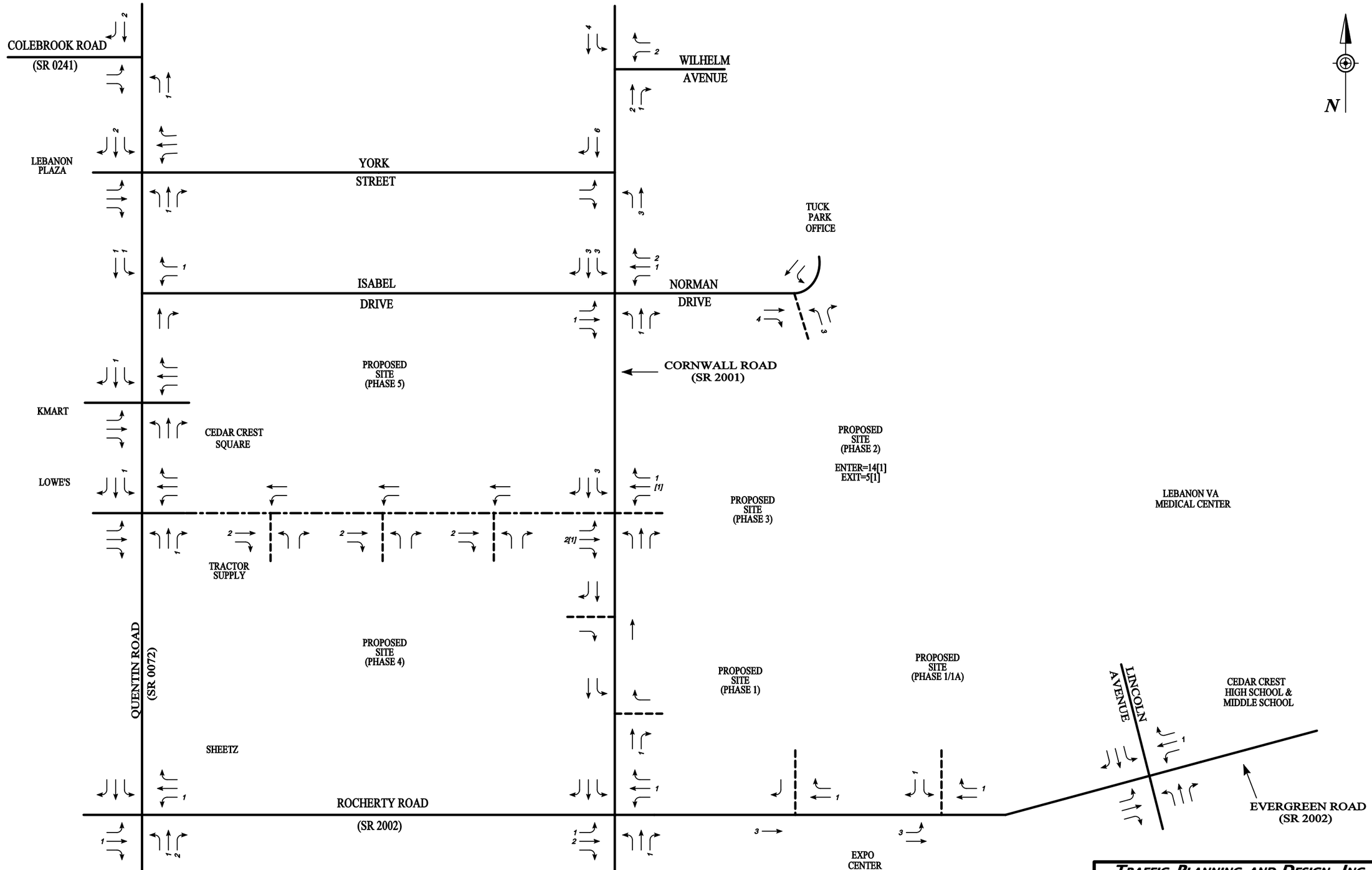

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FIGURE G-9

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 2)
SATURDAY MIDDAY PEAK HOUR

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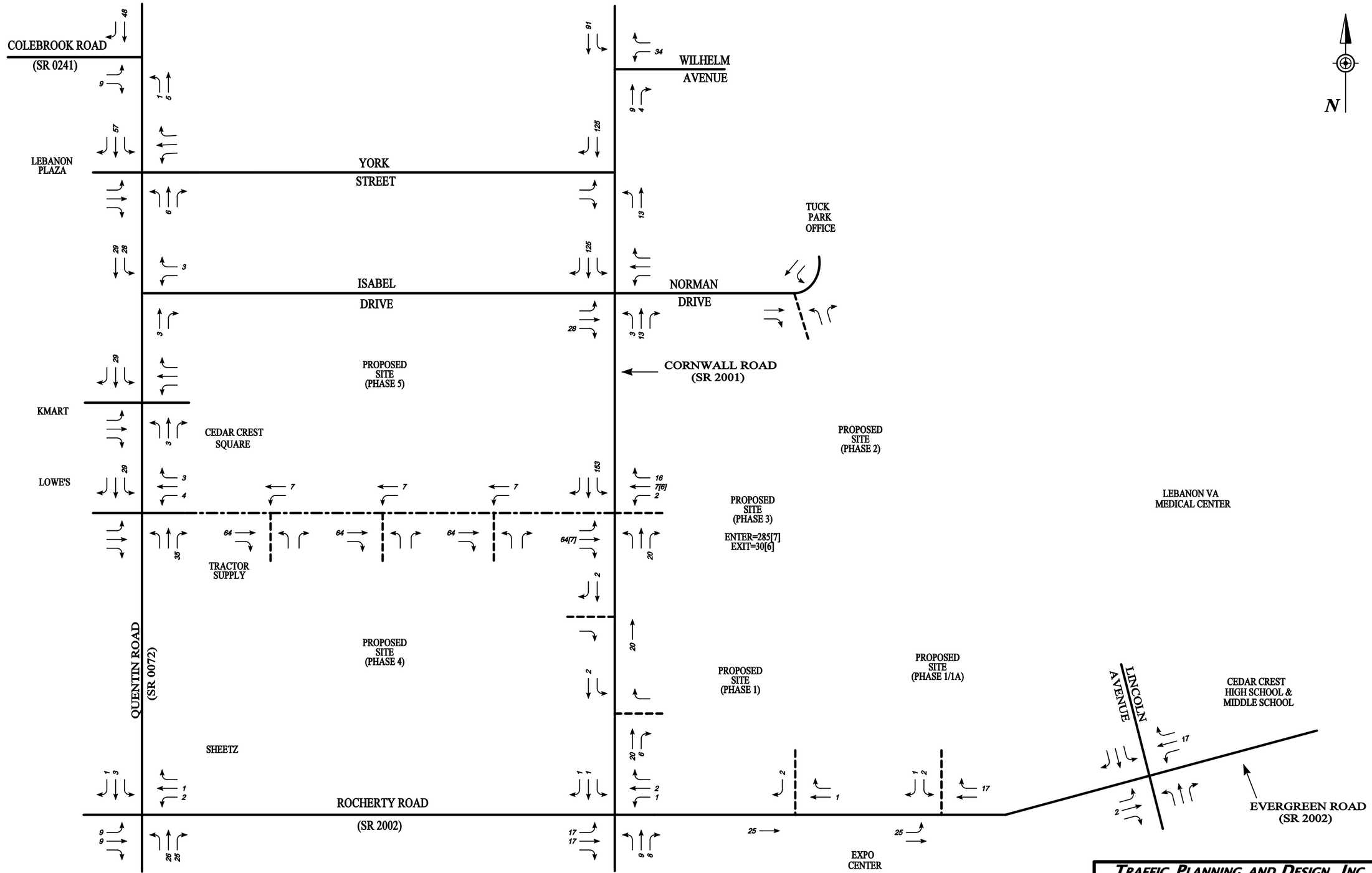

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FIGURE G-10

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 3)
WEEKDAY AM PEAK HOUR

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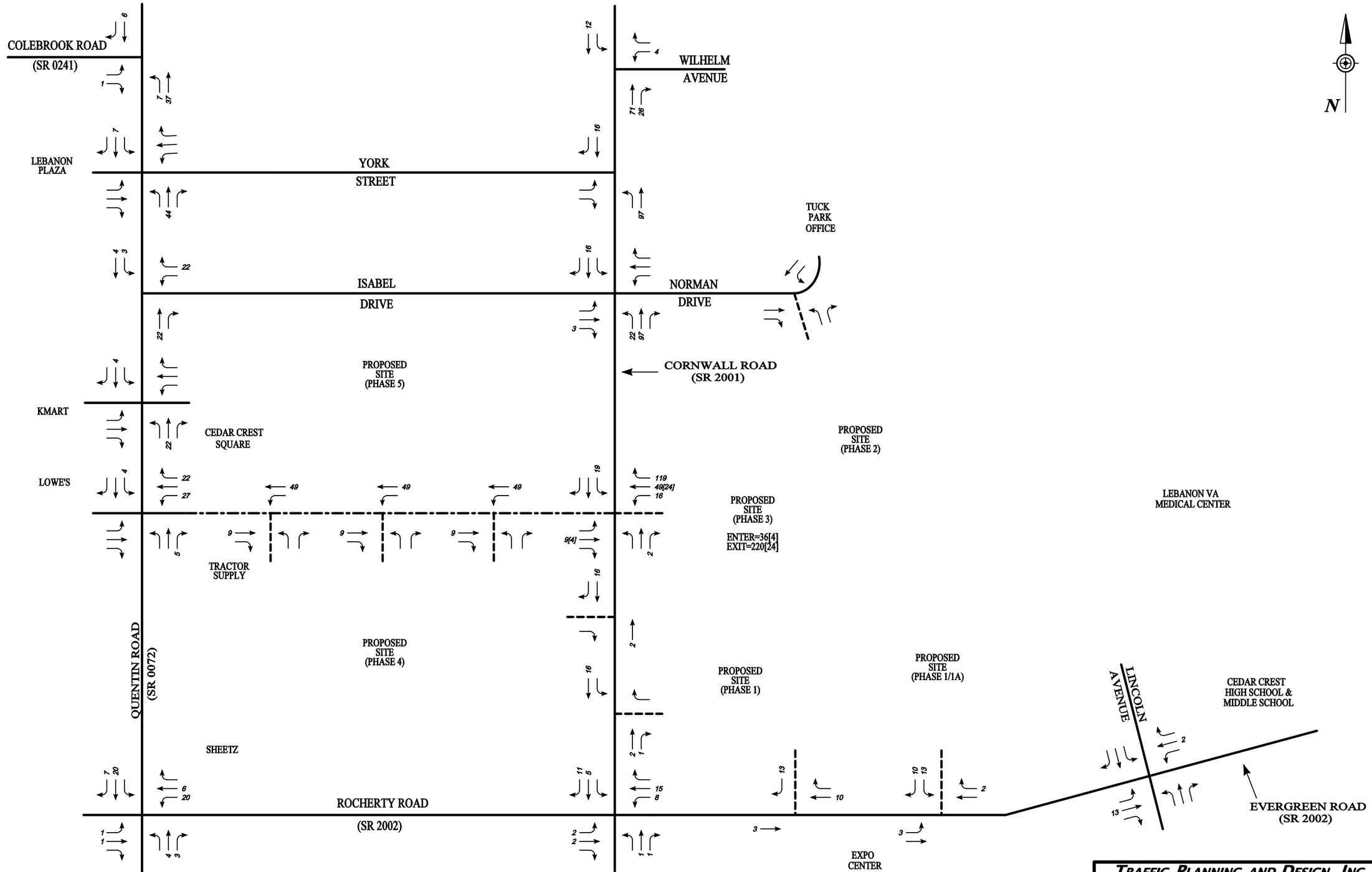

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FIGURE G-11

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 3)
WEEKDAY PM PEAK HOUR

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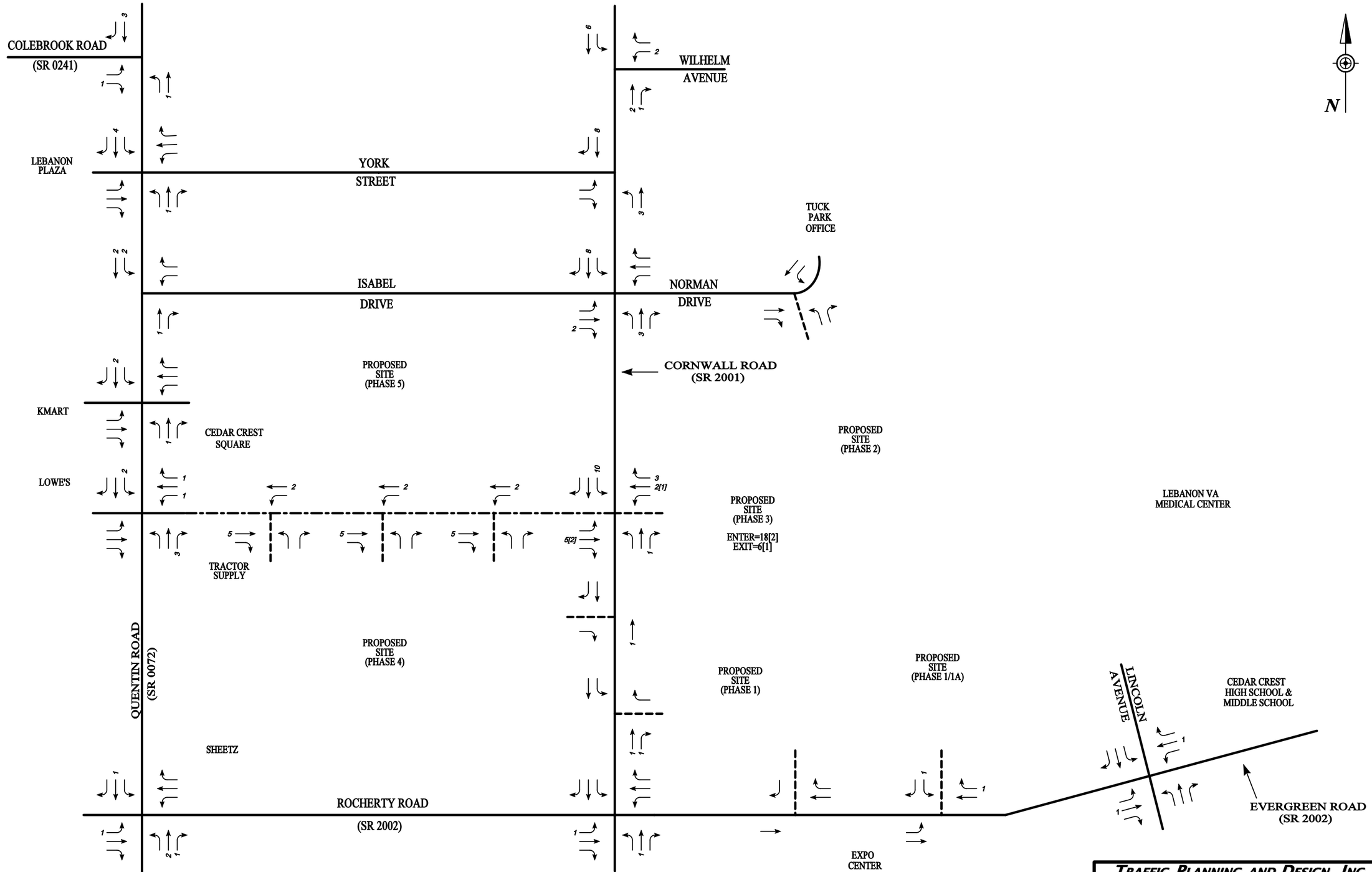

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FIGURE G-12

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 3)
SATURDAY MIDDAY PEAK HOUR

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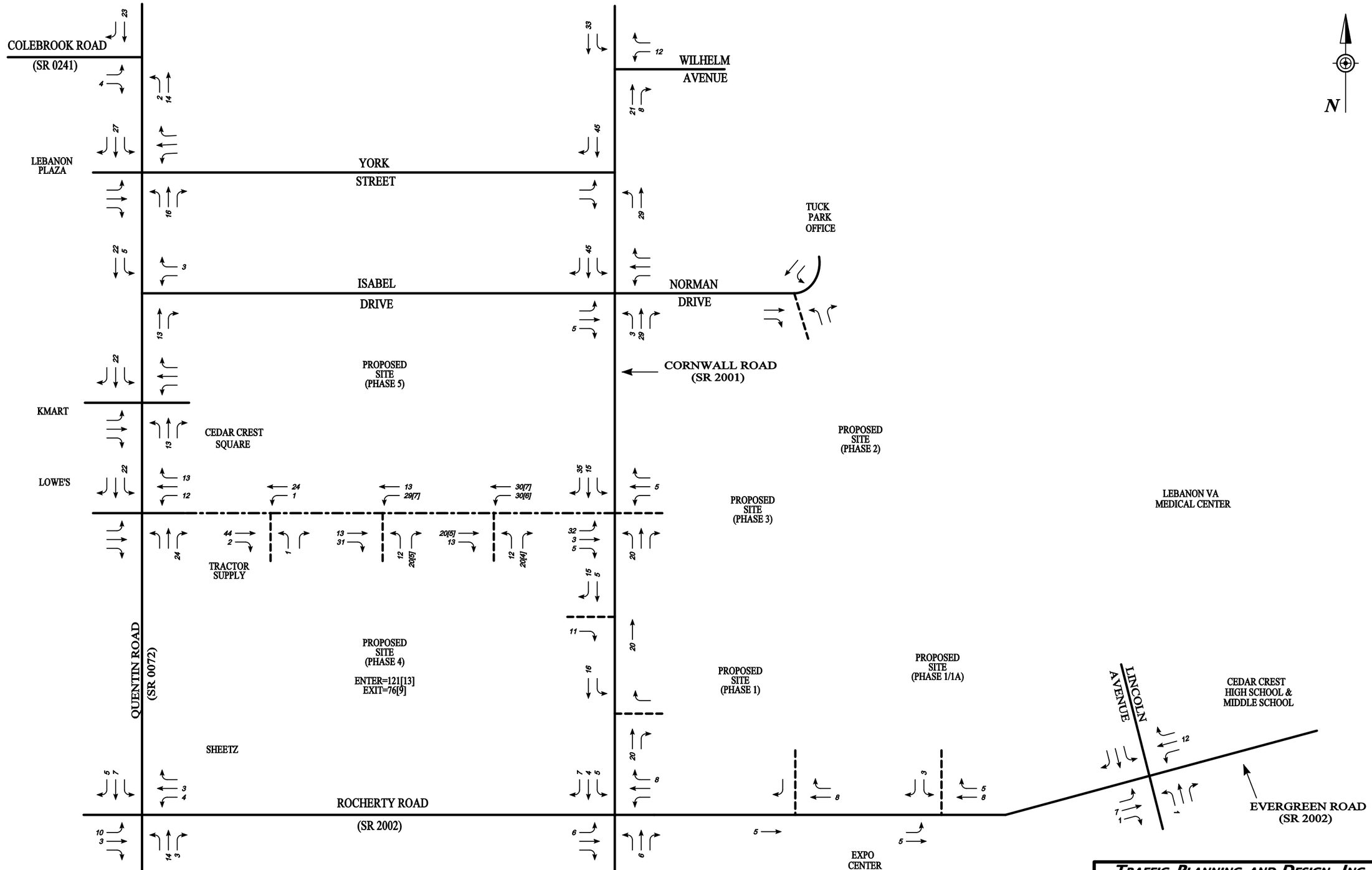

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FIGURE G-13

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 4)
WEEKDAY AM PEAK HOUR

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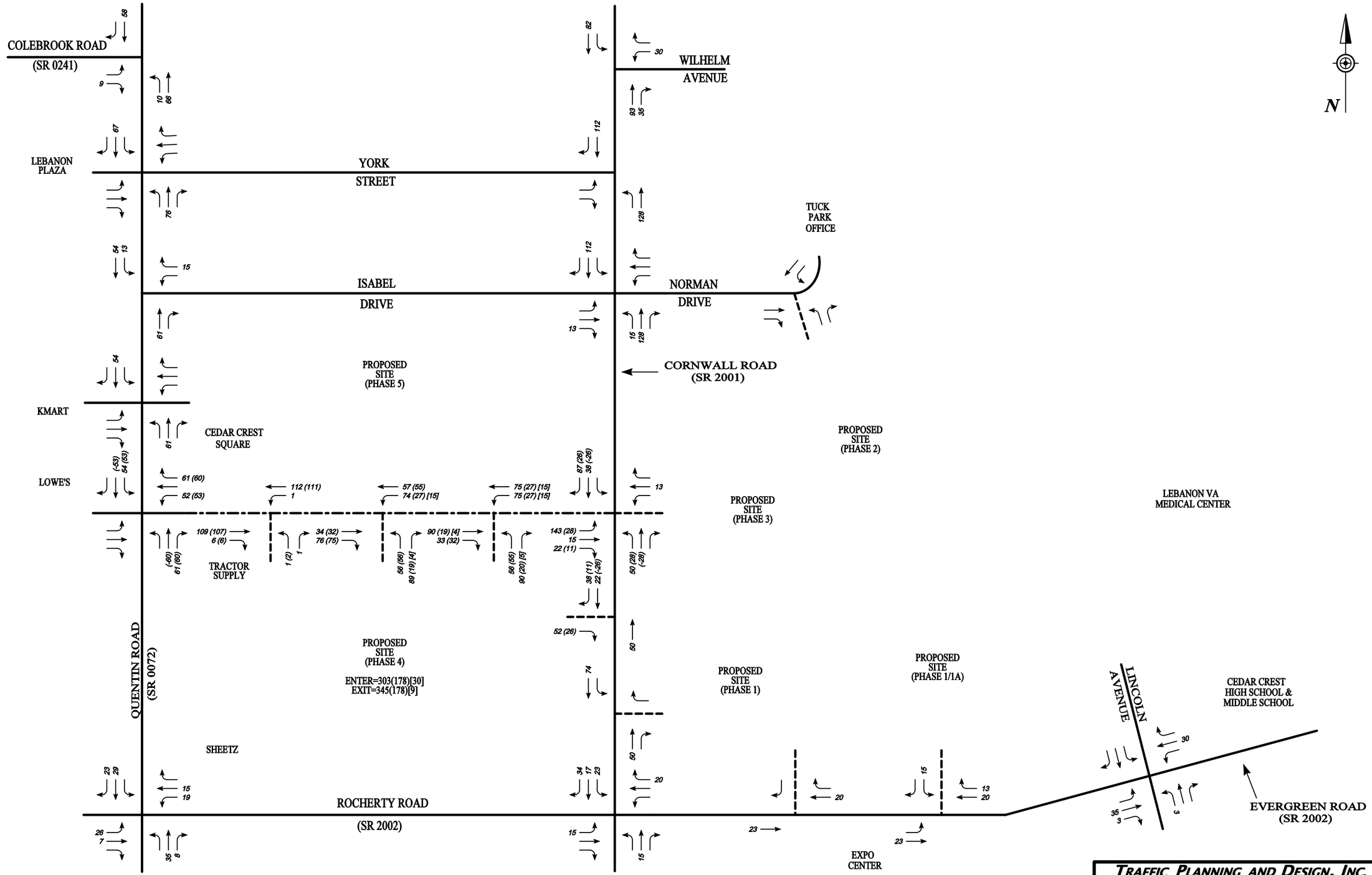

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FIGURE G-14

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 4)
WEEKDAY PM PEAK HOUR

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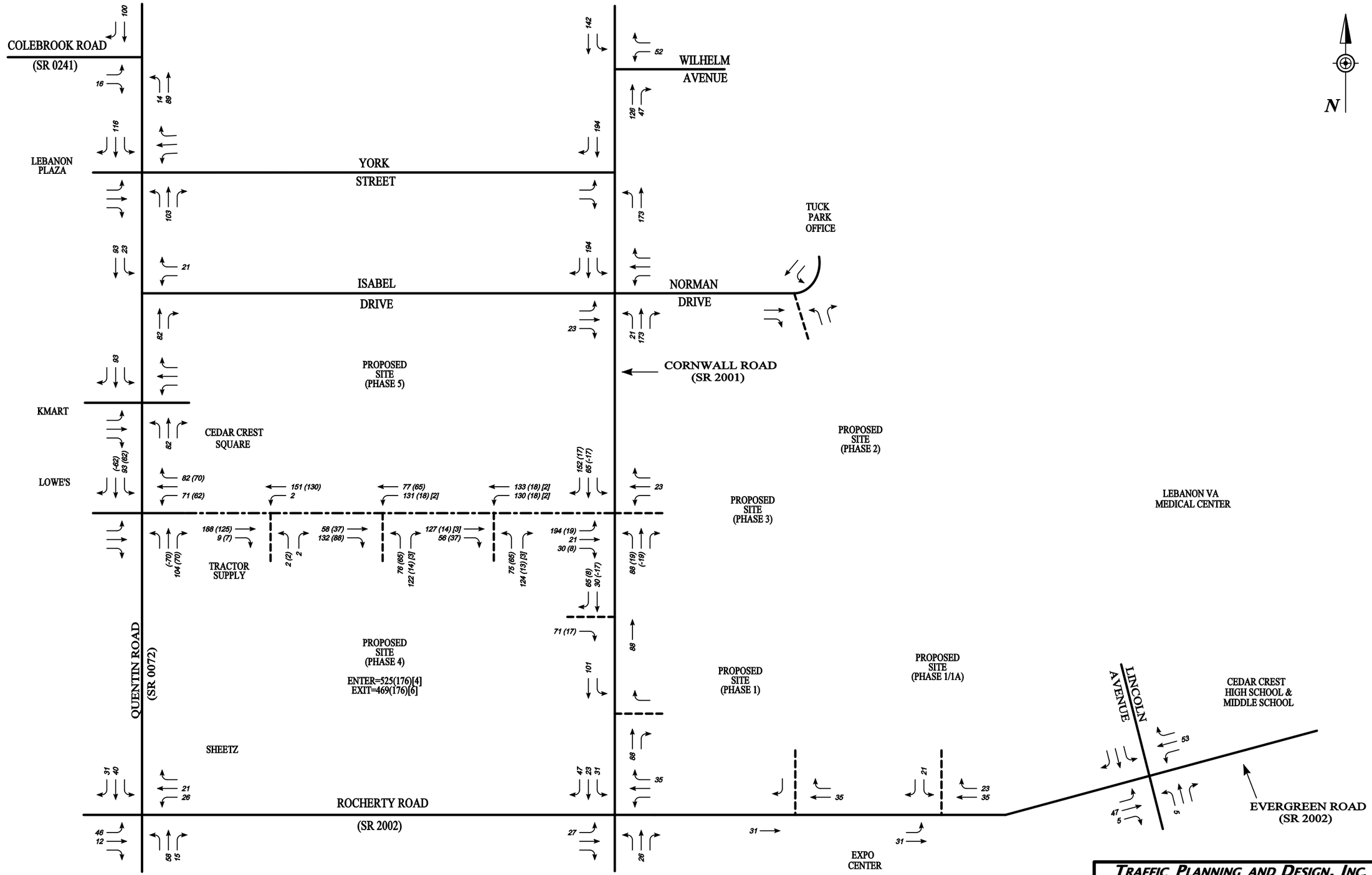

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FIGURE G-15

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 4)
SATURDAY MIDDAY PEAK HOUR

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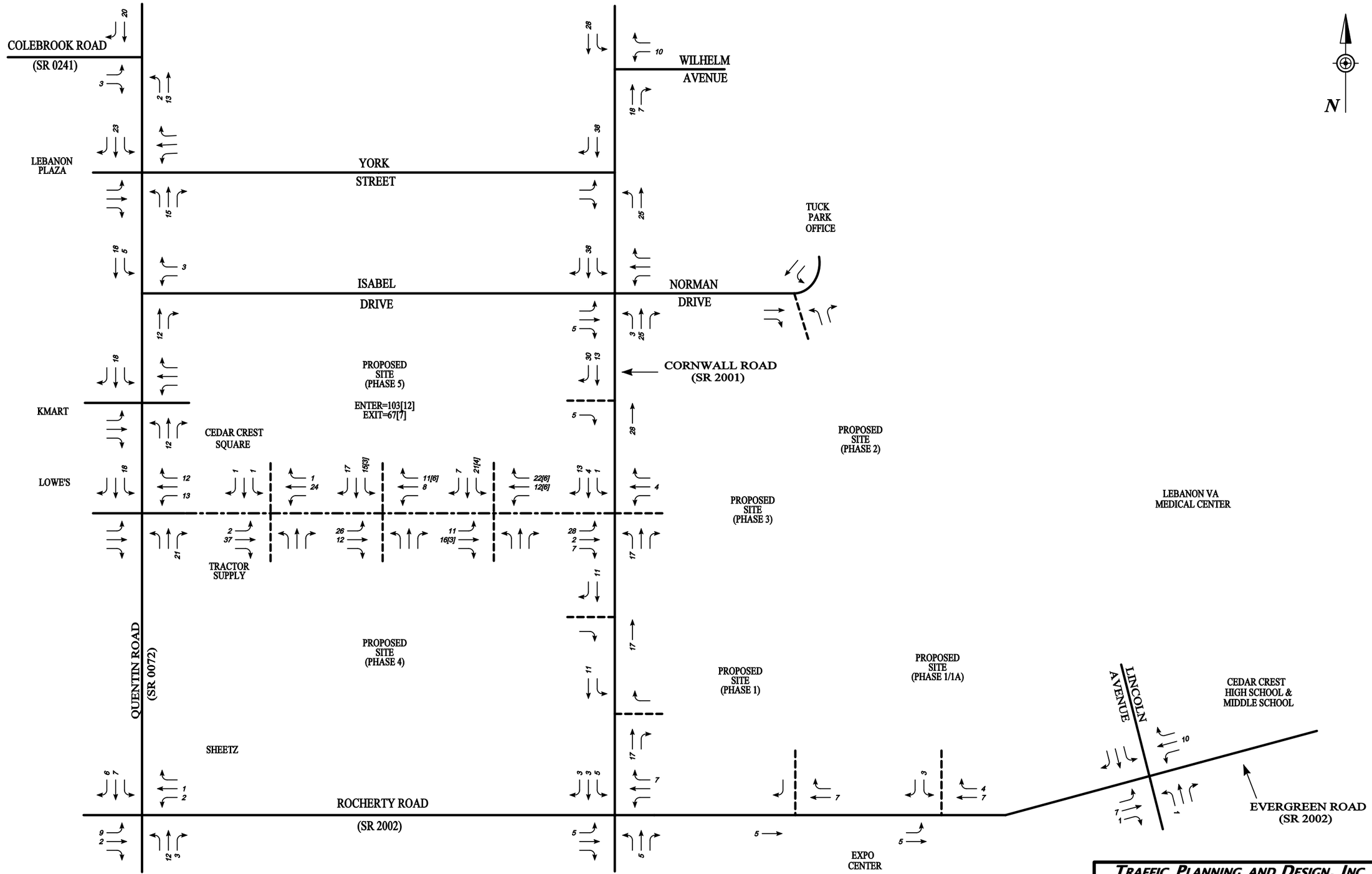

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FIGURE G-16

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 5)
WEEKDAY AM PEAK HOUR

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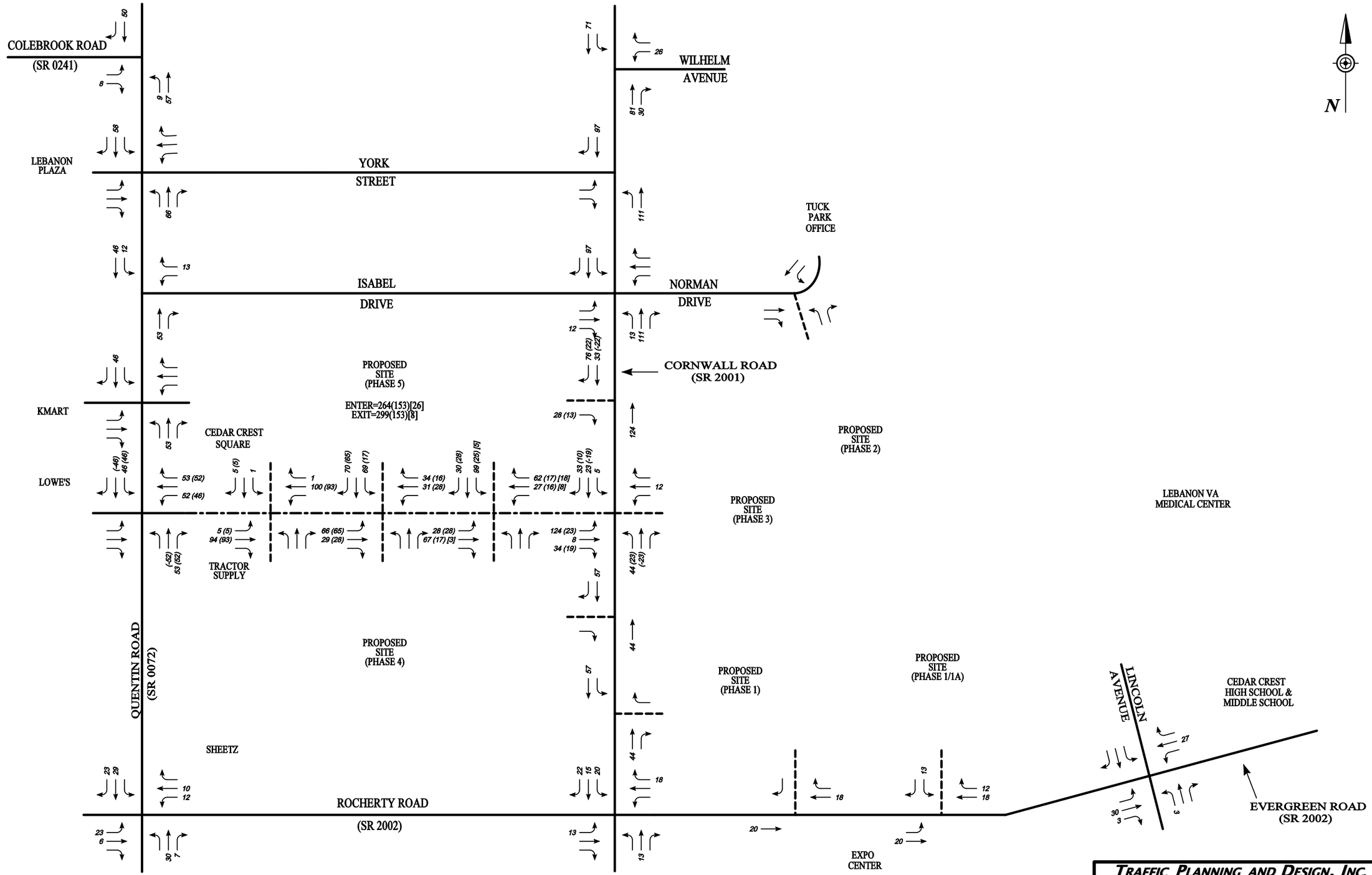

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FIGURE G-17

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 5)
WEEKDAY PM PEAK HOUR

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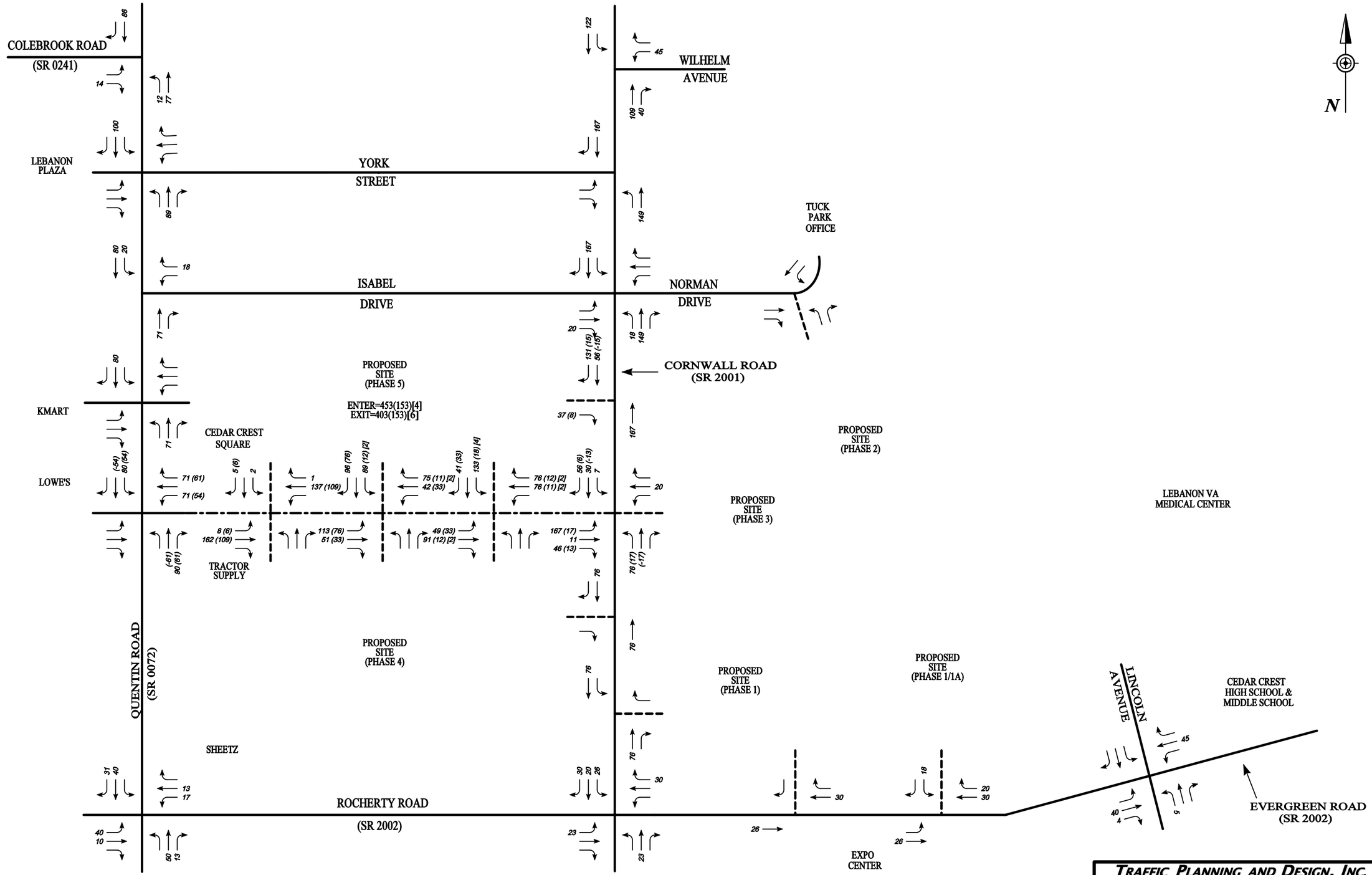

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FIGURE G-18

SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
TRIP DISTRIBUTION - 2035 CONDITIONS (PHASE 5)
SATURDAY MIDDAY PEAK HOUR

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APPENDIX H

VOLUME DEVELOPMENT SPREADSHEETS

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection:	**Quentin Road (SR 0072) & Rocherty Road**									
Synchro Node:	**1**	**Adjacent intersections:**	**West**	**0**	**East**	**7**	**North**	**2**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**89**	**243**	**8**	**175**	**164**	**69**	**15**	**379**	**169**	**86**	**274**	**25**	**1696**
Existing growth	2	6	0	4	4	2	0	9	4	2	6	1	40
2011 Existing Volumes	**91**	**249**	**8**	**179**	**168**	**71**	**15**	**388**	**173**	**88**	**280**	**26**	**1736**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	11	31	0	20	23	3	2	0	7	0	0	4	101
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	24	66	0	46	48	14	1	0	32	4	0	7	242
Tractor Supply Outparcels Trip Distribution	1					6		15		5	13	1	41
Alden Place Trip Distribution								9			5		14
Sheetz Outparcels Trip Distribution	4	3		9	5			11	4				36
VA Medical Center		10		2	1	3			19	19			54
The Preserve at Historic Cornwall Village (Phase 1)			1				1	42			38		82
The Preserve at Historic Cornwall Village (Build-out)			4				4	125			108		241
Total Nearby Developments (2025 conditions)	5	13	1	11	6	9	1	77	23	24	56	1	227
Total Nearby Developments (2035 conditions)	5	13	4	11	6	9	4	160	23	24	126	1	386
2025 Base Volumes	**107**	**293**	**9**	**210**	**197**	**83**	**18**	**465**	**203**	**112**	**336**	**31**	**2064**
2035 Base Volumes	**120**	**328**	**12**	**236**	**222**	**94**	**20**	**548**	**228**	**116**	**406**	**34**	**2364**
New Trips - 2025 conditions		15		19	6	6			44	15			105
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		8		8	3				22				41
New Trips - 2035 conditions - Phase 1A		1		6	2	1			1				11
New Trips - 2035 conditions - Phase 2	3	12		3	1			8	31		1	1	60
New Trips - 2035 conditions - Phase 3	9	9		2	1			26	25		3	1	76
New Trips - 2035 conditions - Phase 4	10	3		4	3			14	3		7	5	49
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	9	2		2	1			12	3		7	6	42
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**15**	**0**	**19**	**6**	**6**	**0**	**0**	**44**	**15**	**0**	**0**	**105**
Total New Trips - 2035 Conditions - Phases 1-4	22	33	0	23	10	1	0	48	82	0	11	7	237
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	31	35	0	25	11	1	0	60	85	0	18	13	279
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution						-9				-5			
Total Trip Distribution (2035 conditions - Phases 1-4)	**22**	**33**	**0**	**23**	**10**	**-8**	**0**	**48**	**82**	**-5**	**11**	**7**	**223**
Total Trip Distribution (2035 conditions - Phases 1-5)	**31**	**35**	**0**	**25**	**11**	**-8**	**0**	**60**	**85**	**-5**	**18**	**13**	**265**
2025 Projected Volumes	**107**	**308**	**9**	**229**	**203**	**89**	**18**	**465**	**247**	**127**	**336**	**31**	**2169**
2035 Projected Volumes - Phases 1-4	**142**	**361**	**12**	**259**	**232**	**86**	**20**	**596**	**310**	**111**	**417**	**41**	**2587**
2035 Projected Volumes - Phases 1-5	**151**	**363**	**12**	**261**	**233**	**86**	**20**	**608**	**313**	**111**	**424**	**47**	**2629**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**80**	**207**	**16**	**191**	**212**	**141**	**7**	**435**	**101**	**150**	**430**	**88**	**2058**
Existing growth	2	5	0	4	5	3	0	10	2	3	10	2	46
2011 Existing Volumes	**82**	**212**	**16**	**195**	**217**	**144**	**7**	**445**	**103**	**153**	**440**	**90**	**2104**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	8	30	1	0	20	0	0	0	10	19	12	16	116
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	20	61	0	1	51	21	0	0	25	41	0	29	249
Tractor Supply Outparcels Trip Distribution	1					7		16		5	13		42
Alden Place Trip Distribution								8			12		20
Sheetz Outparcels Trip Distribution	5	5		43	10			15	5		-22		61
VA Medical Center		2		18	8	18			3	3			52
The Preserve at Historic Cornwall Village (Phase 1)			2				2	51			62		117
The Preserve at Historic Cornwall Village (Build-out)			5				5	130			148		288
Total Nearby Developments (2025 conditions)	6	7	2	61	18	25	2	90	8	8	65	0	292
Total Nearby Developments (2035 conditions)	6	7	5	61	18	25	5	169	8	8	151	0	463
2025 Base Volumes	**96**	**249**	**19**	**256**	**255**	**169**	**9**	**535**	**121**	**180**	**517**	**106**	**2512**
2035 Base Volumes	**108**	**280**	**21**	**257**	**286**	**190**	**12**	**614**	**136**	**202**	**591**	**119**	**2816**
New Trips - 2025 conditions		7		40	13	14			20	7			101
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		3		17	6				10				36
New Trips - 2035 conditions - Phase 1A		2		3	1				6	1			13
New Trips - 2035 conditions - Phase 2		2		25	8			1	4		6	2	48
New Trips - 2035 conditions - Phase 3	1	1		20	6			4	3		20	7	62
New Trips - 2035 conditions - Phase 4	26	7		19	15			35	8		29	23	162
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	23	6		12	10			30	7		29	23	140
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**7**	**0**	**40**	**13**	**14**	**0**	**0**	**20**	**7**	**0**	**0**	**101**
Total New Trips - 2035 Conditions - Phases 1-4	27	15	0	84	36	0	0	40	31	1	55	32	321
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	50	21	0	96	46	0	0	70	38	1	84	55	**461**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution						-19				-22			
Total Trip Distribution (2035 conditions - Phases 1-4)	**27**	**15**	**0**	**84**	**36**	**-19**	**0**	**40**	**31**	**-21**	**55**	**32**	**280**
Total Trip Distribution (2035 conditions - Phases 1-5)	**50**	**21**	**0**	**96**	**46**	**-19**	**0**	**70**	**38**	**-21**	**84**	**55**	**420**
2025 Projected Volumes	**96**	**256**	**19**	**296**	**268**	**183**	**9**	**535**	**141**	**187**	**517**	**106**	**2613**
2035 Projected Volumes - Phases 1-4	**135**	**295**	**21**	**341**	**322**	**171**	**12**	**654**	**167**	**181**	**646**	**151**	**3096**
2035 Projected Volumes - Phases 1-5	**158**	**301**	**21**	**353**	**332**	**171**	**12**	**684**	**174**	**181**	**675**	**174**	**3236**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**72**	**100**	**15**	**117**	**109**	**98**	**17**	**419**	**70**	**185**	**424**	**94**	**1720**
Existing growth	2	2	0	3	3	2	0	10	2	4	10	2	40
2011 Existing Volumes	**74**	**102**	**15**	**120**	**112**	**100**	**17**	**429**	**72**	**189**	**434**	**96**	**1760**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	2	8	1	0	1	5	1	0	1	20	9	16	64
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	13	23	0	0	17	19	0	0	11	47	0	30	160
Tractor Supply Outparcels Trip Distribution	1					11		26		11	24	1	74
Alden Place Trip Distribution								7			6		13
Sheetz Outparcels Trip Distribution	10	9		63	18			30	10		-28		112
VA Medical Center		1		1	1	2			2	2			9
The Preserve at Historic Cornwall Village (Phase 1)			2				2	51			65		120
The Preserve at Historic Cornwall Village (Build-out)			6				5	139			169		319
Total Nearby Developments (2025 conditions)	11	10	2	64	19	13	2	114	12	13	67	1	328
Total Nearby Developments (2035 conditions)	11	10	6	64	19	13	5	202	12	13	171	1	527
2025 Base Volumes	**87**	**120**	**18**	**184**	**132**	**118**	**20**	**543**	**85**	**222**	**510**	**113**	**2152**
2035 Base Volumes	**98**	**135**	**21**	**184**	**148**	**132**	**22**	**631**	**95**	**249**	**605**	**127**	**2447**
New Trips - 2025 conditions		6		13	4	4			17	6			50
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		3		7	2				9				21
New Trips - 2035 conditions - Phase 1A		2		4	1	1			4	1			13
New Trips - 2035 conditions - Phase 2		1		1				1	2				5
New Trips - 2035 conditions - Phase 3	1							2	1		1		5
New Trips - 2035 conditions - Phase 4	46	12		26	21			58	15		40	31	249
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	40	10		17	13			50	13		40	31	214
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**6**	**0**	**13**	**4**	**4**	**0**	**0**	**17**	**6**	**0**	**0**	**50**
Total New Trips - 2035 Conditions - Phases 1-4	47	18	0	38	24	1	0	61	31	1	41	31	293
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	87	28	0	55	37	1	0	111	44	1	81	62	507
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution						-18				-20			
Total Trip Distribution (2035 conditions - Phases 1-4)	**47**	**18**	**0**	**38**	**24**	**-17**	**0**	**61**	**31**	**-19**	**41**	**31**	**255**
Total Trip Distribution (2035 conditions - Phases 1-5)	**87**	**28**	**0**	**55**	**37**	**-17**	**0**	**111**	**44**	**-19**	**81**	**62**	**469**
2025 Projected Volumes	**87**	**126**	**18**	**197**	**136**	**122**	**20**	**543**	**102**	**228**	**510**	**113**	**2202**
2035 Projected Volumes - Phases 1-4	**145**	**153**	**21**	**222**	**172**	**115**	**22**	**692**	**126**	**230**	**646**	**158**	**2702**
2035 Projected Volumes - Phases 1-5	**185**	**163**	**21**	**239**	**185**	**115**	**22**	**742**	**139**	**230**	**686**	**189**	**2916**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection:	**Quentin Road (SR 0072) & Lowe's/Cedar Crest Square/Tractor Supply**										
Synchro Node:	**2**	**Adjacent intersections:**	**West**	**0**	**East**	**17**	**North**	**3**	**South**	**1**	

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2011 Existing Counts	**6**	**1**	**27**	**8**	**2**	**3**	**33**	**492**	**33**	**3**	**345**	**5**	**958**
Existing growth	0	0	0	0	0	0	0	0	0	0	0	0	0
2011 Existing Volumes	**6**	**1**	**27**	**8**	**2**	**3**	**33**	**492**	**33**	**3**	**345**	**5**	**958**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	23	0	0	0	0	23
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	11	0	0	0	0	11
Tractor Supply Outparcels Trip Distribution				19		29			13	34			95
Alden Place Trip Distribution								9			5		14
Sheetz Outparcels Trip Distribution								9			14		23
VA Medical Center								3			19		22
The Preserve at Historic Cornwall Village (Phase 1)								42			38		80
The Preserve at Historic Cornwall Village (Build-out)								125			108		233
Total Nearby Developments (2025 conditions)	0	0	0	19	0	29	0	63	13	34	76	0	234
Total Nearby Developments (2035 conditions)	0	0	0	19	0	29	0	146	13	34	146	0	387
2025 Base Volumes	**6**	**1**	**27**	**27**	**2**	**32**	**33**	**578**	**46**	**37**	**421**	**5**	**1215**
2035 Base Volumes	**6**	**1**	**27**	**27**	**2**	**32**	**33**	**649**	**46**	**37**	**491**	**5**	**1356**
New Trips - 2025 conditions								6			15		21
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1						4				12			16
New Trips - 2035 conditions - Phase 1A						2		1					3
New Trips - 2035 conditions - Phase 2				2		2			11	17			32
New Trips - 2035 conditions - Phase 3				4		3			35	29			71
New Trips - 2035 conditions - Phase 4				12		13			24	22			71
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5				13		12			21	18			64
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**15**	**0**	**21**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	18	0	24	0	1	70	80	0	0	193
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	31	0	36	0	1	91	98	0	0	257
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution				-5		-6			-9	-7			
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**13**	**0**	**18**	**0**	**1**	**61**	**73**	**0**	**0**	**166**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**26**	**0**	**30**	**0**	**1**	**82**	**91**	**0**	**0**	**230**
2025 Projected Volumes	**6**	**1**	**27**	**27**	**2**	**32**	**33**	**584**	**46**	**37**	**436**	**5**	**1236**
2035 Projected Volumes - Phases 1-4	**6**	**1**	**27**	**40**	**2**	**50**	**33**	**650**	**107**	**110**	**491**	**5**	**1522**
2035 Projected Volumes - Phases 1-5	**6**	**1**	**27**	**53**	**2**	**62**	**33**	**650**	**128**	**128**	**491**	**5**	**1586**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2011 Existing Counts	**10**	**3**	**53**	**71**	**3**	**23**	**60**	**617**	**69**	**16**	**548**	**8**	**1481**
Existing growth	0	0	0	0	0	0	0	0	0	0	0	0	0
2011 Existing Volumes	**10**	**3**	**53**	**71**	**3**	**23**	**60**	**617**	**69**	**16**	**548**	**8**	**1481**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	35	0	0	23	0	58
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	45	0	0	16	0	61
Tractor Supply Outparcels Trip Distribution				41		53		-24	28	60	-23		135
Alden Place Trip Distribution								8			12		20
Sheetz Outparcels Trip Distribution								20			19		39
VA Medical Center								18			3		21
The Preserve at Historic Cornwall Village (Phase 1)								51			62		113
The Preserve at Historic Cornwall Village (Build-out)								130			148		278
Total Nearby Developments (2025 conditions)	0	0	0	41	0	53	0	73	28	60	73	0	328
Total Nearby Developments (2035 conditions)	0	0	0	41	0	53	0	152	28	60	159	0	493
2025 Base Volumes	**10**	**3**	**53**	**112**	**3**	**76**	**60**	**725**	**97**	**76**	**644**	**8**	**1867**
2035 Base Volumes	**10**	**3**	**53**	**112**	**3**	**76**	**60**	**814**	**97**	**76**	**723**	**8**	**2035**
New Trips - 2025 conditions								14			7		21
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1						10				5			15
New Trips - 2035 conditions - Phase 1A						1				3	1		5
New Trips - 2035 conditions - Phase 2				8		14			1	2			25
New Trips - 2035 conditions - Phase 3				27		22			5	4			58
New Trips - 2035 conditions - Phase 4				52		61			61	54			228
Pass-by Trips - 2035 conditions - Phase 4				(53)		(60)		(-60)	(60)	(53)	(-53)		113
New Trips - 2035 conditions - Phase 5				52		53			53	46			204
Pass-by Trips - 2035 conditions - Phase 5				(46)		(52)		(-52)	(52)	(46)	(-46)		98
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**0**	**7**	**0**	**21**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	87	0	108	0	0	67	68	1	0	331
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	53	0	60	0	-60	60	53	-53	0	113
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	139	0	161	0	0	120	114	1	0	**535**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	99	0	112	0	-112	112	99	-99	0	**211**
Tractor Supply/Cedar Crest Square Redistribution				-22		-15			-19	-15			
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**118**	**0**	**153**	**0**	**-60**	**108**	**106**	**-52**	**0**	**373**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**216**	**0**	**258**	**0**	**-112**	**213**	**198**	**-98**	**0**	**675**
2025 Projected Volumes	**10**	**3**	**53**	**112**	**3**	**76**	**60**	**739**	**97**	**76**	**651**	**8**	**1888**
2035 Projected Volumes - Phases 1-4	**10**	**3**	**53**	**230**	**3**	**229**	**60**	**754**	**205**	**182**	**671**	**8**	**2408**
2035 Projected Volumes - Phases 1-5	**10**	**3**	**53**	**328**	**3**	**334**	**60**	**702**	**310**	**274**	**625**	**8**	**2710**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2011 Existing Counts	**13**	**9**	**66**	**65**	**10**	**40**	**104**	**541**	**70**	**33**	**609**	**13**	**1573**
Existing growth	0	0	0	0	0	0	0	0	0	0	0	0	0
2011 Existing Volumes	**13**	**9**	**66**	**65**	**10**	**40**	**104**	**541**	**70**	**33**	**609**	**13**	**1573**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution				36		54		0	23	58	0		171
Alden Place Trip Distribution								7			6		13
Sheetz Outparcels Trip Distribution								36			38		74
VA Medical Center								2			2		4
The Preserve at Historic Cornwall Village (Phase 1)								51			65		116
The Preserve at Historic Cornwall Village (Build-out)								139			169		308
Total Nearby Developments (2025 conditions)	0	0	0	36	0	54	0	96	23	58	111	0	378
Total Nearby Developments (2035 conditions)	0	0	0	36	0	54	0	184	23	58	215	0	570
2025 Base Volumes	**13**	**9**	**66**	**101**	**10**	**94**	**104**	**637**	**93**	**91**	**720**	**13**	**1951**
2035 Base Volumes	**13**	**9**	**66**	**101**	**10**	**94**	**104**	**725**	**93**	**91**	**824**	**13**	**2143**
New Trips - 2025 conditions								4			6		10
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1						4				5			9
New Trips - 2035 conditions - Phase 1A						2		1		2	1		6
New Trips - 2035 conditions - Phase 2									1	1			2
New Trips - 2035 conditions - Phase 3				1		1			3	2			7
New Trips - 2035 conditions - Phase 4				71		82			104	93			350
Pass-by Trips - 2035 conditions - Phase 4				(62)		(70)		(-70)	(70)	(62)	(-62)		132
New Trips - 2035 conditions - Phase 5				71		71			90	80			312
Pass-by Trips - 2035 conditions - Phase 5				(54)		(61)		(-61)	(61)	(54)	(-54)		115
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**6**	**0**	**10**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	72	0	89	0	1	108	103	1	0	374
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	62	0	70	0	-70	70	62	-62	0	132
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	143	0	160	0	1	198	183	1	0	686
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	116	0	131	0	-131	131	116	-116	0	247
Tractor Supply/Cedar Crest Square Redistribution				-20		-19			-18	-18			
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**114**	**0**	**140**	**0**	**-69**	**160**	**147**	**-61**	**0**	**431**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**239**	**0**	**272**	**0**	**-130**	**311**	**281**	**-115**	**0**	**858**
2025 Projected Volumes	**13**	**9**	**66**	**101**	**10**	**94**	**104**	**641**	**93**	**91**	**726**	**13**	**1961**
2035 Projected Volumes - Phases 1-4	**13**	**9**	**66**	**215**	**10**	**234**	**104**	**656**	**253**	**238**	**763**	**13**	**2574**
2035 Projected Volumes - Phases 1-5	**13**	**9**	**66**	**340**	**10**	**366**	**104**	**595**	**404**	**372**	**709**	**13**	**3001**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Quentin Road (SR 0072) & Lowe's/K-Mart/Cedar Crest Square**

Synchro Node: **3** **Adjacent intersections:** **West** **0** **East** **0** **North** **4** **South** **2**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**78**	**7**	**19**	**19**	**6**	**74**	**35**	**402**	**32**	**63**	**322**	**39**	**1096**
Existing growth	0	0	0	0	0	0	0	9	0	0	8	0	17
2011 Existing Volumes	**78**	**7**	**19**	**19**	**6**	**74**	**35**	**411**	**32**	**63**	**330**	**39**	**1113**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution								29			34		63
Alden Place Trip Distribution								9			5		14
Sheetz Outparcels Trip Distribution								9			14		23
VA Medical Center								3			19		22
The Preserve at Historic Cornwall Village (Phase 1)								42			38		80
The Preserve at Historic Cornwall Village (Build-out)								125			108		233
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	92	0	0	110	0	202
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	175	0	0	180	0	355
2025 Base Volumes	**78**	**7**	**19**	**19**	**6**	**74**	**35**	**503**	**32**	**63**	**440**	**39**	**1315**
2035 Base Volumes	**78**	**7**	**19**	**19**	**6**	**74**	**35**	**586**	**32**	**63**	**510**	**39**	**1468**
New Trips - 2025 conditions								6			15		21
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								4			12		16
New Trips - 2035 conditions - Phase 1A								3					3
New Trips - 2035 conditions - Phase 2								2			17		19
New Trips - 2035 conditions - Phase 3								3			29		32
New Trips - 2035 conditions - Phase 4								13			22		35
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								12			18		30
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**15**	**0**	**21**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	25	0	0	80	0	105
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	0	0	37	0	0	98	0	135
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								-6			-7		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**0**	**73**	**0**	**92**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**31**	**0**	**0**	**91**	**0**	**122**
2025 Projected Volumes	**78**	**7**	**19**	**19**	**6**	**74**	**35**	**509**	**32**	**63**	**455**	**39**	**1336**
2035 Projected Volumes - Phases 1-4	**78**	**7**	**19**	**19**	**6**	**74**	**35**	**605**	**32**	**63**	**583**	**39**	**1560**
2035 Projected Volumes - Phases 1-5	**78**	**7**	**19**	**19**	**6**	**74**	**35**	**617**	**32**	**63**	**601**	**39**	**1590**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**182**	**19**	**55**	**77**	**20**	**245**	**49**	**466**	**62**	**142**	**440**	**65**	**1822**
Existing growth	0	0	0	0	0	0	0	11	0	0	10	0	21
2011 Existing Volumes	**182**	**19**	**55**	**77**	**20**	**245**	**49**	**477**	**62**	**142**	**450**	**65**	**1843**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution								29			37		66
Alden Place Trip Distribution								8			12		20
Sheetz Outparcels Trip Distribution								20			19		39
VA Medical Center								18			3		21
The Preserve at Historic Cornwall Village (Phase 1)								51			62		113
The Preserve at Historic Cornwall Village (Build-out)								130			148		278
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	126	0	0	133	0	259
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	205	0	0	219	0	424
2025 Base Volumes	**182**	**19**	**55**	**77**	**20**	**245**	**49**	**603**	**62**	**142**	**583**	**65**	**2102**
2035 Base Volumes	**182**	**19**	**55**	**77**	**20**	**245**	**49**	**682**	**62**	**142**	**669**	**65**	**2267**
New Trips - 2025 conditions								14			7		21
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								10			5		15
New Trips - 2035 conditions - Phase 1A								1			4		5
New Trips - 2035 conditions - Phase 2								14			2		16
New Trips - 2035 conditions - Phase 3								22			4		26
New Trips - 2035 conditions - Phase 4								61			54		115
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								53			46		99
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**0**	**7**	**0**	**21**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	108	0	0	69	0	177
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	0	0	161	0	0	115	0	**276**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution								-15			-15		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**93**	**0**	**0**	**54**	**0**	**147**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**146**	**0**	**0**	**100**	**0**	**246**
2025 Projected Volumes	**182**	**19**	**55**	**77**	**20**	**245**	**49**	**617**	**62**	**142**	**590**	**65**	**2123**
2035 Projected Volumes - Phases 1-4	**182**	**19**	**55**	**77**	**20**	**245**	**49**	**775**	**62**	**142**	**723**	**65**	**2414**
2035 Projected Volumes - Phases 1-5	**182**	**19**	**55**	**77**	**20**	**245**	**49**	**828**	**62**	**142**	**769**	**65**	**2513**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**277**	**37**	**89**	**81**	**40**	**178**	**56**	**468**	**72**	**192**	**417**	**154**	**2061**
Existing growth	0	0	0	0	0	0	0	11	0	0	10	0	21
2011 Existing Volumes	**277**	**37**	**89**	**81**	**40**	**178**	**56**	**479**	**72**	**192**	**427**	**154**	**2082**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution								54			58		112
Alden Place Trip Distribution								7			6		13
Sheetz Outparcels Trip Distribution								36			38		74
VA Medical Center								2			2		4
The Preserve at Historic Cornwall Village (Phase 1)								51			65		116
The Preserve at Historic Cornwall Village (Build-out)								139			169		308
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	150	0	0	169	0	319
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	238	0	0	273	0	511
2025 Base Volumes	**277**	**37**	**89**	**81**	**40**	**178**	**56**	**629**	**72**	**192**	**596**	**154**	**2401**
2035 Base Volumes	**277**	**37**	**89**	**81**	**40**	**178**	**56**	**717**	**72**	**192**	**700**	**154**	**2593**
New Trips - 2025 conditions								4			6		10
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								4			5		9
New Trips - 2035 conditions - Phase 1A								3			3		6
New Trips - 2035 conditions - Phase 2											1		1
New Trips - 2035 conditions - Phase 3								1			2		3
New Trips - 2035 conditions - Phase 4								82			93		175
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								71			80		151
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**6**	**0**	**10**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	90	0	0	104	0	194
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	0	0	161	0	0	184	0	345
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								-19			-18		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**71**	**0**	**0**	**86**	**0**	**157**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**142**	**0**	**0**	**166**	**0**	**308**
2025 Projected Volumes	**277**	**37**	**89**	**81**	**40**	**178**	**56**	**633**	**72**	**192**	**602**	**154**	**2411**
2035 Projected Volumes - Phases 1-4	**277**	**37**	**89**	**81**	**40**	**178**	**56**	**788**	**72**	**192**	**786**	**154**	**2750**
2035 Projected Volumes - Phases 1-5	**277**	**37**	**89**	**81**	**40**	**178**	**56**	**859**	**72**	**192**	**866**	**154**	**2901**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection:	**Quentin Road (SR 0072) & Isabel Drive**									
Synchro Node:	**4**	**Adjacent intersections:**	**West**	**0**	**East**	**8**	**North**	**5**	**South**	**3**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2008 Existing Counts	**0**	**0**	**0**	**20**	**0**	**27**	**0**	**423**	**45**	**47**	**449**	**0**	**1011**
Existing growth	0	0	0	1	0	1	0	15	2	2	16	0	37
2011 Existing Volumes	**0**	**0**	**0**	**21**	**0**	**28**	**0**	**438**	**47**	**49**	**465**	**0**	**1048**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	4	0	3	0	0	8	6	0	0	21
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	7	0	5	0	0	15	10	0	0	37
Tractor Supply Outparcels Trip Distribution								29			34		63
Alden Place Trip Distribution								9			5		14
Sheetz Outparcels Trip Distribution								9			14		23
VA Medical Center								3		2	19		24
The Preserve at Historic Cornwall Village (Phase 1)						2		42		1	38		83
The Preserve at Historic Cornwall Village (Build-out)						4		125		4	108		241
Total Nearby Developments (2025 conditions)	0	0	0	0	0	2	0	92	0	3	110	0	207
Total Nearby Developments (2035 conditions)	0	0	0	0	0	4	0	175	0	6	180	0	365
2025 Base Volumes	**0**	**0**	**0**	**25**	**0**	**33**	**0**	**530**	**55**	**58**	**575**	**0**	**1276**
2035 Base Volumes	**0**	**0**	**0**	**28**	**0**	**37**	**0**	**613**	**62**	**65**	**645**	**0**	**1450**
New Trips - 2025 conditions						15		6		36	15		72
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1						4		4		13	12		33
New Trips - 2035 conditions - Phase 1A						3		3		1			7
New Trips - 2035 conditions - Phase 2						3		2		26	17		48
New Trips - 2035 conditions - Phase 3						3		3		28	29		63
New Trips - 2035 conditions - Phase 4						3		13		5	22		43
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5						3		12		5	18		38
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**15**	**0**	**6**	**0**	**36**	**15**	**0**	**72**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	16	0	25	0	73	80	0	194
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	19	0	37	0	78	98	0	232
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								-6			-7		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**19**	**0**	**73**	**73**	**0**	**181**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**31**	**0**	**78**	**91**	**0**	**219**
2025 Projected Volumes	**0**	**0**	**0**	**25**	**0**	**48**	**0**	**536**	**55**	**94**	**590**	**0**	**1348**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**28**	**0**	**53**	**0**	**632**	**62**	**138**	**718**	**0**	**1631**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**0**	**28**	**0**	**56**	**0**	**644**	**62**	**143**	**736**	**0**	**1669**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2008 Existing Counts	**0**	**0**	**0**	**32**	**0**	**86**	**0**	**761**	**56**	**63**	**684**	**0**	**1682**
Existing growth	0	0	0	1	0	3	0	27	2	2	24	0	59
2011 Existing Volumes	**0**	**0**	**0**	**33**	**0**	**89**	**0**	**788**	**58**	**65**	**708**	**0**	**1741**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	6	0	12	0	12	10	8	0	0	48
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	11	0	21	0	46	18	16	7	0	119
Tractor Supply Outparcels Trip Distribution								29			37		66
Alden Place Trip Distribution								8			12		20
Sheetz Outparcels Trip Distribution								20			19		39
VA Medical Center						2		18			3		23
The Preserve at Historic Cornwall Village (Phase 1)						2		51		3	62		118
The Preserve at Historic Cornwall Village (Build-out)						5		130		5	148		288
Total Nearby Developments (2025 conditions)	0	0	0	0	0	4	0	126	0	3	133	0	266
Total Nearby Developments (2035 conditions)	0	0	0	0	0	7	0	205	0	5	219	0	436
2025 Base Volumes	**0**	**0**	**0**	**39**	**0**	**105**	**0**	**926**	**68**	**76**	**841**	**0**	**2055**
2035 Base Volumes	**0**	**0**	**0**	**44**	**0**	**117**	**0**	**1039**	**76**	**86**	**934**	**0**	**2296**
New Trips - 2025 conditions						33		14		16	7		70
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1						10		10		6	5		31
New Trips - 2035 conditions - Phase 1A						2		1		2	4		9
New Trips - 2035 conditions - Phase 2						20		14		4	2		40
New Trips - 2035 conditions - Phase 3						22		22		3	4		51
New Trips - 2035 conditions - Phase 4						15		61		13	54		143
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5						13		53		12	46		124
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**33**	**0**	**14**	**0**	**16**	**7**	**0**	**70**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	69	0	108	0	28	69	0	274
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	82	0	161	0	40	115	0	**398**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution								-15			-15		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**69**	**0**	**93**	**0**	**28**	**54**	**0**	**244**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**0**	**0**	**82**	**0**	**146**	**0**	**40**	**100**	**0**	**368**
2025 Projected Volumes	**0**	**0**	**0**	**39**	**0**	**138**	**0**	**940**	**68**	**92**	**848**	**0**	**2125**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**44**	**0**	**186**	**0**	**1132**	**76**	**114**	**988**	**0**	**2540**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**0**	**44**	**0**	**199**	**0**	**1185**	**76**	**126**	**1034**	**0**	**2664**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2008 Existing Counts	**0**	**0**	**0**	**25**	**0**	**50**	**0**	**815**	**60**	**41**	**892**	**0**	**1883**
Existing growth	0	0	0	1	0	2	0	29	2	1	31	0	66
2011 Existing Volumes	**0**	**0**	**0**	**26**	**0**	**52**	**0**	**844**	**62**	**42**	**923**	**0**	**1949**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	5	0	7	0	0	11	5	0	0	28
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	8	0	12	0	31	20	7	21	0	99
Tractor Supply Outparcels Trip Distribution								54			58		112
Alden Place Trip Distribution								7			6		13
Sheetz Outparcels Trip Distribution								36			38		74
VA Medical Center								2			2		4
The Preserve at Historic Cornwall Village (Phase 1)						2		51		2	65		120
The Preserve at Historic Cornwall Village (Build-out)						5		139		6	169		319
Total Nearby Developments (2025 conditions)	0	0	0	0	0	2	0	150	0	2	169	0	323
Total Nearby Developments (2035 conditions)	0	0	0	0	0	5	0	238	0	6	273	0	522
2025 Base Volumes	**0**	**0**	**0**	**31**	**0**	**61**	**0**	**994**	**73**	**49**	**1092**	**0**	**2300**
2035 Base Volumes	**0**	**0**	**0**	**34**	**0**	**69**	**0**	**1113**	**82**	**55**	**1217**	**0**	**2570**
New Trips - 2025 conditions						11		4		14	6		35
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1						4		4		6	5		19
New Trips - 2035 conditions - Phase 1A						2		3		2	3		10
New Trips - 2035 conditions - Phase 2						1				1	1		3
New Trips - 2035 conditions - Phase 3								1		2	2		5
New Trips - 2035 conditions - Phase 4						21		82		23	93		219
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5						18		71		20	80		189
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**11**	**0**	**4**	**0**	**14**	**6**	**0**	**35**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	28	0	90	0	34	104	0	256
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	46	0	161	0	54	184	0	445
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								-19			-18		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**28**	**0**	**71**	**0**	**34**	**86**	**0**	**219**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**0**	**0**	**46**	**0**	**142**	**0**	**54**	**166**	**0**	**408**
2025 Projected Volumes	**0**	**0**	**0**	**31**	**0**	**72**	**0**	**998**	**73**	**63**	**1098**	**0**	**2335**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**34**	**0**	**97**	**0**	**1184**	**82**	**89**	**1303**	**0**	**2789**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**0**	**34**	**0**	**115**	**0**	**1255**	**82**	**109**	**1383**	**0**	**2978**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Quentin Road (SR 0072) & York Street/Lebanon Plaza Mall Driveway**

Synchro Node: **5** **Adjacent intersections:** **West** **0** **East** **9** **North** **0** **South** **4**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**4**	**5**	**5**	**51**	**10**	**17**	**6**	**392**	**19**	**27**	**471**	**4**	**1011**
Existing growth	0	0	0	1	0	0	0	5	0	0	5	0	11
2011 Existing Volumes	**4**	**5**	**5**	**52**	**10**	**17**	**6**	**397**	**19**	**27**	**476**	**4**	**1022**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	3	0	0	0	5	0	0	8
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	7	0	5	0	0	0	9	0	0	21
Tractor Supply Outparcels Trip Distribution				10				21	8		24		63
Alden Place Trip Distribution								9			5		14
Sheetz Outparcels Trip Distribution								9			14		23
VA Medical Center								3			21		24
The Preserve at Historic Cornwall Village (Phase 1)								44			39		83
The Preserve at Historic Cornwall Village (Build-out)								129			112		241
Total Nearby Developments (2025 conditions)	0	0	0	10	0	0	0	86	8	0	103	0	207
Total Nearby Developments (2035 conditions)	0	0	0	10	0	0	0	171	8	0	176	0	365
2025 Base Volumes	**4**	**5**	**5**	**62**	**10**	**20**	**6**	**483**	**27**	**32**	**579**	**4**	**1237**
2035 Base Volumes	**4**	**5**	**5**	**69**	**10**	**22**	**6**	**568**	**27**	**36**	**652**	**4**	**1408**
New Trips - 2025 conditions								21			51		72
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								8			25		33
New Trips - 2035 conditions - Phase 1A								6			1		7
New Trips - 2035 conditions - Phase 2								5			43		48
New Trips - 2035 conditions - Phase 3								6			57		63
New Trips - 2035 conditions - Phase 4								16			27		43
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								15			23		38
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**21**	**0**	**0**	**51**	**0**	**72**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	41	0	0	153	0	194
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	0	0	56	0	0	176	0	232
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution				-1				-5	-1		-6		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**-1**	**0**	**0**	**0**	**36**	**-1**	**0**	**147**	**0**	**181**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**-1**	**0**	**0**	**0**	**51**	**-1**	**0**	**170**	**0**	**219**
2025 Projected Volumes	**4**	**5**	**5**	**62**	**10**	**20**	**6**	**504**	**27**	**32**	**630**	**4**	**1309**
2035 Projected Volumes - Phases 1-4	**4**	**5**	**5**	**68**	**10**	**22**	**6**	**604**	**26**	**36**	**799**	**4**	**1589**
2035 Projected Volumes - Phases 1-5	**4**	**5**	**5**	**68**	**10**	**22**	**6**	**619**	**26**	**36**	**822**	**4**	**1627**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**52**	**55**	**58**	**101**	**94**	**38**	**61**	**626**	**33**	**31**	**587**	**44**	**1780**
Existing growth	0	0	0	1	0	0	0	7	0	0	7	0	15
2011 Existing Volumes	**52**	**55**	**58**	**102**	**94**	**38**	**61**	**633**	**33**	**31**	**594**	**44**	**1795**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	8	0	7	0	0	0	5	0	0	20
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	23	0	12	0	0	3	10	0	0	48
Tractor Supply Outparcels Trip Distribution				10				21	8		27		66
Alden Place Trip Distribution								8			12		20
Sheetz Outparcels Trip Distribution								20			19		39
VA Medical Center								20			3		23
The Preserve at Historic Cornwall Village (Phase 1)								53			65		118
The Preserve at Historic Cornwall Village (Build-out)								135			153		288
Total Nearby Developments (2025 conditions)	0	0	0	10	0	0	0	122	8	0	126	0	266
Total Nearby Developments (2035 conditions)	0	0	0	10	0	0	0	204	8	0	214	0	436
2025 Base Volumes	**52**	**55**	**58**	**120**	**94**	**45**	**61**	**755**	**41**	**36**	**720**	**44**	**2081**
2035 Base Volumes	**52**	**55**	**58**	**135**	**94**	**50**	**61**	**837**	**44**	**41**	**808**	**44**	**2279**
New Trips - 2025 conditions								47			23		70
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								20			11		31
New Trips - 2035 conditions - Phase 1A								3			6		9
New Trips - 2035 conditions - Phase 2								34			6		40
New Trips - 2035 conditions - Phase 3								44			7		51
New Trips - 2035 conditions - Phase 4								76			67		143
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								66			58		124
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**47**	**0**	**0**	**23**	**0**	**70**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	177	0	0	97	0	274
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	0	0	243	0	0	155	0	**398**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution				-2				-13	-2		-13		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**-2**	**0**	**0**	**0**	**164**	**-2**	**0**	**84**	**0**	**244**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**-2**	**0**	**0**	**0**	**230**	**-2**	**0**	**142**	**0**	**368**
2025 Projected Volumes	**52**	**55**	**58**	**120**	**94**	**45**	**61**	**802**	**41**	**36**	**743**	**44**	**2151**
2035 Projected Volumes - Phases 1-4	**52**	**55**	**58**	**133**	**94**	**50**	**61**	**1001**	**42**	**41**	**892**	**44**	**2523**
2035 Projected Volumes - Phases 1-5	**52**	**55**	**58**	**133**	**94**	**50**	**61**	**1067**	**42**	**41**	**950**	**44**	**2647**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**50**	**64**	**109**	**114**	**111**	**28**	**96**	**563**	**45**	**34**	**685**	**61**	**1960**
Existing growth	0	0	0	1	0	0	0	7	1	0	8	0	17
2011 Existing Volumes	**50**	**64**	**109**	**115**	**111**	**28**	**96**	**570**	**46**	**34**	**693**	**61**	**1977**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	4	0	5	0	0	0	6	0	0	15
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	21	0	9	0	0	1	11	0	0	42
Tractor Supply Outparcels Trip Distribution				16				40	14		42		112
Alden Place Trip Distribution								7			6		13
Sheetz Outparcels Trip Distribution								36			38		74
VA Medical Center								2			2		4
The Preserve at Historic Cornwall Village (Phase 1)								53			67		120
The Preserve at Historic Cornwall Village (Build-out)								144			175		319
Total Nearby Developments (2025 conditions)	0	0	0	16	0	0	0	138	14	0	155	0	323
Total Nearby Developments (2035 conditions)	0	0	0	16	0	0	0	229	14	0	263	0	522
2025 Base Volumes	**50**	**64**	**109**	**135**	**111**	**33**	**96**	**708**	**60**	**40**	**848**	**61**	**2315**
2035 Base Volumes	**50**	**64**	**109**	**152**	**111**	**37**	**96**	**799**	**61**	**45**	**956**	**61**	**2541**
New Trips - 2025 conditions								15			20		35
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								8			11		19
New Trips - 2035 conditions - Phase 1A								5			5		10
New Trips - 2035 conditions - Phase 2								1			2		3
New Trips - 2035 conditions - Phase 3								1			4		5
New Trips - 2035 conditions - Phase 4								103			116		219
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								89			100		189
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15**	**0**	**0**	**20**	**0**	**35**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	118	0	0	138	0	256
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	0	0	207	0	0	238	0	445
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution				-2				-18	-1		-16		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**-2**	**0**	**0**	**0**	**100**	**-1**	**0**	**122**	**0**	**219**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**-2**	**0**	**0**	**0**	**189**	**-1**	**0**	**222**	**0**	**408**
2025 Projected Volumes	**50**	**64**	**109**	**135**	**111**	**33**	**96**	**723**	**60**	**40**	**868**	**61**	**2350**
2035 Projected Volumes - Phases 1-4	**50**	**64**	**109**	**150**	**111**	**37**	**96**	**899**	**60**	**45**	**1078**	**61**	**2760**
2035 Projected Volumes - Phases 1-5	**50**	**64**	**109**	**150**	**111**	**37**	**96**	**988**	**60**	**45**	**1178**	**61**	**2949**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection:	**Quentin Road (SR 0072) & Colebrook Road (SR 0241)**									
Synchro Node:	**6**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**5**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**135**	**0**	**173**	**0**	**0**	**0**	**126**	**368**	**0**	**0**	**367**	**65**	**1234**
Existing growth	2	0	2	0	0	0	1	4	0	0	4	1	14
2011 Existing Volumes	**137**	**0**	**175**	**0**	**0**	**0**	**127**	**372**	**0**	**0**	**371**	**66**	**1248**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	24	0	26	0	0	0	17	0	0	0	0	12	79
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	44	0	51	0	0	0	36	0	0	0	0	21	152
Tractor Supply Outparcels Trip Distribution			5				5	16			19		45
Alden Place Trip Distribution								9			5		14
Sheetz Outparcels Trip Distribution								9			14		23
VA Medical Center								3			21		24
The Preserve at Historic Cornwall Village (Phase 1)								44			39		83
The Preserve at Historic Cornwall Village (Build-out)								129			112		241
Total Nearby Developments (2025 conditions)	0	0	5	0	0	0	5	81	0	0	98	0	189
Total Nearby Developments (2035 conditions)	0	0	5	0	0	0	5	166	0	0	171	0	347
2025 Base Volumes	**161**	**0**	**206**	**0**	**0**	**0**	**149**	**453**	**0**	**0**	**469**	**78**	**1516**
2035 Base Volumes	**181**	**0**	**231**	**0**	**0**	**0**	**168**	**538**	**0**	**0**	**542**	**87**	**1747**
New Trips - 2025 conditions			7				3	18			44		72
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1			4				1	7			21		33
New Trips - 2035 conditions - Phase 1A							1	5			1		7
New Trips - 2035 conditions - Phase 2			6				1	4			37		48
New Trips - 2035 conditions - Phase 3			9				1	5			48		63
New Trips - 2035 conditions - Phase 4			4				2	14			23		43
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5			3				2	13			20		38
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**7**	**0**	**0**	**0**	**3**	**18**	**0**	**0**	**44**	**0**	**72**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	23	0	0	0	6	35	0	0	130	0	194
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	26	0	0	0	8	48	0	0	150	0	232
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								-5			-6		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**23**	**0**	**0**	**0**	**6**	**30**	**0**	**0**	**124**	**0**	**183**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**26**	**0**	**0**	**0**	**8**	**43**	**0**	**0**	**144**	**0**	**221**
2025 Projected Volumes	**161**	**0**	**213**	**0**	**0**	**0**	**152**	**471**	**0**	**0**	**513**	**78**	**1588**
2035 Projected Volumes - Phases 1-4	**181**	**0**	**254**	**0**	**0**	**0**	**174**	**568**	**0**	**0**	**666**	**87**	**1930**
2035 Projected Volumes - Phases 1-5	**181**	**0**	**257**	**0**	**0**	**0**	**176**	**581**	**0**	**0**	**686**	**87**	**1968**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**155**	**0**	**171**	**0**	**0**	**0**	**223**	**596**	**0**	**0**	**549**	**101**	**1795**
Existing growth	2	0	2	0	0	0	3	7	0	0	6	1	21
2011 Existing Volumes	**157**	**0**	**173**	**0**	**0**	**0**	**226**	**603**	**0**	**0**	**555**	**102**	**1816**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	28	0	24	0	0	0	35	0	0	0	0	18	105
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	50	0	49	0	0	0	67	0	0	0	0	33	199
Tractor Supply Outparcels Trip Distribution			6				5	16			21		48
Alden Place Trip Distribution								8			12		20
Sheetz Outparcels Trip Distribution								20			19		39
VA Medical Center								20			3		23
The Preserve at Historic Cornwall Village (Phase 1)								53			65		118
The Preserve at Historic Cornwall Village (Build-out)								135			153		288
Total Nearby Developments (2025 conditions)	0	0	6	0	0	0	5	117	0	0	120	0	248
Total Nearby Developments (2035 conditions)	0	0	6	0	0	0	5	199	0	0	208	0	418
2025 Base Volumes	**185**	**0**	**203**	**0**	**0**	**0**	**266**	**720**	**0**	**0**	**675**	**120**	**2169**
2035 Base Volumes	**207**	**0**	**228**	**0**	**0**	**0**	**298**	**802**	**0**	**0**	**763**	**135**	**2433**
New Trips - 2025 conditions			3				7	40			20		70
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1			2				3	17			9		31
New Trips - 2035 conditions - Phase 1A			1					3			5		9
New Trips - 2035 conditions - Phase 2			1				5	29			5		40
New Trips - 2035 conditions - Phase 3			1				7	37			6		51
New Trips - 2035 conditions - Phase 4			9				10	66			58		143
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5			8				9	57			50		124
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**3**	**0**	**0**	**0**	**7**	**40**	**0**	**0**	**20**	**0**	**70**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	14	0	0	0	25	152	0	0	83	0	274
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	22	0	0	0	34	209	0	0	133	0	**398**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution								-13			-13		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**14**	**0**	**0**	**0**	**25**	**139**	**0**	**0**	**70**	**0**	**248**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**22**	**0**	**0**	**0**	**34**	**196**	**0**	**0**	**120**	**0**	**372**
2025 Projected Volumes	**185**	**0**	**206**	**0**	**0**	**0**	**273**	**760**	**0**	**0**	**695**	**120**	**2239**
2035 Projected Volumes - Phases 1-4	**207**	**0**	**242**	**0**	**0**	**0**	**323**	**941**	**0**	**0**	**833**	**135**	**2681**
2035 Projected Volumes - Phases 1-5	**207**	**0**	**250**	**0**	**0**	**0**	**332**	**998**	**0**	**0**	**883**	**135**	**2805**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**85**	**0**	**266**	**0**	**0**	**0**	**204**	**555**	**0**	**0**	**638**	**49**	**1797**
Existing growth	1	0	3	0	0	0	2	6	0	0	7	1	20
2011 Existing Volumes	**86**	**0**	**269**	**0**	**0**	**0**	**206**	**561**	**0**	**0**	**645**	**50**	**1817**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	15	0	37	0	0	0	27	0	0	0	0	9	88
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	27	0	76	0	0	0	57	0	0	0	0	16	176
Tractor Supply Outparcels Trip Distribution			10				9	31			32		82
Alden Place Trip Distribution								7			6		13
Sheetz Outparcels Trip Distribution								36			38		74
VA Medical Center								2			2		4
The Preserve at Historic Cornwall Village (Phase 1)								53			67		120
The Preserve at Historic Cornwall Village (Build-out)								144			175		319
Total Nearby Developments (2025 conditions)	0	0	10	0	0	0	9	129	0	0	145	0	293
Total Nearby Developments (2035 conditions)	0	0	10	0	0	0	9	220	0	0	253	0	492
2025 Base Volumes	**101**	**0**	**316**	**0**	**0**	**0**	**242**	**690**	**0**	**0**	**790**	**59**	**2198**
2035 Base Volumes	**113**	**0**	**355**	**0**	**0**	**0**	**272**	**781**	**0**	**0**	**898**	**66**	**2485**
New Trips - 2025 conditions			3				2	13			17		35
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1			2				1	7			9		19
New Trips - 2035 conditions - Phase 1A			1				1	4			4		10
New Trips - 2035 conditions - Phase 2								1			2		3
New Trips - 2035 conditions - Phase 3			1					1			3		5
New Trips - 2035 conditions - Phase 4			16				14	89			100		219
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5			14				12	77			86		189
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**3**	**0**	**0**	**0**	**2**	**13**	**0**	**0**	**17**	**0**	**35**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	20	0	0	0	16	102	0	0	118	0	256
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	34	0	0	0	28	179	0	0	204	0	445
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								-18			-16		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**20**	**0**	**0**	**0**	**16**	**84**	**0**	**0**	**102**	**0**	**222**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**34**	**0**	**0**	**0**	**28**	**161**	**0**	**0**	**188**	**0**	**411**
2025 Projected Volumes	**101**	**0**	**319**	**0**	**0**	**0**	**244**	**703**	**0**	**0**	**807**	**59**	**2233**
2035 Projected Volumes - Phases 1-4	**113**	**0**	**375**	**0**	**0**	**0**	**288**	**865**	**0**	**0**	**1000**	**66**	**2707**
2035 Projected Volumes - Phases 1-5	**113**	**0**	**389**	**0**	**0**	**0**	**300**	**942**	**0**	**0**	**1086**	**66**	**2896**

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4/24/2012
Traffic Volumes Worksheet

Intersection: **Cornwall Road (SR 2001) & Rocherty Road (SR 2002)**

Synchro Node: **7** **Adjacent intersections:** **West** **1** **East** **19** **North** **20** **South** **0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**49**	**402**	**25**	**32**	**315**	**141**	**19**	**202**	**176**	**159**	**102**	**47**	**1669**
Existing growth	1	9	1	1	7	3	0	5	4	4	2	1	38
2011 Existing Volumes	**50**	**411**	**26**	**33**	**322**	**144**	**19**	**207**	**180**	**163**	**104**	**48**	**1707**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	3	20	3	4	44	23	0	22	20	17	6	0	162
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	10	79	6	6	91	44	3	29	42	40	0	7	357
Tractor Supply Outparcels Trip Distribution	2	1	2		1		3					2	11
Alden Place Trip Distribution								2			1		3
Sheetz Outparcels Trip Distribution	4	3			5							6	18
VA Medical Center		48		1	6	2			11	12			80
The Preserve at Historic Cornwall Village (Phase 1)				1				12	1		11		25
The Preserve at Historic Cornwall Village (Build-out)				4				35	4		32		75
Total Nearby Developments (2025 conditions)	6	52	2	2	12	2	3	14	12	12	12	8	137
Total Nearby Developments (2035 conditions)	6	52	2	5	12	2	3	37	15	12	33	8	187
2025 Base Volumes	**59**	**483**	**31**	**39**	**378**	**169**	**22**	**243**	**212**	**192**	**122**	**56**	**2006**
2035 Base Volumes	**66**	**542**	**34**	**44**	**425**	**190**	**25**	**273**	**237**	**215**	**137**	**63**	**2251**
New Trips - 2025 conditions	37	37		6	31	5		8	7	8			139
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1	15	15		2	11	1		4	3	2			53
New Trips - 2035 conditions - Phase 1A		2		2	9	1							14
New Trips - 2035 conditions - Phase 2	9	34		1	3			3	10			1	61
New Trips - 2035 conditions - Phase 3	17	17		1	2			9	8		1	1	56
New Trips - 2035 conditions - Phase 4	6					8		6		5	4	7	36
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	5					7		5		5	3	3	28
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**37**	**37**	**0**	**6**	**31**	**5**	**0**	**8**	**7**	**8**	**0**	**0**	**139**
Total New Trips - 2035 Conditions - Phases 1-4	47	68	0	6	25	10	0	22	21	7	5	9	220
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	52	68	0	6	25	17	0	27	21	12	8	12	248
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution		-5			-8	5	-1	1		3			
Total Trip Distribution (2035 conditions - Phases 1-4)	**47**	**63**	**0**	**6**	**17**	**15**	**-1**	**23**	**21**	**10**	**5**	**9**	**215**
Total Trip Distribution (2035 conditions - Phases 1-5)	**52**	**63**	**0**	**6**	**17**	**22**	**-1**	**28**	**21**	**15**	**8**	**12**	**243**
2025 Projected Volumes	**96**	**520**	**31**	**45**	**409**	**174**	**22**	**251**	**219**	**200**	**122**	**56**	**2145**
2035 Projected Volumes - Phases 1-4	**113**	**605**	**34**	**50**	**442**	**205**	**24**	**296**	**258**	**225**	**142**	**72**	**2466**
2035 Projected Volumes - Phases 1-5	**118**	**605**	**34**	**50**	**442**	**212**	**24**	**301**	**258**	**230**	**145**	**75**	**2494**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**52**	**337**	**38**	**61**	**401**	**114**	**40**	**150**	**85**	**136**	**188**	**113**	**1715**
Existing growth	1	8	1	1	9	3	1	3	2	3	4	3	39
2011 Existing Volumes	**53**	**345**	**39**	**62**	**410**	**117**	**41**	**153**	**87**	**139**	**192**	**116**	**1754**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	43	5	0	20	9	4	12	12	22	14	9	150
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	7	93	10	4	79	26	10	9	22	42	17	26	345
Tractor Supply Outparcels Trip Distribution	2	1	2		1		3					3	12
Alden Place Trip Distribution								1			2		3
Sheetz Outparcels Trip Distribution	8	8			7							8	31
VA Medical Center		8		11	44	11			1	2			77
The Preserve at Historic Cornwall Village (Phase 1)				2				14	2		18		36
The Preserve at Historic Cornwall Village (Build-out)				5				39	5		42		91
Total Nearby Developments (2025 conditions)	10	17	2	13	52	11	3	15	3	2	20	11	159
Total Nearby Developments (2035 conditions)	10	17	2	16	52	11	3	40	6	2	44	11	214
2025 Base Volumes	**63**	**405**	**46**	**75**	**482**	**137**	**48**	**180**	**102**	**163**	**226**	**136**	**2063**
2035 Base Volumes	**70**	**455**	**51**	**82**	**541**	**154**	**54**	**202**	**115**	**183**	**253**	**153**	**2313**
New Trips - 2025 conditions	12	22		13	67	7		2	5	5			133
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1	8	5		5	22	3		2	1	2	1	1	50
New Trips - 2035 conditions - Phase 1A		9		1	4				2	1			17
New Trips - 2035 conditions - Phase 2	1	5		9	27				1		1	6	50
New Trips - 2035 conditions - Phase 3	2	2		8	15			1	1		5	11	45
New Trips - 2035 conditions - Phase 4	15					20		15		23	17	34	124
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	13					18		13		20	15	22	101
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**12**	**22**	**0**	**13**	**67**	**7**	**0**	**2**	**5**	**5**	**0**	**0**	**133**
Total New Trips - 2035 Conditions - Phases 1-4	26	21	0	23	68	23	0	18	5	26	24	52	286
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	39	21	0	23	68	41	0	31	5	46	39	74	**387**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution		-20	-2		-17	9	-2	2		12	2		
Total Trip Distribution (2035 conditions - Phases 1-4)	**26**	**1**	**-2**	**23**	**51**	**32**	**-2**	**20**	**5**	**38**	**26**	**52**	**270**
Total Trip Distribution (2035 conditions - Phases 1-5)	**39**	**1**	**-2**	**23**	**51**	**50**	**-2**	**33**	**5**	**58**	**41**	**74**	**371**
2025 Projected Volumes	**75**	**427**	**46**	**88**	**549**	**144**	**48**	**182**	**107**	**168**	**226**	**136**	**2196**
2035 Projected Volumes - Phases 1-4	**96**	**456**	**49**	**105**	**592**	**186**	**52**	**222**	**120**	**221**	**279**	**205**	**2583**
2035 Projected Volumes - Phases 1-5	**109**	**456**	**49**	**105**	**592**	**204**	**52**	**235**	**120**	**241**	**294**	**227**	**2684**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**34**	**237**	**59**	**55**	**261**	**53**	**51**	**94**	**45**	**55**	**119**	**56**	**1119**
Existing growth	1	6	1	1	6	1	1	2	1	1	3	1	25
2011 Existing Volumes	**35**	**243**	**60**	**56**	**267**	**54**	**52**	**96**	**46**	**56**	**122**	**57**	**1144**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	22	6	7	26	8	4	2	5	8	1	0	89
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	56	14	11	64	16	12	0	9	16	0	0	198
Tractor Supply Outparcels Trip Distribution	4	2	5		2		5					4	22
Alden Place Trip Distribution								1			1		2
Sheetz Outparcels Trip Distribution	14	14			15							16	59
VA Medical Center		5		1	4	1			1	2			14
The Preserve at Historic Cornwall Village (Phase 1)				2				14	2		19		37
The Preserve at Historic Cornwall Village (Build-out)				6				39	5		48		98
Total Nearby Developments (2025 conditions)	18	21	5	3	21	1	5	15	3	2	20	20	134
Total Nearby Developments (2035 conditions)	18	21	5	7	21	1	5	40	6	2	49	20	195
2025 Base Volumes	**53**	**286**	**71**	**66**	**314**	**63**	**61**	**113**	**54**	**66**	**143**	**77**	**1367**
2035 Base Volumes	**53**	**320**	**79**	**74**	**352**	**71**	**69**	**136**	**61**	**74**	**171**	**77**	**1537**
New Trips - 2025 conditions	13	16		4	21	4		2	3	5			68
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1	7	5		2	8	1		2	1	2	1	1	30
New Trips - 2035 conditions - Phase 1A		7		1	6	1			2				17
New Trips - 2035 conditions - Phase 2	1	2			1				1				5
New Trips - 2035 conditions - Phase 3	1							1					2
New Trips - 2035 conditions - Phase 4	27					35		26		31	23	47	189
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	23					30		23		26	20	30	152
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**13**	**16**	**0**	**4**	**21**	**4**	**0**	**2**	**3**	**5**	**0**	**0**	**68**
Total New Trips - 2035 Conditions - Phases 1-4	36	14	0	3	15	37	0	29	4	33	24	48	243
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	59	14	0	3	15	67	0	52	4	59	44	78	395
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution		-16	-4		-15	9	-3	3		10	4		
Total Trip Distribution (2035 conditions - Phases 1-4)	**36**	**-2**	**-4**	**3**	**0**	**46**	**-3**	**32**	**4**	**43**	**28**	**48**	**231**
Total Trip Distribution (2035 conditions - Phases 1-5)	**59**	**-2**	**-4**	**3**	**0**	**76**	**-3**	**55**	**4**	**69**	**48**	**78**	**383**
2025 Projected Volumes	**66**	**302**	**71**	**70**	**335**	**67**	**61**	**115**	**57**	**71**	**143**	**77**	**1435**
2035 Projected Volumes - Phases 1-4	**89**	**318**	**75**	**77**	**352**	**117**	**66**	**168**	**65**	**117**	**199**	**125**	**1768**
2035 Projected Volumes - Phases 1-5	**112**	**318**	**75**	**77**	**352**	**147**	**66**	**191**	**65**	**143**	**219**	**155**	**1920**

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Traffic Volumes Worksheet

Intersection:	**Cornwall Road (SR 2001) & Isabel Drive/Norman Drive**									
Synchro Node:	**8**	**Adjacent intersections:**	**West**	**4**	**East**	**0**	**North**	**9**	**South**	**22**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2008 Existing Counts	**5**	**26**	**26**	**35**	**13**	**50**	**26**	**335**	**86**	**111**	**331**	**10**	**1054**
Existing growth	0	0	1	0	0	0	1	12	0	0	12	0	26
2011 Existing Volumes	**5**	**26**	**27**	**35**	**13**	**50**	**27**	**347**	**86**	**111**	**343**	**10**	**1080**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	1	0	2	0	0	0	3	41	0	0	31	2	80
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	2	0	3	0	0	0	5	70	0	0	62	3	145
Tractor Supply Outparcels Trip Distribution								2			2		4
Alden Place Trip Distribution								2			1		3
Sheetz Outparcels Trip Distribution								4			6		10
VA Medical Center			2					2			10		14
The Preserve at Historic Cornwall Village (Phase 1)			1				2	10			10		23
The Preserve at Historic Cornwall Village (Build-out)			4				4	31			28		67
Total Nearby Developments (2025 conditions)	0	0	3	0	0	0	2	20	0	0	29	0	54
Total Nearby Developments (2035 conditions)	0	0	6	0	0	0	4	41	0	0	47	0	98
2025 Base Volumes	**6**	**26**	**32**	**35**	**13**	**50**	**32**	**408**	**86**	**111**	**403**	**12**	**1214**
2035 Base Volumes	**7**	**26**	**36**	**35**	**13**	**50**	**36**	**458**	**86**	**111**	**452**	**13**	**1323**
New Trips - 2025 conditions		16	20		2	7	13	37		48	59		202
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1			13				4	18			54		89
New Trips - 2035 conditions - Phase 1A			1				3	14			4		22
New Trips - 2035 conditions - Phase 2		13	13		1	5	2	5		48	48		135
New Trips - 2035 conditions - Phase 3			28				3	13			125		169
New Trips - 2035 conditions - Phase 4			5				3	29			45		82
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5			5				3	25			38		71
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**16**	**20**	**0**	**2**	**7**	**13**	**37**	**0**	**48**	**59**	**0**	**202**
Total New Trips - 2035 Conditions - Phases 1-4	0	13	60	0	1	5	15	79	0	48	276	0	497
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	13	65	0	1	5	18	104	0	48	314	0	568
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								6			7		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**13**	**60**	**0**	**1**	**5**	**15**	**85**	**0**	**48**	**283**	**0**	**510**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**13**	**65**	**0**	**1**	**5**	**18**	**110**	**0**	**48**	**321**	**0**	**581**
2025 Projected Volumes	**6**	**42**	**52**	**35**	**15**	**57**	**45**	**445**	**86**	**159**	**462**	**12**	**1416**
2035 Projected Volumes - Phases 1-4	**7**	**39**	**96**	**35**	**14**	**55**	**51**	**543**	**86**	**159**	**735**	**13**	**1833**
2035 Projected Volumes - Phases 1-5	**7**	**39**	**101**	**35**	**14**	**55**	**54**	**568**	**86**	**159**	**773**	**13**	**1904**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2008 Existing Counts	**28**	**16**	**51**	**69**	**18**	**113**	**35**	**284**	**39**	**51**	**371**	**17**	**1092**
Existing growth	1	0	2	0	0	0	1	10	0	0	13	1	28
2011 Existing Volumes	**29**	**16**	**53**	**69**	**18**	**113**	**36**	**294**	**39**	**51**	**384**	**18**	**1120**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	5	0	6	0	0	0	2	20	0	0	37	3	73
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	9	0	12	0	0	0	4	40	0	0	70	6	141
Tractor Supply Outparcels Trip Distribution								2			3		5
Alden Place Trip Distribution								1			2		3
Sheetz Outparcels Trip Distribution								8			8		16
VA Medical Center							2	9			2		13
The Preserve at Historic Cornwall Village (Phase 1)			3				2	12			15		32
The Preserve at Historic Cornwall Village (Build-out)			5				5	34			37		81
Total Nearby Developments (2025 conditions)	0	0	3	0	0	0	4	32	0	0	30	0	69
Total Nearby Developments (2035 conditions)	0	0	5	0	0	0	7	54	0	0	52	0	118
2025 Base Volumes	**34**	**16**	**62**	**69**	**18**	**113**	**42**	**346**	**39**	**51**	**451**	**21**	**1262**
2035 Base Volumes	**38**	**16**	**70**	**69**	**18**	**113**	**47**	**388**	**39**	**51**	**506**	**24**	**1379**
New Trips - 2025 conditions		2	14		15	43	18	52		7	40		191
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1			6				10	43			23		82
New Trips - 2035 conditions - Phase 1A			2				2	7			14		25
New Trips - 2035 conditions - Phase 2		2	2		10	37	10	37		6	6		110
New Trips - 2035 conditions - Phase 3			3				22	97			16		138
New Trips - 2035 conditions - Phase 4			13				15	128			112		268
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5			12				13	111			97		233
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**2**	**14**	**0**	**15**	**43**	**18**	**52**	**0**	**7**	**40**	**0**	**191**
Total New Trips - 2035 Conditions - Phases 1-4	0	2	26	0	10	37	59	312	0	6	171	0	623
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	2	38	0	10	37	72	423	0	6	268	0	**856**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution								15			15		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**2**	**26**	**0**	**10**	**37**	**59**	**327**	**0**	**6**	**186**	**0**	**653**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**2**	**38**	**0**	**10**	**37**	**72**	**438**	**0**	**6**	**283**	**0**	**886**
2025 Projected Volumes	**34**	**18**	**76**	**69**	**33**	**156**	**60**	**398**	**39**	**58**	**491**	**21**	**1453**
2035 Projected Volumes - Phases 1-4	**38**	**18**	**96**	**69**	**28**	**150**	**106**	**715**	**39**	**57**	**692**	**24**	**2032**
2035 Projected Volumes - Phases 1-5	**38**	**18**	**108**	**69**	**28**	**150**	**119**	**826**	**39**	**57**	**789**	**24**	**2265**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2008 Existing Counts	**26**	**2**	**44**	**3**	**5**	**15**	**33**	**236**	**3**	**4**	**265**	**14**	**650**
Existing growth	1	0	2	0	0	0	1	8	0	0	9	0	21
2011 Existing Volumes	**27**	**2**	**46**	**3**	**5**	**15**	**34**	**244**	**3**	**4**	**274**	**14**	**671**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	5	0	6	0	0	0	4	11	0	0	8	2	36
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	9	0	9	0	0	0	6	24	0	0	22	4	74
Tractor Supply Outparcels Trip Distribution								4			4		8
Alden Place Trip Distribution								1			1		2
Sheetz Outparcels Trip Distribution								14			16		30
VA Medical Center								1			2		3
The Preserve at Historic Cornwall Village (Phase 1)			2				2	12			17		33
The Preserve at Historic Cornwall Village (Build-out)			6				5	34			42		87
Total Nearby Developments (2025 conditions)	0	0	2	0	0	0	2	32	0	0	40	0	76
Total Nearby Developments (2035 conditions)	0	0	6	0	0	0	5	54	0	0	65	0	130
2025 Base Volumes	**32**	**2**	**54**	**3**	**5**	**15**	**40**	**287**	**3**	**4**	**322**	**16**	**783**
2035 Base Volumes	**36**	**2**	**61**	**3**	**5**	**15**	**45**	**322**	**3**	**4**	**361**	**18**	**875**
New Trips - 2025 conditions		1	13		1	2	10	30		2	38		97
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1			6				4	17			23		50
New Trips - 2035 conditions - Phase 1A			2				2	11			11		26
New Trips - 2035 conditions - Phase 2		1			1	2		1		3	3		11
New Trips - 2035 conditions - Phase 3			2					3			8		13
New Trips - 2035 conditions - Phase 4			23				21	173			194		411
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5			20				18	149			167		354
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**1**	**13**	**0**	**1**	**2**	**10**	**30**	**0**	**2**	**38**	**0**	**97**
Total New Trips - 2035 Conditions - Phases 1-4	0	1	33	0	1	2	27	205	0	3	239	0	511
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	1	53	0	1	2	45	354	0	3	406	0	865
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								19			18		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**1**	**33**	**0**	**1**	**2**	**27**	**224**	**0**	**3**	**257**	**0**	**548**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**1**	**53**	**0**	**1**	**2**	**45**	**373**	**0**	**3**	**424**	**0**	**902**
2025 Projected Volumes	**32**	**3**	**67**	**3**	**6**	**17**	**50**	**317**	**3**	**6**	**360**	**16**	**880**
2035 Projected Volumes - Phases 1-4	**36**	**3**	**94**	**3**	**6**	**17**	**72**	**546**	**3**	**7**	**618**	**18**	**1423**
2035 Projected Volumes - Phases 1-5	**36**	**3**	**114**	**3**	**6**	**17**	**90**	**695**	**3**	**7**	**785**	**18**	**1777**

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Traffic Volumes Worksheet

Intersection:	**Cornwall Road (SR 2001) & York Street**									
Synchro Node:	**9**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**10**	**South**	**8**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**42**	**0**	**21**	**0**	**0**	**0**	**23**	**346**	**0**	**0**	**507**	**56**	**995**
Existing growth	1	0	0	0	0	0	1	8	0	0	12	1	23
2011 Existing Volumes	**43**	**0**	**21**	**0**	**0**	**0**	**24**	**354**	**0**	**0**	**519**	**57**	**1018**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	4	0	0	0	4	42	0	0	62	0	112
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	6	0	7	0	0	0	8	72	0	0	119	8	220
Tractor Supply Outparcels Trip Distribution	8							2			2	10	22
Alden Place Trip Distribution								2			1		3
Sheetz Outparcels Trip Distribution								4			6		10
VA Medical Center								2			10		12
The Preserve at Historic Cornwall Village (Phase 1)								10			10		20
The Preserve at Historic Cornwall Village (Build-out)								31			28		59
Total Nearby Developments (2025 conditions)	8	0	0	0	0	0	0	20	0	0	29	10	67
Total Nearby Developments (2035 conditions)	8	0	0	0	0	0	0	41	0	0	47	10	106
2025 Base Volumes	**51**	**0**	**25**	**0**	**0**	**0**	**28**	**416**	**0**	**0**	**610**	**67**	**1197**
2035 Base Volumes	**57**	**0**	**28**	**0**	**0**	**0**	**32**	**467**	**0**	**0**	**685**	**75**	**1344**
New Trips - 2025 conditions								44			107		151
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								18			54		72
New Trips - 2035 conditions - Phase 1A								14			4		18
New Trips - 2035 conditions - Phase 2								10			96		106
New Trips - 2035 conditions - Phase 3								13			125		138
New Trips - 2035 conditions - Phase 4								29			45		74
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								25			38		63
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**44**	**0**	**0**	**107**	**0**	**151**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	84	0	0	324	0	408
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	0	0	109	0	0	362	0	471
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution	-1							6			7	-1	
Total Trip Distribution (2035 conditions - Phases 1-4)	**-1**	**0**	**0**	**0**	**0**	**0**	**0**	**90**	**0**	**0**	**331**	**-1**	**419**
Total Trip Distribution (2035 conditions - Phases 1-5)	**-1**	**0**	**0**	**0**	**0**	**0**	**0**	**115**	**0**	**0**	**369**	**-1**	**482**
2025 Projected Volumes	**51**	**0**	**25**	**0**	**0**	**0**	**28**	**460**	**0**	**0**	**717**	**67**	**1348**
2035 Projected Volumes - Phases 1-4	**56**	**0**	**28**	**0**	**0**	**0**	**32**	**557**	**0**	**0**	**1016**	**74**	**1763**
2035 Projected Volumes - Phases 1-5	**56**	**0**	**28**	**0**	**0**	**0**	**32**	**582**	**0**	**0**	**1054**	**74**	**1826**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**98**	**0**	**30**	**0**	**0**	**0**	**67**	**465**	**0**	**0**	**386**	**133**	**1179**
Existing growth	2	0	1	0	0	0	2	11	0	0	9	3	28
2011 Existing Volumes	**100**	**0**	**31**	**0**	**0**	**0**	**69**	**476**	**0**	**0**	**395**	**136**	**1207**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	10	0	5	0	0	0	12	51	0	0	39	14	131
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	24	0	10	0	0	0	22	98	0	0	74	33	261
Tractor Supply Outparcels Trip Distribution	8							2			3	10	23
Alden Place Trip Distribution								1			2		3
Sheetz Outparcels Trip Distribution								8			8		16
VA Medical Center								9			2		11
The Preserve at Historic Cornwall Village (Phase 1)								12			15		27
The Preserve at Historic Cornwall Village (Build-out)								34			37		71
Total Nearby Developments (2025 conditions)	8	0	0	0	0	0	0	32	0	0	30	10	80
Total Nearby Developments (2035 conditions)	8	0	0	0	0	0	0	54	0	0	52	10	124
2025 Base Volumes	**118**	**0**	**36**	**0**	**0**	**0**	**81**	**559**	**0**	**0**	**464**	**160**	**1418**
2035 Base Volumes	**132**	**0**	**41**	**0**	**0**	**0**	**91**	**628**	**0**	**0**	**521**	**179**	**1592**
New Trips - 2025 conditions								95			47		142
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								43			23		66
New Trips - 2035 conditions - Phase 1A								7			14		21
New Trips - 2035 conditions - Phase 2								74			12		86
New Trips - 2035 conditions - Phase 3								97			16		113
New Trips - 2035 conditions - Phase 4								128			112		240
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								111			97		208
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**95**	**0**	**0**	**47**	**0**	**142**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	349	0	0	177	0	526
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	0	0	460	0	0	274	0	**734**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution	-2							15			15	-2	
Total Trip Distribution (2035 conditions - Phases 1-4)	**-2**	**0**	**0**	**0**	**0**	**0**	**0**	**364**	**0**	**0**	**192**	**-2**	**552**
Total Trip Distribution (2035 conditions - Phases 1-5)	**-2**	**0**	**0**	**0**	**0**	**0**	**0**	**475**	**0**	**0**	**289**	**-2**	**760**
2025 Projected Volumes	**118**	**0**	**36**	**0**	**0**	**0**	**81**	**654**	**0**	**0**	**511**	**160**	**1560**
2035 Projected Volumes - Phases 1-4	**130**	**0**	**41**	**0**	**0**	**0**	**91**	**992**	**0**	**0**	**713**	**177**	**2144**
2035 Projected Volumes - Phases 1-5	**130**	**0**	**41**	**0**	**0**	**0**	**91**	**1103**	**0**	**0**	**810**	**177**	**2352**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**116**	**0**	**21**	**0**	**0**	**0**	**31**	**237**	**0**	**0**	**216**	**164**	**785**
Existing growth	3	0	0	0	0	0	1	6	0	0	5	4	19
2011 Existing Volumes	**119**	**0**	**21**	**0**	**0**	**0**	**32**	**243**	**0**	**0**	**221**	**168**	**804**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	7	0	4	0	0	0	6	11	0	0	0	13	41
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	24	0	7	0	0	0	10	23	0	0	5	38	107
Tractor Supply Outparcels Trip Distribution	14							4			4	16	38
Alden Place Trip Distribution								1			1		2
Sheetz Outparcels Trip Distribution								14			16		30
VA Medical Center								1			2		3
The Preserve at Historic Cornwall Village (Phase 1)								12			17		29
The Preserve at Historic Cornwall Village (Build-out)								34			42		76
Total Nearby Developments (2025 conditions)	14	0	0	0	0	0	0	32	0	0	40	16	102
Total Nearby Developments (2035 conditions)	14	0	0	0	0	0	0	54	0	0	65	16	149
2025 Base Volumes	**140**	**0**	**25**	**0**	**0**	**0**	**38**	**286**	**0**	**0**	**261**	**197**	**947**
2035 Base Volumes	**157**	**0**	**28**	**0**	**0**	**0**	**42**	**320**	**0**	**0**	**291**	**222**	**1060**
New Trips - 2025 conditions								32			40		72
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								17			23		40
New Trips - 2035 conditions - Phase 1A								11			11		22
New Trips - 2035 conditions - Phase 2								3			6		9
New Trips - 2035 conditions - Phase 3								3			8		11
New Trips - 2035 conditions - Phase 4								173			194		367
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								149			167		316
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**32**	**0**	**0**	**40**	**0**	**72**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	207	0	0	242	0	449
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	0	0	356	0	0	409	0	765
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution	-1							19			18	-2	
Total Trip Distribution (2035 conditions - Phases 1-4)	**-1**	**0**	**0**	**0**	**0**	**0**	**0**	**226**	**0**	**0**	**260**	**-2**	**483**
Total Trip Distribution (2035 conditions - Phases 1-5)	**-1**	**0**	**0**	**0**	**0**	**0**	**0**	**375**	**0**	**0**	**427**	**-2**	**799**
2025 Projected Volumes	**140**	**0**	**25**	**0**	**0**	**0**	**38**	**318**	**0**	**0**	**301**	**197**	**1019**
2035 Projected Volumes - Phases 1-4	**156**	**0**	**28**	**0**	**0**	**0**	**42**	**546**	**0**	**0**	**551**	**220**	**1543**
2035 Projected Volumes - Phases 1-5	**156**	**0**	**28**	**0**	**0**	**0**	**42**	**695**	**0**	**0**	**718**	**220**	**1859**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Cornwall Road (SR 2001) & Wilhelm Avenue**

Synchro Node: **10** **Adjacent intersections:** **West** **0** **East** **0** **North** **0** **South** **9**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**0**	**0**	**0**	**97**	**0**	**25**	**0**	**248**	**61**	**117**	**389**	**0**	**937**
Existing growth	0	0	0	2	0	1	0	6	1	3	9	0	22
2011 Existing Volumes	**0**	**0**	**0**	**99**	**0**	**26**	**0**	**254**	**62**	**120**	**398**	**0**	**959**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	9	0	5	0	23	5	21	39	0	102
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	24	0	8	0	38	14	38	78	0	200
Tractor Supply Outparcels Trip Distribution				6				5	5		6		22
Alden Place Trip Distribution								2			1		3
Sheetz Outparcels Trip Distribution				2				3	1		4		10
VA Medical Center								2			10		12
The Preserve at Historic Cornwall Village (Phase 1)								10			10		20
The Preserve at Historic Cornwall Village (Build-out)								31			28		59
Total Nearby Developments (2025 conditions)	0	0	0	8	0	0	0	22	6	0	31	0	67
Total Nearby Developments (2035 conditions)	0	0	0	8	0	0	0	43	6	0	49	0	106
2025 Base Volumes	**0**	**0**	**0**	**116**	**0**	**31**	**0**	**299**	**73**	**141**	**468**	**0**	**1128**
2035 Base Volumes	**0**	**0**	**0**	**131**	**0**	**34**	**0**	**335**	**82**	**158**	**525**	**0**	**1265**
New Trips - 2025 conditions				30				32	12		77		151
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1				15				13	5		39		72
New Trips - 2035 conditions - Phase 1A				1				10	4		3		18
New Trips - 2035 conditions - Phase 2				26				7	3		70		106
New Trips - 2035 conditions - Phase 3				34				9	4		91		138
New Trips - 2035 conditions - Phase 4				12				21	8		33		74
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5				10				18	7		28		63
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**30**	**0**	**0**	**0**	**32**	**12**	**0**	**77**	**0**	**151**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	88	0	0	0	60	24	0	236	0	408
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	98	0	0	0	78	31	0	264	0	471
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								5			6		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**88**	**0**	**0**	**0**	**65**	**24**	**0**	**242**	**0**	**419**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**98**	**0**	**0**	**0**	**83**	**31**	**0**	**270**	**0**	**482**
2025 Projected Volumes	**0**	**0**	**0**	**146**	**0**	**31**	**0**	**331**	**85**	**141**	**545**	**0**	**1279**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**219**	**0**	**34**	**0**	**400**	**106**	**158**	**767**	**0**	**1684**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**0**	**229**	**0**	**34**	**0**	**418**	**113**	**158**	**795**	**0**	**1747**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**0**	**0**	**0**	**143**	**0**	**63**	**0**	**371**	**200**	**60**	**357**	**0**	**1194**
Existing growth	0	0	0	3	0	1	0	9	5	1	8	0	27
2011 Existing Volumes	**0**	**0**	**0**	**146**	**0**	**64**	**0**	**380**	**205**	**61**	**365**	**0**	**1221**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	18	0	11	0	34	29	11	32	0	135
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	39	0	20	0	66	58	19	62	0	264
Tractor Supply Outparcels Trip Distribution				6				5	5		7		23
Alden Place Trip Distribution								1			2		3
Sheetz Outparcels Trip Distribution				2				6	2		6		16
VA Medical Center								9			2		11
The Preserve at Historic Cornwall Village (Phase 1)								12			15		27
The Preserve at Historic Cornwall Village (Build-out)								34			37		71
Total Nearby Developments (2025 conditions)	0	0	0	8	0	0	0	33	7	0	32	0	80
Total Nearby Developments (2035 conditions)	0	0	0	8	0	0	0	55	7	0	54	0	124
2025 Base Volumes	**0**	**0**	**0**	**172**	**0**	**75**	**0**	**447**	**241**	**72**	**429**	**0**	**1436**
2035 Base Volumes	**0**	**0**	**0**	**193**	**0**	**84**	**0**	**501**	**270**	**80**	**481**	**0**	**1609**
New Trips - 2025 conditions				13				68	27		34		142
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1				6				31	12		17		66
New Trips - 2035 conditions - Phase 1A				4				5	2		10		21
New Trips - 2035 conditions - Phase 2				3				54	20		9		86
New Trips - 2035 conditions - Phase 3				4				71	26		12		113
New Trips - 2035 conditions - Phase 4				30				93	35		82		240
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5				26				81	30		71		208
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**13**	**0**	**0**	**0**	**68**	**27**	**0**	**34**	**0**	**142**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	47	0	0	0	254	95	0	130	0	526
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	73	0	0	0	335	125	0	201	0	**734**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution								13			13		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**47**	**0**	**0**	**0**	**267**	**95**	**0**	**143**	**0**	**552**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**73**	**0**	**0**	**0**	**348**	**125**	**0**	**214**	**0**	**760**
2025 Projected Volumes	**0**	**0**	**0**	**185**	**0**	**75**	**0**	**515**	**268**	**72**	**463**	**0**	**1578**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**240**	**0**	**84**	**0**	**768**	**365**	**80**	**624**	**0**	**2161**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**0**	**266**	**0**	**84**	**0**	**849**	**395**	**80**	**695**	**0**	**2369**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**0**	**0**	**0**	**129**	**0**	**35**	**0**	**176**	**157**	**43**	**228**	**0**	**768**
Existing growth	0	0	0	3	0	1	0	4	4	1	5	0	18
2011 Existing Volumes	**0**	**0**	**0**	**132**	**0**	**36**	**0**	**180**	**161**	**44**	**233**	**0**	**786**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	9	0	6	0	0	16	8	0	0	39
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	28	0	11	0	1	39	14	7	0	100
Tractor Supply Outparcels Trip Distribution				10				9	9		10		38
Alden Place Trip Distribution								1			1		2
Sheetz Outparcels Trip Distribution				4				11	3		12		30
VA Medical Center								1			2		3
The Preserve at Historic Cornwall Village (Phase 1)								12			17		29
The Preserve at Historic Cornwall Village (Build-out)								34			42		76
Total Nearby Developments (2025 conditions)	0	0	0	14	0	0	0	34	12	0	42	0	102
Total Nearby Developments (2035 conditions)	0	0	0	14	0	0	0	56	12	0	67	0	149
2025 Base Volumes	**0**	**0**	**0**	**155**	**0**	**42**	**0**	**214**	**189**	**52**	**275**	**0**	**927**
2035 Base Volumes	**0**	**0**	**0**	**174**	**0**	**47**	**0**	**237**	**212**	**58**	**307**	**0**	**1035**
New Trips - 2025 conditions				11				23	9		29		72
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1				6				12	5		17		40
New Trips - 2035 conditions - Phase 1A				3				8	3		8		22
New Trips - 2035 conditions - Phase 2				2				2	1		4		9
New Trips - 2035 conditions - Phase 3				2				2	1		6		11
New Trips - 2035 conditions - Phase 4				52				126	47		142		367
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5				45				109	40		122		316
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**23**	**9**	**0**	**29**	**0**	**72**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	65	0	0	0	150	57	0	177	0	449
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	110	0	0	0	259	97	0	299	0	765
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								18			16		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**65**	**0**	**0**	**0**	**168**	**57**	**0**	**193**	**0**	**483**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**110**	**0**	**0**	**0**	**277**	**97**	**0**	**315**	**0**	**799**
2025 Projected Volumes	**0**	**0**	**0**	**166**	**0**	**42**	**0**	**237**	**198**	**52**	**304**	**0**	**999**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**239**	**0**	**47**	**0**	**405**	**269**	**58**	**500**	**0**	**1518**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**0**	**284**	**0**	**47**	**0**	**514**	**309**	**58**	**622**	**0**	**1834**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Rocherty Road/Evergreen Road (SR 2002) & Lincoln Avenue**

Synchro Node: **11** **Adjacent intersections:** **West** **18** **East** **0** **North** **0** **South** **0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**274**	**493**	**3**	**14**	**437**	**143**	**15**	**15**	**26**	**105**	**13**	**90**	**1628**
Existing growth	6	11	0	0	10	3	0	0	1	2	0	2	35
2011 Existing Volumes	**280**	**504**	**3**	**14**	**447**	**146**	**15**	**15**	**27**	**107**	**13**	**92**	**1663**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	23	38	1	1	65	26	3	0	0	19	1	13	190
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	63	108	1	3	127	47	5	0	4	34	3	26	421
Tractor Supply Outparcels Trip Distribution		1			1								2
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution		3			5								8
VA Medical Center	26	45		1	6			7	5		1	3	94
The Preserve at Historic Cornwall Village (Phase 1)		1			1								2
The Preserve at Historic Cornwall Village (Build-out)		4			4								8
Total Nearby Developments (2025 conditions)	26	50	0	1	13	0	0	7	5	0	1	3	106
Total Nearby Developments (2035 conditions)	26	53	0	1	16	0	0	7	5	0	1	3	112
2025 Base Volumes	**329**	**592**	**4**	**16**	**525**	**172**	**18**	**22**	**32**	**126**	**15**	**108**	**1959**
2035 Base Volumes	**369**	**665**	**4**	**18**	**590**	**193**	**20**	**22**	**36**	**141**	**17**	**121**	**2196**
New Trips - 2025 conditions		6			15								21
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		3			7								10
New Trips - 2035 conditions - Phase 1A		2			1								3
New Trips - 2035 conditions - Phase 2		1			13								14
New Trips - 2035 conditions - Phase 3		2			17								19
New Trips - 2035 conditions - Phase 4		7	1		12		1						21
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5		7	1		10		1						19
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**6**	**0**	**0**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**21**
Total New Trips - 2035 Conditions - Phases 1-4	0	15	1	0	50	0	1	0	0	0	0	0	67
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	22	2	0	60	0	2	0	0	0	0	0	86
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution													
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**15**	**1**	**0**	**50**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**67**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**22**	**2**	**0**	**60**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**86**
2025 Projected Volumes	**329**	**598**	**4**	**16**	**540**	**172**	**18**	**22**	**32**	**126**	**15**	**108**	**1980**
2035 Projected Volumes - Phases 1-4	**369**	**680**	**5**	**18**	**640**	**193**	**21**	**22**	**36**	**141**	**17**	**121**	**2263**
2035 Projected Volumes - Phases 1-5	**369**	**687**	**6**	**18**	**650**	**193**	**22**	**22**	**36**	**141**	**17**	**121**	**2282**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**143**	**415**	**20**	**7**	**349**	**38**	**9**	**14**	**6**	**31**	**39**	**229**	**1300**
Existing growth	3	10	0	0	8	1	0	0	0	1	1	5	29
2011 Existing Volumes	**146**	**425**	**20**	**7**	**357**	**39**	**9**	**14**	**6**	**32**	**40**	**234**	**1329**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	22	56	4	0	11	7	2	1	0	6	0	17	126
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	43	115	6	0	59	12	3	3	1	10	6	51	309
Tractor Supply Outparcels Trip Distribution		1			1								2
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution		8			7								15
VA Medical Center	4	7		4	42			1	1		7	24	90
The Preserve at Historic Cornwall Village (Phase 1)		2			2								4
The Preserve at Historic Cornwall Village (Build-out)		5			5								10
Total Nearby Developments (2025 conditions)	4	18	0	4	52	0	0	1	1	0	7	24	111
Total Nearby Developments (2035 conditions)	4	21	0	4	55	0	0	1	1	0	7	24	117
2025 Base Volumes	**172**	**499**	**24**	**11**	**420**	**46**	**11**	**16**	**7**	**38**	**47**	**275**	**1566**
2035 Base Volumes	**193**	**561**	**26**	**11**	**471**	**51**	**12**	**18**	**8**	**42**	**53**	**309**	**1755**
New Trips - 2025 conditions		13			7								20
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		6			3								9
New Trips - 2035 conditions - Phase 1A		1			2								3
New Trips - 2035 conditions - Phase 2		10			2								12
New Trips - 2035 conditions - Phase 3		13			2								15
New Trips - 2035 conditions - Phase 4		35	3		30		3						71
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5		30	3		27		3						63
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**13**	**0**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**20**
Total New Trips - 2035 Conditions - Phases 1-4	0	65	3	0	39	0	3	0	0	0	0	0	110
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	95	6	0	66	0	6	0	0	0	0	0	**173**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution													
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**65**	**3**	**0**	**39**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**110**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**95**	**6**	**0**	**66**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**173**
2025 Projected Volumes	**172**	**512**	**24**	**11**	**427**	**46**	**11**	**16**	**7**	**38**	**47**	**275**	**1586**
2035 Projected Volumes - Phases 1-4	**193**	**626**	**29**	**11**	**510**	**51**	**15**	**18**	**8**	**42**	**53**	**309**	**1865**
2035 Projected Volumes - Phases 1-5	**193**	**656**	**32**	**11**	**537**	**51**	**18**	**18**	**8**	**42**	**53**	**309**	**1928**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2009 Existing Counts	**63**	**255**	**13**	**4**	**278**	**27**	**12**	**12**	**1**	**25**	**28**	**79**	**797**
Existing growth	1	6	0	0	6	1	0	0	0	1	1	2	18
2011 Existing Volumes	**64**	**261**	**13**	**4**	**284**	**28**	**12**	**12**	**1**	**26**	**29**	**81**	**815**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	8	23	2	1	27	5	2	1	0	5	4	12	90
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	17	57	4	1	64	9	4	3	0	8	8	24	199
Tractor Supply Outparcels Trip Distribution		2			2								4
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution		14			15								29
VA Medical Center	3	5			4			1			1	2	16
The Preserve at Historic Cornwall Village (Phase 1)		2			2								4
The Preserve at Historic Cornwall Village (Build-out)		5			6								11
Total Nearby Developments (2025 conditions)	3	23	0	0	23	0	0	1	0	0	1	2	53
Total Nearby Developments (2035 conditions)	3	26	0	0	27	0	0	1	0	0	1	2	60
2025 Base Volumes	**75**	**307**	**15**	**5**	**334**	**33**	**14**	**14**	**1**	**31**	**34**	**95**	**958**
2035 Base Volumes	**84**	**344**	**17**	**5**	**375**	**37**	**16**	**16**	**1**	**34**	**38**	**107**	**1074**
New Trips - 2025 conditions		4			6								10
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		3			3								6
New Trips - 2035 conditions - Phase 1A		2			2								4
New Trips - 2035 conditions - Phase 2					1								1
New Trips - 2035 conditions - Phase 3		1			1								2
New Trips - 2035 conditions - Phase 4		47	5		53		5						110
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5		40	4		45		5						94
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**4**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10**
Total New Trips - 2035 Conditions - Phases 1-4	0	53	5	0	60	0	5	0	0	0	0	0	123
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	93	9	0	105	0	10	0	0	0	0	0	217
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution													
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**53**	**5**	**0**	**60**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**123**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**93**	**9**	**0**	**105**	**0**	**10**	**0**	**0**	**0**	**0**	**0**	**217**
2025 Projected Volumes	**75**	**311**	**15**	**5**	**340**	**33**	**14**	**14**	**1**	**31**	**34**	**95**	**968**
2035 Projected Volumes - Phases 1-4	**84**	**397**	**22**	**5**	**435**	**37**	**21**	**16**	**1**	**34**	**38**	**107**	**1197**
2035 Projected Volumes - Phases 1-5	**84**	**437**	**26**	**5**	**480**	**37**	**26**	**16**	**1**	**34**	**38**	**107**	**1291**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection:	**Norman Drive & Site Driveway**									
Synchro Node:	**12**	**Adjacent intersections:**	**West**	**8**	**East**	**0**	**North**	**0**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2008 Existing Counts	**0**	**223**	**0**	**0**	**98**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**321**
Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0
2011 Existing Volumes	**0**	**223**	**0**	**0**	**98**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**321**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**223**	**0**	**0**	**98**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**321**
2035 Base Volumes	**0**	**223**	**0**	**0**	**98**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**321**
New Trips - 2025 conditions			64				9						73
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1													0
New Trips - 2035 conditions - Phase 1A													0
New Trips - 2035 conditions - Phase 2			61				6						67
New Trips - 2035 conditions - Phase 3													0
New Trips - 2035 conditions - Phase 4													0
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5													0
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**64**	**0**	**0**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**73**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	61	0	0	0	6	0	0	0	0	0	67
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	61	0	0	0	6	0	0	0	0	0	67
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution													
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**61**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**67**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**61**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**67**
2025 Projected Volumes	**0**	**223**	**64**	**0**	**98**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**394**
2035 Projected Volumes - Phases 1-4	**0**	**223**	**61**	**0**	**98**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**388**
2035 Projected Volumes - Phases 1-5	**0**	**223**	**61**	**0**	**98**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**388**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2008 Existing Counts	**0**	**106**	**0**	**0**	**200**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**306**
Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0
2011 Existing Volumes	**0**	**106**	**0**	**0**	**200**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**306**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**106**	**0**	**0**	**200**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**306**
2035 Base Volumes	**0**	**106**	**0**	**0**	**200**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**306**
New Trips - 2025 conditions			9				58						67
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1													0
New Trips - 2035 conditions - Phase 1A													0
New Trips - 2035 conditions - Phase 2			8				47						55
New Trips - 2035 conditions - Phase 3													0
New Trips - 2035 conditions - Phase 4													0
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5													0
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**9**	**0**	**0**	**0**	**58**	**0**	**0**	**0**	**0**	**0**	**67**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	8	0	0	0	47	0	0	0	0	0	55
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	8	0	0	0	47	0	0	0	0	0	**55**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution													
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**8**	**0**	**0**	**0**	**47**	**0**	**0**	**0**	**0**	**0**	**55**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**8**	**0**	**0**	**0**	**47**	**0**	**0**	**0**	**0**	**0**	**55**
2025 Projected Volumes	**0**	**106**	**9**	**0**	**200**	**0**	**58**	**0**	**0**	**0**	**0**	**0**	**373**
2035 Projected Volumes - Phases 1-4	**0**	**106**	**8**	**0**	**200**	**0**	**47**	**0**	**0**	**0**	**0**	**0**	**361**
2035 Projected Volumes - Phases 1-5	**0**	**106**	**8**	**0**	**200**	**0**	**47**	**0**	**0**	**0**	**0**	**0**	**361**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2008 Existing Counts	**0**	**9**	**0**	**0**	**23**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**32**
Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0
2011 Existing Volumes	**0**	**9**	**0**	**0**	**23**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**32**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**9**	**0**	**0**	**23**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**32**
2035 Base Volumes	**0**	**9**	**0**	**0**	**23**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**32**
New Trips - 2025 conditions			3				3						6
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1													0
New Trips - 2035 conditions - Phase 1A													0
New Trips - 2035 conditions - Phase 2			4				3						7
New Trips - 2035 conditions - Phase 3													0
New Trips - 2035 conditions - Phase 4													0
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5													0
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**6**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	4	0	0	0	3	0	0	0	0	0	7
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	4	0	0	0	3	0	0	0	0	0	7
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution													
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**4**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**7**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**4**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**7**
2025 Projected Volumes	**0**	**9**	**3**	**0**	**23**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**38**
2035 Projected Volumes - Phases 1-4	**0**	**9**	**4**	**0**	**23**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**39**
2035 Projected Volumes - Phases 1-5	**0**	**9**	**4**	**0**	**23**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**39**

TPD# BLAC.A.00001
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Traffic Volumes Worksheet

Intersection:	**Cornwall Road (SR 2001) & Proposed Township Road**									
Synchro Node:	**14**	**Adjacent intersections:**	**West**	**15**	**East**	**0**	**North**	**22**	**South**	**21**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**392**	**0**	**0**	**308**	**0**	**700**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**392**	**0**	**0**	**308**	**0**	**700**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	47	0	0	22	0	69
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	80	0	0	45	0	125
Tractor Supply Outparcels Trip Distribution								2			2		4
Alden Place Trip Distribution								2			1		3
Sheetz Outparcels Trip Distribution								4			6		10
VA Medical Center								2			12		14
The Preserve at Historic Cornwall Village (Phase 1)								12			11		23
The Preserve at Historic Cornwall Village (Build-out)								35			32		67
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	22	0	0	32	0	54
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	45	0	0	53	0	98
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**461**	**0**	**0**	**362**	**0**	**823**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**517**	**0**	**0**	**406**	**0**	**923**
New Trips - 2025 conditions								50			79		129
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		15			12	16		6		50	17		116
New Trips - 2035 conditions - Phase 1A					8	15		2		5			30
New Trips - 2035 conditions - Phase 2		34		1	9	7			3	61			115
New Trips - 2035 conditions - Phase 3		71		2	13	16			20	153			275
New Trips - 2035 conditions - Phase 4	32	3	5		5		20				15	35	115
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	28	2	7		4		17			1	4	13	76
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**50**	**0**	**0**	**79**	**0**	**129**
Total New Trips - 2035 Conditions - Phases 1-4	32	123	5	3	47	54	20	8	23	269	32	35	651
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	60	125	12	3	51	54	37	8	23	270	36	48	727
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution	6	2	3		3		6					7	
Total Trip Distribution (2035 conditions - Phases 1-4)	**38**	**125**	**8**	**3**	**50**	**54**	**26**	**8**	**23**	**269**	**32**	**42**	**678**
Total Trip Distribution (2035 conditions - Phases 1-5)	**66**	**127**	**15**	**3**	**54**	**54**	**43**	**8**	**23**	**270**	**36**	**55**	**754**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**511**	**0**	**0**	**441**	**0**	**952**
2035 Projected Volumes - Phases 1-4	**38**	**125**	**8**	**3**	**50**	**54**	**26**	**525**	**23**	**269**	**438**	**42**	**1601**
2035 Projected Volumes - Phases 1-5	**66**	**127**	**15**	**3**	**54**	**54**	**43**	**525**	**23**	**270**	**442**	**55**	**1677**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**316**	**0**	**0**	**437**	**0**	**753**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**316**	**0**	**0**	**437**	**0**	**753**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	19	0	0	44	0	63
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	40	0	0	82	0	122
Tractor Supply Outparcels Trip Distribution								2			3		5
Alden Place Trip Distribution								1			2		3
Sheetz Outparcels Trip Distribution								8			8		16
VA Medical Center								11			2		13
The Preserve at Historic Cornwall Village (Phase 1)								14			18		32
The Preserve at Historic Cornwall Village (Build-out)								39			42		81
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	36	0	0	33	0	69
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	61	0	0	57	0	118
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**371**	**0**	**0**	**514**	**0**	**885**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**417**	**0**	**0**	**576**	**0**	**993**
New Trips - 2025 conditions								70			54		124
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		11		2	21	27		26		12	17		116
New Trips - 2035 conditions - Phase 1A		7			3	8		1		14	2		35
New Trips - 2035 conditions - Phase 2		6		7	41	47				8			109
New Trips - 2035 conditions - Phase 3		13		16	73	119			2	19			242
New Trips - 2035 conditions - Phase 4	143	15	22		13		50				38	87	368
Pass-by Trips - 2035 conditions - Phase 4	(28)		(11)				(28)	(-28)			(-26)	(26)	39
New Trips - 2035 conditions - Phase 5	124	8	34		12		44			5	23	33	283
Pass-by Trips - 2035 conditions - Phase 5	(23)		(19)				(23)	(-23)			(-19)	(10)	33
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**70**	**0**	**0**	**54**	**0**	**124**
Total New Trips - 2035 Conditions - Phases 1-4	143	52	22	25	151	201	50	27	2	53	57	87	870
Total Pass-by Trips - 2035 conditions - Phases 1-4	28	0	11	0	0	0	28	-28	0	0	-26	26	39
Total New Trips - 2035 Conditions - Phases 1-5	267	60	56	25	163	201	94	27	2	58	80	120	**1153**
Total Pass-by Trips - 2035 conditions - Phases 1-5	51	0	30	0	0	0	51	-51	0	0	-45	36	**72**
Tractor Supply/Cedar Crest Square Redistribution	15	8	14		8		11					15	
Total Trip Distribution (2035 conditions - Phases 1-4)	**186**	**60**	**47**	**25**	**159**	**201**	**89**	**-1**	**2**	**53**	**31**	**128**	**980**
Total Trip Distribution (2035 conditions - Phases 1-5)	**333**	**68**	**100**	**25**	**171**	**201**	**156**	**-24**	**2**	**58**	**35**	**171**	**1296**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**441**	**0**	**0**	**568**	**0**	**1009**
2035 Projected Volumes - Phases 1-4	**186**	**60**	**47**	**25**	**159**	**201**	**89**	**416**	**2**	**53**	**607**	**128**	**1973**
2035 Projected Volumes - Phases 1-5	**333**	**68**	**100**	**25**	**171**	**201**	**156**	**393**	**2**	**58**	**611**	**171**	**2289**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**181**	**0**	**0**	**230**	**0**	**411**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**181**	**0**	**0**	**230**	**0**	**411**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	2	0	2
Tractor Supply Outparcels Trip Distribution								4			4		8
Alden Place Trip Distribution								1			1		2
Sheetz Outparcels Trip Distribution								14			16		30
VA Medical Center								1			2		3
The Preserve at Historic Cornwall Village (Phase 1)								14			19		33
The Preserve at Historic Cornwall Village (Build-out)								39			48		87
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	34	0	0	42	0	76
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	59	0	0	71	0	130
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**215**	**0**	**0**	**272**	**0**	**487**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**240**	**0**	**0**	**303**	**0**	**543**
New Trips - 2025 conditions								40			51		91
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		11		1	8	8		13		12	17		70
New Trips - 2035 conditions - Phase 1A		5			4	11		2		12	1		35
New Trips - 2035 conditions - Phase 2		3			1	1				3			8
New Trips - 2035 conditions - Phase 3		7			3	3			1	10			24
New Trips - 2035 conditions - Phase 4	194	21	30		23		88				65	152	573
Pass-by Trips - 2035 conditions - Phase 4	(19)		(8)				(19)	(-19)			(-17)	(17)	27
New Trips - 2035 conditions - Phase 5	167	11	46		20		76			7	30	56	413
Pass-by Trips - 2035 conditions - Phase 5	(17)		(13)				(17)	(-17)			(-13)	(6)	23
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**40**	**0**	**0**	**51**	**0**	**91**
Total New Trips - 2035 Conditions - Phases 1-4	194	47	30	1	39	23	88	15	1	37	83	152	710
Total Pass-by Trips - 2035 conditions - Phases 1-4	19	0	8	0	0	0	19	-19	0	0	-17	17	27
Total New Trips - 2035 Conditions - Phases 1-5	361	58	76	1	59	23	164	15	1	44	113	208	1123
Total Pass-by Trips - 2035 conditions - Phases 1-5	36	0	21	0	0	0	36	-36	0	0	-30	23	50
Tractor Supply/Cedar Crest Square Redistribution	19	6	14		6		12					18	
Total Trip Distribution (2035 conditions - Phases 1-4)	**232**	**53**	**52**	**1**	**45**	**23**	**119**	**-4**	**1**	**37**	**66**	**187**	**812**
Total Trip Distribution (2035 conditions - Phases 1-5)	**416**	**64**	**111**	**1**	**65**	**23**	**212**	**-21**	**1**	**44**	**83**	**249**	**1248**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**255**	**0**	**0**	**323**	**0**	**578**
2035 Projected Volumes - Phases 1-4	**232**	**53**	**52**	**1**	**45**	**23**	**119**	**236**	**1**	**37**	**369**	**187**	**1355**
2035 Projected Volumes - Phases 1-5	**416**	**64**	**111**	**1**	**65**	**23**	**212**	**219**	**1**	**44**	**386**	**249**	**1791**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Proposed Township Road & Eastern Driveways**

Synchro Node: **15** **Adjacent intersections:** **West** **16** **East** **14** **North** **0** **South** **0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
New Trips - 2025 conditions													0
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		12			4								16
New Trips - 2035 conditions - Phase 1A					2								2
New Trips - 2035 conditions - Phase 2		28			4								32
New Trips - 2035 conditions - Phase 3		64			7								71
New Trips - 2035 conditions - Phase 4		25	13	36	37		12		24				147
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	11	19			18	28				25		7	108
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total New Trips - 2035 Conditions - Phases 1-4	0	129	13	36	54	0	12	0	24	0	0	0	268
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	11	148	13	36	72	28	12	0	24	25	0	7	376
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution		11			16								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**140**	**13**	**36**	**70**	**0**	**12**	**0**	**24**	**0**	**0**	**0**	**295**
Total Trip Distribution (2035 conditions - Phases 1-5)	**11**	**159**	**13**	**36**	**88**	**28**	**12**	**0**	**24**	**25**	**0**	**7**	**403**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Projected Volumes - Phases 1-4	**0**	**140**	**13**	**36**	**70**	**0**	**12**	**0**	**24**	**0**	**0**	**0**	**295**
2035 Projected Volumes - Phases 1-5	**11**	**159**	**13**	**36**	**88**	**28**	**12**	**0**	**24**	**25**	**0**	**7**	**403**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
New Trips - 2025 conditions													0
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		5			10								15
New Trips - 2035 conditions - Phase 1A		3			1								4
New Trips - 2035 conditions - Phase 2		3			22								25
New Trips - 2035 conditions - Phase 3		9			49								58
New Trips - 2035 conditions - Phase 4		94	33	90	90		56		95				458
Pass-by Trips - 2035 conditions - Phase 4		(19)	(32)	(27)	(27)		(55)		(20)				180
New Trips - 2035 conditions - Phase 5	28	70			35	80				104		30	347
Pass-by Trips - 2035 conditions - Phase 5	(28)	(17)			(16)	(17)				(25)		(28)	131
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total New Trips - 2035 Conditions - Phases 1-4	0	114	33	90	172	0	56	0	95	0	0	0	560
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	19	32	27	27	0	55	0	20	0	0	0	180
Total New Trips - 2035 Conditions - Phases 1-5	28	184	33	90	207	80	56	0	95	104	0	30	**907**
Total Pass-by Trips - 2035 conditions - Phases 1-5	28	36	32	27	43	17	55	0	20	25	0	28	**311**
Tractor Supply/Cedar Crest Square Redistribution		37			34								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**170**	**65**	**117**	**233**	**0**	**111**	**0**	**115**	**0**	**0**	**0**	**811**
Total Trip Distribution (2035 conditions - Phases 1-5)	**56**	**257**	**65**	**117**	**284**	**97**	**111**	**0**	**115**	**129**	**0**	**58**	**1289**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Projected Volumes - Phases 1-4	**0**	**170**	**65**	**117**	**233**	**0**	**111**	**0**	**115**	**0**	**0**	**0**	**811**
2035 Projected Volumes - Phases 1-5	**56**	**257**	**65**	**117**	**284**	**97**	**111**	**0**	**115**	**129**	**0**	**58**	**1289**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
New Trips - 2025 conditions													0
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		5			4								9
New Trips - 2035 conditions - Phase 1A		2			2								4
New Trips - 2035 conditions - Phase 2		2											2
New Trips - 2035 conditions - Phase 3		5			2								7
New Trips - 2035 conditions - Phase 4		127	56	132	135		75		124				649
Pass-by Trips - 2035 conditions - Phase 4		(14)	(37)	(18)	(18)		(65)		(13)				165
New Trips - 2035 conditions - Phase 5	49	93			78	78				137		41	476
Pass-by Trips - 2035 conditions - Phase 5	(33)	(12)			(11)	(12)				(18)		(33)	119
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total New Trips - 2035 Conditions - Phases 1-4	0	141	56	132	143	0	75	0	124	0	0	0	671
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	14	37	18	18	0	65	0	13	0	0	0	165
Total New Trips - 2035 Conditions - Phases 1-5	49	234	56	132	221	78	75	0	124	137	0	41	1147
Total Pass-by Trips - 2035 conditions - Phases 1-5	33	26	37	18	29	12	65	0	13	18	0	33	284
Tractor Supply/Cedar Crest Square Redistribution		39			36								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**194**	**93**	**150**	**197**	**0**	**140**	**0**	**137**	**0**	**0**	**0**	**911**
Total Trip Distribution (2035 conditions - Phases 1-5)	**82**	**299**	**93**	**150**	**286**	**90**	**140**	**0**	**137**	**155**	**0**	**74**	**1506**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Projected Volumes - Phases 1-4	**0**	**194**	**93**	**150**	**197**	**0**	**140**	**0**	**137**	**0**	**0**	**0**	**911**
2035 Projected Volumes - Phases 1-5	**82**	**299**	**93**	**150**	**286**	**90**	**140**	**0**	**137**	**155**	**0**	**74**	**1506**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Proposed Township Road & Middle Driveways**

Synchro Node: **16** **Adjacent intersections:** **West** 17 **East** 15 **North** 0 **South** 0

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
New Trips - 2025 conditions													0
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		12			4								16
New Trips - 2035 conditions - Phase 1A					2								2
New Trips - 2035 conditions - Phase 2		28			4								32
New Trips - 2035 conditions - Phase 3		64			7								71
New Trips - 2035 conditions - Phase 4		13	31	36	13		12		25				130
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	26	12			8	17				18		17	98
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total New Trips - 2035 Conditions - Phases 1-4	0	117	31	36	30	0	12	0	25	0	0	0	251
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	26	129	31	36	38	17	12	0	25	18	0	17	349
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution		11			16								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**128**	**31**	**36**	**46**	**0**	**12**	**0**	**25**	**0**	**0**	**0**	**278**
Total Trip Distribution (2035 conditions - Phases 1-5)	**26**	**140**	**31**	**36**	**54**	**17**	**12**	**0**	**25**	**18**	**0**	**17**	**376**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Projected Volumes - Phases 1-4	**0**	**128**	**31**	**36**	**46**	**0**	**12**	**0**	**25**	**0**	**0**	**0**	**278**
2035 Projected Volumes - Phases 1-5	**26**	**140**	**31**	**36**	**54**	**17**	**12**	**0**	**25**	**18**	**0**	**17**	**376**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
New Trips - 2025 conditions													0
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		5			10								15
New Trips - 2035 conditions - Phase 1A		3			1								4
New Trips - 2035 conditions - Phase 2		3			22								25
New Trips - 2035 conditions - Phase 3		9			49								58
New Trips - 2035 conditions - Phase 4		34	76	89	57		56		93				405
Pass-by Trips - 2035 conditions - Phase 4		(32)	(75)	(27)	(55)		(56)		(19)				264
New Trips - 2035 conditions - Phase 5	66	29			31	34				69		70	299
Pass-by Trips - 2035 conditions - Phase 5	(65)	(28)			(28)	(16)				(17)		(65)	219
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total New Trips - 2035 Conditions - Phases 1-4	0	54	76	89	139	0	56	0	93	0	0	0	507
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	32	75	27	55	0	56	0	19	0	0	0	264
Total New Trips - 2035 Conditions - Phases 1-5	66	83	76	89	170	34	56	0	93	69	0	70	**806**
Total Pass-by Trips - 2035 conditions - Phases 1-5	65	60	75	27	83	16	56	0	19	17	0	65	**483**
Tractor Supply/Cedar Crest Square Redistribution		37			34								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**123**	**151**	**116**	**228**	**0**	**112**	**0**	**112**	**0**	**0**	**0**	**842**
Total Trip Distribution (2035 conditions - Phases 1-5)	**131**	**180**	**151**	**116**	**287**	**50**	**112**	**0**	**112**	**86**	**0**	**135**	**1360**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Projected Volumes - Phases 1-4	**0**	**123**	**151**	**116**	**228**	**0**	**112**	**0**	**112**	**0**	**0**	**0**	**842**
2035 Projected Volumes - Phases 1-5	**131**	**180**	**151**	**116**	**287**	**50**	**112**	**0**	**112**	**86**	**0**	**135**	**1360**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
New Trips - 2025 conditions													0
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		5			4								9
New Trips - 2035 conditions - Phase 1A		2			2								4
New Trips - 2035 conditions - Phase 2		2											2
New Trips - 2035 conditions - Phase 3		5			2								7
New Trips - 2035 conditions - Phase 4		58	132	133	77		76		125				601
Pass-by Trips - 2035 conditions - Phase 4		(37)	(88)	(18)	(65)		(65)		(14)				287
New Trips - 2035 conditions - Phase 5	113	51			42	77				91		96	470
Pass-by Trips - 2035 conditions - Phase 5	(76)	(33)			(33)	(11)				(12)		(76)	241
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total New Trips - 2035 Conditions - Phases 1-4	0	72	132	133	85	0	76	0	125	0	0	0	623
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	37	88	18	65	0	65	0	14	0	0	0	287
Total New Trips - 2035 Conditions - Phases 1-5	113	123	132	133	127	77	76	0	125	91	0	96	1093
Total Pass-by Trips - 2035 conditions - Phases 1-5	76	70	88	18	98	11	65	0	14	12	0	76	528
Tractor Supply/Cedar Crest Square Redistribution		39			36								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**148**	**220**	**151**	**186**	**0**	**141**	**0**	**139**	**0**	**0**	**0**	**985**
Total Trip Distribution (2035 conditions - Phases 1-5)	**189**	**232**	**220**	**151**	**261**	**88**	**141**	**0**	**139**	**103**	**0**	**172**	**1696**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Projected Volumes - Phases 1-4	**0**	**148**	**220**	**151**	**186**	**0**	**141**	**0**	**139**	**0**	**0**	**0**	**985**
2035 Projected Volumes - Phases 1-5	**189**	**232**	**220**	**151**	**261**	**88**	**141**	**0**	**139**	**103**	**0**	**172**	**1696**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection:	**Proposed Township Road & Western Driveways**									
Synchro Node:	**17**	**Adjacent intersections:**	**West**	**2**	**East**	**16**	**North**	**0**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
New Trips - 2025 conditions													0
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		12			4								16
New Trips - 2035 conditions - Phase 1A					2								2
New Trips - 2035 conditions - Phase 2		28			4								32
New Trips - 2035 conditions - Phase 3		64			7								71
New Trips - 2035 conditions - Phase 4		44	2	1	24		1						72
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5	2	37			24	1				1		1	66
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total New Trips - 2035 Conditions - Phases 1-4	0	148	2	1	41	0	1	0	0	0	0	0	193
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	2	185	2	1	65	1	1	0	0	1	0	1	259
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution		11			16								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**159**	**2**	**1**	**57**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**220**
Total Trip Distribution (2035 conditions - Phases 1-5)	**2**	**196**	**2**	**1**	**81**	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**286**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Projected Volumes - Phases 1-4	**0**	**159**	**2**	**1**	**57**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**220**
2035 Projected Volumes - Phases 1-5	**2**	**196**	**2**	**1**	**81**	**1**	**1**	**0**	**0**	**1**	**0**	**1**	**286**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
New Trips - 2025 conditions													0
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		5			10								15
New Trips - 2035 conditions - Phase 1A		3			1								4
New Trips - 2035 conditions - Phase 2		3			22								25
New Trips - 2035 conditions - Phase 3		9			49								58
New Trips - 2035 conditions - Phase 4		109	6	1	112		1		1				230
Pass-by Trips - 2035 conditions - Phase 4		(107)	(6)		(111)		(2)						226
New Trips - 2035 conditions - Phase 5	5	94			100	1				1		5	206
Pass-by Trips - 2035 conditions - Phase 5	(5)	(93)			(93)							(5)	196
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total New Trips - 2035 Conditions - Phases 1-4	0	129	6	1	194	0	1	0	1	0	0	0	332
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	107	6	0	111	0	2	0	0	0	0	0	226
Total New Trips - 2035 Conditions - Phases 1-5	5	223	6	1	294	1	1	0	1	1	0	5	**538**
Total Pass-by Trips - 2035 conditions - Phases 1-5	5	200	6	0	204	0	2	0	0	0	0	5	**422**
Tractor Supply/Cedar Crest Square Redistribution		37			34								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**273**	**12**	**1**	**339**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**629**
Total Trip Distribution (2035 conditions - Phases 1-5)	**10**	**460**	**12**	**1**	**532**	**1**	**3**	**0**	**1**	**1**	**0**	**10**	**1031**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Projected Volumes - Phases 1-4	**0**	**273**	**12**	**1**	**339**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**629**
2035 Projected Volumes - Phases 1-5	**10**	**460**	**12**	**1**	**532**	**1**	**3**	**0**	**1**	**1**	**0**	**10**	**1031**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply Outparcels Trip Distribution													0
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution													0
VA Medical Center													0
The Preserve at Historic Cornwall Village (Phase 1)													0
The Preserve at Historic Cornwall Village (Build-out)													0
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
New Trips - 2025 conditions													0
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		5			4								9
New Trips - 2035 conditions - Phase 1A		2			2								4
New Trips - 2035 conditions - Phase 2		2											2
New Trips - 2035 conditions - Phase 3		5			2								7
New Trips - 2035 conditions - Phase 4		188	9	2	151		2		2				354
Pass-by Trips - 2035 conditions - Phase 4		(125)	(7)		(130)		(2)						264
New Trips - 2035 conditions - Phase 5	8	162			137	1				2		5	315
Pass-by Trips - 2035 conditions - Phase 5	(6)	(109)			(109)							(6)	230
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total New Trips - 2035 Conditions - Phases 1-4	0	202	9	2	159	0	2	0	2	0	0	0	376
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	125	7	0	130	0	2	0	0	0	0	0	264
Total New Trips - 2035 Conditions - Phases 1-5	8	364	9	2	296	1	2	0	2	2	0	5	691
Total Pass-by Trips - 2035 conditions - Phases 1-5	6	234	7	0	239	0	2	0	0	0	0	6	494
Tractor Supply/Cedar Crest Square Redistribution		39			36								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**366**	**16**	**2**	**325**	**0**	**4**	**0**	**2**	**0**	**0**	**0**	**715**
Total Trip Distribution (2035 conditions - Phases 1-5)	**14**	**637**	**16**	**2**	**571**	**1**	**4**	**0**	**2**	**2**	**0**	**11**	**1260**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2035 Projected Volumes - Phases 1-4	**0**	**366**	**16**	**2**	**325**	**0**	**4**	**0**	**2**	**0**	**0**	**0**	**715**
2035 Projected Volumes - Phases 1-5	**14**	**637**	**16**	**2**	**571**	**1**	**4**	**0**	**2**	**2**	**0**	**11**	**1260**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Rocherty Road (SR 2002) & Eastern Driveway**

Synchro Node: **18** **Adjacent intersections:** **West** **19** **East** **11** **North** **0** **South** **0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**737**	**0**	**0**	**488**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1225**
Balancing													0
2011 Existing Volumes	**0**	**737**	**0**	**0**	**488**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1225**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	52	0	0	68	0	0	0	0	0	0	0	120
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	155	0	0	136	0	0	0	0	0	0	0	291
Tractor Supply Outparcels Trip Distribution		1			1								2
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution		3			5								8
VA Medical Center		72			10								82
The Preserve at Historic Cornwall Village (Phase 1)		1			1								2
The Preserve at Historic Cornwall Village (Build-out)		4			4								8
Total Nearby Developments (2025 conditions)	0	77	0	0	17	0	0	0	0	0	0	0	94
Total Nearby Developments (2035 conditions)	0	80	0	0	20	0	0	0	0	0	0	0	100
2025 Base Volumes	**0**	**866**	**0**	**0**	**573**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1439**
2035 Base Volumes	**0**	**972**	**0**	**0**	**644**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1616**
New Trips - 2025 conditions	52				4	11				6		26	99
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1	20				2	5				3		8	38
New Trips - 2035 conditions - Phase 1A	2					1				2		12	17
New Trips - 2035 conditions - Phase 2	44					13				1		2	60
New Trips - 2035 conditions - Phase 3	25					17				2		1	45
New Trips - 2035 conditions - Phase 4		5			8	5				3			21
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5		5			7	4				3			19
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**52**	**0**	**0**	**0**	**4**	**11**	**0**	**0**	**0**	**6**	**0**	**26**	**99**
Total New Trips - 2035 Conditions - Phases 1-4	91	5	0	0	10	41	0	0	0	11	0	23	181
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	91	10	0	0	17	45	0	0	0	14	0	23	200
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution		-2			-3	3				2			
Total Trip Distribution (2035 conditions - Phases 1-4)	**91**	**3**	**0**	**0**	**7**	**44**	**0**	**0**	**0**	**13**	**0**	**23**	**181**
Total Trip Distribution (2035 conditions - Phases 1-5)	**91**	**8**	**0**	**0**	**14**	**48**	**0**	**0**	**0**	**16**	**0**	**23**	**200**
2025 Projected Volumes	**52**	**866**	**0**	**0**	**577**	**11**	**0**	**0**	**0**	**6**	**0**	**26**	**1538**
2035 Projected Volumes - Phases 1-4	**91**	**975**	**0**	**0**	**651**	**44**	**0**	**0**	**0**	**13**	**0**	**23**	**1797**
2035 Projected Volumes - Phases 1-5	**91**	**980**	**0**	**0**	**658**	**48**	**0**	**0**	**0**	**16**	**0**	**23**	**1816**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**558**	**0**	**0**	**576**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1134**
Balancing													0
2011 Existing Volumes	**0**	**558**	**0**	**0**	**576**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1134**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	75	0	0	25	0	0	0	0	0	0	0	100
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	152	0	0	105	0	0	0	0	0	0	0	257
Tractor Supply Outparcels Trip Distribution		1			1								2
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution		8			7								15
VA Medical Center		12			66								78
The Preserve at Historic Cornwall Village (Phase 1)		2			2								4
The Preserve at Historic Cornwall Village (Build-out)		5			5								10
Total Nearby Developments (2025 conditions)	0	23	0	0	76	0	0	0	0	0	0	0	99
Total Nearby Developments (2035 conditions)	0	26	0	0	79	0	0	0	0	0	0	0	105
2025 Base Volumes	**0**	**656**	**0**	**0**	**677**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1333**
2035 Base Volumes	**0**	**736**	**0**	**0**	**760**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1496**
New Trips - 2025 conditions	32				3	4				13		45	97
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1	8				2	1				6		7	24
New Trips - 2035 conditions - Phase 1A	12					2				1		5	20
New Trips - 2035 conditions - Phase 2	6					2				10		21	39
New Trips - 2035 conditions - Phase 3	3					2				13		10	28
New Trips - 2035 conditions - Phase 4		23			20	13				15			71
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5		20			18	12				13			63
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**32**	**0**	**0**	**0**	**3**	**4**	**0**	**0**	**0**	**13**	**0**	**45**	**97**
Total New Trips - 2035 Conditions - Phases 1-4	29	23	0	0	22	20	0	0	0	45	0	43	182
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	29	43	0	0	40	32	0	0	0	58	0	43	**245**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution		-8			-8	8				8			
Total Trip Distribution (2035 conditions - Phases 1-4)	**29**	**15**	**0**	**0**	**14**	**28**	**0**	**0**	**0**	**53**	**0**	**43**	**182**
Total Trip Distribution (2035 conditions - Phases 1-5)	**29**	**35**	**0**	**0**	**32**	**40**	**0**	**0**	**0**	**66**	**0**	**43**	**245**
2025 Projected Volumes	**32**	**656**	**0**	**0**	**680**	**4**	**0**	**0**	**0**	**13**	**0**	**45**	**1430**
2035 Projected Volumes - Phases 1-4	**29**	**751**	**0**	**0**	**774**	**28**	**0**	**0**	**0**	**53**	**0**	**43**	**1678**
2035 Projected Volumes - Phases 1-5	**29**	**771**	**0**	**0**	**792**	**40**	**0**	**0**	**0**	**66**	**0**	**43**	**1741**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**337**	**0**	**0**	**369**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**706**
Balancing													0
2011 Existing Volumes	**0**	**337**	**0**	**0**	**369**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**706**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	33	0	0	40	0	0	0	0	0	0	0	73
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	78	0	0	89	0	0	0	0	0	0	0	167
Tractor Supply Outparcels Trip Distribution		2			2								4
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution		14			15								29
VA Medical Center		8			6								14
The Preserve at Historic Cornwall Village (Phase 1)		2			2								4
The Preserve at Historic Cornwall Village (Build-out)		5			6								11
Total Nearby Developments (2025 conditions)	0	26	0	0	25	0	0	0	0	0	0	0	51
Total Nearby Developments (2035 conditions)	0	29	0	0	29	0	0	0	0	0	0	0	58
2025 Base Volumes	**0**	**396**	**0**	**0**	**434**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**830**
2035 Base Volumes	**0**	**444**	**0**	**0**	**487**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**931**
New Trips - 2025 conditions	24				3	3				4		15	49
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1	8				2	1				3		3	17
New Trips - 2035 conditions - Phase 1A	9					2				2		8	21
New Trips - 2035 conditions - Phase 2	3					1						1	5
New Trips - 2035 conditions - Phase 3						1				1			2
New Trips - 2035 conditions - Phase 4		31			35	23				21			110
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5		26			30	20				18			94
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**24**	**0**	**0**	**0**	**3**	**3**	**0**	**0**	**0**	**4**	**0**	**15**	**49**
Total New Trips - 2035 Conditions - Phases 1-4	20	31	0	0	37	28	0	0	0	27	0	12	155
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	20	57	0	0	67	48	0	0	0	45	0	12	249
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution		-6			-6	6				6			
Total Trip Distribution (2035 conditions - Phases 1-4)	**20**	**25**	**0**	**0**	**31**	**34**	**0**	**0**	**0**	**33**	**0**	**12**	**155**
Total Trip Distribution (2035 conditions - Phases 1-5)	**20**	**51**	**0**	**0**	**61**	**54**	**0**	**0**	**0**	**51**	**0**	**12**	**249**
2025 Projected Volumes	**24**	**396**	**0**	**0**	**437**	**3**	**0**	**0**	**0**	**4**	**0**	**15**	**879**
2035 Projected Volumes - Phases 1-4	**20**	**469**	**0**	**0**	**518**	**34**	**0**	**0**	**0**	**33**	**0**	**12**	**1086**
2035 Projected Volumes - Phases 1-5	**20**	**495**	**0**	**0**	**548**	**54**	**0**	**0**	**0**	**51**	**0**	**12**	**1180**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection:	**Rocherty Road (SR 2002) & Western Driveway**									
Synchro Node:	**19**	**Adjacent intersections:**	**West**	**7**	**East**	**18**	**North**	**0**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**737**	**0**	**0**	**488**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1225**
Balancing													0
2011 Existing Volumes	**0**	**737**	**0**	**0**	**488**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1225**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	52	0	0	68	0	0	0	0	0	0	0	120
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	155	0	0	136	0	0	0	0	0	0	0	291
Tractor Supply Outparcels Trip Distribution		1			1								2
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution		3			5								8
VA Medical Center		72			10								82
The Preserve at Historic Cornwall Village (Phase 1)		1			1								2
The Preserve at Historic Cornwall Village (Build-out)		4			4								8
Total Nearby Developments (2025 conditions)	0	77	0	0	17	0	0	0	0	0	0	0	94
Total Nearby Developments (2035 conditions)	0	80	0	0	20	0	0	0	0	0	0	0	100
2025 Base Volumes	**0**	**866**	**0**	**0**	**573**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1439**
2035 Base Volumes	**0**	**972**	**0**	**0**	**644**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1616**
New Trips - 2025 conditions		52			26	4						16	98
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		20			8	2						6	36
New Trips - 2035 conditions - Phase 1A		2			12								14
New Trips - 2035 conditions - Phase 2		44			2							2	48
New Trips - 2035 conditions - Phase 3		25			1							2	28
New Trips - 2035 conditions - Phase 4		5			8								13
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5		5			7								12
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**52**	**0**	**0**	**26**	**4**	**0**	**0**	**0**	**0**	**0**	**16**	**98**
Total New Trips - 2035 Conditions - Phases 1-4	0	96	0	0	31	2	0	0	0	0	0	10	139
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	101	0	0	38	2	0	0	0	0	0	10	151
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution		-2			-3								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**94**	**0**	**0**	**28**	**2**	**0**	**0**	**0**	**0**	**0**	**10**	**134**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**99**	**0**	**0**	**35**	**2**	**0**	**0**	**0**	**0**	**0**	**10**	**146**
2025 Projected Volumes	**0**	**918**	**0**	**0**	**599**	**4**	**0**	**0**	**0**	**0**	**0**	**16**	**1537**
2035 Projected Volumes - Phases 1-4	**0**	**1066**	**0**	**0**	**672**	**2**	**0**	**0**	**0**	**0**	**0**	**10**	**1750**
2035 Projected Volumes - Phases 1-5	**0**	**1071**	**0**	**0**	**679**	**2**	**0**	**0**	**0**	**0**	**0**	**10**	**1762**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**558**	**0**	**0**	**576**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1134**
Balancing													0
2011 Existing Volumes	**0**	**558**	**0**	**0**	**576**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1134**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	75	0	0	25	0	0	0	0	0	0	0	100
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	152	0	0	105	0	0	0	0	0	0	0	257
Tractor Supply Outparcels Trip Distribution		1			1								2
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution		8			7								15
VA Medical Center		12			66								78
The Preserve at Historic Cornwall Village (Phase 1)		2			2								4
The Preserve at Historic Cornwall Village (Build-out)		5			5								10
Total Nearby Developments (2025 conditions)	0	23	0	0	76	0	0	0	0	0	0	0	99
Total Nearby Developments (2035 conditions)	0	26	0	0	79	0	0	0	0	0	0	0	105
2025 Base Volumes	**0**	**656**	**0**	**0**	**677**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1333**
2035 Base Volumes	**0**	**736**	**0**	**0**	**760**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1496**
New Trips - 2025 conditions		32			45	3						42	122
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		8			7	2						23	40
New Trips - 2035 conditions - Phase 1A		12			5								17
New Trips - 2035 conditions - Phase 2		6			21							15	42
New Trips - 2035 conditions - Phase 3		3			10							13	26
New Trips - 2035 conditions - Phase 4		23			20								43
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5		20			18								38
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**32**	**0**	**0**	**45**	**3**	**0**	**0**	**0**	**0**	**0**	**42**	**122**
Total New Trips - 2035 Conditions - Phases 1-4	0	52	0	0	63	2	0	0	0	0	0	51	168
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	72	0	0	81	2	0	0	0	0	0	51	**206**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution		-8			-8								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**44**	**0**	**0**	**55**	**2**	**0**	**0**	**0**	**0**	**0**	**51**	**152**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**64**	**0**	**0**	**73**	**2**	**0**	**0**	**0**	**0**	**0**	**51**	**190**
2025 Projected Volumes	**0**	**688**	**0**	**0**	**722**	**3**	**0**	**0**	**0**	**0**	**0**	**42**	**1455**
2035 Projected Volumes - Phases 1-4	**0**	**780**	**0**	**0**	**815**	**2**	**0**	**0**	**0**	**0**	**0**	**51**	**1648**
2035 Projected Volumes - Phases 1-5	**0**	**800**	**0**	**0**	**833**	**2**	**0**	**0**	**0**	**0**	**0**	**51**	**1686**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**337**	**0**	**0**	**369**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**706**
Balancing													0
2011 Existing Volumes	**0**	**337**	**0**	**0**	**369**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**706**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	33	0	0	40	0	0	0	0	0	0	0	73
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	78	0	0	89	0	0	0	0	0	0	0	167
Tractor Supply Outparcels Trip Distribution		2			2								4
Alden Place Trip Distribution													0
Sheetz Outparcels Trip Distribution		14			15								29
VA Medical Center		8			6								14
The Preserve at Historic Cornwall Village (Phase 1)		2			2								4
The Preserve at Historic Cornwall Village (Build-out)		5			6								11
Total Nearby Developments (2025 conditions)	0	26	0	0	25	0	0	0	0	0	0	0	51
Total Nearby Developments (2035 conditions)	0	29	0	0	29	0	0	0	0	0	0	0	58
2025 Base Volumes	**0**	**396**	**0**	**0**	**434**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**830**
2035 Base Volumes	**0**	**444**	**0**	**0**	**487**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**931**
New Trips - 2025 conditions		24			15	3						14	56
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1		8			3	2						8	21
New Trips - 2035 conditions - Phase 1A		9			8								17
New Trips - 2035 conditions - Phase 2		3			1								4
New Trips - 2035 conditions - Phase 3													0
New Trips - 2035 conditions - Phase 4		31			35								66
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5		26			30								56
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**24**	**0**	**0**	**15**	**3**	**0**	**0**	**0**	**0**	**0**	**14**	**56**
Total New Trips - 2035 Conditions - Phases 1-4	0	51	0	0	47	2	0	0	0	0	0	8	108
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	77	0	0	77	2	0	0	0	0	0	8	164
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution		-6			-6								
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**45**	**0**	**0**	**41**	**2**	**0**	**0**	**0**	**0**	**0**	**8**	**96**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**71**	**0**	**0**	**71**	**2**	**0**	**0**	**0**	**0**	**0**	**8**	**152**
2025 Projected Volumes	**0**	**420**	**0**	**0**	**449**	**3**	**0**	**0**	**0**	**0**	**0**	**14**	**886**
2035 Projected Volumes - Phases 1-4	**0**	**489**	**0**	**0**	**528**	**2**	**0**	**0**	**0**	**0**	**0**	**8**	**1027**
2035 Projected Volumes - Phases 1-5	**0**	**515**	**0**	**0**	**558**	**2**	**0**	**0**	**0**	**0**	**0**	**8**	**1083**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Cornwall Road (SR 2001) & Southern Driveway**

Synchro Node: **20** **Adjacent intersections:** **West** **0** **East** **0** **North** **21** **South** **7**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**392**	**0**	**0**	**308**	**0**	**700**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**392**	**0**	**0**	**308**	**0**	**700**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	47	0	0	22	0	69
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	80	0	0	45	0	125
Tractor Supply Outparcels Trip Distribution								2			2		4
Alden Place Trip Distribution								2			1		3
Sheetz Outparcels Trip Distribution								4			6		10
VA Medical Center								2			12		14
The Preserve at Historic Cornwall Village (Phase 1)								12			11		23
The Preserve at Historic Cornwall Village (Build-out)								35			32		67
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	22	0	0	32	0	54
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	45	0	0	53	0	98
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**461**	**0**	**0**	**362**	**0**	**823**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**517**	**0**	**0**	**406**	**0**	**923**
New Trips - 2025 conditions						45		5	45	71	8		174
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1						5		1	19	15	2		42
New Trips - 2035 conditions - Phase 1A						1		1					2
New Trips - 2035 conditions - Phase 2								3	9		1		13
New Trips - 2035 conditions - Phase 3								20	6		2		28
New Trips - 2035 conditions - Phase 4								20			16		36
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								17			11		28
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**45**	**0**	**5**	**45**	**71**	**8**	**0**	**174**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	6	0	45	34	15	21	0	121
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	6	0	62	34	15	32	0	149
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								6			3		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**51**	**34**	**15**	**24**	**0**	**130**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**68**	**34**	**15**	**35**	**0**	**158**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**45**	**0**	**466**	**45**	**71**	**370**	**0**	**997**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**568**	**34**	**15**	**430**	**0**	**1053**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**585**	**34**	**15**	**441**	**0**	**1081**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**316**	**0**	**0**	**437**	**0**	**753**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**316**	**0**	**0**	**437**	**0**	**753**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	19	0	0	44	0	63
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	40	0	0	82	0	122
Tractor Supply Outparcels Trip Distribution								2			3		5
Alden Place Trip Distribution								1			2		3
Sheetz Outparcels Trip Distribution								8			8		16
VA Medical Center								11			2		13
The Preserve at Historic Cornwall Village (Phase 1)								14			18		32
The Preserve at Historic Cornwall Village (Build-out)								39			42		81
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	36	0	0	33	0	69
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	61	0	0	57	0	118
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**371**	**0**	**0**	**514**	**0**	**885**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**417**	**0**	**0**	**576**	**0**	**993**
New Trips - 2025 conditions						63		7	14	49	5		138
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1						23		3	10	15	4		55
New Trips - 2035 conditions - Phase 1A						1		1		1	1		3
New Trips - 2035 conditions - Phase 2									1		7		8
New Trips - 2035 conditions - Phase 3								2	1		16		19
New Trips - 2035 conditions - Phase 4								50			74		124
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								44			57		101
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**63**	**0**	**7**	**14**	**49**	**5**	**0**	**138**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	24	0	55	12	16	102	0	209
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	24	0	99	12	16	159	0	**310**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Tractor Supply/Cedar Crest Square Redistribution								11			14		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**66**	**12**	**16**	**116**	**0**	**234**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**110**	**12**	**16**	**173**	**0**	**335**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**63**	**0**	**378**	**14**	**49**	**519**	**0**	**1023**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**483**	**12**	**16**	**692**	**0**	**1227**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**527**	**12**	**16**	**749**	**0**	**1328**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**181**	**0**	**0**	**230**	**0**	**411**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**181**	**0**	**0**	**230**	**0**	**411**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	2	0	2
Tractor Supply Outparcels Trip Distribution								4			4		8
Alden Place Trip Distribution								1			1		2
Sheetz Outparcels Trip Distribution								14			16		30
VA Medical Center								1			2		3
The Preserve at Historic Cornwall Village (Phase 1)								14			19		33
The Preserve at Historic Cornwall Village (Build-out)								39			48		87
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	34	0	0	42	0	76
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	59	0	0	71	0	130
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**215**	**0**	**0**	**272**	**0**	**487**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**240**	**0**	**0**	**303**	**0**	**543**
New Trips - 2025 conditions						36		4	15	46	5		106
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1						12		1	9	15	3		40
New Trips - 2035 conditions - Phase 1A						1		1		1			3
New Trips - 2035 conditions - Phase 2									1		7		1
New Trips - 2035 conditions - Phase 3								1	1				2
New Trips - 2035 conditions - Phase 4								88			101		189
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								76			76		152
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**36**	**0**	**4**	**15**	**46**	**5**	**0**	**106**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	13	0	91	11	16	104	0	235
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	0	0	0	13	0	167	11	16	180	0	387
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								12			14		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**103**	**11**	**16**	**118**	**0**	**261**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**179**	**11**	**16**	**194**	**0**	**413**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**36**	**0**	**219**	**15**	**46**	**277**	**0**	**593**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**343**	**11**	**16**	**421**	**0**	**804**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**419**	**11**	**16**	**497**	**0**	**956**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Cornwall Road (SR 2001) & Middle Right-In/Right-Out Driveway**

Synchro Node: **21** **Adjacent intersections:** **West** **0** **East** **0** **North** **14** **South** **20**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**392**	**0**	**0**	**308**	**0**	**700**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**392**	**0**	**0**	**308**	**0**	**700**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	47	0	0	22	0	69
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	80	0	0	45	0	125
Tractor Supply Outparcels Trip Distribution								2			2		4
Alden Place Trip Distribution								2			1		3
Sheetz Outparcels Trip Distribution								4			6		10
VA Medical Center								2			12		14
The Preserve at Historic Cornwall Village (Phase 1)								12			11		23
The Preserve at Historic Cornwall Village (Build-out)								35			32		67
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	22	0	0	32	0	54
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	45	0	0	53	0	98
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**461**	**0**	**0**	**362**	**0**	**823**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**517**	**0**	**0**	**406**	**0**	**923**
New Trips - 2025 conditions								50			79		129
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								6			17		23
New Trips - 2035 conditions - Phase 1A								2					2
New Trips - 2035 conditions - Phase 2								3			1		4
New Trips - 2035 conditions - Phase 3								20			2		22
New Trips - 2035 conditions - Phase 4			11					20			5	15	51
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5								17			11		28
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**50**	**0**	**0**	**79**	**0**	**129**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	11	0	0	0	0	51	0	0	25	15	102
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	11	0	0	0	0	68	0	0	36	15	130
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								6			3		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**57**	**0**	**0**	**28**	**15**	**111**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**74**	**0**	**0**	**39**	**15**	**139**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**511**	**0**	**0**	**441**	**0**	**952**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**574**	**0**	**0**	**434**	**15**	**1034**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**591**	**0**	**0**	**445**	**15**	**1062**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**316**	**0**	**0**	**437**	**0**	**753**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**316**	**0**	**0**	**437**	**0**	**753**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	19	0	0	44	0	63
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	40	0	0	82	0	122
Tractor Supply Outparcels Trip Distribution								2			3		5
Alden Place Trip Distribution								1			2		3
Sheetz Outparcels Trip Distribution								8			8		16
VA Medical Center								11			2		13
The Preserve at Historic Cornwall Village (Phase 1)								14			18		32
The Preserve at Historic Cornwall Village (Build-out)								39			42		81
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	36	0	0	33	0	69
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	61	0	0	57	0	118
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**371**	**0**	**0**	**514**	**0**	**885**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**417**	**0**	**0**	**576**	**0**	**993**
New Trips - 2025 conditions								70			54		124
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								26			19		45
New Trips - 2035 conditions - Phase 1A								1			2		3
New Trips - 2035 conditions - Phase 2											7		7
New Trips - 2035 conditions - Phase 3								2			16		18
New Trips - 2035 conditions - Phase 4			52					50			22	38	162
Pass-by Trips - 2035 conditions - Phase 4			(26)								(-26)	(11)	11
New Trips - 2035 conditions - Phase 5								44			57		101
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**70**	**0**	**0**	**54**	**0**	**124**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	52	0	0	0	0	79	0	0	66	38	235
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	26	0	0	0	0	0	0	0	-26	11	11
Total New Trips - 2035 Conditions - Phases 1-5	0	0	52	0	0	0	0	123	0	0	123	38	**336**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	26	0	0	0	0	0	0	0	-26	11	**11**
Tractor Supply/Cedar Crest Square Redistribution								11			14		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**78**	**0**	**0**	**0**	**0**	**90**	**0**	**0**	**54**	**49**	**271**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**78**	**0**	**0**	**0**	**0**	**134**	**0**	**0**	**111**	**49**	**372**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**441**	**0**	**0**	**568**	**0**	**1009**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**78**	**0**	**0**	**0**	**0**	**507**	**0**	**0**	**630**	**49**	**1264**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**78**	**0**	**0**	**0**	**0**	**551**	**0**	**0**	**687**	**49**	**1365**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**181**	**0**	**0**	**230**	**0**	**411**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**181**	**0**	**0**	**230**	**0**	**411**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	0	0	0	0	0	0
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	0	0	0	2	0	2
Tractor Supply Outparcels Trip Distribution								4			4		8
Alden Place Trip Distribution								1			1		2
Sheetz Outparcels Trip Distribution								14			16		30
VA Medical Center								1			2		3
The Preserve at Historic Cornwall Village (Phase 1)								14			19		33
The Preserve at Historic Cornwall Village (Build-out)								39			48		87
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	34	0	0	42	0	76
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	59	0	0	71	0	130
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**215**	**0**	**0**	**272**	**0**	**487**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**240**	**0**	**0**	**303**	**0**	**543**
New Trips - 2025 conditions								40			51		91
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								13			18		31
New Trips - 2035 conditions - Phase 1A								2			1		3
New Trips - 2035 conditions - Phase 2													0
New Trips - 2035 conditions - Phase 3								1					1
New Trips - 2035 conditions - Phase 4			71					88			30	65	254
Pass-by Trips - 2035 conditions - Phase 4			(17)								(-17)	(8)	8
New Trips - 2035 conditions - Phase 5								76			76		152
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**40**	**0**	**0**	**51**	**0**	**91**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	71	0	0	0	0	104	0	0	49	65	289
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	17	0	0	0	0	0	0	0	-17	8	8
Total New Trips - 2035 Conditions - Phases 1-5	0	0	71	0	0	0	0	180	0	0	125	65	441
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	17	0	0	0	0	0	0	0	-17	8	8
Tractor Supply/Cedar Crest Square Redistribution								12			14		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**88**	**0**	**0**	**0**	**0**	**116**	**0**	**0**	**46**	**73**	**323**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**88**	**0**	**0**	**0**	**0**	**192**	**0**	**0**	**122**	**73**	**475**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**255**	**0**	**0**	**323**	**0**	**578**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**88**	**0**	**0**	**0**	**0**	**356**	**0**	**0**	**349**	**73**	**866**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**88**	**0**	**0**	**0**	**0**	**432**	**0**	**0**	**425**	**73**	**1018**

TPD# BLAC.A.00001
4/24/2012
Traffic Volumes Worksheet

Intersection: **Cornwall Road (SR 2001) & Northern Right-In/Right-Out Driveway**

Synchro Node: **22** **Adjacent intersections:** **West** **0** **East** **0** **North** **8** **South** **14**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**460**	**0**	**0**	**405**	**0**	**865**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**460**	**0**	**0**	**405**	**0**	**865**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	59	0	0	39	0	98
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	102	0	0	76	0	178
Tractor Supply Outparcels Trip Distribution								2			2		4
Alden Place Trip Distribution								2			1		3
Sheetz Outparcels Trip Distribution								4			6		10
VA Medical Center								2			12		14
The Preserve at Historic Cornwall Village (Phase 1)								12			11		23
The Preserve at Historic Cornwall Village (Build-out)								35			32		67
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	22	0	0	32	0	54
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	45	0	0	53	0	98
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**541**	**0**	**0**	**476**	**0**	**1017**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**607**	**0**	**0**	**534**	**0**	**1141**
New Trips - 2025 conditions								50			79		129
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								22			67		89
New Trips - 2035 conditions - Phase 1A								17			5		22
New Trips - 2035 conditions - Phase 2								7			61		68
New Trips - 2035 conditions - Phase 3								16			153		169
New Trips - 2035 conditions - Phase 4								32			50		82
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5			5					28			13	30	76
Pass-by Trips - 2035 conditions - Phase 5													0
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**50**	**0**	**0**	**79**	**0**	**129**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	94	0	0	336	0	430
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	5	0	0	0	0	122	0	0	349	30	506
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	0	0	0	0	0	0	0	0	0	0	0
Tractor Supply/Cedar Crest Square Redistribution								6			7		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**100**	**0**	**0**	**343**	**0**	**443**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**128**	**0**	**0**	**356**	**30**	**519**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**591**	**0**	**0**	**555**	**0**	**1146**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**707**	**0**	**0**	**877**	**0**	**1584**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**735**	**0**	**0**	**890**	**30**	**1660**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**369**	**0**	**0**	**506**	**0**	**875**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**369**	**0**	**0**	**506**	**0**	**875**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	29	0	0	56	0	85
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	57	0	0	104	0	161
Tractor Supply Outparcels Trip Distribution								2			3		5
Alden Place Trip Distribution								1			2		3
Sheetz Outparcels Trip Distribution								8			8		16
VA Medical Center								11			2		13
The Preserve at Historic Cornwall Village (Phase 1)								14			18		32
The Preserve at Historic Cornwall Village (Build-out)								39			42		81
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	36	0	0	33	0	69
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	61	0	0	57	0	118
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**434**	**0**	**0**	**595**	**0**	**1029**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**487**	**0**	**0**	**667**	**0**	**1154**
New Trips - 2025 conditions								70			54		124
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								53			29		82
New Trips - 2035 conditions - Phase 1A								9			16		25
New Trips - 2035 conditions - Phase 2								47			8		55
New Trips - 2035 conditions - Phase 3								119			19		138
New Trips - 2035 conditions - Phase 4								143			125		268
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5			28					124			33	76	261
Pass-by Trips - 2035 conditions - Phase 5			(13)								(-22)	(22)	13
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**70**	**0**	**0**	**54**	**0**	**124**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	371	0	0	197	0	568
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	28	0	0	0	0	495	0	0	230	76	**829**
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	13	0	0	0	0	0	0	0	-22	22	**13**
Tractor Supply/Cedar Crest Square Redistribution								15			15		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**386**	**0**	**0**	**212**	**0**	**598**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**41**	**0**	**0**	**0**	**0**	**510**	**0**	**0**	**223**	**98**	**872**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**504**	**0**	**0**	**649**	**0**	**1153**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**873**	**0**	**0**	**879**	**0**	**1752**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**41**	**0**	**0**	**0**	**0**	**997**	**0**	**0**	**890**	**98**	**2026**

Time Period: Saturday Midday Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2010 Existing Counts	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**281**	**0**	**0**	**323**	**0**	**604**
Balancing													0
2011 Existing Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**281**	**0**	**0**	**323**	**0**	**604**
2025 Base growth (minimum of 1.16% compounded for 14 yrs)	0	0	0	0	0	0	0	15	0	0	15	0	30
2035 Base growth (minimum of 1.16% compounded for 24 yrs)	0	0	0	0	0	0	0	31	0	0	32	0	63
Tractor Supply Outparcels Trip Distribution								4			4		8
Alden Place Trip Distribution								1			1		2
Sheetz Outparcels Trip Distribution								14			16		30
VA Medical Center								1			2		3
The Preserve at Historic Cornwall Village (Phase 1)								14			19		33
The Preserve at Historic Cornwall Village (Build-out)								39			48		87
Total Nearby Developments (2025 conditions)	0	0	0	0	0	0	0	34	0	0	42	0	76
Total Nearby Developments (2035 conditions)	0	0	0	0	0	0	0	59	0	0	71	0	130
2025 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**330**	**0**	**0**	**380**	**0**	**710**
2035 Base Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**371**	**0**	**0**	**426**	**0**	**797**
New Trips - 2025 conditions								40			51		91
Pass-by Trips - 2025 conditions													0
New Trips - 2035 conditions - Phase 1								21			29		50
New Trips - 2035 conditions - Phase 1A								13			13		26
New Trips - 2035 conditions - Phase 2								1			3		4
New Trips - 2035 conditions - Phase 3								3			10		13
New Trips - 2035 conditions - Phase 4								194			217		411
Pass-by Trips - 2035 conditions - Phase 4													0
New Trips - 2035 conditions - Phase 5			37					167			56	131	391
Pass-by Trips - 2035 conditions - Phase 5			(8)								(-15)	(15)	8
Total Trip Distribution (2025 conditions)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**40**	**0**	**0**	**51**	**0**	**91**
Total New Trips - 2035 Conditions - Phases 1-4	0	0	0	0	0	0	0	232	0	0	272	0	504
Total Pass-by Trips - 2035 conditions - Phases 1-4	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - 2035 Conditions - Phases 1-5	0	0	37	0	0	0	0	399	0	0	328	131	895
Total Pass-by Trips - 2035 conditions - Phases 1-5	0	0	8	0	0	0	0	0	0	0	-15	15	8
Tractor Supply/Cedar Crest Square Redistribution								19			18		
Total Trip Distribution (2035 conditions - Phases 1-4)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**251**	**0**	**0**	**290**	**0**	**541**
Total Trip Distribution (2035 conditions - Phases 1-5)	**0**	**0**	**45**	**0**	**0**	**0**	**0**	**418**	**0**	**0**	**331**	**146**	**940**
2025 Projected Volumes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**370**	**0**	**0**	**431**	**0**	**801**
2035 Projected Volumes - Phases 1-4	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**622**	**0**	**0**	**716**	**0**	**1338**
2035 Projected Volumes - Phases 1-5	**0**	**0**	**45**	**0**	**0**	**0**	**0**	**789**	**0**	**0**	**757**	**146**	**1737**

APPENDIX I

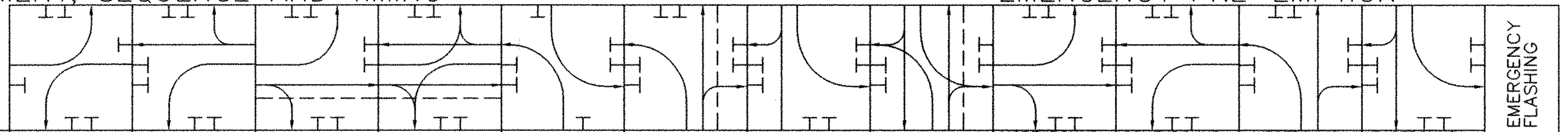
TRAFFIC SIGNAL DIAGRAMS

T024

Permit No. 88-13 Sheet 3 of 4
Date Issued 9-20-93 Date Revised 9/19/05

FILE: T024

MOVEMENT, SEQUENCE AND TIMING

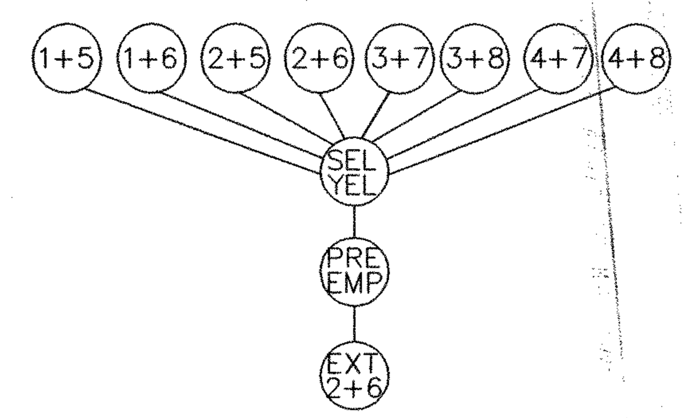


SIGNAL / INTERVAL	1+5: 1	2	3	1+6: 4	5	6	7	2+5: 8	9	10	11	2+6: 12	13	14	15	3+7: 16	17	18	3+8: 19	20	21	22	4+7: 23	24	25	4+8: 26	27	28	29
1	R/←G	R(1)/←Y	R(1)	G/←G	G/←G	Y(3)	R(4)	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
2	R	R	R	G	G	Y(4)	R(4)	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
3	R/←G	R(2)/←Y	R(2)	R	R	R	R	G/←G	G/←G	Y(3)	R(4)	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
4	R	R	R	R	R	R	R	G	G	Y(4)	R(4)	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
5	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R/←G	R(5)/←Y	R(5)	R	R	R	R	R/←G	R(7)/←Y	R(8)	G	G	Y	R
6	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y(8)	R(8)	G	G	Y	R
7	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R/←G	R(6)/←Y	R(6)	G/←G	G/←G	Y(7)	R(8)	R	R	R	G	G	Y	R
8	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	Y(8)	R(8)	R	R	R	G	G	Y	R
9,10	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	FH	H	H	H	H	H	M	FH	H	H
11,12	H	H	H	H	H	H	H	M	FH	H	H	M	FH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
FAIL SAFE LIGHT "A"	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FAIL SAFE LIGHT "B"	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FAIL SAFE LIGHT "C"	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FAIL SAFE LIGHT "D"	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FIXED		4.5	2			4.5	2			4.5	2			4.5	2		4	3			4	3		4	3			4	3
MINIMUM	7			7				7				15				7			7				7			7			
SEC/ACT.												2																	
MAX. INIT.												30																	
PASSAGE	4			4				4				6				4			4				4			4			
BFORE RED.												30																	
TO REDUCE												15																	
MIN. GAP												3.0																	
MAX I	15			15				15				75				15			15				15			15			
MAX II	15			15				15				76				15			15				15			30			
*PEDESTRIAN								(9)				12	11						(10)							12	16		
MEMORY	NON LOCK			NON LOCK				NON LOCK				MIN RECALL				NON LOCK			NON LOCK				NON LOCK			NON LOCK			

EMERGENCY PRE-EMPTION

SIGNAL / INTERVAL	NORTHBOUND PRE-EMPTION: 30	31	32	33	SOUTHBOUND PRE-EMPTION: 34	35	36	37	WESTBOUND PRE-EMPTION: 38	39	40	41	EASTBOUND PRE-EMPTION: 42	43	44	45	EMERGENCY FLASHING
1	SELECTIVE YELLOW	R	R	R	SELECTIVE YELLOW	G/←G	Y	R	SELECTIVE YELLOW	R	R	R	SELECTIVE YELLOW	R	R	R	Y
2		R	R	R		G	Y	R		R	R	R		R	R	R	Y
3		G/←G	Y	R		R	R	R		R	R	R		R	R	R	Y
4		G	Y	R		R	R	R		R	R	R		R	R	R	Y
5		R	R	R		R	R	R		R	R	R		G/←G	Y	R	R
6		R	R	R		R	R	R		R	R	R		G	Y	R	R
7		R	R	R		R	R	R		G/←G	Y	R		R	R	R	R
8		R	R	R		R	R	R		G	Y	R		R	R	R	R
9,10		H	H	H		H	H	H		H	H	H		H	H	H	OFF
11,12		H	H	H		H	H	H		H	H	H		H	H	H	OFF
FAIL SAFE LIGHT "A"	OFF	FLSH	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FAIL SAFE LIGHT "B"	OFF	OFF	OFF	OFF	OFF	FLSH	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FAIL SAFE LIGHT "C"	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	FLSH	OFF	OFF	OFF	OFF	OFF	OFF	OFF
FAIL SAFE LIGHT "D"	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	FLSH	OFF	OFF	OFF
FIXED	(11)	(12)	(13)	(13)	(11)	(12)	(13)	(13)	(11)	(12)	(13)	(13)	(11)	(12)	(13)	(13)	

MAX II OPERATES BETWEEN THE HOURS OF 2:15 PM AND 5:30 PM.



CONTROLLER NOTES:

1. R OVER ←G IF FOLLOWED BY PHASE 1+6.
2. R OVER ←G IF FOLLOWED BY PHASE 2+5.
3. G OVER ←Y IF FOLLOWED BY PHASE 2+6.
4. G IF FOLLOWED BY PHASE 2+6.
5. R OVER ←G IF FOLLOWED BY PHASE 4+7.
6. R OVER ←G IF FOLLOWED BY PHASE 3+8.
7. G OVER ←Y IF FOLLOWED BY PHASE 4+8.
8. G IF FOLLOWED BY PHASE 4+8.
9. TIMING WILL BE AS SHOWN IN PHASE 2+6. IT MAY TIMEOUT IN THIS PHASE OR BE COMPLETED IN PHASE 2+6.
10. TIMING WILL BE AS SHOWN IN PHASE 4+8. IT MAY TIME OUT IN THIS PHASE OR BE COMPLETED IN PHASE 4+8.
11. SELECTIVE CLEARANCE INTERVAL INCLUDES THE NORMAL ALL-RED PHASE INTERVAL
12. FOR DURATION OF PRE-EMPTION
13. NORMAL YELLOW AND ALL-RED PHASE TIMING SHALL BE UTILIZED

EMERGENCY PRE-EMPTION NOTES:

Controller to be equipped with emergency pre-emption for the northbound & southbound approaches of Quentin Road and the eastbound and westbound approaches of Rocherty Road with a fail safe device for each direction of operation.

This fail-safe shall consist of a flashing white flood light, and shall begin flashing when the preemption phase displays preemption green for the emergency vehicle approach. Location of the emergency vehicle detectors are to be field adjusted to achieve maximum operation.

The signals, when activated by an emergency vehicle, shall terminate all green indications, except the green indications for the phase governed by the approaching emergency vehicle, followed by selective clearances dependent upon the phase in which the pre-emption occurs. The "green" indications for the pre-empted phase shall remain "green" for the duration of signal pre-emption and "red" indications displayed for other phases.

The signals when activated by an emergency vehicle shall all time out all yellow and red indications, followed by the green interval of the pre-emption phase governed by the approaching emergency vehicle.

If signals have been actuated by pedestrian pushbutton, and the signal is pre-empted, the pedestrian time shall time out followed by the appropriate selective clearances, before going into emergency pre-emption.

If the signals, when activated by an emergency vehicle, are flashing, all signals shall remain flashing.

Upon completion of the pre-emption phase in returning to normal operation, phase 2+6 interval 12 shall follow.

In emergency pre-emption, no priority shall be established, pre-emption shall be a "first come, first serve" operation.

GENERAL NOTES

Installation, operation and maintenance of this traffic signal shall be in accordance with Pennsylvania Department of Transportation Regulations on Official Traffic Control Devices.

No modifications of this installation is permitted unless prior approval is granted, in writing, by the Department.

All maintenance necessary for proper visibility of the signals, including trimming trees, is the responsibility of the Permittee.

All signs and pavement markings indicated on this drawing are considered part of the permit and shall be installed and maintained by the Permittee, unless otherwise indicated. Except the longitudinal pavement markings on State highways which will be maintained by the Department.

Post mounted signals shall be installed with the signal heads a minimum of 2 feet behind the face of the curb or edge of the shoulder. Support poles for overhead signals shall also have a minimum horizontal clearance of 2 feet.

The bottom of signal heads and signs erected over the roadway shall not be less than 15 feet nor more than 19 feet above the roadway.

The bottom of post mounted signal heads shall not be less than 8 feet nor more than 15 feet above the sidewalk or pavement grade.

The minimum horizontal distance between signal heads measured at right angles to the approach shall be 8 feet.

Permittee shall obtain a Highway Occupancy Permit for Embankment Removal, Curbing and or Sidewalk, Drainage Structures, changes in Highway Geometry, Pavement Widening, or Installation of additional lanes.

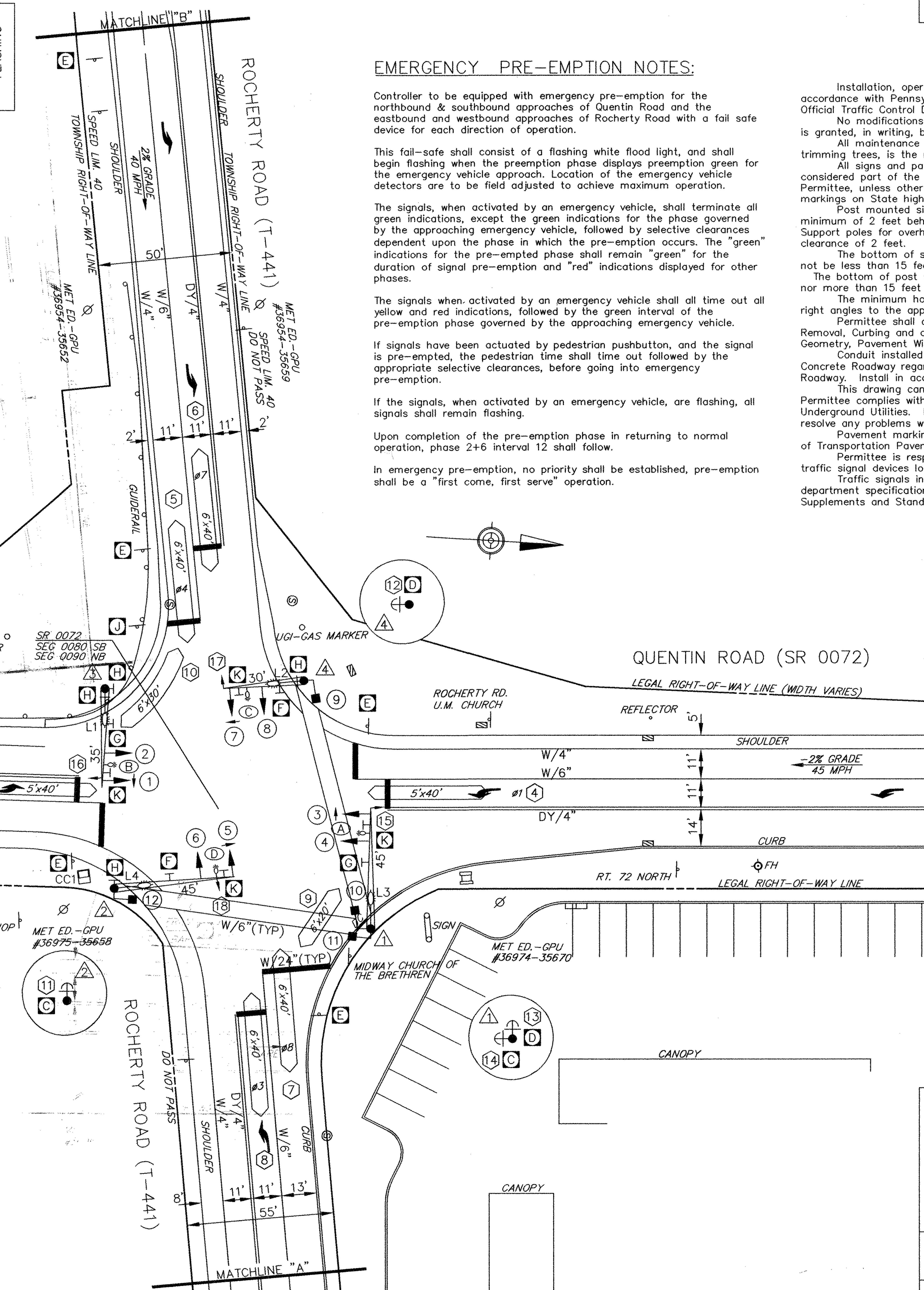
Conduit installed in Bituminous Roadway less than 5 years old, or Concrete Roadway regardless of age, must be Bored or Jacked under the Roadway. Install in accordance with Traffic Signal Standards TC-7800 Series.

This drawing cannot be used as a construction drawing unless the Permittee complies with the provisions of Act 187, Prevention of Damage to Underground Utilities. Prior to construction, consult with utility companies to resolve any problems which may be created due to the location of utilities.

Pavement markings shall be placed in accordance with the Department of Transportation Pavement Marking Handbook.

Permittee is responsible for obtaining approval of the installation of traffic signal devices located outside highway right-of-way.

Traffic signals installed using Liquid Fuels Tax Funds must conform to department specifications as set forth in current Publication 408, Supplements and Standard Drawings.



LEGEND

- Mast Arm
- Strain Pole
- Pedestal
- Vehicular Signal Head
- Pedestrian Signal Head
- Sign
- Vehicle Detector
- Pedestrian Push Button
- Controller Assembly
- W/4" — Solid White Line/Width
- BW/4" — Broken White Line/Width
- Y/4" — Solid Yellow Line/Width
- BY/4" — Broken Yellow Line/Width
- DY/4" — Double Solid Yellow Line/Width
- Junction Box
- Luminaire
- Emergency Pre-emption Detector
- Emergency Pre-emption Fail Safe

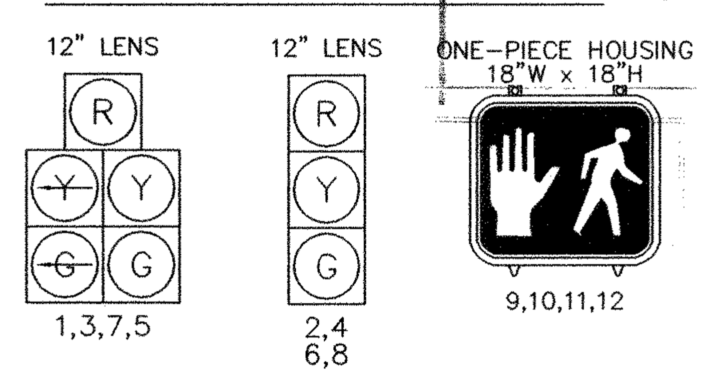
CONTROLLER NOTES:

1. DETECTOR 1 CALLS AND EXTENDS ø2, PRESENCE
2. DETECTOR 2 CALLS AND EXTENDS ø6, PRESENCE
3. DETECTOR 3 CALLS AND EXTENDS ø5, PRESENCE
4. DETECTOR 4 CALLS AND EXTENDS ø1, PRESENCE
5. DETECTOR 5 CALLS AND EXTENDS ø4, PRESENCE
6. DETECTOR 6 CALLS AND EXTENDS ø7, PRESENCE
7. DETECTOR 7 CALLS AND EXTENDS ø8, PRESENCE
8. DETECTOR 8 CALLS AND EXTENDS ø3, PRESENCE
9. DETECTOR 9 CALLS AND EXTENDS ø8, 4 SEC DELAY, PRESENCE
10. DETECTOR 10 CALLS AND EXTENDS ø4, 4 SEC DELAY, PRESENCE

SIGNS

Plan Symbol	Description	Size W x H	Series Designation
A	LEFT LANE MUST TURN LEFT	30"X30"	R3-7L
B	SIGNAL AHEAD SIGN	48"X48"	W3-3
C	PUSH BUTTON FOR GREEN LIGHT ←	9"X12"	R10-3
D	PUSH BUTTON FOR GREEN LIGHT →	9"X12"	R10-3
E	LANE USE CONTROL SIGN	30"X30"	R3-8A(L-SR)
F	Quentin Rd	96"X16"	D3-4
G	Rocherty Rd	96"X16"	D3-4
H	NO PEDESTRIAN CROSSING	24"X24"	R9-3A
J	STOP HERE ON RED	24"X30"	R10-6L
K	LEFT TURN YIELD ON GREEN ●	30"X36"	R10-12

SIGNAL INDICATIONS



SIGNALS TO BE EQUIPPED WITH BACKPLATES 5,6,7,8

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS ______

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS AND LOUVERS ______

Scale: 1"=25' 0 25 50 75

FILE: T024

County, LEBANON

Municipality, NORTH CORNWALL TOWNSHIP

Intersection, QUENTIN ROAD (SR 0072) AND ROCHERTY ROAD (T-441)

Reviewed, [signature] 12/6-04
Municipal Official Date

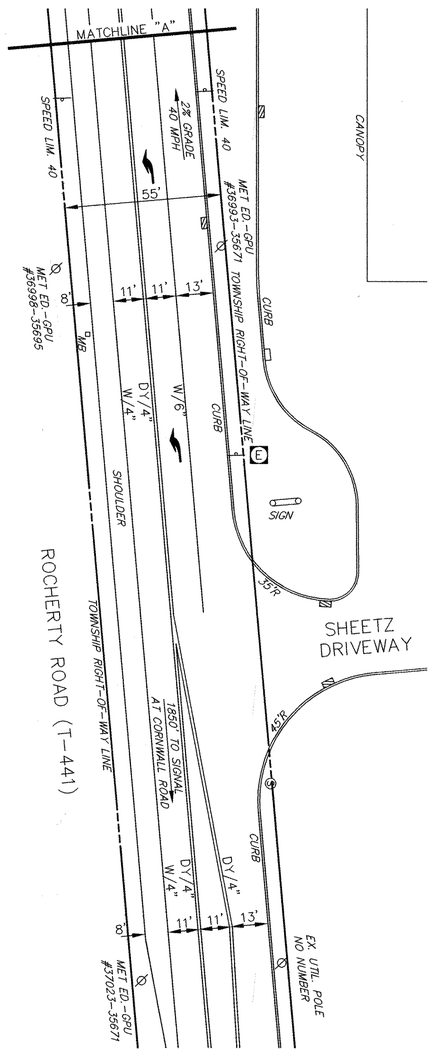
Recommended, [signature] 12/9/04
District Traffic Engineer Date

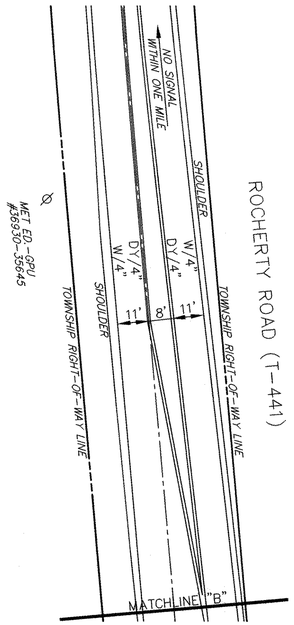
DRAWING: F:\Data\DWG\TT\TT005\PennDOT\SignalPlan.dwg - PLOTTED: Dec 03, 2004 3:27 pm

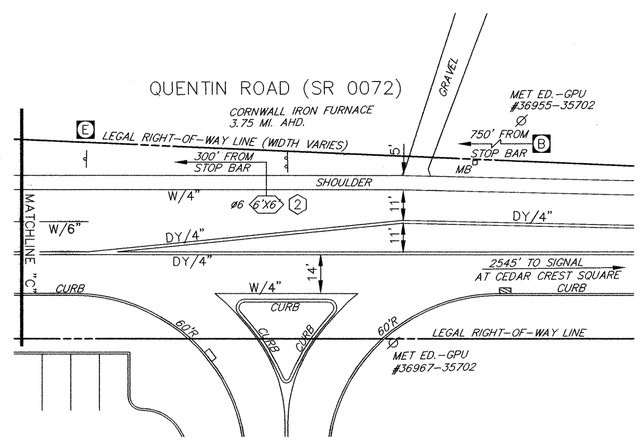
T 024

Permit No. 88-13 Sheet 4 of 4
Date Issued 9-20-93 Date Revised 9/19/05

FILE: T024







Scale: 1"=25' 0 25 50 75

FILE: T024

County, LEBANON
Municipality, NORTH CORNWALL TOWNSHIP
Intersection, QUENTIN ROAD (SR 0072) AND ROCHERTY ROAD

Reviewed, Robert L. Stoltz — Municipal Official — 12/6-04 Date

Recommended, for District Traffic Engineer — 12/9/04 Date

DRAWING: F:\Data\DN6\TT\TT0005\PennDOTSignalPlan.dwg - PLOTTED: Dec 09, 2004 3:28 pm

PERMIT NO.:	88-13	SHEET	2	OF	4
DATE ISSUED:	9/20/1993	DATE REVISED:			

COORDINATION PROGRAM

EVENT NO.	DAY OF WEEK M	T	W	T	F	S	S	TIME	CYCLE	SPLIT	OFFSET	REMARKS
1	X	X	X	X	X	X	X	0:00				FREE
2	X	X	X	X	X			15:00	1	1	1	PM 140
3	X	X	X	X	X			17:30				FREE
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												

OFFSETS (SEC.)

	CYCLE NO.:	1	2	3	4	5	6
	LENGTH: (SEC.)	140					
OFFSET	1	90					

SPLITS (SEC.)

CYCLE	SPLIT	PHASE 1	2	3	4	5	6	7	8
1	1	12	73	15	40	58	27	15	40

OFFSET REFERENCED TO:
Strart of Yellow Phase 2+6.

* PHASE TIME INCLUDES CHANGE AND CLEARANCE INTERVAL TIMES

MASTER: SR 0072, Cedar Crest Square Service Rd. and Lowes Service Rd.

FILE: T-024

COUNTY:
Lebanon

MUNICIPALITY:
North Cornwall Township

INTERSECTION:
Quentin Road (SR 0072)
and Rocherty Road (T-441)

Permit No. 88-30 Sheet 3 of 3
Date Issued 3/3/06 Date Revised _____

FILE: T-041

MOVEMENT, SEQUENCE AND TIMING EMERGENCY PRE-EMPTION

PHASE	1+6				2+6⑥				4+8				NORTH BOUND PRE-EMPTION				SOUTH BOUND PRE-EMPTION				EMERGENCY FLASHING
INTERVAL / SIGNAL	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
1,2	R	R	R	R	G	G	Y	R	R	R	R	R	SELECTIVE CLEARANCE	G	Y	R	SELECTIVE CLEARANCE	R	R	R	Y
3	~~G~~	~~G~~	~~Y~~	~~R~~ ②	G	G	Y	R	R	R	R	R		R	R	R		~~Y~~	Y	R	Y
4	G	G	Y	~~R~~ ②	G	G	Y	R	R	R	R	R		R	R	R		G	Y	R	Y
5,6	R	R	R	R	R	R	R	R	G	G	Y	R		R	R	R		R	R	R	R
13	~~G~~	~~G~~	~~Y~~	R	R	R	R	R	G	G	Y	R		R	R	R		R	R	R	OFF
7,8	R	R	R	R	R	R	R	R	G	G	Y	R		R	R	R		R	R	R	R
9,10	H	H	H	H	M	FH	H	H	H	H	H	H		H	H	H		H	H	H	OFF
11,12	H	H	H	H	H	H	H	H	M	FH	H	H		H	H	H		H	H	H	OFF
FAIL SAFE LIGHT "A"	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	FLSH	OFF	OFF	OFF	OFF	OFF	OFF	
FAIL SAFE LIGHT "B"	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	FLSH	OFF	OFF	
FIXED			5	2			5	2			4	3	③	④	⑤	⑤	③	④	⑤	⑤	
MINIMUM	7				15				7												
SEC/ACT.					3																
MAX. INIT.					30																
PASSAGE	6				6				4												
BFORE RED.					30																
TO REDUCE					15																
MIN. GAP					3																
MAX I	15				60				12												
*PEDESTRIAN					11	14			11	13											
MEMORY	NON-LOCK				MIN. RECALL				NON-LOCK												

*UPON PEDESTRIAN ACTUATION, OTHERWISE HAND INDICATION AT ALL TIMES

M – MAN
H – HAND
FH – FLASHING HAND

DETECTOR NOTES

1. DETECTOR 1 CALLS AND EXTENDS PHASE 2, PRESENCE.
2. DETECTOR 2 CALLS AND EXTENDS PHASE 6, PRESENCE.
3. DETECTOR 3 CALLS AND EXTENDS PHASE 1, PRESENCE.
4. DETECTOR 4 CALLS AND EXTENDS PHASE 4, PRESENCE, 4 SEC DELAY.
5. DETECTOR 5 CALLS AND EXTENDS PHASE 4, PRESENCE, 4 SEC DELAY.
6. DETECTOR 6 CALLS AND EXTENDS PHASE 8, PRESENCE, 4 SEC DELAY.
7. DETECTOR 7 CALLS AND EXTENDS PHASE 8, PRESENCE, 4 SEC. DELAY.
8. DETECTOR 15 CALLS AND EXTENDS PHASE 8, PRESENCE, 4 SEC DELAY.

CONTROLLER NOTES

① G OVER ✳ IF FOLLOWED BY PHASE 2+6.
② G IF FOLLOWED BY PHASE 2+6.
③ SELECTIVE CLEARANCE INTERVAL INCLUDES THE NORMAL ALL-RED PHASE INTERVAL
④ FOR DURATION OF PRE-EMPTION
⑤ NORMAL YELLOW AND ALL-RED PHASE TIMING SHALL BE UTILIZED
⑥ PHASE 6 ON, OMITS PHASE 1

EMERGENCY PRE-EMPTION NOTES:

CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND & SOUTHBOUND APPROACHES OF QUENTIN ROAD WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.

THIS FAIL-SAFE SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL BEGIN FLASHING WHEN THE PREEMPTION PHASE DISPLAYS PREEMPTION GREEN FOR THE EMERGENCY VEHICLE APPROACH. LOCATION OF THE EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.

THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS, EXCEPT THE GREEN INDICATIONS FOR THE PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE, FOLLOWED BY SELECTIVE CLEARANCES DEPENDENT UPON THE PHASE IN WHICH THE PRE-EMPTION OCCURS. THE "GREEN" INDICATIONS FOR THE PRE-EMPTED PHASE SHALL REMAIN "GREEN" FOR THE DURATION OF SIGNAL PRE-EMPTION AND "RED" INDICATIONS DISPLAYED FOR OTHER PHASES.

THE SIGNALS WHEN ACTIVATED BY AN EMERGENCY VEHICLE SHALL ALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.

IF SIGNALS HAVE BEEN ACTUATED BY PEDESTRIAN PUSHBUTTON, AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES, BEFORE GOING INTO EMERGENCY PRE-EMPTION.

IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING, ALL SIGNALS SHALL REMAIN FLASHING.

UPON COMPLETION OF THE PRE-EMPTION PHASE IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 5 SHALL FOLLOW.

IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

GENERAL NOTES

Installation, operation and maintenance of this traffic signal shall be in accordance with Pennsylvania Department of Transportation Regulations on Official Traffic Control Devices.

No modifications of this installation is permitted unless prior approval is granted, in writing, by the Department.

All maintenance necessary for proper visibility of the signals, including trimming trees, is the responsibility of the Permittee.

All signs and pavement markings indicated on this drawing are considered part of the permit and shall be installed and maintained by the Permittee, unless otherwise indicated. Except the longitudinal pavement markings on State highways which will be maintained by the Department.

Post mounted signals shall be installed with the signal heads a minimum of 2 feet behind the face of the curb or edge of the shoulder. Support poles for overhead signals shall also have a minimum horizontal clearance of 2 feet.

The bottom of signal heads and signs erected over the roadway shall not be less than 15 feet nor more than 19 feet above the roadway.

The bottom of post mounted signal heads shall not be less than 8 feet nor more than 15 feet above the sidewalk or pavement grade.

The minimum horizontal distance between signal heads measured at right angles to the approach shall be 8 feet.

Permittee shall obtain a Highway Occupancy Permit for Embankment Removal, Curbing and or Sidewalk, Drainage Structures, changes in Highway Geometry, Pavement Widening, or Installation of additional lanes.

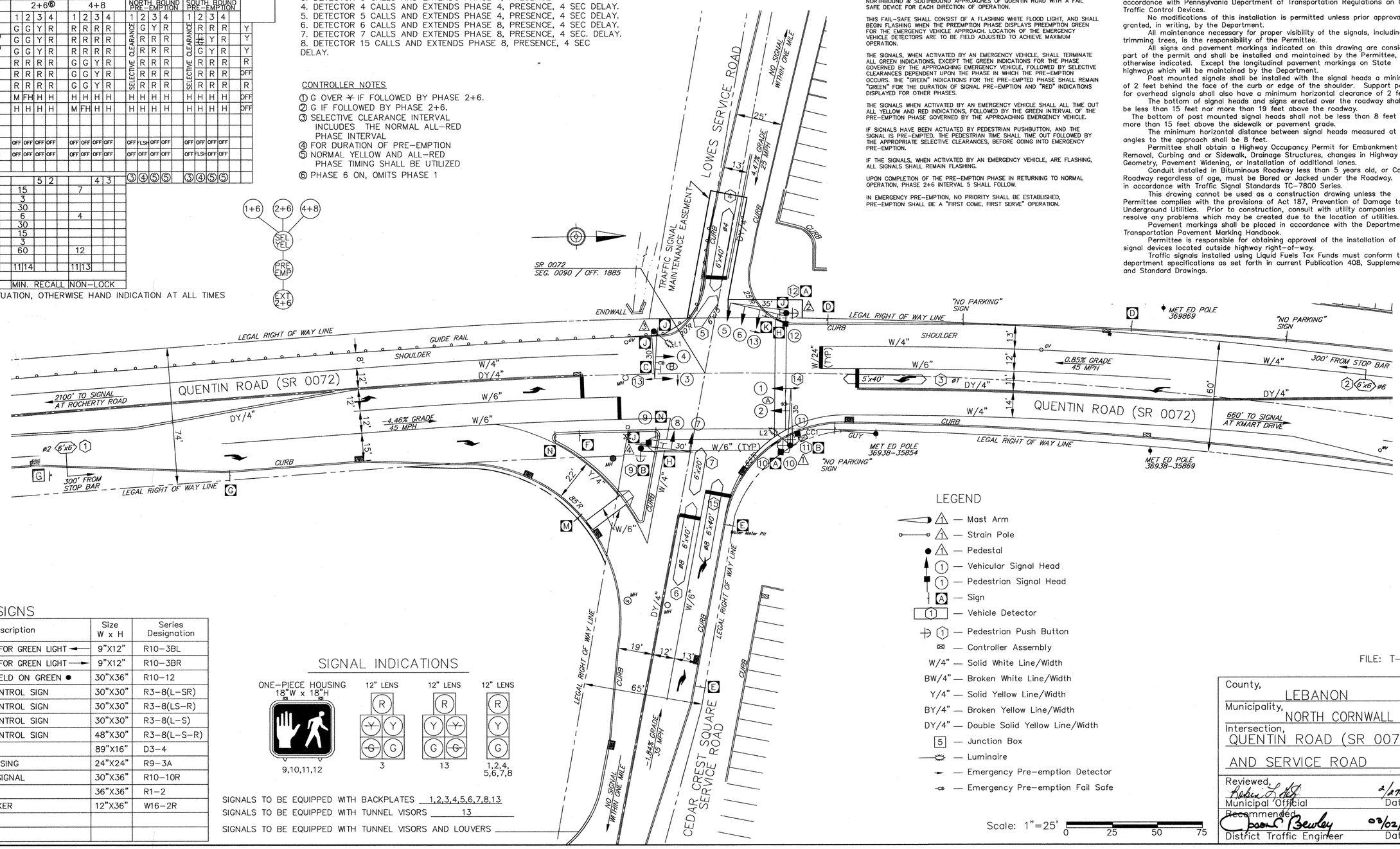
Conduit installed in Bituminous Roadway less than 5 years old, or Concrete Roadway regardless of age, must be Bored or Jacked under the Roadway. Install in accordance with Traffic Signal Standards TC-7800 Series.

This drawing cannot be used as a construction drawing unless the Permittee complies with the provisions of Act 187, Prevention of Damage to Underground Utilities. Prior to construction, consult with utility companies to resolve any problems which may be created due to the location of utilities.

Pavement markings shall be placed in accordance with the Department of Transportation Pavement Marking Handbook.

Permittee is responsible for obtaining approval of the installation of traffic signal devices located outside highway right-of-way.

Traffic signals installed using Liquid Fuels Tax Funds must conform to department specifications as set forth in current Publication 408, Supplements and Standard Drawings.



SIGNS

Plan Symbol	Description	Size W x H	Series Designation
A	PUSH BUTTON FOR GREEN LIGHT ←	9"X12"	R10-3BL
B	PUSH BUTTON FOR GREEN LIGHT →	9"X12"	R10-3BR
C	LEFT TURN YIELD ON GREEN ●	30"X36"	R10-12
D	LANE USE CONTROL SIGN	30"X30"	R3-8(L-SR)
E	LANE USE CONTROL SIGN	30"X30"	R3-8(LS-R)
F	LANE USE CONTROL SIGN	30"X30"	R3-8(L-S)
G	LANE USE CONTROL SIGN	48"X30"	R3-8(L-S-R)
H	Quentin Rd	89"X16"	D3-4
J	NO PED CROSSING	24"X24"	R9-3A
K	RIGHT TURN SIGNAL	30"X36"	R10-10R
M	YIELD	36"X36"	R1-2
N	HAZARD MARKER	12"X36"	W16-2R

SIGNAL INDICATIONS

SIGNALS TO BE EQUIPPED WITH BACKPLATES 1,2,3,4,5,6,7,8,13
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS 13
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS AND LOUVERS _____

LEGEND

- Mast Arm
- Strain Pole
- Pedestal
- Vehicular Signal Head
- Pedestrian Signal Head
- Sign
- Vehicle Detector
- Pedestrian Push Button
- Controller Assembly
- W/4" — Solid White Line/Width
- BW/4" — Broken White Line/Width
- Y/4" — Solid Yellow Line/Width
- BY/4" — Broken Yellow Line/Width
- DY/4" — Double Solid Yellow Line/Width
- Junction Box
- Luminaire
- Emergency Pre-emption Detector
- Emergency Pre-emption Fail Safe

Scale: 1"=25' 0 25 50 75

FILE: T-041

County, LEBANON
Municipality, NORTH CORNWALL TWP.
Intersection, QUENTIN ROAD (SR 0072) AND SERVICE ROAD

Reviewed, Robert L. Kelly — Municipal Official — 2/27-06 Date
Recommended, Jason L. Bewley — District Traffic Engineer — 03/02/06 Date

PERMIT NO.:	88-30	SHEET	2	OF	3
DATE ISSUED:	3/8/2006	DATE REVISED:			

COORDINATION PROGRAM

EVENT NO.	DAY OF WEEK M	T	W	T	F	S	S	TIME	CYCLE	SPLIT	OFFSET	REMARKS
1	X	X	X	X	X	X	X	0:00				FREE
2	X	X	X	X	X			15:00	1	1	1	Coord
3	X	X	X	X	X			17:30				FREE
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												

OFFSETS (SEC.)

	CYCLE NO.:	1	2	3	4	5	6
	LENGTH: (SEC.)	70					
OFFSET	1	20					

SPLITS (SEC.)

CYCLE	SPLIT	PHASE 1	2	3	4	5	6	7	8
1	1	13	36		21		49		21

OFFSET REFERENCED TO:
Start of Yellow Phase 2+6.

* PHASE TIME INCLUDES CHANGE AND CLEARANCE INTERVAL TIMES

MASTER: At this intersection

FILE: T-041

COUNTY:
Lebanon

MUNICIPALITY:
North Cornwall Township

INTERSECTION:
Quentin Road (SR 0072), Lowes Service Rd. & Cedar Crest Square Service Rd.

T-012

PERMIT NO. 88-5	SHEET 3 OF 4
DATE ISSUED 11-20-89	DATE REVISED 3/1/01

FILE T012

MOVEMENT, PHASING, AND SEQUENCE CHART

PHASE	1+5			1+6			2+5			2+6			3+7			3+8			4+7			4+8			EMERGENCY FLASH
SIGNAL INTERVAL	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
1	Ac Y Y R	Ac Y Y R	Ac Y Y R	Ac Y Y R	Ac Y Y R	Ac Y Y R	R R R	R R R	R R R	G Y R	G Y R	G Y R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	Y
2	R R R	R R R	R R R	G Y R	G Y R	G Y R	R R R	R R R	R R R	G Y R	G Y R	G Y R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	Y
3	Ac Y Y R	Ac Y Y R	Ac Y Y R	R R R	R R R	R R R	Ac Y Y R	Ac Y Y R	Ac Y Y R	G Y R	G Y R	G Y R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	Y
4	R R R	R R R	R R R	R R R	R R R	R R R	G Y R	G Y R	G Y R	G Y R	G Y R	G Y R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	Y
5	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	Ac Y Y R	Ac Y Y R	Ac Y Y R	Ac Y Y R	Ac Y Y R	Ac Y Y R	R R R	R R R	R R R	G Y R	G Y R	G Y R	R
6	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	G Y R	G Y R	G Y R	R R R	R R R	R R R	G Y R	G Y R	G Y R	R
7	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	Ac Y Y R	Ac Y Y R	Ac Y Y R	R R R	R R R	R R R	Ac Y Y R	Ac Y Y R	Ac Y Y R	G Y R	G Y R	G Y R	R
8	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	G Y R	G Y R	G Y R	G Y R	G Y R	G Y R	R
9	R R R	R R R	R R R	G Y R	G Y R	G Y R	R R R	R R R	R R R	G Y R	G Y R	G Y R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	Y
10	R R R	R R R	R R R	R R R	R R R	R R R	G Y R	G Y R	G Y R	G Y R	G Y R	G Y R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	Y
11	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	G Y R	G Y R	G Y R	R R R	R R R	R R R	G Y R	G Y R	G Y R	R
12	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	R R R	G Y R	G Y R	G Y R	G Y R	G Y R	G Y R	R
FIXED		3.0	1.9		3.0	1.9		3.0	1.9		4.5	1.9		3.0	2.1		3.0	2.1		3.0	2.1		3.8	2.1	
MINIMUM	3			3			3			15			3			3			3			3			
ADDED INIT	–			–			–			2.0			–			–			–			–			
MAX INITIAL	–			–			–			35			–			–			–			–			
PASSAGE	3			3			3			6			3			3			3			3			
TBR	–			–			–			55			–			–			–			–			
TTR	–			–			–			15			–			–			–			–			
MIN GAP	–			–			–			3.5			–			–			–			–			
MAX I	15			15			15			50			18			18			18			18			
* PEDESTRIAN	–			G			G			18			–			G			G			18			
MEMORY	NON–LOCK			NON–LOCK			NON–LOCK			MIN RECALL			NON–LOCK			NON–LOCK			NON–LOCK			DUAL ENTRY			

* UPON PEDESTRIAN ACTUATION ONLY

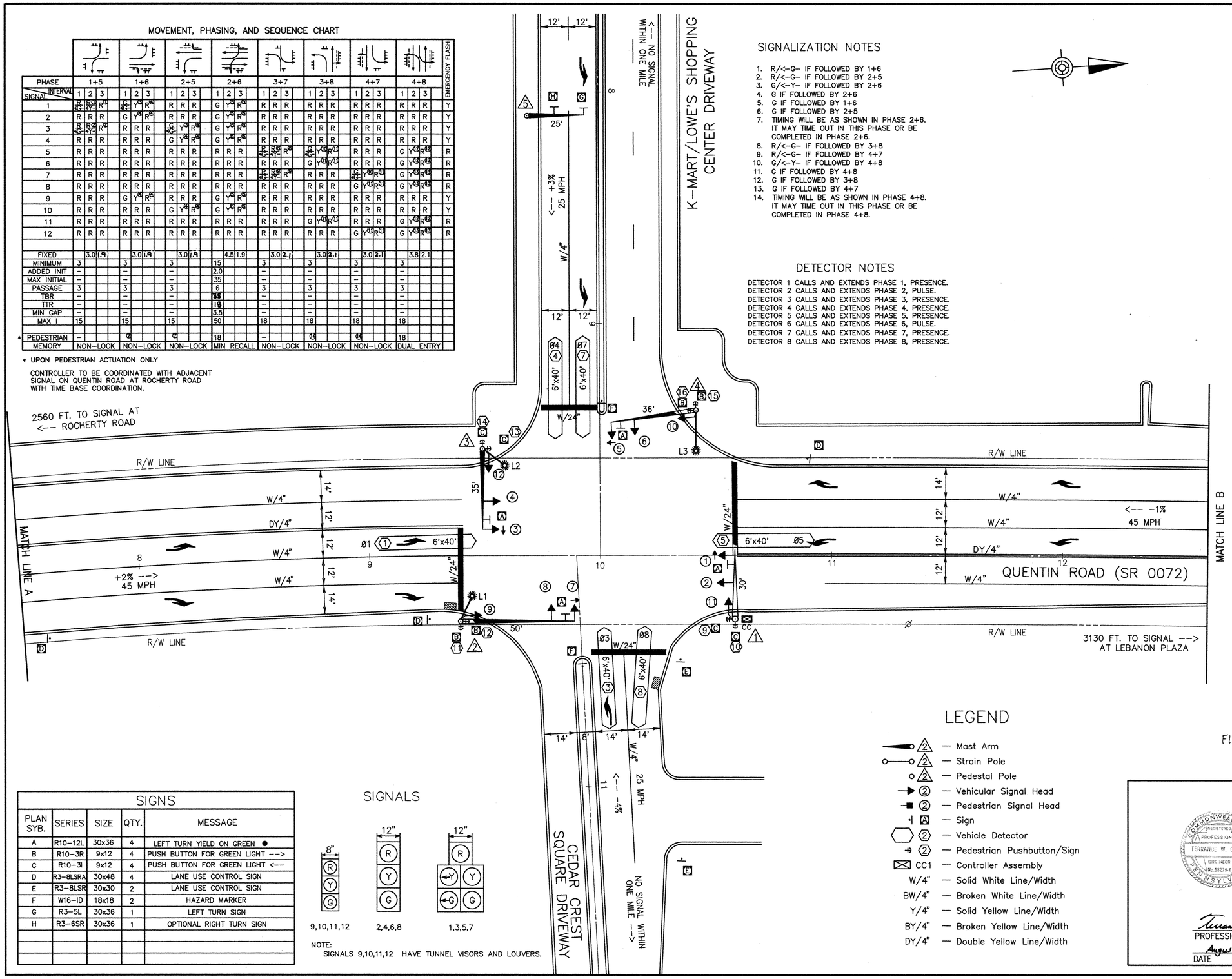
CONTROLLER TO BE COORDINATED WITH ADJACENT SIGNAL ON QUENTIN ROAD AT ROCHERTY ROAD WITH TIME BASE COORDINATION.

SIGNALIZATION NOTES

1. R/<–G– IF FOLLOWED BY 1+6
2. R/<–G– IF FOLLOWED BY 2+5
3. G/<–Y– IF FOLLOWED BY 2+6
4. G IF FOLLOWED BY 2+6
5. G IF FOLLOWED BY 1+6
6. G IF FOLLOWED BY 2+5
7. TIMING WILL BE AS SHOWN IN PHASE 2+6. IT MAY TIME OUT IN THIS PHASE OR BE COMPLETED IN PHASE 2+6.
8. R/<–G– IF FOLLOWED BY 3+8
9. R/<–G– IF FOLLOWED BY 4+7
10. G/<–Y– IF FOLLOWED BY 4+8
11. G IF FOLLOWED BY 4+8
12. G IF FOLLOWED BY 3+8
13. G IF FOLLOWED BY 4+7
14. TIMING WILL BE AS SHOWN IN PHASE 4+8. IT MAY TIME OUT IN THIS PHASE OR BE COMPLETED IN PHASE 4+8.

DETECTOR NOTES

DETECTOR 1 CALLS AND EXTENDS PHASE 1, PRESENCE.
DETECTOR 2 CALLS AND EXTENDS PHASE 2, PULSE.
DETECTOR 3 CALLS AND EXTENDS PHASE 3, PRESENCE.
DETECTOR 4 CALLS AND EXTENDS PHASE 4, PRESENCE.
DETECTOR 5 CALLS AND EXTENDS PHASE 5, PRESENCE.
DETECTOR 6 CALLS AND EXTENDS PHASE 6, PULSE.
DETECTOR 7 CALLS AND EXTENDS PHASE 7, PRESENCE.
DETECTOR 8 CALLS AND EXTENDS PHASE 8, PRESENCE.



GENERAL NOTES

INSTALLATION, OPERATION AND MAINTENANCE OF THIS TRAFFIC SIGNAL SHALL BE IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION REGULATIONS ON OFFICIAL TRAFFIC CONTROL DEVICES.

NO MODIFICATION OF THIS INSTALLATION IS PERMITTED UNLESS PRIOR APPROVAL IS GRANTED, IN WRITING, BY THE DEPARTMENT.

ALL MAINTENANCE NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS, INCLUDING TRIMMING TREES, IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED BY THE PERMITTEE, UNLESS OTHERWISE INDICATED. EXCEPT THE LONGITUDINAL PAVEMENT MARKINGS ON STATE HIGHWAYS, WHICH WILL BE MAINTAINED BY THE DEPARTMENT.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF THE CURB OR EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM HORZONTAL CLEARANCE OF 2 FEET.

THE BOTTOM OF SIGNAL HEADS AND SIGNS ERECTED OVER THE ROADWAY SHALL NOT BE LESS THAN 15 FEET NOR MORE THAN 19 FEET ABOVE THE ROADWAY. THE BOTTOM OF POST MOUNTED SIGNAL HEADS SHALL NOT BE LESS THAN 8 FEET NOR MORE THAN 15 FEET ABOVE THE SIDEWALK OR PAVEMENT GRADE.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNAL HEADS, MEASURED AT RIGHT ANGLES TO THE APPROACH, SHALL BE 8 FEET.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR EMBANKMENT REMOVAL, CHANGES IN HIGHWAY GEOMETRY, PAVEMENT WIDENING, OR INSTALLATION OF ADDITIONAL LANES.

CONDUIT INSTALLED IN ASPHALT ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC–7800 SERIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 38, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, CONSULT WITH UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORTATION PAVEMENT MARKING HANDBOOK.

PERMITTEE IS RESPONSIBLE FOR OBTAINING APPROVAL FOR INSTALLATION OF TRAFFIC SIGNAL DEVICES LOCATED OUTSIDE HIGHWAY RIGHT–OF–WAY.

TRAFFIC SIGNALS INSTALLED USING LIQUID FUELS TAX FUNDS MUST CONFORM TO DEPARTMENT SPECIFICATIONS AS SET FORTH IN CURRENT PUBLICATION 408, SUPPLEMENTS AND STANDARD DRAWINGS.

SCALE 0 20 40 60

SIGNS

PLAN SYB.	SERIES	SIZE	QTY.	MESSAGE
A	R10–12L	30x36	4	LEFT TURN YIELD ON GREEN ●
B	R10–3R	9x12	4	PUSH BUTTON FOR GREEN LIGHT -->
C	R10–3I	9x12	4	PUSH BUTTON FOR GREEN LIGHT <--
D	R3–8LSRA	30x48	4	LANE USE CONTROL SIGN
E	R3–8LSR	30x30	2	LANE USE CONTROL SIGN
F	W16–1D	18x18	2	HAZARD MARKER
G	R3–5L	30x36	1	LEFT TURN SIGN
H	R3–6SR	30x36	1	OPTIONAL RIGHT TURN SIGN

SIGNALS

NOTE:
SIGNALS 9,10,11,12 HAVE TUNNEL VISORS AND LOUVERS.

LEGEND

- (2) — Mast Arm
- (2) — Strain Pole
- (2) — Pedestal Pole
- (2) — Vehicular Signal Head
- (2) — Pedestrian Signal Head
- (A) — Sign
- (2) — Vehicle Detector
- (2) — Pedestrian Pushbutton/Sign
- CC1 — Controller Assembly
- W/4" — Solid White Line/Width
- BW/4" — Broken White Line/Width
- Y/4" — Solid Yellow Line/Width
- BY/4" — Broken Yellow Line/Width
- DY/4" — Double Yellow Line/Width

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER TERRANCE W. GROVE No. 18279-E

Terrance W. Grove
PROFESSIONAL ENGINEER
August 12, 1994
DATE

FILE T012

County: LEBANON

Municipality: NORTH CORNWALL TOWNSHIP

Intersection: QUENTIN ROAD (SR 0072), CEDAR CREST SQUARE DRIVEWAY AND K-MART LOWE'S DRIVEWAY

Reviewed: [signature] 12 Aug 94
Municipal Official — Date

Recommended: Donald C. Brown 9-1-94
Dist. Traffic Eng. — Date

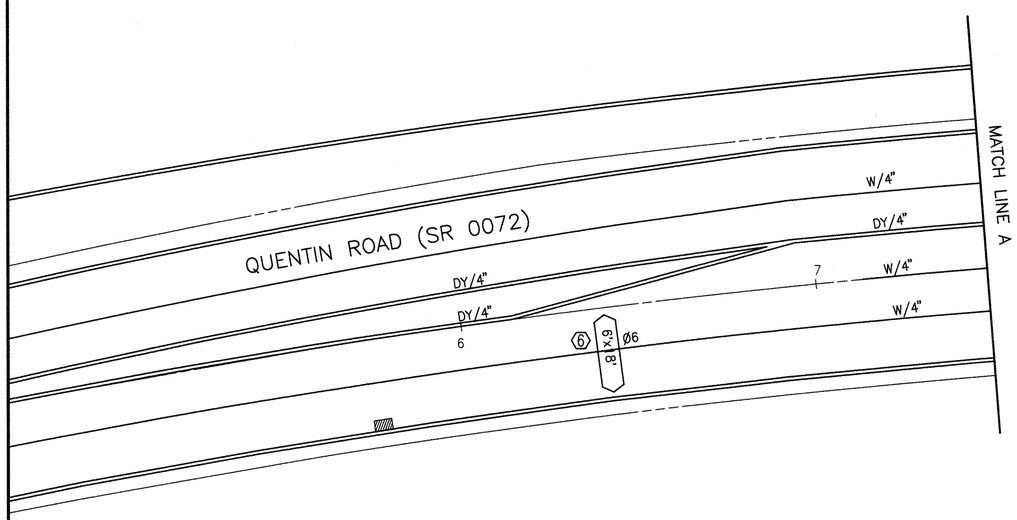
12496P1

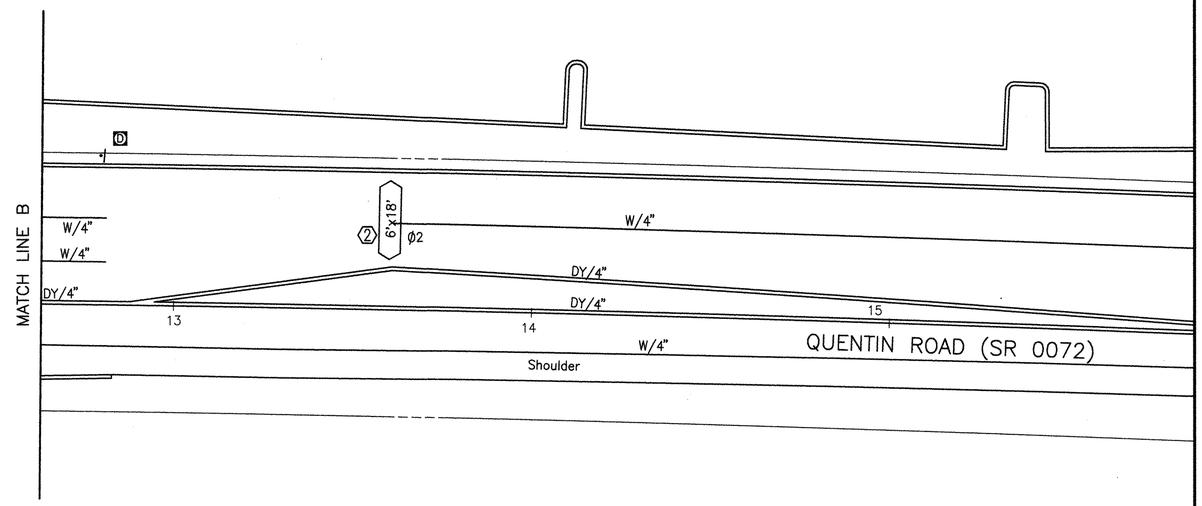
TWG 05/10/94
REV 08/10/94

T-012

PERMIT NO. 88-5	SHEET 4 OF 4
DATE ISSUED 11-20-89	DATE REVISED 3/1/01

T-012





SCALE 0 20 40 60

LEGEND

- 2 — Mast Arm
- 2 — Strain Pole
- 2 — Pedestal Pole
- 2 — Vehicular Signal Head
- 2 — Pedestrian Signal Head
- A — Sign
- 2 — Vehicle Detector
- 2 — Pedestrian Pushbutton/Sign
- CC1 — Controller Assembly
- W/4" — Solid White Line/Width
- BW/4" — Broken White Line/Width
- Y/4" — Solid Yellow Line/Width
- BY/4" — Broken Yellow Line/Width
- DY/4" — Double Yellow Line/Width

County: LEBANON

Municipality: NORTH CORNWALL TOWNSHIP

Intersection: QUENTIN ROAD (SR 0072), CEDAR CREST SQUARE DRIVEWAY AND K-MART LOWE'S DRIVEWAY

Reviewed: [signature] 12 AUG 94
Municipal Official — Date

Recommended: [signature] 9-1-94
Dist. Traffic Eng. — Date

12496P2 TWG 04/19/94

PERMIT NO.:	88-5	SHEET	2	OF	4
DATE ISSUED:	11/20/1989	DATE REVISED:			

COORDINATION PROGRAM

EVENT NO.	DAY OF WEEK							TIME	CYCLE	SPLIT	OFFSET	REMARKS
	M	T	W	T	F	S	S					
1	X	X	X	X	X	X	X	0:00				FREE
2	X	X	X	X	X			15:00	1	1	1	PM 140
3	X	X	X	X	X			17:30				FREE
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												

OFFSETS (SEC.)

	CYCLE NO.:	1	2	3	4	5	6
	LENGTH: (SEC.)	140					
OFFSET	1	73					

SPLITS (SEC.)

CYCLE	SPLIT	PHASE 1	2	3	4	5	6	7	8
1	1	19	79	19	23	19	79	19	23

OFFSET REFERENCED TO:
Strart of Yellow Phase 2+6.

* PHASE TIME INCLUDES CHANGE AND CLEARANCE INTERVAL TIMES

MASTER: SR 0072, Cedar Crest Square Service Rd. and Lowe's Service Rd.

FILE: T-012

COUNTY:
Lebanon

MUNICIPALITY:
North Cornwall Township

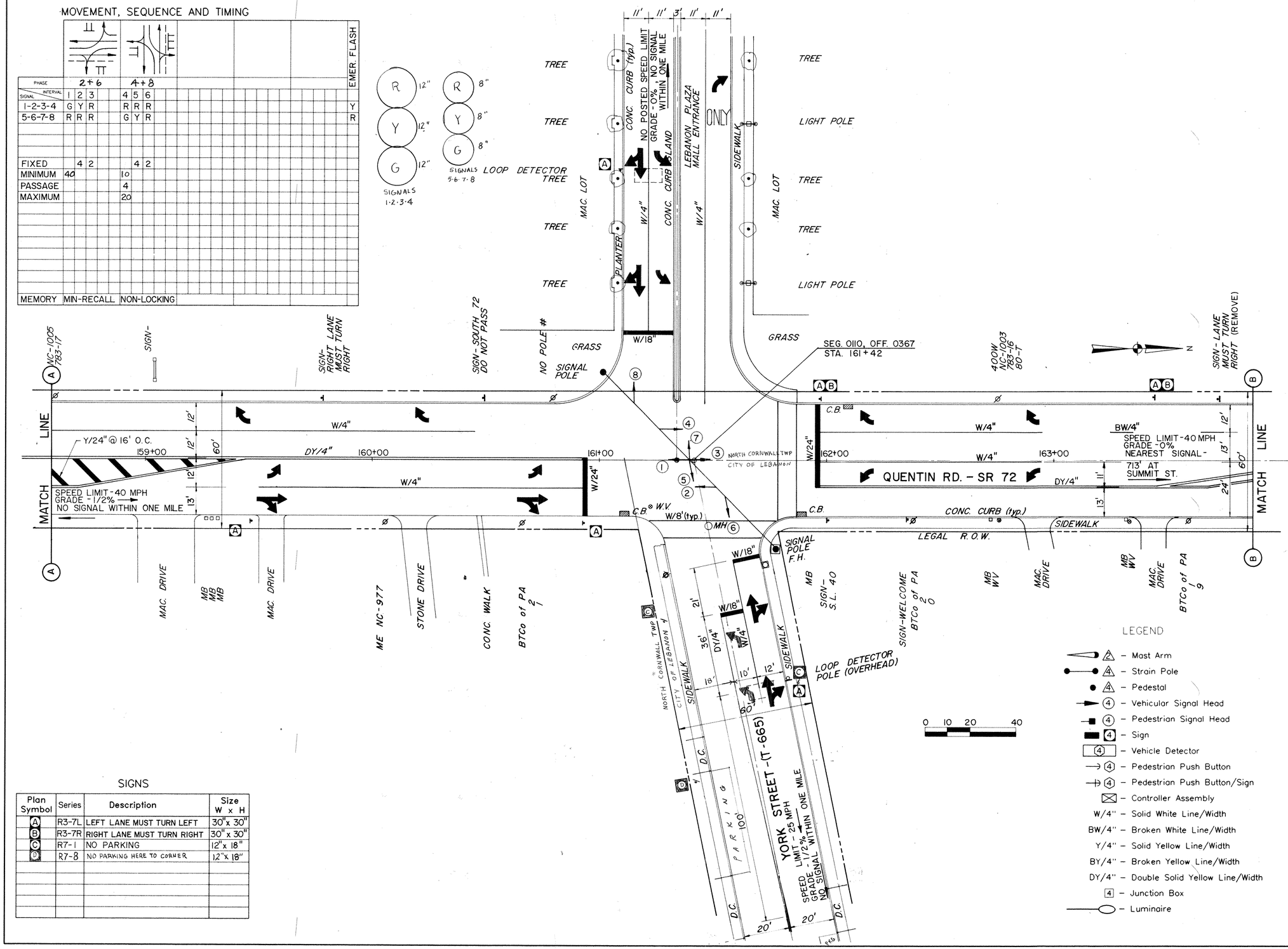
INTERSECTION:
Quentin Rd. (SR 0072), Cedar Crest Square Dwy. & Kmart/Lowe's Dwy.

File T05

Permit No. 5852 Sheet ___ of ___
Date Issued 3-8-66 Date Revised ___

MOVEMENT, SEQUENCE AND TIMING

PHASE	2+6			4+8			EMER. FLASH
SIGNAL / INTERVAL	1	2	3	4	5	6	
1-2-3-4	G	Y	R	R	R	R	Y
5-6-7-8	R	R	R	G	Y	R	R
FIXED		4	2		4	2	
MINIMUM	40			10			
PASSAGE				4			
MAXIMUM				20			
MEMORY	MIN-RECALL			NON-LOCKING			



SIGNS

Plan Symbol	Series	Description	Size W x H
A	R3-7L	LEFT LANE MUST TURN LEFT	30" x 30"
B	R3-7R	RIGHT LANE MUST TURN RIGHT	30" x 30"
C	R7-1	NO PARKING	12" x 18"
D	R7-8	NO PARKING HERE TO CORNER	12" x 18"

LEGEND

- Mast Arm
- Strain Pole
- Pedestal
- Vehicular Signal Head
- Pedestrian Signal Head
- Sign
- Vehicle Detector
- Pedestrian Push Button
- Pedestrian Push Button/Sign
- Controller Assembly
- W/4" – Solid White Line/Width
- BW/4" – Broken White Line/Width
- Y/4" – Solid Yellow Line/Width
- BY/4" – Broken Yellow Line/Width
- DY/4" – Double Solid Yellow Line/Width
- Junction Box
- Luminaire

GENERAL NOTES

Installation, operation and maintenance of this traffic signal shall be in accordance with Pennsylvania Department of Transportation Regulations on Official Traffic Control Devices.

No modifications of this installation is permitted unless prior approval is granted, in writing, by the Department.

All maintenance necessary for proper visibility of the signals, including trimming trees, is the responsibility of the Permittee.

All signs and pavement markings indicated on this drawing are considered part of the permit and shall be installed and maintained by the Permittee, unless otherwise indicated. Except the longitudinal pavement markings on State highways which will be maintained by the Department.

Post mounted signals shall be installed with the signal heads a minimum of 2 feet behind the face of the curb or edge of the shoulder. Support poles for overhead signals shall also have a minimum horizontal clearance of 2 feet.

The bottom of signal heads and signs erected over the roadway shall not be less than 15 feet nor more than 19 feet above the roadway. The bottom of post mounted signal heads shall not be less than 8 feet nor more than 15 feet above the sidewalk or pavement grade.

The minimum horizontal distance between signal heads measured at right angles to the approach shall be 8 feet.

In addition to this signal permit, the Permittee shall obtain a Highway Occupancy Permit prior to any openings being made in or under any portion of a State Highway.

This drawing cannot be used as a construction drawing unless the Permittee complies with the provisions of Act 287/172, Prevention of Damage to Underground Utilities. Prior to construction consult with utility companies to resolve any problems which may be created due to the location of utilies.

Pavement markings shall be placed in accordance with the Department of Transportation Pavement Marking Handbook.

Automatic changes from Stop-And-Go to flashing operation shall be made at the end of the common major street red interval.

Automatic changes from flashing to Stop-And-Go operation shall be made at the beginning of the major street green interval, preferably at the beginning of the common major street green interval

Permittee is responsible for obtaining approval of the installation of traffic signal devices located outside highway right-of-way.

FILE T05

County, LEBANON
Municipality, CITY OF LEBANON & NORTH CORNWALL TOWNSHIP
Intersection, QUENTIN ROAD (SR 72) & YORK STREET (T-665) & SHOPPING CENTER DRIVEWAY

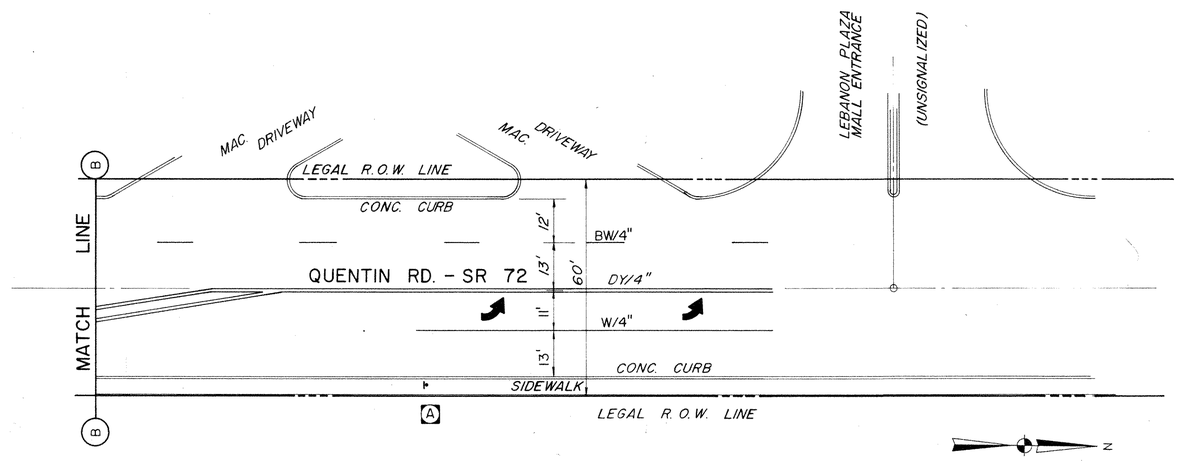
Reviewed, [signature] 5-7-91
Municipal Official — Date

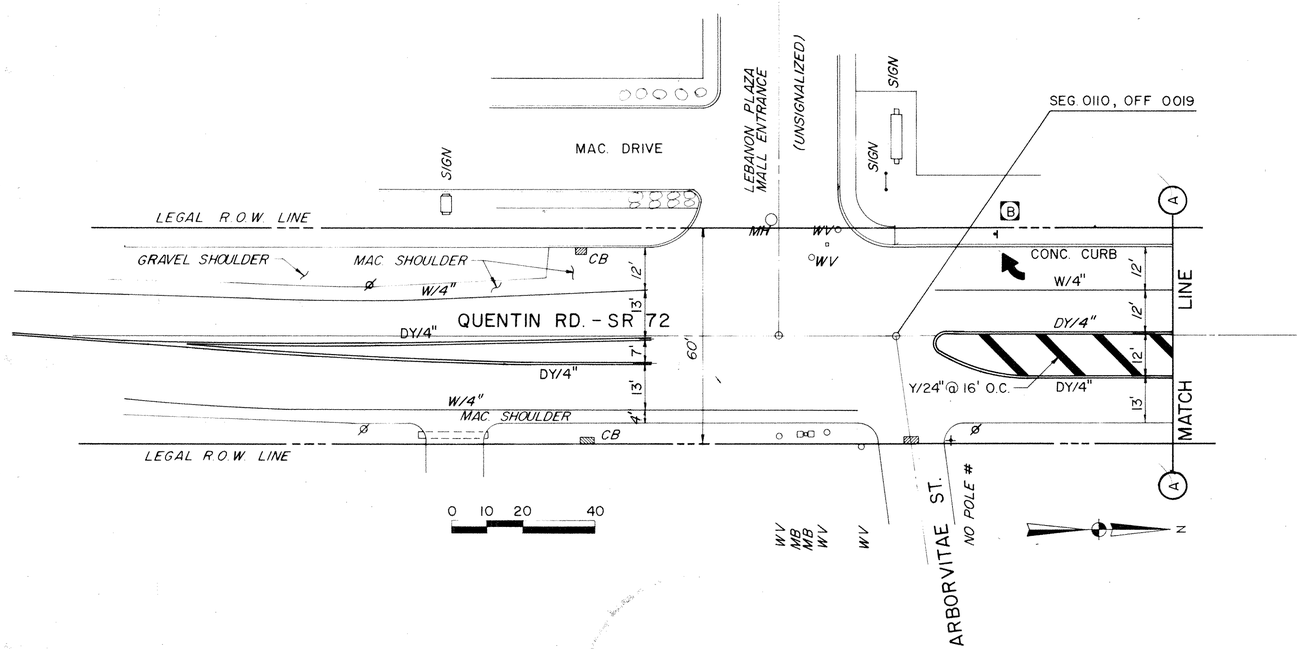
Recommended, [signature] 5/28/91
District Traffic Engineer — Date

dbg810-0025 08/21/90 16:54:52 ej

FILE T05

Permit No. 5852 Sheet ___ of ___
Date Issued 3-8-66 Date Revised ___





FILE T05

County,
LEBANON
Municipality, CITY OF LEBANON & NORTH CORNWALL TOWNSHIP
Intersection,
QUENTIN ROAD (SR 72) & YORK STREET (T-665) & SHOPPING CENTER DRIVEWAY

Reviewed,
Calvin R. Ebbert — 5-7-91
Municipal Official — Date

Recommended,
Leslie L. Dove — 5/28/91
District Traffic Engineer — Date

Coo2

PERMIT NO. 88-1 SHEET 2 OF 2

DATE ISSUED 05/11/81 DATE REVISED 01/24/03

	Phase 1				Phase 2				Phase 3				Phase 4*				FLASHING
	INTERVALS				INTERVALS				INTERVALS				INTERVALS				
SIGNALS	1	2			3	4	5		6	7	8		9	10			
1	G/G	G/Y			G	Y	R		R	R	R		R	R			Y
2	G	G			G	Y	R		R	R	R		R	R			Y
3,4	R	R			G	Y	R		R	R	R		R	R			Y
5,6	R	R			R	R	R		G	Y	R		R	R			R
7–10	DW	DW			DW	DW	DW		DW	DW	DW		W*	FD*			OFF
FIXED		3.5				3.5	3.0			3.0	2.5						
MINIMUM	3				10				3								
SEC/ACT					2.5												
MAX. INIT.					20												
PASSAGE	3				6				3								
TBR					20												
TTR					10												
MIN. GAP					3												
MAXIMUM	12				40				18								
PED*													10	12			
MEMORY	NON–LOCKING				MIN. RECALL				NON–LOCKING				NON–LOCKING				

PEDESTRIAN NOTES:

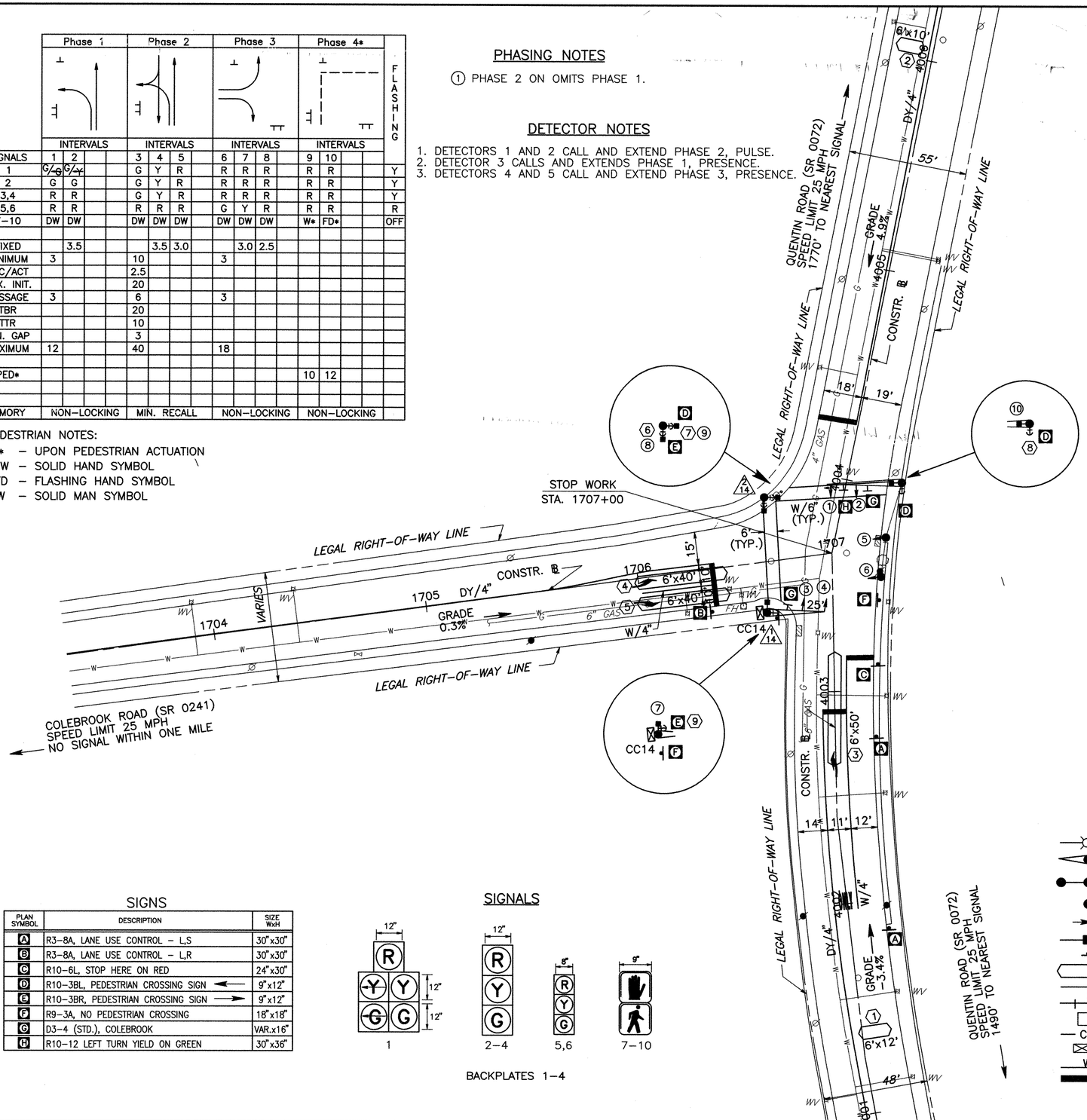
- * – UPON PEDESTRIAN ACTUATION
- DW – SOLID HAND SYMBOL
- FD – FLASHING HAND SYMBOL
- W – SOLID MAN SYMBOL

PHASING NOTES

1. PHASE 2 ON OMITS PHASE 1.

DETECTOR NOTES

1. DETECTORS 1 AND 2 CALL AND EXTEND PHASE 2, PULSE.
2. DETECTOR 3 CALLS AND EXTENDS PHASE 1, PRESENCE.
3. DETECTORS 4 AND 5 CALL AND EXTEND PHASE 3, PRESENCE.



GENERAL NOTES

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POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF THE CURB OR EDGE OF THE SHOULDER, SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM HORIZONTAL CLEARANCE OF 2 FEET.

THE BOTTOM OF SIGNAL HEADS AND SIGNS ERECTED OVER THE ROADWAY SHALL NOT BE LESS THAN 15 FEET OR MORE THAN 19 FEET ABOVE THE ROADWAY. THE BOTTOM OF POST MOUNTED SIGNAL HEADS SHALL NOT BE LESS THAN 8 FEET OR MORE THAN 15 FEET ABOVE THE SIDEWALK OR PAVEMENT GRADE.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNAL HEADS, MEASURED AT RIGHT ANGLES TO THE APPROACH, SHALL BE 8 FEET.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR EMBANKMENT REMOVAL, CURBING AND/OR SIDEWALK, DRAINAGE STRUCTURES, CHANGES IN HIGHWAY GEOMETRY, PAVEMENT WIDENING, OR INSTALLATION OF ADDITIONAL LANES.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC–7800 SERIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 187, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, CONSULT WITH UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORTATION PAVEMENT MARKING HANDBOOK.

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TRAFFIC SIGNALS INSTALLED USING LIQUID FUELS TAX FUNDS MUST CONFORM TO DEPARTMENT SPECIFICATIONS AS SET FORTH IN CURRENT PUBLICATION 408, SUPPLEMENTS AND STANDARD DRAWINGS.

SIGNS

PLAN SYMBOL	DESCRIPTION	SIZE WxH
A	R3–8A, LANE USE CONTROL – L,S	30"x30"
B	R3–8A, LANE USE CONTROL – L,R	30"x30"
C	R10–6L, STOP HERE ON RED	24"x30"
D	R10–3BL, PEDESTRIAN CROSSING SIGN ←	9"x12"
E	R10–3BR, PEDESTRIAN CROSSING SIGN →	9"x12"
F	R9–3A, NO PEDESTRIAN CROSSING	18"x18"
G	D3–4 (STD.), COLEBROOK	VAR.x16"
H	R10–12 LEFT TURN YIELD ON GREEN	30"x36"

SIGNALS

BACKPLATES 1–4

LEGEND

- 4 — LUMINAIRE
- 4/01 — MAST ARM
- 4/01 — STRAIN POLE
- 4/01 — PEDESTAL
- 4 — VEHICULAR SIGNAL HEAD
- 4 — PEDESTRIAN SIGNAL HEAD
- A — SIGN
- 4 — VEHICLE DETECTOR
- 4 — PEDESTRIAN PUSH BUTTON
- 4 — PEDESTRIAN PUSH BUTTON / SIGN
- 4 — JUNCTION BOX
- C/2" — CONDUIT / SIZE
- CC4 — CONTROLLER ASSEMBLY
- W/4" — LINE TYPE / WIDTH
- STOPBAR (W/12" TYP.)

COUNTY: LEBANON

MUNICIPALITY: CITY OF LEBANON

INTERSECTION: QUENTIN ROAD (SR 0072)

AND COLEBROOK ROAD (SR 0241)

REVIEWED: 1-24-03

MUNICIPAL OFFICIAL DATE

RECOMMENDED: 1-27-03

DISTRICT TRAFFIC ENGINEER DATE

SCALE: IN FEET 0 25 50 75

FILE: D:\35637\SIGNAL\Permit\APSIPP14.DGN
DATE: 20–Jan–2003 15:28

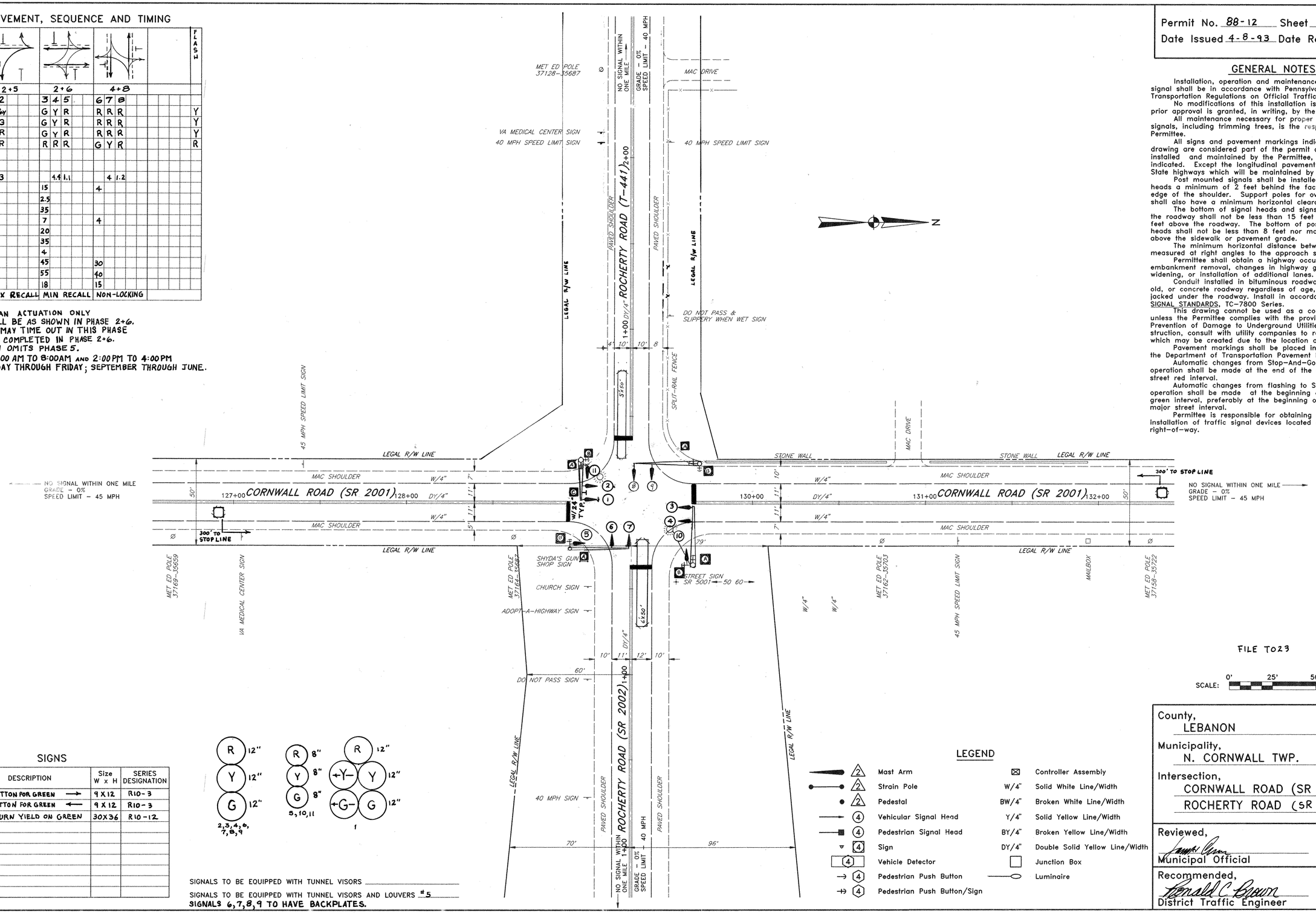
T023

Permit No. 88-12 Sheet 2 of 2
Date Issued 4-8-93 Date Revised

MOVEMENT, SEQUENCE AND TIMING

PHASE	2+5				2+6				4+8				FLASH
INTERNAL / SIGNAL	1	2			3	4	5		6	7	8		
1	G+G	G+Y			G	Y	R		R	R	R		Y
2	G	G			G	Y	R		R	R	R		Y
3·4·5	R	R			G	Y	R		R	R	R		Y
6·7·8·9·10·11	R	R			R	R	R		G	Y	R		R
FIXED		3				4.4	1.1			4	1.2		
MIN. GREEN	3				15				4				
ADDED INT.					2.5								
MAX. INT.					35								
PASSAGE	3				7				4				
TTR					20								
TBR					35								
MIN. GAP					4								
MAX I	10				45				30				
MAX II	20				55				40				
PED *	①				18				15				
MEMORY	MAX RECALL				MIN RECALL				NON-LOCKING				

* UPON PEDESTRIAN ACTUATION ONLY
① TIMING WILL BE AS SHOWN IN PHASE 2+6. INTERVAL 1 MAY TIME OUT IN THIS PHASE OR MAY BE COMPLETED IN PHASE 2+6.
② PHASE 2 ON OMITS PHASE 5.
③ MAX.II – 7:00 AM TO 8:00AM AND 2:00PM TO 4:00PM MONDAY THROUGH FRIDAY; SEPTEMBER THROUGH JUNE.



GENERAL NOTES

Installation, operation and maintenance of this traffic signal shall be in accordance with Pennsylvania Department of Transportation Regulations on Official Traffic Control Devices.

No modifications of this installation is permitted unless prior approval is granted, in writing, by the Department.

All maintenance necessary for proper visibility of the signals, including trimming trees, is the responsibility of the Permittee.

All signs and pavement markings indicated on this drawing are considered part of the permit and shall be installed and maintained by the Permittee, unless otherwise indicated. Except the longitudinal pavement markings on State highways which will be maintained by the Department.

Post mounted signals shall be installed with the signal heads a minimum of 2 feet behind the face of the curb or edge of the shoulder. Support poles for overhead signals shall also have a minimum horizontal clearance of 2 feet.

The bottom of signal heads and signs erected over the roadway shall not be less than 15 feet nor more than 19 feet above the roadway. The bottom of post mounted signal heads shall not be less than 8 feet nor more than 15 feet above the sidewalk or pavement grade.

The minimum horizontal distance between signal heads measured at right angles to the approach shall be 8 feet.

Permittee shall obtain a highway occupancy permit for embankment removal, changes in highway geometry, pavement widening, or installation of additional lanes.

Conduit installed in bituminous roadway less then 5 years old, or concrete roadway regardless of age, must be bored or jacked under the roadway. Install in accordance with TRAFFIC SIGNAL STANDARDS, TC-7800 Series.

This drawing cannot be used as a construction drawing unless the Permittee complies with the provisions of Act 38, Prevention of Damage to Underground Utilities. Prior to construction, consult with utility companies to resolve any problems which may be created due to the location of utilities.

Pavement markings shall be placed in accordance with the Department of Transportation Pavement Marking Handbook.

Automatic changes from Stop-And-Go to flashing operation shall be made at the end of the common major street red interval.

Automatic changes from flashing to Stop-And-Go operation shall be made at the beginning of the major street green interval, preferably at the beginning of the common major street interval.

Permittee is responsible for obtaining approval of the installation of traffic signal devices located outside highway right-of-way.

FILE T023

SCALE: 0' 25' 50' 75'

SIGNS

PLAN SYMBOL	DESCRIPTION	Size W x H	SERIES DESIGNATION
A	PUSH BUTTON FOR GREEN →	9 X 12	R10-3
B	PUSH BUTTON FOR GREEN ←	9 X 12	R10-3
C	LEFT TURN YIELD ON GREEN	30X36	R10-12

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS _____

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS AND LOUVERS #5

SIGNALS 6,7,8,9 TO HAVE BACKPLATES.

LEGEND

2	Mast Arm	⊠	Controller Assembly
2	Strain Pole	W/4"	Solid White Line/Width
2	Pedestal	BW/4"	Broken White Line/Width
4	Vehicular Signal Head	Y/4"	Solid Yellow Line/Width
4	Pedestrian Signal Head	BY/4"	Broken Yellow Line/Width
4	Sign	DY/4"	Double Solid Yellow Line/Width
4	Vehicle Detector	□	Junction Box
4	Pedestrian Push Button		Luminaire
4	Pedestrian Push Button/Sign		

County, LEBANON

Municipality, N. CORNWALL TWP.

Intersection, CORNWALL ROAD (SR 2001) / ROCHERTY ROAD (SR 2002)

Reviewed, Municipal Official — Date 4-7-93

Recommended, District Traffic Engineer — Date 4-6-93

BkgDwnWrtmr: 02179028 Last Revised: 02/02/93 08:04

S-3338

T035

Permit No. 88-23 Sheet 2 of 2
Date Issued 04/28/03 Date Revised 4/5/05

MOVEMENT, SEQUENCE AND TIMING

PHASE	2 + 5				2 + 6				4 + 8				EMERGENCY FLASHING
INTERVAL / SIGNAL	1	2	3		1	2	3		1	2	3		
1	G/Y ①	Y ②	R ②		G	Y	R		R	R	R		Y
2	G	Y ②	R ②		G	Y	R		R	R	R		Y
3,4	R	R	R		G	Y	R		R	R	R		Y
5,6,7,8	R	R	R		R	R	R		G	Y	R		R
9,11	R	R	R		R	R	R		G	Y	R		R
10	R	R	R		G	Y	R		R	R	R		Y
12	G	Y ②	R ②		G	Y	R		R	R	R		Y

FIXED		4.0	2.0			4.0	2.0			3.0	2.5		
MINIMUM	4				12				3				
SEC/ACT					2.5								
MAX INT					25								
PASSAGE	3				6				3				
TBR					25								
TTR					15								
MIN GAP					3.5								
MAX I	7				45				20				
MAX II	7				60				40				
PED*	③				25				25				
MEMORY	NON LOCKING				MIN. RECALL				NON LOCKING				

* UPON PEDESTRIAN ACTUATION ONLY

① ⅄ IF FOLLOWED BY 2 + 6.
② G IF FOLLOWED BY 2 + 6.
③ TIMING WILL-BE AS SHOWN IN PHASE 2 + 6.
IT MAY TIME OUT IN THIS PHASE OR BE COMPLTED IN PHASE 2+6.
PHASE 2 ON OMITS PHASE 5.
MAX II TO OPERATE 3:30 PM TO 6:30 PM M-F.

DETECTOR NOTES

DETECTOR 1 CALLS AND EXTENDS PHASE 5, PRESENCE.
DETECTOR 2 CALLS AND EXTENDS PHASE 2, PRESENCE.
DETECTOR 3 CALLS AND EXTENDS PHASE 6, PRESENCE.
DETECTOR 4 CALLS AND EXTENDS PHASE 4, PRESENCE.
DETECTOR 5 CALLS AND EXTENDS PHASE 8, PRESENCE.

GENERAL NOTES

INSTALLATION, OPERATION AND MAINTENANCE OF THIS TRAFFIC SIGNAL SHALL BE IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION REGULATIONS ON OFFICIAL TRAFFIC CONTROL DEVICES.

NO MODIFICATION OF THIS INSTALLATION IS PERMITTED UNLESS PRIOR APPROVAL IS GRANTED, IN WRITING, BY THE DEPARTMENT.

ALL MAINTENANCE NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS, INCLUDING TRIMMING TREES, IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED BY THE PERMITTEE, UNLESS OTHERWISE INDICATED. EXCEPT THE LONGITUDINAL PAVEMENT MARKINGS ON STATE HIGHWAYS, WHICH WILL BE MAINTAINED BY THE DEPARTMENT.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF THE CURB OR EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM HORZONTAL CLEARANCE OF 2 FEET.

THE BOTTOM OF SIGNAL HEADS AND SIGNS ERECTED OVER THE ROADWAY SHALL NOT BE LESS THAN 15 FEET OR MORE THAN 19 FEET ABOVE THE ROADWAY. THE BOTTOM OF POST MOUNTED SIGNAL HEADS SHALL NOT BE LESS THAN 8 FEET NOR MORE THAN 15 FEET ABOVE THE SIDEWALK OR PAVEMENT GRADE.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNAL HEADS, MEASURED AT RIGHT ANGLES TO THE APPROACH, SHALL BE 8 FEET.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR EMBANKMENT REMOVAL, CURBING AND/OR SIDEWALK, DRAINAGE STRUCTURES, CHANGES IN HIGHWAY GEOMETRY, PAVEMENT WIDENING, OR INSTALLATION OF ADDITIONAL LANES.

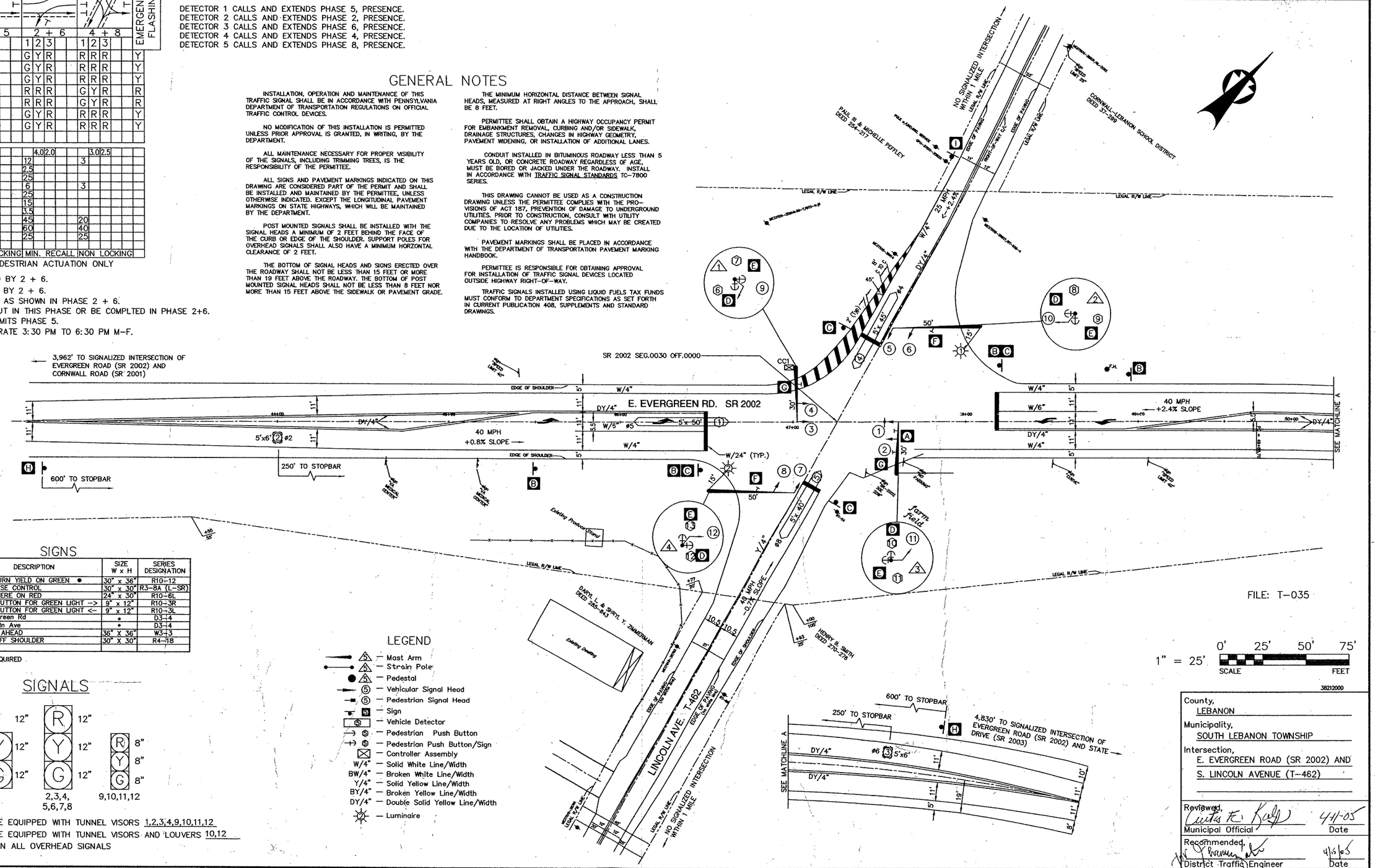
CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 187, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, CONSULT WITH UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORTATION PAVEMENT MARKING HANDBOOK.

PERMITTEE IS RESPONSIBLE FOR OBTAINING APPROVAL FOR INSTALLATION OF TRAFFIC SIGNAL DEVICES LOCATED OUTSIDE HIGHWAY RIGHT-OF-WAY.

TRAFFIC SIGNALS INSTALLED USING LIQUID FUELS TAX FUNDS MUST CONFORM TO DEPARTMENT SPECIFICATIONS AS SET FORTH IN CURRENT PUBLICATION 408, SUPPLEMENTS AND STANDARD DRAWINGS.

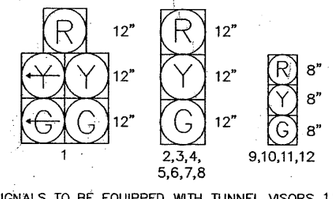


SIGNS

PLAN SYMBOL	DESCRIPTION	SIZE W x H	SERIES DESIGNATION
A	LEFT TURN YIELD ON GREEN ●	30" x 36"	R10-12
B	LANE USE CONTROL	30" x 30"	R3-8A (L-SR)
C	STOP HERE ON RED	24" x 30"	R10-6L
D	PUSH BUTTON FOR GREEN LIGHT ->	9" x 12"	R10-3R
E	PUSH BUTTON FOR GREEN LIGHT <-	9" x 12"	R10-3L
F	E Evergreen Rd	*	D3-4
G	S Lincoln Ave	*	D3-4
H	SIGNAL AHEAD	36" X 36"	W3-3
I	KEEP OFF SHOULDER	30" X 30"	R4-18

* SIZE AS REQUIRED

SIGNALS



SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS 1,2,3,4,9,10,11,12
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS AND LOUVERS 10,12
BACKPLATES ON ALL OVERHEAD SIGNALS

LEGEND

- Mast Arm
- Strain Pole
- Pedestal
- Vehicular Signal Head
- Pedestrian Signal Head
- Sign
- Vehicle Detector
- Pedestrian Push Button
- Pedestrian Push Button/Sign
- Controller Assembly
- W/4" — Solid White Line/Width
- BW/4" — Broken White Line/Width
- Y/4" — Solid Yellow Line/Width
- BY/4" — Broken Yellow Line/Width
- DY/4" — Double Solid Yellow Line/Width
- Luminaire

FILE: T-035

1" = 25' 0' 25' 50' 75' SCALE FEET

38212000

County, LEBANON
Municipality, SOUTH LEBANON TOWNSHIP
Intersection, E. EVERGREEN ROAD (SR 2002) AND S. LINCOLN AVENUE (T-462)

Reviewed, Curtis E. Kelly — Municipal Official — 4-11-05 Date
Recommended, [signature] — District Traffic Engineer — 4/15/05 Date

APPENDIX J

CAPACITY ANALYSIS WORKSHEETS: PENNDOT GUIDELINES

TABLE J-1
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Route 72 & Rocherty Road	EB	L	D	D	D	D	D
	EB	T/R	F(261.1)	F(279.9)	F(93.4)	F(309.7)	F(126.8)
	WB	L	D	F(88.0)	F(85.8)	F(135.0)	F(148.8)
	WB	T	F(137.1)	F(164.8)	D	F(163.2)	D
	WB	R					C
	NB	L	B	B	C	B	C
	NB	T	D	D	D	E	E
	NB	R			C		C
	SB	L	B	D	C	E	C
	SB	T/R	B	C	C	C	C
	ILOS		**F(85.9)**	**F(100.5)**	**D(50.5)**	**F(113.5)**	**E(66.1)**
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	C	C	D	C	D
	WB	L	C	C	E	D	E
	WB	T					
	WB	R	C	C	D	C	D
	NB	L	A	A	A	A	A
	NB	T	B	B	A	B	A
	NB	R	A	A	A	A	A
	SB	L	A	A	A	A	A
	SB	T/R	A	A	A	A	A
	ILOS		**A(9.1)**	**B(10.9)**	**A(9.0)**	**B(10.9)**	**A(7.9)**
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	B	C	D	C	D
	EB	T/R	C	C	D	C	D
	WB	L	C	C	D	C	D
	WB	T/R	C	C	D	D	D
	NB	L	B	B	A	B	A
	NB	T	C	C	A	C	A
	NB	R	B	B	A	B	A
	SB	L	B	B	A	B	A
	SB	T	B	B	B	C	B
	SB	R	B	B	A	B	A
	ILOS		**C(21.8)**	**C(22.7)**	**B(17.1)**	**C(23.4)**	**B(16.6)**
Route 72 & Isabel Drive	WB	L/R	C	E	D	D	D
	NB	T/R	--	--	A	--	A
	SB	L	A	A	A	A	A
	SB	T	--	--	A	--	A
	ILOS		**A(2.3)**	**A(3.2)**	**A(7.9)**	**A(2.5)**	**A(7.5)**

TABLE J-1 (CONTINUED)
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	C	C	C	C	C
	EB	T/R	C	C	C	C	C
	WB	L	C	C	C	C	C
	WB	T/R	C	C	C	C	C
	NB	L	A	A	A	A	A
	NB	T/R	A	A	A	A	A
	SB	L	A	A	A	A	A
	SB	T	A	A	A	A	A
	SB	R	A	A	A	A	A
	ILOS		**A(6.9)**	**A(7.4)**	**A(7.6)**	**A(7.6)**	**A(8.7)**
Route 72 & Route 241	EB	L	C	C	C	C	D
	EB	R	B	C	C	C	C
	NB	L	A	B	B	B	B
	NB	T	A	A	A	A	A
	SB	T/R	C	C	C	C	C
	ILOS		**B(17.4)**	**B(19.8)**	**C(20.9)**	**B(19.9)**	**C(23.8)**
Cornwall Road & Rocherty Road	EB	L	F(298.4)	F(257.7)	B	F(202.6)	B
	EB	T/R			D		E
	WB	L	F(137.3)	F(131.2)	C	F(139.6)	C
	WB	T			C		C
	WB	R			C		C
	NB	L	D	D	C	D	C
	NB	T			D		D
	NB	R			C		C
	SB	L	C	F(138.2)	D	F(158.5)	D
	SB	T/R			C		B
	ILOS		**F(140.2)**	**F(148.1)**	**D(38.3)**	**F(137.7)**	**D(44.4)**
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	E	C	C	C	D
	WB	L/T/R	F(91.7)	C	C	C	D
	NB	L/T/R	A	A	A	A	A
	SB	L/T/R	A	B	C	B	C
	ILOS		**B(14.9)**	**B(10.8)**	**B(16.4)**	**B(10.9)**	**B(18.6)**
Cornwall Road & York Street	EB	L/R	D	E	C	E	C
	NB	L	A	A	A	A	A
	NB	T	--	--		--	
	SB	T/R	--	--	A	--	B
	ILOS		**A(2.6)**	**A(3.9)**	**A(8.2)**	**A(2.9)**	**B(11.8)**

TABLE J-1 (CONTINUED)
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Cornwall Road & Wilhelm Avenue	WB	L	F(63.6)	F(205.0)	D	F(133.1)	F(147.0)
	WB	R					C
	NB	T	--	--	A	--	A
	NB	R	--	--		--	A
	SB	L	A	A	B	A	B
	SB	T	--	--		--	
	ILOS		**A(9.8)**	**D(28.0)**	**B(17.6)**	**C(19.3)**	**C(26.1)**
Evergreen Road & Lincoln Avenue	EB	L	F(82.2)	F(178.4)	F(178.6)	F(128.1)	F(155.5)
	EB	T/R	A	B	B	A	A
	WB	L	B	B	B	B	B
	WB	T/R	C	E	E	F(92.1)	F(97.0)
	NB	L/T/R	C	C	C	C	C
	SB	L/T/R	D	F(87.6)	F(87.6)	F(107.5)	F(131.7)
	ILOS		**C(34.4)**	**E(68.8)**	**E(71.4)**	**E(72.1)**	**F(81.3)**
Cornwall Road & Township Roadway	EB	L	--	--	--	--	C
	EB	T/R					C
	WB	L					D
	WB	T					D
	WB	R					D
	NB	L					A
	NB	T/R					C
	SB	L					B
	SB	T					B
	SB	R					B
	ILOS						**C(23.2)**
Township Road & Eastern Site Driveway	WB	L	--	--	--	--	A
	NB	L/R					A
	ILOS						**A(2.1)**
Township Road & Middle Site Driveway	WB	L	--	--	--	--	A
	NB	L/R					A
	ILOS						**A(2.2)**
Township Road & Western Site Driveway	WB	L	--	--	--	--	A
	NB	L/R					A
	ILOS						**A(0.1)**
Rocherty Road & Eastern Site Driveway	EB	L	--	--	A	--	A
	SB	L/R			B		F(149.5)
	ILOS				**A(0.6)**		**A(3.5)**
Rocherty Road & Western Site Driveway	SB	R	--	--	B	--	B
	ILOS				**A(0.1)**		**A(0.1)**

TABLE J-1 (CONTINUED)
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Cornwall Road & Southern Site Driveway	WB	R	--	--	B	--	B
	SB	L			A		A
	ILOS				**A(1.1)**		**A(0.2)**
Cornwall Road & Middle Site Driveway	EB	R	--	--	--	--	B
	ILOS						**A(0.1)**
Norman Drive & Site Driveway	WB	L	--	--	A	--	A
	NB	L/R			B		B
	ILOS				**A(0.2)**		**A(0.1)**

TABLE J-2
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Route 72 & Rocherty Road	EB	L	E	E	E	F(91.9)	E
	EB	T/R	D	E	E	F(279.2)	F(239.6)
	WB	L	F(84.3)	F(221.0)	F(139.0)	F(208.7)	F(271.1)
	WB	T	F(88.6)	F(164.2)	F(98.6)	F(307.5)	E
	WB	R					D
	NB	L	C	C	C	C	C
	NB	T	D	E	D	E	D
	NB	R			C		C
	SB	L	C	D	D	E	D
	SB	T/R	C	C	D	C	D
	ILOS		**D(53.4)**	**F(89.5)**	**E(67.2)**	**F(135.6)**	**F(94.5)**
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	C	C	D	C	D
	WB	L	D	D	E	E	E
	WB	T					
	WB	R	C	B	D	C	D
	NB	L	A	B	A	A	B
	NB	T	B	D	B	C	B
	NB	R	A	C	A	A	A
	SB	L	B	C	B	C	D
	SB	T/R	B	B	A	A	B
	ILOS		**B(15.1)**	**C(24.7)**	**B(17.8)**	**B(17.7)**	**C(26.7)**
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	F(119.4)	E	E	E	E
	EB	T/R	E	D	D	D	D
	WB	L	D	D	D	D	D
	WB	T/R	E	F(86.4)	E	E	E
	NB	L	C	A	A	A	A
	NB	T	C	B	B	C	C
	NB	R	D	B	A	B	A
	SB	L	B	B	C	C	D
	SB	T	B	C	C	C	C
	SB	R	B	B	B	B	B
	ILOS		**D(44.3)**	**D(37.3)**	**C(30.6)**	**D(38.9)**	**D(41.1)**
Route 72 & Isabel Drive	WB	L/R	F(85.3)	F(334.4)	D	F(467.2)	E
	NB	T/R	--	--	B	--	D
	SB	L	A	A	C	A	D
	SB	T	--	--	A	--	A
	ILOS		**A(8.2)**	**D(28.3)**	**B(16.2)**	**E(36.4)**	**C(31.4)**

TABLE J-2 (CONTINUED)
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	C	C	C	C	C
	EB	T/R	C	C	C	C	C
	WB	L	C	C	C	C	D
	WB	T/R	C	C	C	C	C
	NB	L	A	A	A	A	A
	NB	T/R	A	B	B	B	C
	SB	L	A	A	A	A	A
	SB	T	A	A	A	B	B
	SB	R	A	A	A	A	A
	ILOS		**B(12.0)**	**B(13.6)**	**B(14.1)**	**B(14.7)**	**B(19.8)**
Route 72 & Route 241	EB	L	C	D	D	D	E
	EB	R	C	C	C	C	D
	NB	L	C	D	D	D	E
	NB	T	A	A	A	A	B
	SB	T/R	C	D	D	E	D
	ILOS		**C(22.2)**	**C(33.9)**	**C(34.7)**	**D(36.1)**	**D(39.8)**
Cornwall Road & Rocherty Road	EB	L	F(120.0)	F(150.0)	C	F(177.7)	C
	EB	T/R			C		D
	WB	L	F(167.5)	F(206.5)	C	F(262.2)	C
	WB	T			D		D
	WB	R			C		B
	NB	L	C	C	C	C	D
	NB	T			D		D
	NB	R			C		C
	SB	L	C	F(122.9)	C	F(118.2)	B
	SB	T/R			D		B
	ILOS		**F(99.1)**	**F(143.1)**	**D(37.5)**	**F(167.5)**	**C(32.0)**
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	E	B	B	B	D
	WB	L/T/R	F(90.1)	B	B	B	D
	NB	L/T/R	A	A	B	A	B
	SB	L/T/R	A	B	B	B	B
	ILOS		**C(21.5)**	**B(12.8)**	**B(16.4)**	**B(12.6)**	**C(21.3)**
Cornwall Road & York Street	EB	L/R	F(69.5)	F(230.1)	D	F(265.9)	F(106.5)
	NB	L	A	A	B	A	E
	NB	T	--	--		--	
	SB	T/R	--	--	A	--	B
	ILOS		**B(10.2)**	**D(31.5)**	**B(13.7)**	**D(30.2)**	**D(48.9)**

TABLE J-2 (CONTINUED)
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Cornwall Road & Wilhelm Avenue	WB	L	F(84.4)	F(282.7)	F(135.1)	F(380.9)	F(271.8)
	WB	R					D
	NB	T	--	--	A	--	A
	NB	R	--	--		--	A
	SB	L	A	A	A	A	A
	SB	T	--	--		--	
	ILOS		**C(15.8)**	**F(50.9)**	**C(27.7)**	**F(66.5)**	**C(34.7)**
Evergreen Road & Lincoln Avenue	EB	L	B	B	B	B	B
	EB	T/R	B	B	B	B	B
	WB	L	B	C	C	B	B
	WB	T/R	C	D	D	D	D
	NB	L/T/R	B	C	C	C	C
	SB	L/T/R	C	D	D	D	D
	ILOS		**C(21.5)**	**D(30.6)**	**C(31.0)**	**C(26.7)**	**C(27.7)**
Cornwall Road & Township Roadway	EB	L	--	--	--	--	C
	EB	T/R					C
	WB	L					C
	WB	T					D
	WB	R					C
	NB	L					A
	NB	T/R					B
	SB	L					B
	SB	T					C
	SB	R					A
	ILOS						**C(25.4)**
Township Road & Eastern Site Driveway	WB	L	--	--	--	--	A
	NB	L/R					B
	ILOS						**A(5.1)**
Township Road & Middle Site Driveway	WB	L	--	--	--	--	A
	NB	L/R					B
	ILOS						**A(4.7)**
Township Road & Western Site Driveway	WB	L	--	--	--	--	A
	NB	L/R					B
	ILOS						**A(0.1)**
Rocherty Road & Eastern Site Driveway	EB	L	--	--	A	--	A
	SB	L/R			C		F(233.6)
	ILOS				**A(0.9)**		**B(13.5)**
Rocherty Road & Western Site Driveway	SB	R	--	--	C	--	C
	ILOS				**A(0.4)**		**A(0.5)**

TABLE J-2 (CONTINUED)
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Cornwall Road & Southern Site Driveway	WB	R	--	--	B	--	B
	SB	L			A		A
	ILOS				**A(1.1)**		**A(0.3)**
Cornwall Road & Middle Site Driveway	EB	R	--	--	--	--	B
	ILOS						**A(0.8)**
Norman Drive & Site Driveway	WB	L	--	--	A	--	A
	NB	L/R			B		B
	ILOS				**A(1.5)**		**A(1.2)**

TABLE J-3
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Route 72 & Rocherty Road	EB	L	D	D	D	D	D
	EB	T/R	D	E	D	E	E
	WB	L	C	D	D	E	E
	WB	T	E	F(174.9)	E	F(187.0)	D
	WB	R					D
	NB	L	C	C	C	C	C
	NB	T	D	D	D	D	D
	NB	R			C		B
	SB	L	C	D	C	F(106.3)	F(107.5)
	SB	T/R	C	C	C	C	D
	ILOS		**D(37.8)**	**E(59.8)**	**D(41.9)**	**E(68.0)**	**D(50.5)**
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	C	C	D	C	D
	WB	L	C	C	E	D	E
	WB	T					
	WB	R	B	C	D	C	D
	NB	L	B	B	A	B	B
	NB	T	C	C	A	C	B
	NB	R	B	B	A	B	A
	SB	L	A	B	A	B	D
	SB	T/R	A	B	A	A	B
	ILOS		**B(15.6)**	**B(19.1)**	**B(14.8)**	**B(18.1)**	**C(25.2)**
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	D	E	E	E	E
	EB	T/R	C	D	D	D	D
	WB	L	C	D	D	D	D
	WB	T/R	D	E	E	E	E
	NB	L	B	B	A	C	C
	NB	T	D	D	C	D	D
	NB	R	C	C	A	C	A
	SB	L	C	D	D	D	D
	SB	T	C	C	C	C	C
	SB	R	B	B	B	B	C
	ILOS		**C(32.7)**	**D(40.8)**	**C(33.5)**	**D(44.8)**	**D(42.9)**
Route 72 & Isabel Drive	WB	L/R	F(120.7)	F(455.4)	D	F(626.9)	D
	NB	T/R	--	--	B	--	D
	SB	L	A	A	C	A	D
	SB	T	--	--	A	--	B
	ILOS		**A(6.7)**	**C(22.6)**	**B(15.4)**	**D(28.4)**	**C(32.4)**

TABLE J-3 (CONTINUED)
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	C	C	C	C	C
	EB	T/R	C	C	C	C	C
	WB	L	C	D	D	D	E
	WB	T/R	C	C	C	C	C
	NB	L	A	B	C	D	F(119.6)
	NB	T/R	A	B	B	B	B
	SB	L	A	A	A	A	A
	SB	T	A	B	B	B	C
	SB	R	A	A	A	A	A
	ILOS		**B(13.2)**	**B(16.4)**	**B(17.0)**	**B(19.2)**	**C(26.0)**
Route 72 & Route 241	EB	L	C	C	C	D	D
	EB	R	C	C	C	C	D
	NB	L	B	C	C	C	D
	NB	T	A	A	A	A	A
	SB	T/R	C	C	C	C	D
	ILOS		**B(17.5)**	**C(22.7)**	**C(23.0)**	**C(25.6)**	**C(32.0)**
Cornwall Road & Rocherty Road	EB	L	B	C	B	C	C
	EB	T/R			C		D
	WB	L	C	C	B	C	C
	WB	T			C		C
	WB	R			B		C
	NB	L	C	C	C	C	C
	NB	T			C		C
	NB	R			C		C
	SB	L	B	B	B	B	A
	SB	T/R			C		A
	ILOS		**C(21.9)**	**C(26.5)**	**C(24.8)**	**C(24.3)**	**C(24.3)**
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	C	B	B	B	D
	WB	L/T/R	B	B	B	B	D
	NB	L/T/R	A	A	A	A	A
	SB	L/T/R	A	A	A	A	A
	ILOS		**A(3.4)**	**A(7.6)**	**A(8.2)**	**A(6.7)**	**A(8.6)**
Cornwall Road & York Street	EB	L/R	C	D	B	D	C
	NB	L	A	A	A	A	A
	NB	T	--	--		--	
	SB	T/R	--	--	A	--	B
	ILOS		**A(4.0)**	**A(5.5)**	**A(9.7)**	**A(5.9)**	**B(12.0)**

TABLE J-3 (CONTINUED)
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Cornwall Road & Wilhelm Avenue	WB	L	C	D	B	D	D
	WB	R					C
	NB	T	--	--	A	--	A
	NB	R	--	--		--	A
	SB	L	A	A	A	A	A
	SB	T	--	--		--	
	ILOS		**A(4.7)**	**A(6.7)**	**A(9.3)**	**A(7.8)**	**B(12.4)**
Evergreen Road & Lincoln Avenue	EB	L	A	A	A	A	A
	EB	T/R	A	A	A	A	A
	WB	L	A	B	B	A	B
	WB	T/R	B	B	B	B	C
	NB	L/T/R	B	B	B	B	C
	SB	L/T/R	B	C	C	C	C
	ILOS		**B(11.4)**	**B(13.5)**	**B(13.6)**	**B(13.1)**	**B(15.5)**
Cornwall Road & Township Roadway	EB	L	--	--	--	--	C
	EB	T/R					C
	WB	L					D
	WB	T					D
	WB	R					D
	NB	L					A
	NB	T/R					B
	SB	L					B
	SB	T					B
	SB	R					A
	ILOS						**B(19.1)**
Township Road & Eastern Site Driveway	WB	L	--	--	--	--	A
	NB	L/R					C
	ILOS						**A(6.7)**
Township Road & Middle Site Driveway	WB	L	--	--	--	--	A
	NB	L/R					C
	ILOS						**A(5.9)**
Township Road & Western Site Driveway	WB	L	--	--	--	--	A
	NB	L/R					B
	ILOS						**A(0.1)**
Rocherty Road & Eastern Site Driveway	EB	L	--	--	A	--	A
	SB	L/R			B		C
	ILOS				**A(0.5)**		**A(1.1)**
Rocherty Road & Western Site Driveway	SB	R	--	--	B	--	B
	ILOS				**A(0.2)**		**A(0.1)**

TABLE J-3 (CONTINUED)
LEVEL OF SERVICE SUMMARY (DELAY): PENNDOT GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2011 Existing	2025 Base	2025 Projected	2035 Base	2035 Projected
Cornwall Road & Southern Site Driveway	WB	R	--	--	A	--	B
	SB	L			A		A
	ILOS				**A(1.2)**		**A(0.3)**
Cornwall Road & Middle Site Driveway	EB	R	--	--	--	--	B
	ILOS						**A(1.1)**
Norman Drive & Site Driveway	WB	L	--	--	A	--	A
	NB	L/R			A		A
	ILOS				**A(0.4)**		**A(0.6)**

TABLE J-4
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Route 72 & Rocherty Road	EB	L	190	136	151	190	97	132
	EB	T/R	--	627	698	--	448	559
	WB	L	300	378	426	300	323	394
	WB	T	--	584	616	--	323	256
	WB	R				325		42
	NB	L	105	18	21	105	21	22
	NB	T	--	781	1108	--	535	742
	NB	R				250	58	97
	SB	L	225	98	173	225	102	124
	SB	T/R	--	336	420	--	362	441
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	--	0	0	--	0	0
	WB	L/T	--	25	24	--	34	70
	WB	R	115	20	22	115	28	39
	NB	L	135	24	24	135	9	5
	NB	T	--	365	424	--	140	78
	NB	R	230	15	15	230	2	0
	SB	L	135	14	15	135[1]/200[2]	11	24
	SB	T/R	--	135	174	--	84	83
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	--	82	90	--	94	96
	EB	T/R	--	18	19	--	19	19
	WB	L	--	25	28	--	29	30
	WB	T/R	--	0	0	--	0	0
	NB	L	230	23	22	230[1]/165[2]	3	5
	NB	T	--	440	523	--	519	258
	NB	R	230	10	11	230	6	1
	SB	L	235	36	35	235	29	30
	SB	T	--	353	421	--	255	375
	SB	R	235	6	5	235	2	3
Route 72 & Isabel Drive	WB	L/R	--	49	38	--	52	75
	NB	T/R	--	--	--	--	171	156
	SB	L	--	8	7	275	24	29
	SB	T				--	180	206

1 = Under 2025 conditions
2 = Under 2035 conditions

TABLE J-4 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	--	7	7	--	7	8
	EB	T/R	--	8	8	--	8	8
	WB	L	70	55	60	70	55	65
	WB	T/R	--	23	22	--	23	24
	NB	L	130	3	3	130	3	3
	NB	T/R	--	168	211	--	180	237
	SB	L	150	14	16	150	14	16
	SB	T	--	205	247	--	236	373
	SB	R	320	2	2	320	2	2
Route 72 & Route 241	EB	L	55	137	162	55	139	213
	EB	R	--	43	59	--	47	72
	NB	L	90	51	73	90	66	121
	NB	T	--	187	231	--	191	226
	SB	T/R	--	345	432	--	381	571
Cornwall Road & Rocherty Road	EB	L	--	1015	1001	225	60	71
	EB	T/R				--	594	704
	WB	L	--	920	955	TWLTL	33	37
	WB	T				425[1]	346	381
	WB	R				325	21	57
	NB	L	--	457	564	150	26	37
	NB	T				--	247	347
	NB	R				350	47	96
	SB	L	--	559	675	TWLTL	218	229
	SB	T/R				275[1]	163	105
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	--	29	38	--	50	106
	WB	L/T/R	--	41	64	--	47	117
	NB	L/T/R	--	137	203	--	171	111
	SB	L/T/R	--	200	307	--	413	844
Cornwall Road & York Street	EB	L/R	--	76	57	--	60	74
	NB	L/T	--	5	4	--	177	255
	SB	T/R	--	--	--	--	184	476

1 = Distance from Future Stop-Bar to Centerline of Nearest Future Site Driveway
TWCLTL = Two-Way Left-Turn Lane

TABLE J-4 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Cornwall Road & Wilhelm Avenue	WB	L	--	271	215	--	201	273
	WB	R				150		26
	NB	T	--	--	--	--	53	46
	NB	R				265		0
	SB	L/T	--	17	14	--	341	443
Evergreen Road & Lincoln Avenue	EB	L	100	388	403	100	388	414
	EB	T/R	--	270	299	--	274	299
	WB	L	80	14	19	80	14	18
	WB	T/R	--	740	779	--	763	828
	NB	L/T/R	--	56	63	--	56	65
	SB	L/T/R	--	135	333	--	135	342
Cornwall Road & Township Roadway	EB	L	--	--	--	TWLTL	--	48
	EB	T/R				275[1]		131
	WB	L				100		11
	WB	T				160[1]		70
	WB	R				100		38
	NB	L				TWLTL		9
	NB	T/R				1325[1]		558
	SB	L				400		106
	SB	T				--		280
	SB	R				275		4
Township Road & Eastern Site Driveway	WB	L	--	--	--	TWLTL	--	2
	NB	L/R				--		4
Township Road & Middle Site Driveway	WB	L	--	--	--	TWLTL	--	2
	NB	L/R				--		4
Township Road & Western Site Driveway	WB	L	--	--	--	TWLTL	--	0
	NB	L/R				--		0
Rocherty Road & Eastern Site Driveway	EB	L	--	--	--	TWLTL	5	10
	SB	L/R				--	7	71
Rocherty Road & Western Site Driveway	SB	R	--	--	--	--	3	2

1 = Distance from Future Stop-Bar to Centerline of Nearest Future Site Driveway
TWLTL = Two-Way Left-Turn Lane

TABLE J-4 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Cornwall Road & Southern Site Driveway	WB	R	--	--	--	--	7	1
	SB	L				TWLTL	6	1
Cornwall Road & Middle Site Driveway	EB	R	--	--	--	--	--	1
Norman Drive & Site Driveway	WB	L	--	--	--	--	0	0
	NB	L/R				--	1	1

TWLTL = Two-Way Left-Turn Lane

TABLE J-5
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Route 72 & Rocherty Road	EB	L	190	111	172	190	100	171
	EB	T/R	--	366	600	--	382	541
	WB	L	300	400	464	300	410	547
	WB	T	--	749	852	--	642	425
	WB	R				325		61
	NB	L	105	12	13	105	12	13
	NB	T	--	908	1081	--	530	708
	NB	R				250	43	56
	SB	L	225	217	239	225	168	162
	SB	T/R	--	585	787	--	743	949
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	--	30	32	--	40	40
	WB	L/T	--	47	40	--	75	344
	WB	R	115	22	26	115	31	98
	NB	L	135	31	17	135	28	23
	NB	T	--	542	392	--	292	392
	NB	R	230	16	4	230	8	7
	SB	L	135	43	44	135[1]/200[2]	35	148
	SB	T/R	--	224	299	--	279	315
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	--	245	219	--	195	218
	EB	T/R	--	36	33	--	29	29
	WB	L	--	98	92	--	83	85
	WB	T/R	--	53	72	--	49	80
	NB	L	230	13	19	230[1]/165[2]	5	10
	NB	T	--	404	873	--	369	921
	NB	R	230	22	26	230	1	2
	SB	L	235	86	97	235	93	164
	SB	T	--	561	750	--	338	771
	SB	R	235	27	34	235	17	22
Route 72 & Isabel Drive	WB	L/R	--	308	356	--	115	185
	NB	T/R	--	--	--	--	1066	1217
	SB	L	--	17	14	275	30	129
	SB	T				--	388	454

1 = Under 2025 conditions
2 = Under 2035 conditions

TABLE J-5 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	--	50	51	--	50	51
	EB	T/R	--	63	65	--	63	65
	WB	L	70	105	137	70	105	135
	WB	T/R	--	92	95	--	92	95
	NB	L	130	30	32	130	31	38
	NB	T/R	--	394	450	--	446	736
	SB	L	150	21	25	150	22	55
	SB	T	--	295	349	--	312	431
	SB	R	320	9	8	320	9	8
Route 72 & Route 241	EB	L	55	165	229	55	174	277
	EB	R	--	43	62	--	44	72
	NB	L	90	172	243	90	192	338
	NB	T	--	318	354	--	329	492
	SB	T/R	--	704	801	--	710	950
Cornwall Road & Rocherty Road	EB	L	--	668	725	225	50	59
	EB	T/R				--	419	458
	WB	L	--	844	975	TWLTL	58	61
	WB	T				425[1]	547	569
	WB	R				325	31	67
	NB	L	--	262	308	150	47	67
	NB	T				--	183	233
	NB	R				350	44	47
	SB	L	--	678	690	TWLTL	135	66
	SB	T/R				275[1]	414	370
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	--	40	67	--	44	104
	WB	L/T/R	--	70	120	--	133	220
	NB	L/T/R	--	137	203	--	178	711
	SB	L/T/R	--	207	291	--	249	466
Cornwall Road & York Street	EB	L/R	--	320	304	--	150	265
	NB	L/T	--	9	10	--	391	1174
	SB	T/R	--	--	--	--	161	455

1 = Distance from Future Stop-Bar to Centerline of Nearest Future Site Driveway
TWLTL = Two-Way Left-Turn Lane

TABLE J-5 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Cornwall Road & Wilhelm Avenue	WB	L	--	442	521	--	304	405
	WB	R				150		55
	NB	T	--	--	--	--	136	96
	NB	R				265		0
	SB	L/T	--	10	9	--	238	252
Evergreen Road & Lincoln Avenue	EB	L	100	115	127	100	115	123
	EB	T/R	--	431	460	--	448	502
	WB	L	80	18	19	80	18	18
	WB	T/R	--	495	581	--	505	560
	NB	L/T/R	--	27	44	--	27	51
	SB	L/T/R	--	287	322	--	287	365
Cornwall Road & Township Roadway	EB	L	--	--	--	TWLTL	--	145
	EB	T/R				275[1]		65
	WB	L				100		37
	WB	T				160[1]		157
	WB	R				100		61
	NB	L				TWLTL		22
	NB	T/R				1325[1]		298
	SB	L				400		24
	SB	T				--		562
	SB	R				275		10
Township Road & Eastern Site Driveway	WB	L	--	--	--	TWLTL	--	8
	NB	L/R				--		46
Township Road & Middle Site Driveway	WB	L	--	--	--	TWLTL	--	8
	NB	L/R				--		42
Township Road & Western Site Driveway	WB	L	--	--	--	TWLTL	--	0
	NB	L/R				--		1
Rocherty Road & Eastern Site Driveway	EB	L	--	--	--	TWLTL	3	3
	SB	L/R				--	14	182
Rocherty Road & Western Site Driveway	SB	R	--	--	--	--	10	14

1 = Distance from Future Stop-Bar to Centerline of Nearest Future Site Driveway
TWLTL = Two-Way Left-Turn Lane

TABLE J-5 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Cornwall Road & Southern Site Driveway	WB	R	--	--	--	--	8	4
	SB	L				TWLTL	4	1
Cornwall Road & Middle Site Driveway	EB	R	--	--	--	--	--	15
Norman Drive & Site Driveway	WB	L	--	--	--	--	0	0
	NB	L/R				--	9	7

TWLTL = Two-Way Left-Turn Lane

TABLE J-6
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Route 72 & Rocherty Road	EB	L	190	119	137	190	96	155
	EB	T/R	--	255	290	--	184	258
	WB	L	300	262	238	300	206	242
	WB	T	--	525	556	--	343	210
	WB	R				325		52
	NB	L	105	17	19	105	18	19
	NB	T	--	662	845	--	540	748
	NB	R				250	38	46
	SB	L	225	271	395	225	185	285
	SB	T/R	--	683	787	--	703	937
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	--	25	27	--	29	26
	WB	L/T	--	93	94	--	109	327
	WB	R	115	32	38	115	36	85
	NB	L	135	81	81	135	39	43
	NB	T	--	472	539	--	219	399
	NB	R	230	24	23	230	7	9
	SB	L	135	40	37	135[1]/200[2]	30	182
	SB	T/R	--	388	455	--	252	360
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	--	376	352	--	330	353
	EB	T/R	--	81	81	--	71	77
	WB	L	--	81	81	--	81	84
	WB	T/R	--	138	143	--	145	163
	NB	L	230	40	40	230[1]/165[2]	15	16
	NB	T	--	748	876	--	565	944
	NB	R	230	30	32	230	0	4
	SB	L	235	207	230	235	150	151
	SB	T	--	569	776	--	462	747
	SB	R	235	56	63	235	29	39
Route 72 & Isabel Drive	WB	L/R	--	248	272	--	79	101
	NB	T/R	--	--	--	--	1157	1288
	SB	L	--	10	9	275	18	90
	SB	T				--	547	993

1 = Under 2025 conditions
2 = Under 2035 conditions

TABLE J-6 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	--	46	51	--	46	51
	EB	T/R	--	74	87	--	74	90
	WB	L	70	111	174	70	111	174
	WB	T/R	--	91	100	--	91	100
	NB	L	130	113	73	130	119	97
	NB	T/R	--	445	416	--	486	635
	SB	L	150	28	27	150	29	41
	SB	T	--	554	535	--	575	739
	SB	R	320	2	2	320	2	2
Route 72 & Route 241	EB	L	55	105	118	55	106	132
	EB	R	--	75	143	--	76	187
	NB	L	90	173	223	90	180	297
	NB	T	--	232	264	--	232	361
	SB	T/R	--	668	745	--	677	987
Cornwall Road & Rocherty Road	EB	L	--	321	331	225	45	53
	EB	T/R				--	305	294
	WB	L	--	367	381	TWLTL	48	47
	WB	T				425[1]	276	261
	WB	R				325	20	35
	NB	L	--	222	245	150	51	76
	NB	T				--	110	156
	NB	R				350	20	34
	SB	L	--	218	235	TWLTL	61	33
	SB	T/R				275[1]	194	58
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	--	14	11	--	24	76
	WB	L/T/R	--	7	6	--	10	29
	NB	L/T/R	--	103	108	--	122	236
	SB	L/T/R	--	96	109	--	111	220
Cornwall Road & York Street	EB	L/R	--	81	92	--	106	170
	NB	L/T	--	4	3	--	155	211
	SB	T/R	--	--	--	--	135	428

1 = Distance from Future Stop-Bar to Centerline of Nearest Future Site Driveway
TWLTL = Two-Way Left-Turn Lane

TABLE J-6 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Cornwall Road & Wilhelm Avenue	WB	L	--	95	116	--	140	253
	WB	R				150		28
	NB	T	--	--	--	--	112	90
	NB	R				265		0
	SB	L/T	--	5	5	--	163	182
Evergreen Road & Lincoln Avenue	EB	L	100	28	31	100	28	33
	EB	T/R	--	114	124	--	116	166
	WB	L	80	6	7	80	6	8
	WB	T/R	--	230	233	--	235	338
	NB	L/T/R	--	23	33	--	23	44
	SB	L/T/R	--	77	97	--	78	126
Cornwall Road & Township Roadway	EB	L	--	--	--	TWLTL	--	179
	EB	T/R				275[1]		60
	WB	L				100		5
	WB	T				160[1]		60
	WB	R				100		23
	NB	L				TWLTL		45
	NB	T/R				1325[1]		182
	SB	L				400		17
	SB	T				--		297
	SB	R				275		13
Township Road & Eastern Site Driveway	WB	L	--	--	--	TWLTL	--	11
	NB	L/R				--		73
Township Road & Middle Site Driveway	WB	L	--	--	--	TWLTL	--	12
	NB	L/R				--		67
Township Road & Western Site Driveway	WB	L	--	--	--	TWLTL	--	0
	NB	L/R				--		1
Rocherty Road & Eastern Site Driveway	EB	L	--	--	--	TWLTL	2	2
	SB	L/R				--	3	18
Rocherty Road & Western Site Driveway	SB	R	--	--	--	--	2	1

1 = Distance from Future Stop-Bar to Centerline of Nearest Future Site Driveway
TWLTL = Two-Way Left-Turn Lane

TABLE J-6 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET): PENNDOT GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		Existing Storage	2025 Base	2035 Base	Future Storage	2025 Projected	2035 Projected
Cornwall Road & Southern Site Driveway	WB	R	--	--	--	--	4	2
	SB	L				TWLTL	3	1
Cornwall Road & Middle Site Driveway	EB	R	--	--	--	--	--	11
Norman Drive & Site Driveway	WB	L	--	--	--	--	0	0
	NB	L/R				--	0	0

TWLTL = Two-Way Left-Turn Lane

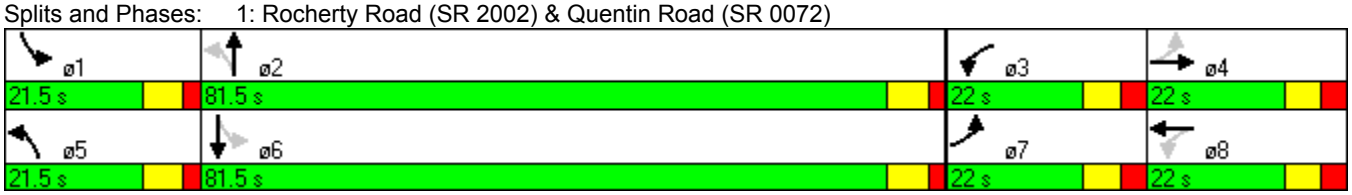
EXISTING CONDITIONS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	91	249	179	168	15	388	88	280
Lane Group Flow (vph)	126	312	197	303	20	653	98	344
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.5	21.5	13.5	21.5
Total Split (s)	22.0	22.0	22.0	22.0	21.5	81.5	21.5	81.5
Total Split (%)	15.0%	15.0%	15.0%	15.0%	14.6%	55.4%	14.6%	55.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.53	1.36	0.75	1.07	0.05	0.93	0.38	0.40
Control Delay	42.2	228.7	54.0	118.6	10.7	50.5	15.4	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	228.7	54.0	118.6	10.7	50.5	15.4	19.1
Queue Length 50th (ft)	68	~306	113	~249	6	440	32	132
Queue Length 95th (ft)	120	#557	#306	#522	14	561	56	249
Internal Link Dist (ft)		569		654		721		1806
Turn Bay Length (ft)	190		300		105		225	
Base Capacity (vph)	279	229	262	284	529	1081	325	1087
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	1.36	0.75	1.07	0.04	0.60	0.30	0.32

Intersection Summary

Cycle Length: 147
Actuated Cycle Length: 117
Natural Cycle: 90
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	249	8	179	168	71	15	388	173	88	280	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	11	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1677	1749		1577	1764		1425	1645		1640	1658	
Flt Permitted	0.26	1.00		0.22	1.00		0.55	1.00		0.15	1.00	
Satd. Flow (perm)	462	1749		367	1764		819	1645		259	1658	
Peak-hour factor, PHF	0.72	0.83	0.67	0.91	0.84	0.69	0.75	0.85	0.88	0.90	0.90	0.78
Adj. Flow (vph)	126	300	12	197	200	103	20	456	197	98	311	33
RTOR Reduction (vph)	0	1	0	0	12	0	0	12	0	0	2	0
Lane Group Flow (vph)	126	311	0	197	291	0	20	641	0	98	342	0
Heavy Vehicles (%)	3%	3%	13%	9%	3%	6%	20%	10%	4%	8%	12%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.8	15.3		33.4	18.1		56.3	53.5		69.8	60.5	
Effective Green, g (s)	27.8	15.3		33.4	18.1		56.3	53.5		69.8	60.5	
Actuated g/C Ratio	0.23	0.13		0.28	0.15		0.47	0.44		0.58	0.50	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	232	221		255	264		395	728		261	830	
v/s Ratio Prot	0.06	c0.18		c0.10	c0.16		0.00	c0.39		c0.03	c0.21	
v/s Ratio Perm	0.07			0.12			0.02			0.19		
v/c Ratio	0.54	1.41		0.77	1.10		0.05	0.88		0.38	0.41	
Uniform Delay, d1	39.3	52.8		37.1	51.4		17.5	30.8		18.5	19.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	208.3		14.3	85.7		0.1	13.3		1.2	0.9	
Delay (s)	42.5	261.1		51.4	137.1		17.6	44.1		19.8	19.9	
Level of Service	D	F		D	F		B	D		B	B	
Approach Delay (s)		198.2			103.3			43.3			19.9	
Approach LOS		F			F			D			B	

Intersection Summary			
HCM Average Control Delay	85.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	120.9	Sum of lost time (s)	40.5
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	6	1	8	2	3	33	492	33	3	345
Lane Group Flow (vph)	0	56	0	20	4	40	547	40	8	404
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	22.0	14.0	22.0
Total Split (s)	19.0	19.0	19.0	19.0	22.0	67.0	67.0	67.0	22.0	89.0
Total Split (%)	17.6%	17.6%	17.6%	17.6%	20.4%	62.0%	62.0%	62.0%	20.4%	82.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	Min	None	Min
v/c Ratio		0.20		0.10	0.01	0.06	0.43	0.03	0.02	0.31
Control Delay		13.4		24.9	9.3	8.3	9.9	3.6	4.7	5.5
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.4		24.9	9.3	8.3	9.9	3.6	4.7	5.5
Queue Length 50th (ft)		3		4	0	5	85	0	1	56
Queue Length 95th (ft)		0		15	5	25	298	13	2	104
Internal Link Dist (ft)		216		230			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		410		301	610	852	1696	1644	580	1713
Starvation Cap Reductn		0		0	0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.14		0.07	0.01	0.05	0.32	0.02	0.01	0.24

Intersection Summary

Cycle Length: 108
Actuated Cycle Length: 49.4
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1	27	8	2	3	33	492	33	3	345	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1521			1419	1226	1609	1770	1714	1305	1712	
Flt Permitted		0.95			0.78	1.00	0.52	1.00	1.00	0.32	1.00	
Satd. Flow (perm)		1448			1155	1226	888	1770	1714	439	1712	
Peak-hour factor, PHF	0.75	0.25	0.61	0.50	0.50	0.75	0.83	0.90	0.83	0.38	0.88	0.42
Adj. Flow (vph)	8	4	44	16	4	4	40	547	40	8	392	12
RTOR Reduction (vph)	0	41	0	0	0	4	0	0	18	0	1	0
Lane Group Flow (vph)	0	15	0	0	20	0	40	547	22	8	403	0
Heavy Vehicles (%)	17%	0%	4%	25%	50%	33%	15%	10%	3%	33%	14%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		4.6			4.6	5.8	31.4	31.4	31.4	39.6	39.6	
Effective Green, g (s)		4.6			4.6	5.8	31.4	31.4	31.4	39.6	39.6	
Actuated g/C Ratio		0.08			0.08	0.10	0.54	0.54	0.54	0.68	0.68	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		114			91	270	479	955	925	317	1165	
v/s Ratio Prot						0.00		c0.31		0.00	c0.24	
v/s Ratio Perm		0.01			c0.02	0.00	0.05		0.01	0.02		
v/c Ratio		0.14			0.22	0.00	0.08	0.57	0.02	0.03	0.35	
Uniform Delay, d1		24.9			25.1	23.6	6.5	8.9	6.2	4.2	3.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.7			1.7	0.0	0.2	1.7	0.0	0.1	0.5	
Delay (s)		25.7			26.8	23.6	6.7	10.6	6.3	4.3	4.4	
Level of Service		C			C	C	A	B	A	A	A	
Approach Delay (s)		25.7			26.3			10.1			4.4	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	21.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	78	7	19	6	35	411	32	63	330	39
Lane Group Flow (vph)	104	40	32	135	48	467	48	88	359	68
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	23.1	23.9	23.1	23.9	19.9	56.4	56.4	19.9	56.4	56.4
Total Split (%)	18.7%	19.4%	18.7%	19.4%	16.1%	45.7%	45.7%	16.1%	45.7%	45.7%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.29	0.11	0.09	0.44	0.10	0.74	0.08	0.21	0.51	0.10
Control Delay	23.0	16.6	21.6	14.9	9.6	29.6	5.8	10.4	21.2	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	16.6	21.6	14.9	9.6	29.6	5.8	10.4	21.2	5.1
Queue Length 50th (ft)	32	4	9	5	9	184	0	18	128	0
Queue Length 95th (ft)	73	17	22	1	24	350	12	37	256	6
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	517	472	661	594	636	1202	1168	599	1211	1080
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.08	0.05	0.23	0.08	0.39	0.04	0.15	0.30	0.06

Intersection Summary

Cycle Length: 123.3
Actuated Cycle Length: 70.3
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

ø1	ø2	ø3	ø4
19.9 s	56.4 s	23.1 s	23.9 s
ø5	ø6	ø7	ø8
19.9 s	56.4 s	23.1 s	23.9 s

3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	7	19	19	6	74	35	411	32	63	330	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1567	1429		1902	1722		1618	1673	1607	1778	1686	1476
Flt Permitted	0.45	1.00		0.73	1.00		0.49	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	735	1429		1464	1722		828	1673	1607	561	1686	1476
Peak-hour factor, PHF	0.75	0.58	0.68	0.59	0.50	0.60	0.73	0.88	0.67	0.72	0.92	0.57
Adj. Flow (vph)	104	12	28	32	12	123	48	467	48	88	359	68
RTOR Reduction (vph)	0	22	0	0	106	0	0	0	30	0	0	41
Lane Group Flow (vph)	104	18	0	32	29	0	48	467	18	88	359	27
Heavy Vehicles (%)	8%	14%	16%	0%	0%	4%	11%	13%	0%	2%	17%	10%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	23.8	16.3		12.5	10.1		31.7	27.8	27.8	35.1	29.5	29.5
Effective Green, g (s)	23.8	16.3		12.5	10.1		31.7	27.8	27.8	35.1	29.5	29.5
Actuated g/C Ratio	0.32	0.22		0.17	0.14		0.43	0.37	0.37	0.47	0.40	0.40
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	331	313		260	234		394	625	600	356	669	585
v/s Ratio Prot	c0.04	0.01		0.00	0.02		0.01	c0.28		c0.02	0.21	
v/s Ratio Perm	c0.06			0.02			0.05		0.01	0.10		0.02
v/c Ratio	0.31	0.06		0.12	0.12		0.12	0.75	0.03	0.25	0.54	0.05
Uniform Delay, d1	18.6	23.0		26.2	28.3		12.7	20.2	14.8	11.9	17.2	13.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1		0.2	0.2		0.1	6.5	0.1	0.4	2.0	0.1
Delay (s)	19.2	23.1		26.4	28.5		12.8	26.8	14.8	12.3	19.2	13.9
Level of Service	B	C		C	C		B	C	B	B	B	B
Approach Delay (s)		20.2			28.1			24.5			17.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	16.4
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	21	28	438	47	49	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Grade (%)	-2%		3%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.929		0.979			
Flt Protected	0.977					0.994
Satd. Flow (prot)	1898	0	1610	0	0	1685
Flt Permitted	0.977					0.994
Satd. Flow (perm)	1898	0	1610	0	0	1685
Link Speed (mph)	30		45			45
Link Distance (ft)	408		1653			553
Travel Time (s)	9.3		25.0			8.4
Peak Hour Factor	0.63	0.75	0.90	0.51	0.65	0.81
Heavy Vehicles (%)	4%	4%	10%	10%	10%	10%
Adj. Flow (vph)	33	37	487	92	75	574
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	0	579	0	0	649
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.84	0.84	1.07	1.07	1.02	1.02
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 66.4%	ICU Level of Service C
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	21	28	438	47	49	465
Sign Control	Stop		Free			Free
Grade	-2%		3%			-3%
Peak Hour Factor	0.63	0.75	0.90	0.51	0.65	0.81
Hourly flow rate (vph)	33	37	487	92	75	574
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1258	533			579	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1258	533			579	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	81	93			92	
cM capacity (veh/h)	172	543			957	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	71	579	649
Volume Left	33	0	75
Volume Right	37	92	0
cSH	270	1700	957
Volume to Capacity	0.26	0.34	0.08
Queue Length 95th (ft)	26	0	6
Control Delay (s)	23.0	0.0	2.0
Lane LOS	C		A
Approach Delay (s)	23.0	0.0	2.0
Approach LOS	C		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

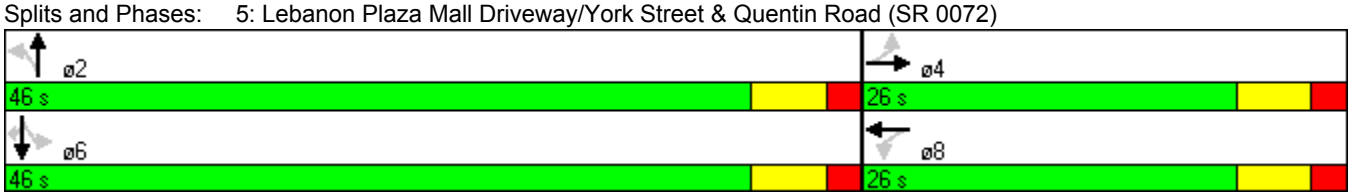
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	4	5	52	10	6	397	27	476	4
Lane Group Flow (vph)	8	20	65	36	20	528	36	523	8
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	26.0	26.0	26.0	26.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	36.1%	36.1%	36.1%	36.1%	63.9%	63.9%	63.9%	63.9%	63.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.05	0.07	0.30	0.12	0.04	0.42	0.06	0.41	0.01
Control Delay	22.5	18.0	27.0	13.8	4.5	6.5	4.7	6.5	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	18.0	27.0	13.8	4.5	6.5	4.7	6.5	2.5
Queue Length 50th (ft)	3	4	22	4	2	82	4	82	0
Queue Length 95th (ft)	7	8	47	22	3	123	11	148	2
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	342	512	420	554	513	1255	560	1269	1161
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.15	0.06	0.04	0.42	0.06	0.41	0.01

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 62.2
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	5	5	52	10	17	6	397	19	27	476	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.90		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1375	1575		1668	1671		1535	1754		1686	1778	1623
Flt Permitted	0.73	1.00		0.74	1.00		0.45	1.00		0.44	1.00	1.00
Satd. Flow (perm)	1062	1575		1307	1671		720	1754		785	1778	1623
Peak-hour factor, PHF	0.50	0.42	0.63	0.80	0.83	0.71	0.30	0.80	0.59	0.75	0.91	0.50
Adj. Flow (vph)	8	12	8	65	12	24	20	496	32	36	523	8
RTOR Reduction (vph)	0	7	0	0	21	0	0	2	0	0	0	3
Lane Group Flow (vph)	8	13	0	65	15	0	20	526	0	36	523	5
Heavy Vehicles (%)	25%	0%	20%	2%	10%	0%	17%	11%	0%	4%	11%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.2	8.2		8.2	8.2		43.1	43.1		43.1	43.1	43.1
Effective Green, g (s)	8.2	8.2		8.2	8.2		43.1	43.1		43.1	43.1	43.1
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.68	0.68		0.68	0.68	0.68
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	138	204		169	216		490	1194		534	1211	1105
v/s Ratio Prot		0.01			0.01			c0.30			0.29	
v/s Ratio Perm	0.01			c0.05			0.03			0.05		0.00
v/c Ratio	0.06	0.06		0.38	0.07		0.04	0.44		0.07	0.43	0.00
Uniform Delay, d1	24.2	24.2		25.2	24.2		3.3	4.6		3.4	4.6	3.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2		2.0	0.2		0.0	0.3		0.1	0.2	0.0
Delay (s)	24.4	24.4		27.2	24.4		3.3	4.9		3.4	4.8	3.2
Level of Service	C	C		C	C		A	A		A	A	A
Approach Delay (s)		24.4			26.2			4.8			4.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	63.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

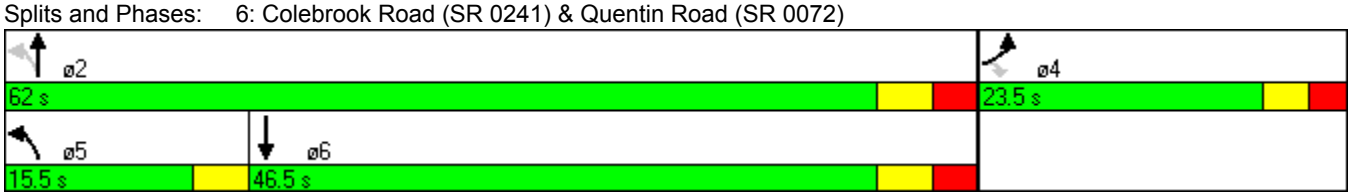
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	137	175	127	372	371
Lane Group Flow (vph)	199	211	144	443	539
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	23.5	23.5	15.5	62.0	46.5
Total Split (%)	27.5%	27.5%	18.1%	72.5%	54.4%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.59	0.46	0.32	0.43	0.81
Control Delay	31.9	7.8	6.7	8.6	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	7.8	6.7	8.6	28.2
Queue Length 50th (ft)	67	0	17	76	165
Queue Length 95th (ft)	112	40	42	139	267
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	510	592	502	1559	1274
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.39	0.36	0.29	0.28	0.42

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 60.6
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	137	175	127	372	371	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1627	1428	1625	1769	1823	
Flt Permitted	0.95	1.00	0.22	1.00	1.00	
Satd. Flow (perm)	1627	1428	381	1769	1823	
Peak-hour factor, PHF	0.69	0.83	0.88	0.84	0.81	0.81
Adj. Flow (vph)	199	211	144	443	458	81
RTOR Reduction (vph)	0	167	0	0	9	0
Lane Group Flow (vph)	199	44	144	443	530	0
Heavy Vehicles (%)	3%	5%	9%	9%	13%	12%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	12.6	12.6	35.4	35.4	22.0	
Effective Green, g (s)	12.6	12.6	35.4	35.4	22.0	
Actuated g/C Ratio	0.21	0.21	0.59	0.59	0.37	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	342	300	430	1044	668	
v/s Ratio Prot	c0.12		0.06	c0.25	c0.29	
v/s Ratio Perm		0.03	0.14			
v/c Ratio	0.58	0.15	0.33	0.42	0.79	
Uniform Delay, d1	21.3	19.3	7.3	6.7	17.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	0.2	0.5	0.8	7.8	
Delay (s)	23.8	19.6	7.8	7.5	24.8	
Level of Service	C	B	A	A	C	
Approach Delay (s)	21.6			7.6	24.8	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

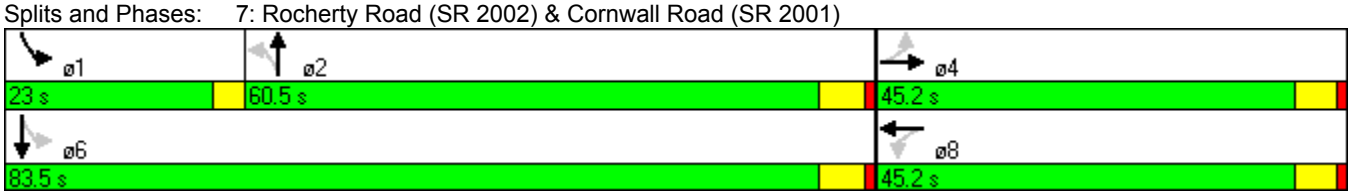
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	50	411	33	322	19	207	163	104
Lane Group Flow (vph)	0	582	0	592	0	524	0	369
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.2	9.2	9.2	9.2	20.5	20.5	6.0	20.5
Total Split (s)	45.2	45.2	45.2	45.2	60.5	60.5	23.0	83.5
Total Split (%)	35.1%	35.1%	35.1%	35.1%	47.0%	47.0%	17.9%	64.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.4	4.4	3.0	4.4
All-Red Time (s)	1.2	1.2	1.2	1.2	1.1	1.1	0.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	5.5	5.5	3.0	5.5
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Max	Min
v/c Ratio		1.55		1.18		0.85		0.77
Control Delay		288.9		132.9		45.5		25.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		288.9		132.9		45.5		25.9
Queue Length 50th (ft)		~615		~521		334		144
Queue Length 95th (ft)		#954		#859		345		194
Internal Link Dist (ft)		1052		2233		731		2352
Turn Bay Length (ft)								
Base Capacity (vph)		376		503		815		552
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		1.55		1.18		0.64		0.67

Intersection Summary

Cycle Length: 128.7
Actuated Cycle Length: 115.8
Natural Cycle: 120
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	411	26	33	322	144	19	207	180	163	104	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	10	10	10
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)		5.2			5.2			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			0.94			0.98	
Flt Protected		0.99			1.00			1.00			0.97	
Satd. Flow (prot)		1631			1602			1707			1551	
Flt Permitted		0.65			0.87			0.97			0.37	
Satd. Flow (perm)		1071			1405			1661			591	
Peak-hour factor, PHF	0.56	0.91	0.63	0.73	0.92	0.73	0.79	0.74	0.82	0.86	0.85	0.84
Adj. Flow (vph)	89	452	41	45	350	197	24	280	220	190	122	57
RTOR Reduction (vph)	0	2	0	0	13	0	0	22	0	0	6	0
Lane Group Flow (vph)	0	580	0	0	579	0	0	502	0	0	363	0
Heavy Vehicles (%)	4%	6%	8%	16%	9%	6%	0%	1%	3%	12%	3%	9%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		40.4			40.4			41.4			64.6	
Effective Green, g (s)		40.4			40.4			41.4			64.6	
Actuated g/C Ratio		0.35			0.35			0.36			0.56	
Clearance Time (s)		5.2			5.2			5.5			5.5	
Vehicle Extension (s)		4.0			4.0			7.0			7.0	
Lane Grp Cap (vph)		374			491			594			498	
v/s Ratio Prot											c0.13	
v/s Ratio Perm		c0.54			0.41			c0.30			0.28	
v/c Ratio		1.55			1.18			0.84			0.73	
Uniform Delay, d1		37.7			37.7			34.2			19.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		260.8			100.1			12.6			8.3	
Delay (s)		298.4			137.7			46.8			27.3	
Level of Service		F			F			D			C	
Approach Delay (s)		298.4			137.7			46.8			27.3	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM Average Control Delay	140.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	115.7	Sum of lost time (s)	16.2
Intersection Capacity Utilization	92.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	26	27	35	13	50	27	347	86	111	343	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.948			0.931			0.975			0.995	
Flt Protected		0.994			0.983			0.997			0.987	
Satd. Flow (prot)	0	1902	0	0	1971	0	0	1674	0	0	1675	0
Flt Permitted		0.994			0.983			0.997			0.987	
Satd. Flow (perm)	0	1902	0	0	1971	0	0	1674	0	0	1675	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		204			694			593			2221	
Travel Time (s)		4.6			15.8			9.0			33.7	
Peak Hour Factor	0.42	0.54	0.72	0.73	0.65	0.69	0.81	0.87	0.86	0.73	0.81	0.50
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	12	48	38	48	20	72	33	399	100	152	423	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	98	0	0	140	0	0	532	0	0	595	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.08	1.08	1.08	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 72.1% ICU Level of Service C
Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	26	27	35	13	50	27	347	86	111	343	10
Sign Control		Stop			Stop			Free			Free	
Grade		5%			0%			-2%			0%	
Peak Hour Factor	0.42	0.54	0.72	0.73	0.65	0.69	0.81	0.87	0.86	0.73	0.81	0.50
Hourly flow rate (vph)	12	48	38	48	20	72	33	399	100	152	423	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1336	1303	433	1315	1263	449	443			499		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1336	1303	433	1315	1263	449	443			499		
tC, single (s)	7.2	6.6	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	63	94	40	86	88	97			86		
cM capacity (veh/h)	88	132	618	80	142	614	1106			1055		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	140	532	596
Volume Left	12	48	33	152
Volume Right	38	72	100	20
cSH	174	164	1106	1055
Volume to Capacity	0.56	0.85	0.03	0.14
Queue Length 95th (ft)	73	148	2	13
Control Delay (s)	49.4	91.7	0.9	3.6
Lane LOS	E	F	A	A
Approach Delay (s)	49.4	91.7	0.9	3.6
Approach LOS	E	F		

Intersection Summary			
Average Delay	14.9		
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	43	21	24	354	519	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.959				0.985	
Flt Protected	0.966			0.996		
Satd. Flow (prot)	1709	0	0	1781	1809	0
Flt Permitted	0.966			0.996		
Satd. Flow (perm)	1709	0	0	1781	1809	0
Link Speed (mph)	25			40	40	
Link Distance (ft)	1308			929	312	
Travel Time (s)	35.7			15.8	5.3	
Peak Hour Factor	0.66	0.75	0.64	0.83	0.82	0.70
Heavy Vehicles (%)	0%	10%	9%	6%	3%	7%
Adj. Flow (vph)	65	28	38	427	633	81
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	0	0	465	714	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	22			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 48.7% ICU Level of Service A
Analysis Period (min) 15

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	43	21	24	354	519	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.66	0.75	0.64	0.83	0.82	0.70
Hourly flow rate (vph)	65	28	38	427	633	81
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1175	674	714			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1175	674	714			
tC, single (s)	6.4	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.3			
p0 queue free %	68	94	96			
cM capacity (veh/h)	204	441	854			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	93	464	714
Volume Left	65	38	0
Volume Right	28	0	81
cSH	244	854	1700
Volume to Capacity	0.38	0.04	0.42
Queue Length 95th (ft)	43	3	0
Control Delay (s)	28.7	1.3	0.0
Lane LOS	D	A	
Approach Delay (s)	28.7	1.3	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	99	26	254	62	120	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.961		0.971			
Flt Protected	0.966					0.988
Satd. Flow (prot)	1683	0	1789	0	0	2034
Flt Permitted	0.966					0.988
Satd. Flow (perm)	1683	0	1789	0	0	2034
Link Speed (mph)	35		40			40
Link Distance (ft)	1025		312			921
Travel Time (s)	20.0		5.3			15.7
Peak Hour Factor	0.87	0.57	0.79	0.69	0.71	0.73
Heavy Vehicles (%)	2%	8%	4%	0%	1%	5%
Adj. Flow (vph)	114	46	322	90	169	545
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	0	412	0	0	714
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.00	1.00	0.85	0.85
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 61.8%	ICU Level of Service B
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	99	26	254	62	120	398
Sign Control	Stop		Free			Free
Grade	2%		0%			1%
Peak Hour Factor	0.87	0.57	0.79	0.69	0.71	0.73
Hourly flow rate (vph)	114	46	322	90	169	545
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1250	366			411	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1250	366			411	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	30	93			85	
cM capacity (veh/h)	163	665			1153	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	159	411	714
Volume Left	114	0	169
Volume Right	46	90	0
cSH	207	1700	1153
Volume to Capacity	0.77	0.24	0.15
Queue Length 95th (ft)	132	0	13
Control Delay (s)	63.6	0.0	3.5
Lane LOS	F		A
Approach Delay (s)	63.6	0.0	3.5
Approach LOS	F		

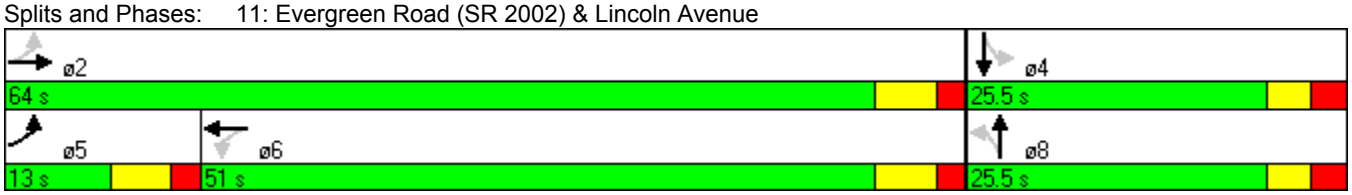
Intersection Summary			
Average Delay	9.8		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	280	504	14	447	15	15	107	13
Lane Group Flow (vph)	315	623	32	712	0	86	0	256
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	13.0	64.0	51.0	51.0	25.5	25.5	25.5	25.5
Total Split (%)	14.5%	71.5%	57.0%	57.0%	28.5%	28.5%	28.5%	28.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	1.06	0.58	0.09	0.92		0.25		0.79
Control Delay	84.7	11.1	12.6	37.3		19.6		45.5
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	84.7	11.1	12.6	37.3		19.6		45.5
Queue Length 50th (ft)	~88	175	9	321		21		114
Queue Length 95th (ft)	#218	225	11	#557		36		101
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	298	1268	426	958		419		389
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	1.06	0.49	0.08	0.74		0.21		0.66

Intersection Summary

Cycle Length: 89.5
Actuated Cycle Length: 79.3
Natural Cycle: 90
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	504	3	14	447	146	15	15	27	107	13	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.95			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1702	1684		1614	1615			1704			1662	
Flt Permitted	0.15	1.00		0.43	1.00			0.87			0.82	
Satd. Flow (perm)	263	1684		728	1615			1506			1402	
Peak-hour factor, PHF	0.89	0.82	0.38	0.44	0.90	0.68	0.63	0.63	0.72	0.82	0.54	0.90
Adj. Flow (vph)	315	615	8	32	497	215	24	24	38	130	24	102
RTOR Reduction (vph)	0	0	0	0	18	0	0	30	0	0	27	0
Lane Group Flow (vph)	315	623	0	32	694	0	0	56	0	0	229	0
Heavy Vehicles (%)	2%	8%	33%	7%	9%	4%	7%	0%	8%	4%	0%	6%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	50.6	50.6		37.4	37.4			16.9			16.9	
Effective Green, g (s)	50.6	50.6		37.4	37.4			16.9			16.9	
Actuated g/C Ratio	0.64	0.64		0.47	0.47			0.21			0.21	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	300	1079		345	765			322			300	
v/s Ratio Prot	c0.10	0.37			0.43							
v/s Ratio Perm	c0.58			0.04				0.04			c0.16	
v/c Ratio	1.05	0.58		0.09	0.91			0.17			0.76	
Uniform Delay, d1	16.6	8.1		11.5	19.2			25.4			29.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	65.7	1.5		0.3	15.6			0.3			11.0	
Delay (s)	82.2	9.6		11.8	34.8			25.6			40.2	
Level of Service	F	A		B	C			C			D	
Approach Delay (s)		34.0			33.8			25.6			40.2	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	34.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

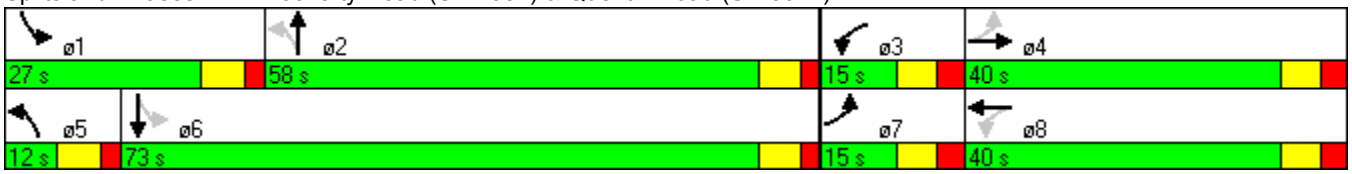
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	82	212	195	217	7	445	153	440
Lane Group Flow (vph)	111	267	232	431	12	582	166	575
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.5	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.0	21.5	13.5	21.5
Total Split (s)	15.0	40.0	15.0	40.0	12.0	58.0	27.0	73.0
Total Split (%)	10.7%	28.6%	10.7%	28.6%	8.6%	41.4%	19.3%	52.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.74	0.64	0.92	0.97	0.04	0.79	0.51	0.64
Control Delay	63.2	55.5	81.5	85.1	15.0	44.4	22.9	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	55.5	81.5	85.1	15.0	44.4	22.9	29.8
Queue Length 50th (ft)	71	218	161	369	5	446	75	349
Queue Length 95th (ft)	96	300	#276	#589	9	#684	126	566
Internal Link Dist (ft)		569		654		721		1806
Turn Bay Length (ft)	190		300		105		225	
Base Capacity (vph)	149	419	252	444	317	736	399	905
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.64	0.92	0.97	0.04	0.79	0.42	0.64

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 70 (50%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	82	212	16	195	217	144	7	445	103	153	440	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	11	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.93		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1765		1653	1788		1710	1738		1771	1710	
Flt Permitted	0.12	1.00		0.39	1.00		0.33	1.00		0.18	1.00	
Satd. Flow (perm)	218	1765		670	1788		594	1738		337	1710	
Peak-hour factor, PHF	0.74	0.86	0.80	0.84	0.95	0.71	0.58	0.96	0.87	0.92	0.93	0.88
Adj. Flow (vph)	111	247	20	232	228	203	12	464	118	166	473	102
RTOR Reduction (vph)	0	2	0	0	23	0	0	6	0	0	6	0
Lane Group Flow (vph)	111	265	0	232	408	0	12	576	0	166	569	0
Heavy Vehicles (%)	1%	2%	0%	4%	1%	0%	0%	4%	4%	0%	7%	2%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.0	33.0		41.0	33.0		61.0	58.8		78.5	69.8	
Effective Green, g (s)	41.0	33.0		41.0	33.0		61.0	58.8		78.5	69.8	
Actuated g/C Ratio	0.29	0.24		0.29	0.24		0.44	0.42		0.56	0.50	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	149	416		252	421		276	730		324	853	
v/s Ratio Prot	0.04	0.15		c0.05	c0.23		0.00	c0.33		c0.05	c0.33	
v/s Ratio Perm	0.18			0.22			0.02			0.24		
v/c Ratio	0.74	0.64		0.92	0.97		0.04	0.79		0.51	0.67	
Uniform Delay, d1	40.3	48.1		47.8	53.0		23.3	35.2		21.6	26.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.17	1.07	
Incremental Delay, d2	19.2	3.6		36.4	35.6		0.1	8.5		1.6	3.7	
Delay (s)	59.5	51.7		84.3	88.6		23.4	43.7		27.0	32.1	
Level of Service	E	D		F	F		C	D		C	C	
Approach Delay (s)		54.0			87.1			43.3			31.0	
Approach LOS		D			F			D			C	

Intersection Summary			
HCM Average Control Delay	53.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	33.5
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

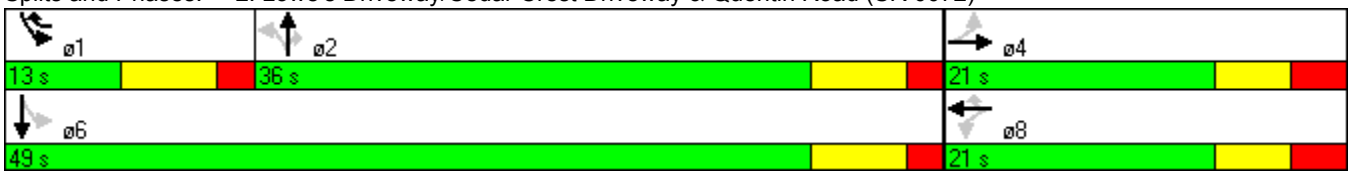
2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	10	3	71	3	23	60	617	69	16	548
Lane Group Flow (vph)	0	92	0	139	36	72	649	80	24	589
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	21.0	21.0	21.0	21.0	13.0	36.0	36.0	36.0	13.0	49.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	18.6%	51.4%	51.4%	51.4%	18.6%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.30		0.63	0.07	0.15	0.62	0.08	0.07	0.46
Control Delay		12.2		39.5	5.6	7.9	13.7	2.4	8.9	11.1
Queue Delay		0.2		0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay		12.3		39.5	5.6	7.9	13.8	2.4	8.9	11.1
Queue Length 50th (ft)		7		54	0	17	329	7	6	181
Queue Length 95th (ft)		30		40	8	m24	m361	m6	14	326
Internal Link Dist (ft)		216		230			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		338		251	524	481	1048	1050	338	1289
Starvation Cap Reductn		0		0	0	0	0	0	0	0
Spillback Cap Reductn		31		0	33	0	33	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.30		0.55	0.07	0.15	0.64	0.08	0.07	0.46

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 20 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	3	53	71	3	23	60	617	69	16	548	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1532			1782	1568	1796	1820	1766	1536	1874	
Flt Permitted		0.91			0.67	1.00	0.44	1.00	1.00	0.22	1.00	
Satd. Flow (perm)		1402			1255	1568	836	1820	1766	354	1874	
Peak-hour factor, PHF	0.63	0.75	0.74	0.54	0.38	0.64	0.83	0.95	0.86	0.67	0.95	0.68
Adj. Flow (vph)	16	4	72	131	8	36	72	649	80	24	577	12
RTOR Reduction (vph)	0	61	0	0	0	29	0	0	40	0	1	0
Lane Group Flow (vph)	0	31	0	0	139	7	72	649	40	24	588	0
Heavy Vehicles (%)	0%	0%	6%	1%	33%	4%	3%	7%	0%	13%	4%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		10.7			10.7	14.3	34.7	34.7	34.7	45.3	45.3	
Effective Green, g (s)		10.7			10.7	14.3	34.7	34.7	34.7	45.3	45.3	
Actuated g/C Ratio		0.15			0.15	0.20	0.50	0.50	0.50	0.65	0.65	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		214			192	477	414	902	875	290	1213	
v/s Ratio Prot						0.00		c0.36		0.00	c0.31	
v/s Ratio Perm		0.02			c0.11	0.00	0.09		0.02	0.05		
v/c Ratio		0.14			0.72	0.02	0.17	0.72	0.05	0.08	0.48	
Uniform Delay, d1		25.7			28.2	22.2	9.7	13.8	9.1	7.4	6.3	
Progression Factor		1.00			1.00	1.00	0.63	0.78	0.90	1.52	1.43	
Incremental Delay, d2		0.4			13.5	0.0	0.5	2.8	0.1	0.3	1.3	
Delay (s)		26.1			41.7	22.3	6.7	13.6	8.3	11.5	10.3	
Level of Service		C			D	C	A	B	A	B	B	
Approach Delay (s)		26.1			37.7			12.5			10.4	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

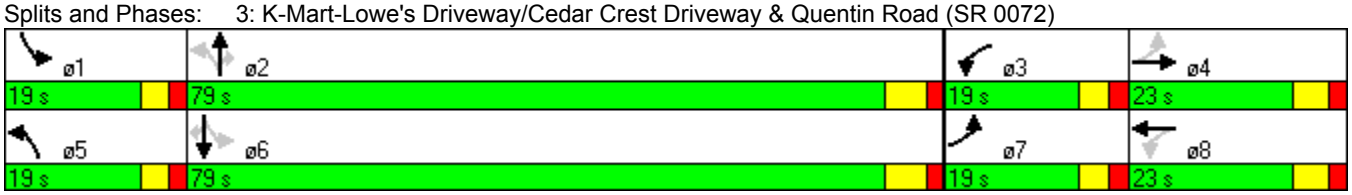
3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	182	19	77	20	49	477	62	142	450	65
Lane Group Flow (vph)	225	96	96	402	56	568	68	167	536	80
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	19.0	23.0	19.0	23.0	19.0	79.0	79.0	19.0	79.0	79.0
Total Split (%)	13.6%	16.4%	13.6%	16.4%	13.6%	56.4%	56.4%	13.6%	56.4%	56.4%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	1.02	0.40	0.32	0.91	0.11	0.56	0.07	0.34	0.48	0.09
Control Delay	113.0	29.5	44.6	41.1	14.5	32.1	11.7	10.0	18.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0
Total Delay	113.0	29.5	44.6	41.1	14.5	35.0	11.7	10.0	18.5	3.0
Queue Length 50th (ft)	176	30	68	94	26	521	17	52	283	0
Queue Length 95th (ft)	#274	38	104	17	m39	601	m31	76	355	18
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	220	255	336	477	604	1015	942	533	1119	935
Starvation Cap Reductn	0	0	0	0	0	328	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.38	0.29	0.84	0.09	0.83	0.07	0.31	0.48	0.09

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 73 (52%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	19	55	77	20	245	49	477	62	142	450	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1600		1902	1761		1796	1783	1607	1814	1844	1489
Flt Permitted	0.24	1.00		0.69	1.00		0.39	1.00	1.00	0.31	1.00	1.00
Satd. Flow (perm)	424	1600		1392	1761		734	1783	1607	597	1844	1489
Peak-hour factor, PHF	0.81	0.59	0.86	0.80	0.56	0.67	0.88	0.84	0.91	0.85	0.84	0.81
Adj. Flow (vph)	225	32	64	96	36	366	56	568	68	167	536	80
RTOR Reduction (vph)	0	52	0	0	268	0	0	0	28	0	0	32
Lane Group Flow (vph)	225	44	0	96	134	0	56	568	40	167	536	48
Heavy Vehicles (%)	0%	11%	0%	0%	5%	1%	0%	6%	0%	0%	7%	9%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	30.7	16.8		25.1	14.0		85.5	79.6	79.6	94.1	83.9	83.9
Effective Green, g (s)	30.7	16.8		25.1	14.0		85.5	79.6	79.6	94.1	83.9	83.9
Actuated g/C Ratio	0.22	0.12		0.18	0.10		0.61	0.57	0.57	0.67	0.60	0.60
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	219	192		290	176		493	1014	914	490	1105	892
v/s Ratio Prot	c0.10	0.03		0.03	0.08		0.00	c0.32		c0.02	c0.29	
v/s Ratio Perm	c0.12			0.03			0.06		0.02	0.20		0.03
v/c Ratio	1.03	0.23		0.33	0.76		0.11	0.56	0.04	0.34	0.49	0.05
Uniform Delay, d1	51.3	55.7		49.7	61.4		11.6	19.1	13.4	11.2	15.8	11.6
Progression Factor	1.00	1.00		1.00	1.00		1.73	1.47	2.90	1.00	1.00	1.00
Incremental Delay, d2	68.1	0.6		0.7	17.4		0.1	1.8	0.1	0.4	1.5	0.1
Delay (s)	119.4	56.4		50.3	78.8		20.2	29.9	38.8	11.6	17.4	11.7
Level of Service	F	E		D	E		C	C	D	B	B	B
Approach Delay (s)		100.6			73.3			30.0			15.6	
Approach LOS		F			E			C			B	

Intersection Summary			
HCM Average Control Delay	44.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	27.9
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	33	89	788	58	65	708
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Grade (%)	-2%		3%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.903		0.989			
Flt Protected	0.986					0.994
Satd. Flow (prot)	1898	0	1754	0	0	1765
Flt Permitted	0.986					0.994
Satd. Flow (perm)	1898	0	1754	0	0	1765
Link Speed (mph)	30		45			45
Link Distance (ft)	408		1653			553
Travel Time (s)	9.3		25.0			8.4
Peak Hour Factor	0.80	0.86	0.96	0.78	0.61	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	5%	5%
Adj. Flow (vph)	41	103	821	74	107	730
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	0	895	0	0	837
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.84	0.84	1.07	1.07	1.02	1.02
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 103.2%	ICU Level of Service G
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	33	89	788	58	65	708
Sign Control	Stop		Free			Free
Grade	-2%		3%			-3%
Peak Hour Factor	0.80	0.86	0.96	0.78	0.61	0.97
Hourly flow rate (vph)	41	103	821	74	107	730
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1801	858			895	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1801	858			895	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	45	71			86	
cM capacity (veh/h)	75	357			746	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	145	895	836
Volume Left	41	0	107
Volume Right	103	74	0
cSH	173	1700	746
Volume to Capacity	0.84	0.53	0.14
Queue Length 95th (ft)	146	0	12
Control Delay (s)	85.3	0.0	3.7
Lane LOS	F		A
Approach Delay (s)	85.3	0.0	3.7
Approach LOS	F		

Intersection Summary			
Average Delay	8.2		
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		

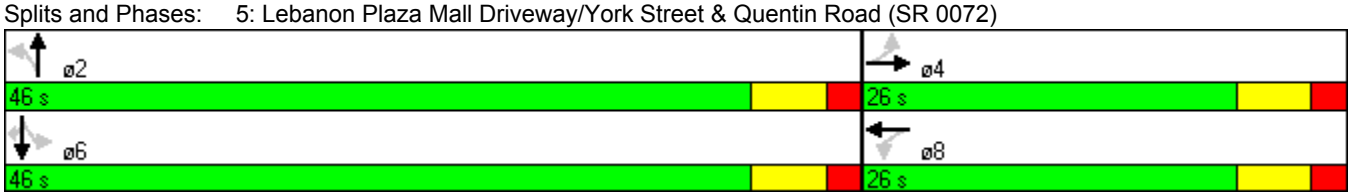
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	52	55	102	94	61	633	31	594	44
Lane Group Flow (vph)	68	152	124	165	72	744	36	632	56
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	26.0	26.0	26.0	26.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	36.1%	36.1%	36.1%	36.1%	63.9%	63.9%	63.9%	63.9%	63.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.31	0.40	0.55	0.44	0.18	0.64	0.11	0.54	0.05
Control Delay	26.0	14.3	32.9	23.0	7.6	11.6	7.1	9.7	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	14.3	32.9	23.0	7.6	11.6	7.1	9.7	2.2
Queue Length 50th (ft)	23	23	44	48	10	147	5	115	0
Queue Length 95th (ft)	46	55	81	81	32	325	19	248	10
Internal Link Dist (ft)		341		1234		612		2055	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	352	562	363	584	396	1159	315	1176	1028
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.27	0.34	0.28	0.18	0.64	0.11	0.54	0.05

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 64.6
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	58	102	94	38	61	633	33	31	594	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1653	1627		1685	1828		1744	1863		1754	1897	1623
Flt Permitted	0.65	1.00		0.66	1.00		0.35	1.00		0.28	1.00	1.00
Satd. Flow (perm)	1135	1627		1171	1828		639	1863		508	1897	1623
Peak-hour factor, PHF	0.77	0.81	0.69	0.82	0.78	0.86	0.85	0.92	0.59	0.86	0.94	0.79
Adj. Flow (vph)	68	68	84	124	121	44	72	688	56	36	632	56
RTOR Reduction (vph)	0	68	0	0	20	0	0	3	0	0	0	21
Lane Group Flow (vph)	68	84	0	124	145	0	72	741	0	36	632	35
Heavy Vehicles (%)	4%	2%	2%	1%	0%	3%	3%	4%	0%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	12.5	12.5		12.5	12.5		40.1	40.1		40.1	40.1	40.1
Effective Green, g (s)	12.5	12.5		12.5	12.5		40.1	40.1		40.1	40.1	40.1
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.62	0.62		0.62	0.62	0.62
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	220	315		227	354		397	1156		315	1178	1007
v/s Ratio Prot		0.05			0.08			c0.40			0.33	
v/s Ratio Perm	0.06			c0.11			0.11			0.07		0.02
v/c Ratio	0.31	0.27		0.55	0.41		0.18	0.64		0.11	0.54	0.03
Uniform Delay, d1	22.3	22.2		23.5	22.8		5.2	7.7		5.0	7.0	4.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	0.6		3.3	1.1		0.2	1.2		0.2	0.5	0.0
Delay (s)	23.4	22.8		26.8	23.9		5.5	8.9		5.2	7.4	4.8
Level of Service	C	C		C	C		A	A		A	A	A
Approach Delay (s)		23.0			25.1			8.6			7.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

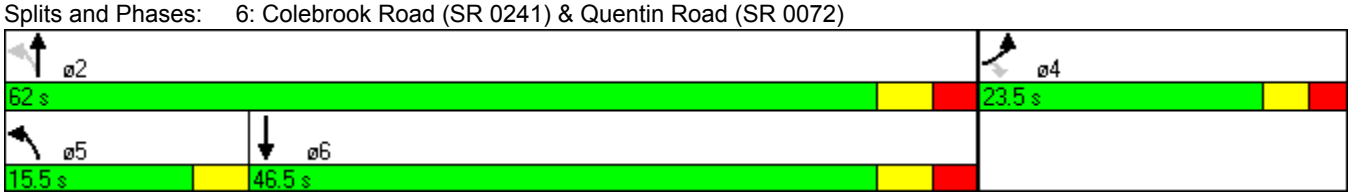
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	157	173	226	603	555
Lane Group Flow (vph)	215	211	314	648	714
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	23.5	23.5	15.5	62.0	46.5
Total Split (%)	27.5%	27.5%	18.1%	72.5%	54.4%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.66	0.46	0.76	0.55	0.88
Control Delay	38.4	8.1	28.3	9.8	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	8.1	28.3	9.8	32.6
Queue Length 50th (ft)	87	0	73	142	272
Queue Length 95th (ft)	139	40	121	248	442
Internal Link Dist (ft)	516			127	360
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	439	544	419	1498	1173
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.39	0.75	0.43	0.61

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 70.5
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	157	173	226	603	555	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1470	1736	1872	1983	
Flt Permitted	0.95	1.00	0.12	1.00	1.00	
Satd. Flow (perm)	1660	1470	228	1872	1983	
Peak-hour factor, PHF	0.73	0.82	0.72	0.93	0.93	0.87
Adj. Flow (vph)	215	211	314	648	597	117
RTOR Reduction (vph)	0	169	0	0	9	0
Lane Group Flow (vph)	215	42	314	648	705	0
Heavy Vehicles (%)	1%	2%	2%	3%	4%	1%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	13.9	13.9	44.2	44.2	28.6	
Effective Green, g (s)	13.9	13.9	44.2	44.2	28.6	
Actuated g/C Ratio	0.20	0.20	0.63	0.63	0.41	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	329	291	404	1180	809	
v/s Ratio Prot	c0.13		c0.13	0.35	c0.36	
v/s Ratio Perm		0.03	0.36			
v/c Ratio	0.65	0.14	0.78	0.55	0.87	
Uniform Delay, d1	25.9	23.2	16.0	7.3	19.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.6	0.2	9.1	1.2	11.3	
Delay (s)	30.5	23.4	25.1	8.5	30.4	
Level of Service	C	C	C	A	C	
Approach Delay (s)	27.0			13.9	30.4	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	70.1	Sum of lost time (s)	15.5
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

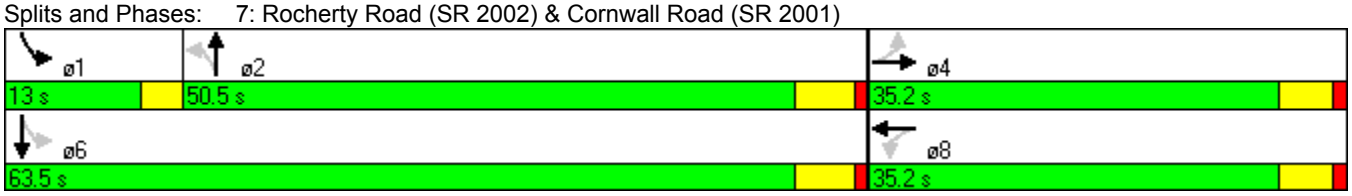
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	53	345	62	410	41	153	139	192
Lane Group Flow (vph)	0	502	0	705	0	334	0	521
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.2	9.2	9.2	9.2	20.5	20.5	6.0	20.5
Total Split (s)	35.2	35.2	35.2	35.2	50.5	50.5	13.0	63.5
Total Split (%)	35.7%	35.7%	35.7%	35.7%	51.2%	51.2%	13.2%	64.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.4	4.4	3.0	4.4
All-Red Time (s)	1.2	1.2	1.2	1.2	1.1	1.1	0.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	5.5	5.5	3.0	5.5
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Max	Min
v/c Ratio		1.16		1.28		0.61		0.90
Control Delay		123.5		168.2		24.5		35.4
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		123.5		168.2		24.5		35.4
Queue Length 50th (ft)		~314		~473		128		174
Queue Length 95th (ft)		#626		#772		180		#290
Internal Link Dist (ft)		1052		2233		731		2352
Turn Bay Length (ft)								
Base Capacity (vph)		433		549		849		778
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		1.16		1.28		0.39		0.67

Intersection Summary

Cycle Length: 98.7
Actuated Cycle Length: 83.9
Natural Cycle: 90
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	345	39	62	410	117	41	153	87	139	192	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	10	10	10
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)		5.2			5.2			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.96			0.96	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		1654			1721			1750			1563	
Flt Permitted		0.71			0.86			0.87			0.64	
Satd. Flow (perm)		1178			1485			1531			1021	
Peak-hour factor, PHF	0.72	0.92	0.73	0.85	0.84	0.81	0.83	0.82	0.89	0.77	0.96	0.83
Adj. Flow (vph)	74	375	53	73	488	144	49	187	98	181	200	140
RTOR Reduction (vph)	0	4	0	0	8	0	0	18	0	0	16	0
Lane Group Flow (vph)	0	498	0	0	697	0	0	316	0	0	505	0
Heavy Vehicles (%)	4%	4%	3%	5%	2%	4%	0%	1%	0%	7%	9%	4%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.6			30.6			29.2			42.4	
Effective Green, g (s)		30.6			30.6			29.2			42.4	
Actuated g/C Ratio		0.37			0.37			0.35			0.51	
Clearance Time (s)		5.2			5.2			5.5			5.5	
Vehicle Extension (s)		4.0			4.0			7.0			7.0	
Lane Grp Cap (vph)		431			543			534			583	
v/s Ratio Prot											c0.11	
v/s Ratio Perm		0.42			c0.47			0.21			c0.33	
v/c Ratio		1.16			1.28			0.59			0.87	
Uniform Delay, d1		26.6			26.6			22.4			18.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		93.4			141.0			3.8			14.9	
Delay (s)		120.0			167.5			26.2			33.0	
Level of Service		F			F			C			C	
Approach Delay (s)		120.0			167.5			26.2			33.0	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM Average Control Delay	99.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	10.7
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	16	53	69	18	113	36	294	39	51	384	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.930			0.928			0.984			0.993	
Flt Protected		0.986			0.982			0.995			0.994	
Satd. Flow (prot)	0	1869	0	0	1924	0	0	1736	0	0	1667	0
Flt Permitted		0.986			0.982			0.995			0.994	
Satd. Flow (perm)	0	1869	0	0	1924	0	0	1736	0	0	1667	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		204			694			593			2224	
Travel Time (s)		4.6			15.8			9.0			33.7	
Peak Hour Factor	0.78	0.67	0.80	0.78	0.64	0.86	0.88	0.91	0.81	0.71	0.85	0.61
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	5%	5%	5%
Adj. Flow (vph)	37	24	66	88	28	131	41	323	48	72	452	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	0	0	247	0	0	412	0	0	554	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.08	1.08	1.08	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 56.3% ICU Level of Service B
Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	29	16	53	69	18	113	36	294	39	51	384	18
Sign Control		Stop			Stop			Free			Free	
Grade		5%			0%			-2%			0%	
Peak Hour Factor	0.78	0.67	0.80	0.78	0.64	0.86	0.88	0.91	0.81	0.71	0.85	0.61
Hourly flow rate (vph)	37	24	66	88	28	131	41	323	48	72	452	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1185	1063	467	1117	1054	347	481			371		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1185	1063	467	1117	1054	347	481			371		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	66	88	89	36	86	81	96			94		
cM capacity (veh/h)	111	200	594	138	204	696	1087			1171		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	127	248	412	553
Volume Left	37	88	41	72
Volume Right	66	131	48	30
cSH	225	256	1087	1171
Volume to Capacity	0.57	0.97	0.04	0.06
Queue Length 95th (ft)	78	228	3	5
Control Delay (s)	40.1	90.1	1.2	1.7
Lane LOS	E	F	A	A
Approach Delay (s)	40.1	90.1	1.2	1.7
Approach LOS	E	F		

Intersection Summary			
Average Delay	21.5		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	100	31	69	476	395	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962				0.966	
Flt Protected	0.965			0.993		
Satd. Flow (prot)	1749	0	0	1850	1740	0
Flt Permitted	0.965			0.993		
Satd. Flow (perm)	1749	0	0	1850	1740	0
Link Speed (mph)	25			40	40	
Link Distance (ft)	1314			931	299	
Travel Time (s)	35.8			15.9	5.1	
Peak Hour Factor	0.74	0.60	0.84	0.89	0.88	0.90
Heavy Vehicles (%)	0%	3%	2%	2%	7%	1%
Adj. Flow (vph)	135	52	82	535	449	151
Shared Lane Traffic (%)						
Lane Group Flow (vph)	187	0	0	617	600	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	22			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 75.4%	ICU Level of Service D
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	100	31	69	476	395	136
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.60	0.84	0.89	0.88	0.90
Hourly flow rate (vph)	135	52	82	535	449	151
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1224	524	600			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1224	524	600			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	26	91	92			
cM capacity (veh/h)	183	551	977			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	187	617	600
Volume Left	135	82	0
Volume Right	52	0	151
cSH	224	977	1700
Volume to Capacity	0.83	0.08	0.35
Queue Length 95th (ft)	159	7	0
Control Delay (s)	69.5	2.2	0.0
Lane LOS	F	A	
Approach Delay (s)	69.5	2.2	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	10.2		
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	146	64	380	205	61	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.958		0.954			
Flt Protected	0.967					0.991
Satd. Flow (prot)	1731	0	1789	0	0	2023
Flt Permitted	0.967					0.991
Satd. Flow (perm)	1731	0	1789	0	0	2023
Link Speed (mph)	35		40			40
Link Distance (ft)	1198		299			807
Travel Time (s)	23.3		5.1			13.8
Peak Hour Factor	0.87	0.83	0.88	0.91	0.71	0.91
Heavy Vehicles (%)	1%	0%	2%	0%	0%	6%
Adj. Flow (vph)	168	77	432	225	86	401
Shared Lane Traffic (%)						
Lane Group Flow (vph)	245	0	657	0	0	487
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.00	1.00	0.85	0.85
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 77.1%	ICU Level of Service D
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	146	64	380	205	61	365
Sign Control	Stop		Free			Free
Grade	2%		0%			1%
Peak Hour Factor	0.87	0.83	0.88	0.91	0.71	0.91
Hourly flow rate (vph)	168	77	432	225	86	401
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1117	544			657	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1117	544			657	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	20	86			91	
cM capacity (veh/h)	209	542			940	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	245	657	487
Volume Left	168	0	86
Volume Right	77	225	0
cSH	259	1700	940
Volume to Capacity	0.95	0.39	0.09
Queue Length 95th (ft)	218	0	8
Control Delay (s)	84.4	0.0	2.5
Lane LOS	F		A
Approach Delay (s)	84.4	0.0	2.5
Approach LOS	F		

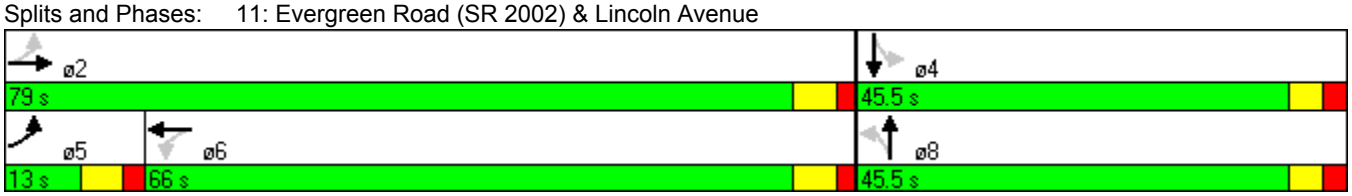
Intersection Summary			
Average Delay	15.8		
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	146	425	7	357	9	14	32	40
Lane Group Flow (vph)	176	502	12	464	0	64	0	468
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	13.0	79.0	66.0	66.0	45.5	45.5	45.5	45.5
Total Split (%)	10.4%	63.5%	53.0%	53.0%	36.5%	36.5%	36.5%	36.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.49	0.55	0.04	0.77		0.14		0.80
Control Delay	15.9	15.2	18.3	31.6		18.3		27.6
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	15.9	15.2	18.3	31.6		18.3		27.6
Queue Length 50th (ft)	37	131	3	173		17		129
Queue Length 95th (ft)	91	317	11	343		19		180
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	359	1574	717	1418		878		978
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.49	0.32	0.02	0.33		0.07		0.48

Intersection Summary

Cycle Length: 124.5
Actuated Cycle Length: 74.1
Natural Cycle: 45
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	425	20	7	357	39	9	14	6	32	40	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1702	1720		1727	1722			1729			1639	
Flt Permitted	0.24	1.00		0.48	1.00			0.87			0.97	
Satd. Flow (perm)	434	1720		871	1722			1519			1589	
Peak-hour factor, PHF	0.83	0.92	0.50	0.58	0.86	0.79	0.56	0.39	0.50	0.71	0.70	0.64
Adj. Flow (vph)	176	462	40	12	415	49	16	36	12	45	57	366
RTOR Reduction (vph)	0	3	0	0	5	0	0	7	0	0	107	0
Lane Group Flow (vph)	176	499	0	12	459	0	0	57	0	0	361	0
Heavy Vehicles (%)	2%	5%	5%	0%	4%	3%	0%	14%	0%	0%	5%	2%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	39.6	39.6		26.1	26.1			22.3			22.3	
Effective Green, g (s)	39.6	39.6		26.1	26.1			22.3			22.3	
Actuated g/C Ratio	0.54	0.54		0.36	0.36			0.30			0.30	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	364	928		310	612			461			483	
v/s Ratio Prot	0.05	c0.29			c0.27							
v/s Ratio Perm	0.21			0.01				0.04			c0.23	
v/c Ratio	0.48	0.54		0.04	0.75			0.12			0.75	
Uniform Delay, d1	11.0	11.0		15.5	20.8			18.5			23.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.0	1.4		0.1	6.8			0.1			6.3	
Delay (s)	12.0	12.4		15.6	27.6			18.6			29.3	
Level of Service	B	B		B	C			B			C	
Approach Delay (s)		12.3			27.3			18.6			29.3	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	17.5
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

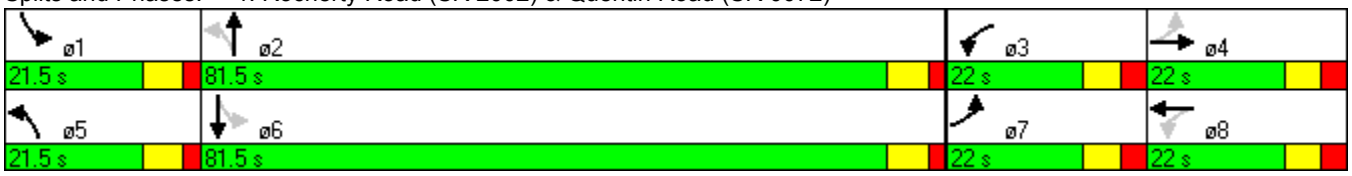
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	74	102	120	112	17	429	189	434
Lane Group Flow (vph)	90	130	140	287	24	543	203	628
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.5	21.5	13.5	21.5
Total Split (s)	22.0	22.0	22.0	22.0	21.5	81.5	21.5	81.5
Total Split (%)	15.0%	15.0%	15.0%	15.0%	14.6%	55.4%	14.6%	55.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.34	0.57	0.39	0.84	0.09	0.88	0.59	0.73
Control Delay	31.5	53.7	31.1	62.1	12.6	47.1	19.9	27.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	53.7	31.1	62.1	12.6	47.1	19.9	27.9
Queue Length 50th (ft)	40	76	65	169	7	327	67	278
Queue Length 95th (ft)	87	#168	134	#367	15	490	111	526
Internal Link Dist (ft)		569		654		721		1806
Turn Bay Length (ft)	190		300		105		225	
Base Capacity (vph)	336	256	398	341	402	1371	380	1356
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.51	0.35	0.84	0.06	0.40	0.53	0.46

Intersection Summary

Cycle Length: 147
Actuated Cycle Length: 101.1
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	102	15	120	112	100	17	429	72	189	434	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	11	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.92		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	1651		1669	1692		1613	1796		1736	1772	
Flt Permitted	0.35	1.00		0.55	1.00		0.27	1.00		0.16	1.00	
Satd. Flow (perm)	613	1651		966	1692		457	1796		301	1772	
Peak-hour factor, PHF	0.82	0.93	0.75	0.86	0.80	0.68	0.71	0.93	0.88	0.93	0.88	0.71
Adj. Flow (vph)	90	110	20	140	140	147	24	461	82	203	493	135
RTOR Reduction (vph)	0	4	0	0	24	0	0	6	0	0	8	0
Lane Group Flow (vph)	90	126	0	140	263	0	24	537	0	203	620	0
Heavy Vehicles (%)	4%	9%	0%	3%	6%	5%	6%	1%	4%	2%	2%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.5	15.6		31.3	19.0		41.8	39.0		58.3	49.0	
Effective Green, g (s)	24.5	15.6		31.3	19.0		41.8	39.0		58.3	49.0	
Actuated g/C Ratio	0.23	0.15		0.29	0.18		0.39	0.37		0.55	0.46	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	228	241		364	301		209	656		337	814	
v/s Ratio Prot	0.03	0.08		c0.04	c0.16		0.00	c0.30		c0.07	c0.35	
v/s Ratio Perm	0.06			0.07			0.04			0.26		
v/c Ratio	0.39	0.52		0.38	0.87		0.11	0.82		0.60	0.76	
Uniform Delay, d1	33.7	42.1		29.1	42.7		21.0	30.7		17.7	24.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	2.6		0.9	23.9		0.3	9.3		3.5	5.5	
Delay (s)	35.2	44.7		30.1	66.6		21.4	39.9		21.2	29.5	
Level of Service	D	D		C	E		C	D		C	C	
Approach Delay (s)		40.8			54.6			39.1			27.5	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	37.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	106.7	Sum of lost time (s)	33.5
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	13	9	65	10	40	104	541	70	33	609
Lane Group Flow (vph)	0	124	0	100	52	132	595	80	48	671
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	22.0	14.0	22.0
Total Split (s)	19.0	19.0	19.0	19.0	22.0	67.0	67.0	67.0	22.0	89.0
Total Split (%)	17.6%	17.6%	17.6%	17.6%	20.4%	62.0%	62.0%	62.0%	20.4%	82.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	Min	None	Min
v/c Ratio		0.40		0.41	0.08	0.38	0.70	0.10	0.12	0.56
Control Delay		17.7		34.8	5.7	18.4	22.1	3.6	5.2	9.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		17.7		34.8	5.7	18.4	22.1	3.6	5.2	9.2
Queue Length 50th (ft)		17		39	0	40	218	0	7	143
Queue Length 95th (ft)		27		63	16	71	339	21	13	217
Internal Link Dist (ft)		216		230			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		325		261	806	679	1637	1526	512	1908
Starvation Cap Reductn		0		0	0	0	0	0	0	61
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.38		0.38	0.06	0.19	0.36	0.05	0.09	0.36

Intersection Summary

Cycle Length: 108
Actuated Cycle Length: 69.1
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	9	66	65	10	40	104	541	70	33	609	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.91			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1595			1842	1584	1832	1909	1766	1638	1909	
Flt Permitted		0.91			0.76	1.00	0.41	1.00	1.00	0.21	1.00	
Satd. Flow (perm)		1461			1462	1584	790	1909	1766	366	1909	
Peak-hour factor, PHF	0.54	0.56	0.79	0.77	0.63	0.77	0.79	0.91	0.88	0.69	0.93	0.81
Adj. Flow (vph)	24	16	84	84	16	52	132	595	80	48	655	16
RTOR Reduction (vph)	0	66	0	0	0	38	0	0	45	0	1	0
Lane Group Flow (vph)	0	58	0	0	100	14	132	595	35	48	670	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%	1%	2%	0%	6%	2%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		11.4			11.4	18.6	30.8	30.8	30.8	45.0	45.0	
Effective Green, g (s)		11.4			11.4	18.6	30.8	30.8	30.8	45.0	45.0	
Actuated g/C Ratio		0.16			0.16	0.26	0.44	0.44	0.44	0.64	0.64	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		237			237	576	346	835	773	364	1220	
v/s Ratio Prot						0.00		c0.31		0.01	c0.35	
v/s Ratio Perm		0.04			c0.07	0.01	0.17		0.02	0.07		
v/c Ratio		0.24			0.42	0.02	0.38	0.71	0.05	0.13	0.55	
Uniform Delay, d1		25.7			26.5	19.2	13.4	16.2	11.4	7.6	7.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.7			1.7	0.0	2.0	4.2	0.1	0.5	1.2	
Delay (s)		26.5			28.2	19.2	15.3	20.3	11.4	8.1	8.2	
Level of Service		C			C	B	B	C	B	A	A	
Approach Delay (s)		26.5			25.1			18.6			8.2	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	21.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

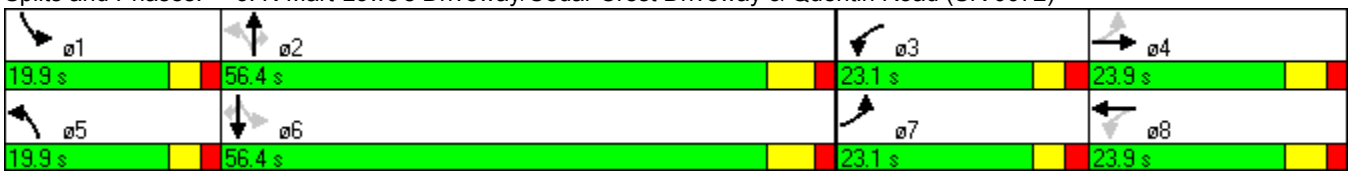
3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	277	37	81	40	56	479	72	192	427	154
Lane Group Flow (vph)	315	163	133	264	68	551	104	204	464	164
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	23.1	23.9	23.1	23.9	19.9	56.4	56.4	19.9	56.4	56.4
Total Split (%)	18.7%	19.4%	18.7%	19.4%	16.1%	45.7%	45.7%	16.1%	45.7%	45.7%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.81	0.43	0.35	0.76	0.18	0.86	0.17	0.63	0.58	0.22
Control Delay	45.2	29.2	27.4	36.1	13.2	44.7	6.5	22.5	27.1	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.2	29.2	27.4	36.1	13.2	44.7	6.5	22.5	27.1	3.8
Queue Length 50th (ft)	152	56	56	75	20	320	4	66	233	0
Queue Length 95th (ft)	#373	82	82	139	40	475	19	121	362	39
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	389	386	530	450	526	979	878	386	1030	933
Starvation Cap Reductn	0	0	0	0	0	19	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.42	0.25	0.59	0.13	0.57	0.12	0.53	0.45	0.18

Intersection Summary

Cycle Length: 123.3
Actuated Cycle Length: 99.6
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	37	89	81	40	178	56	479	72	192	427	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1650		1902	1804		1796	1890	1607	1814	1954	1623
Flt Permitted	0.23	1.00		0.65	1.00		0.37	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	405	1650		1309	1804		705	1890	1607	283	1954	1623
Peak-hour factor, PHF	0.88	0.62	0.86	0.61	0.77	0.84	0.82	0.87	0.69	0.94	0.92	0.94
Adj. Flow (vph)	315	60	103	133	52	212	68	551	104	204	464	164
RTOR Reduction (vph)	0	47	0	0	122	0	0	0	62	0	0	97
Lane Group Flow (vph)	315	116	0	133	142	0	68	551	42	204	464	67
Heavy Vehicles (%)	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	36.2	20.3		23.3	12.5		41.4	35.3	35.3	51.8	40.8	40.8
Effective Green, g (s)	36.2	20.3		23.3	12.5		41.4	35.3	35.3	51.8	40.8	40.8
Actuated g/C Ratio	0.36	0.20		0.23	0.12		0.41	0.35	0.35	0.52	0.41	0.41
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	385	334		368	225		357	665	566	323	795	660
v/s Ratio Prot	c0.15	0.07		0.04	0.08		0.01	c0.29		c0.07	0.24	
v/s Ratio Perm	c0.14			0.05			0.07		0.03	0.25		0.04
v/c Ratio	0.82	0.35		0.36	0.63		0.19	0.83	0.07	0.63	0.58	0.10
Uniform Delay, d1	26.3	34.3		31.8	41.7		18.4	29.7	21.6	18.0	23.1	18.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.7	0.6		0.6	5.7		0.3	9.8	0.2	4.0	2.1	0.2
Delay (s)	39.0	34.9		32.4	47.4		18.6	39.5	21.8	22.0	25.2	18.6
Level of Service	D	C		C	D		B	D	C	C	C	B
Approach Delay (s)		37.6			42.4			35.0			23.1	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.3	Sum of lost time (s)	16.4
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	26	52	844	62	42	923
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Grade (%)	-2%		3%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.911		0.991			
Flt Protected	0.983					0.997
Satd. Flow (prot)	1948	0	1793	0	0	1840
Flt Permitted	0.983					0.997
Satd. Flow (perm)	1948	0	1793	0	0	1840
Link Speed (mph)	30		45			45
Link Distance (ft)	408		1653			553
Travel Time (s)	9.3		25.0			8.4
Peak Hour Factor	0.78	0.83	0.87	0.88	0.68	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Adj. Flow (vph)	33	63	970	70	62	982
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	0	1040	0	0	1044
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.84	0.84	1.07	1.07	1.02	1.02
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 94.0%	ICU Level of Service F
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	26	52	844	62	42	923
Sign Control	Stop		Free			Free
Grade	-2%		3%			-3%
Peak Hour Factor	0.78	0.83	0.87	0.88	0.68	0.94
Hourly flow rate (vph)	33	63	970	70	62	982
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2111	1005			1041	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2111	1005			1041	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	36	79			91	
cM capacity (veh/h)	52	296			672	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	96	1041	1044
Volume Left	33	0	62
Volume Right	63	70	0
cSH	112	1700	672
Volume to Capacity	0.86	0.61	0.09
Queue Length 95th (ft)	127	0	8
Control Delay (s)	120.7	0.0	2.9
Lane LOS	F		A
Approach Delay (s)	120.7	0.0	2.9
Approach LOS	F		

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

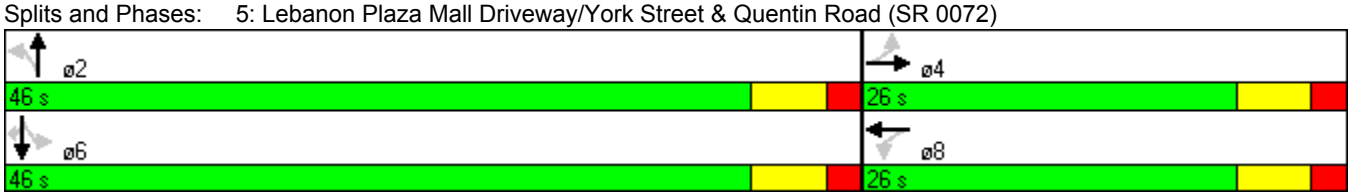
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	50	64	115	111	96	570	34	693	61
Lane Group Flow (vph)	60	204	146	196	112	741	48	745	115
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	26.0	26.0	26.0	26.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	36.1%	36.1%	36.1%	36.1%	63.9%	63.9%	63.9%	63.9%	63.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.25	0.47	0.65	0.49	0.37	0.65	0.17	0.64	0.11
Control Delay	24.0	13.9	37.8	24.7	12.5	12.5	8.7	12.3	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	13.9	37.8	24.7	12.5	12.5	8.7	12.3	2.0
Queue Length 50th (ft)	20	29	54	63	20	162	7	164	0
Queue Length 95th (ft)	45	71	92	87	62	307	21	342	2
Internal Link Dist (ft)		350		1246		556		2069	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	339	576	323	572	301	1142	290	1173	1010
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.35	0.45	0.34	0.37	0.65	0.17	0.64	0.11

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 66.1
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	64	109	115	111	28	96	570	46	34	693	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1629		1685	1845		1778	1875		1702	1934	1591
Flt Permitted	0.62	1.00		0.60	1.00		0.26	1.00		0.27	1.00	1.00
Satd. Flow (perm)	1118	1629		1064	1845		495	1875		479	1934	1591
Peak-hour factor, PHF	0.83	0.84	0.85	0.79	0.71	0.70	0.86	0.85	0.66	0.71	0.93	0.53
Adj. Flow (vph)	60	76	128	146	156	40	112	671	70	48	745	115
RTOR Reduction (vph)	0	92	0	0	14	0	0	5	0	0	0	45
Lane Group Flow (vph)	60	112	0	146	182	0	112	736	0	48	745	70
Heavy Vehicles (%)	0%	0%	1%	1%	0%	4%	1%	3%	0%	3%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	14.0	14.0		14.0	14.0		40.1	40.1		40.1	40.1	40.1
Effective Green, g (s)	14.0	14.0		14.0	14.0		40.1	40.1		40.1	40.1	40.1
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.61	0.61		0.61	0.61	0.61
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	237	345		225	391		300	1137		291	1173	965
v/s Ratio Prot		0.07			0.10			c0.39			0.39	
v/s Ratio Perm	0.05			c0.14			0.23			0.10		0.04
v/c Ratio	0.25	0.32		0.65	0.46		0.37	0.65		0.16	0.64	0.07
Uniform Delay, d1	21.7	22.0		23.8	22.8		6.6	8.4		5.7	8.3	5.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.7		7.0	1.2		0.8	1.3		0.3	1.1	0.0
Delay (s)	22.5	22.8		30.8	24.0		7.4	9.7		6.0	9.5	5.4
Level of Service	C	C		C	C		A	A		A	A	A
Approach Delay (s)		22.7			26.9			9.4			8.8	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.2%	ICU Level of Service	G
Analysis Period (min)	15		

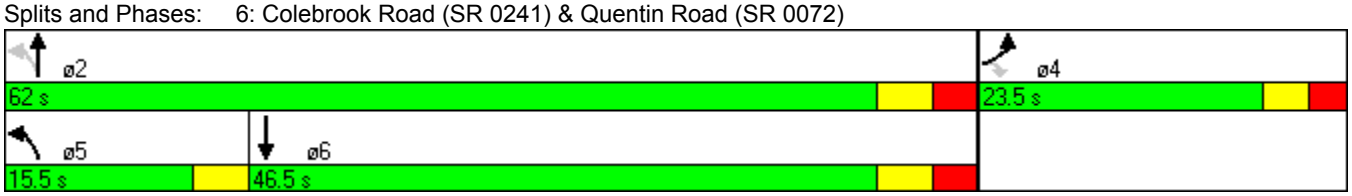
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	86	269	206	561	645
Lane Group Flow (vph)	101	274	229	591	754
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	23.5	23.5	15.5	62.0	46.5
Total Split (%)	27.5%	27.5%	18.1%	72.5%	54.4%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.41	0.60	0.53	0.47	0.86
Control Delay	32.8	10.3	12.4	7.0	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.8	10.3	12.4	7.0	27.8
Queue Length 50th (ft)	36	0	23	91	253
Queue Length 95th (ft)	86	64	100	183	437
Internal Link Dist (ft)	583			118	332
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	484	631	467	1633	1326
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.43	0.49	0.36	0.57

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 64.3
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	86	269	206	561	645	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1500	1771	1909	2042	
Flt Permitted	0.95	1.00	0.13	1.00	1.00	
Satd. Flow (perm)	1660	1500	241	1909	2042	
Peak-hour factor, PHF	0.85	0.98	0.90	0.95	0.96	0.61
Adj. Flow (vph)	101	274	229	591	672	82
RTOR Reduction (vph)	0	233	0	0	6	0
Lane Group Flow (vph)	101	41	229	591	748	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	4%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	9.6	9.6	42.1	42.1	27.5	
Effective Green, g (s)	9.6	9.6	42.1	42.1	27.5	
Actuated g/C Ratio	0.15	0.15	0.66	0.66	0.43	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	250	226	426	1262	882	
v/s Ratio Prot	c0.06		c0.09	0.31	c0.37	
v/s Ratio Perm		0.03	0.26			
v/c Ratio	0.40	0.18	0.54	0.47	0.85	
Uniform Delay, d1	24.5	23.6	9.7	5.3	16.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.4	1.3	0.8	8.8	
Delay (s)	25.5	24.0	11.0	6.1	25.0	
Level of Service	C	C	B	A	C	
Approach Delay (s)	24.4			7.5	25.0	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	63.7	Sum of lost time (s)	15.5
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

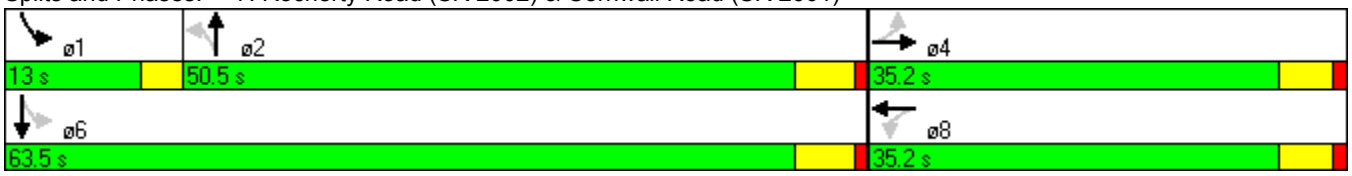
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	35	243	56	267	52	96	56	122
Lane Group Flow (vph)	0	414	0	454	0	267	0	266
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.2	9.2	9.2	9.2	20.5	20.5	6.0	20.5
Total Split (s)	35.2	35.2	35.2	35.2	50.5	50.5	13.0	63.5
Total Split (%)	35.7%	35.7%	35.7%	35.7%	51.2%	51.2%	13.2%	64.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.4	4.4	3.0	4.4
All-Red Time (s)	1.2	1.2	1.2	1.2	1.1	1.1	0.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	5.5	5.5	3.0	5.5
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Max	Min
v/c Ratio		0.66		0.70		0.71		0.40
Control Delay		23.9		25.4		33.3		13.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		23.9		25.4		33.3		13.8
Queue Length 50th (ft)		133		150		99		66
Queue Length 95th (ft)		258		#326		142		116
Internal Link Dist (ft)		1052		2233		731		2352
Turn Bay Length (ft)								
Base Capacity (vph)		626		646		902		1187
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.66		0.70		0.30		0.22

Intersection Summary

Cycle Length: 98.7
Actuated Cycle Length: 72.1
Natural Cycle: 60
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	243	60	56	267	54	52	96	46	56	122	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	10	10	10
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)		5.2			5.2			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.97			0.96	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1682			1755			1734			1648	
Flt Permitted		0.87			0.87			0.81			0.86	
Satd. Flow (perm)		1483			1533			1426			1438	
Peak-hour factor, PHF	0.53	0.86	0.92	0.72	0.88	0.74	0.67	0.78	0.70	0.81	0.96	0.82
Adj. Flow (vph)	66	283	65	78	303	73	78	123	66	69	127	70
RTOR Reduction (vph)	0	6	0	0	6	0	0	16	0	0	18	0
Lane Group Flow (vph)	0	408	0	0	448	0	0	251	0	0	248	0
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	2%	2%	3%	0%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.1			30.1			18.2			31.2	
Effective Green, g (s)		30.1			30.1			18.2			31.2	
Actuated g/C Ratio		0.42			0.42			0.25			0.43	
Clearance Time (s)		5.2			5.2			5.5			5.5	
Vehicle Extension (s)		4.0			4.0			7.0			7.0	
Lane Grp Cap (vph)		620			641			360			652	
v/s Ratio Prot											c0.05	
v/s Ratio Perm		0.28			c0.29			c0.18			0.11	
v/c Ratio		0.66			0.70			0.70			0.38	
Uniform Delay, d1		16.8			17.2			24.4			13.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.8			3.6			9.7			1.3	
Delay (s)		19.6			20.8			34.1			15.2	
Level of Service		B			C			C			B	
Approach Delay (s)		19.6			20.8			34.1			15.2	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	2	46	3	5	15	34	244	3	4	274	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.920			0.926			0.997			0.994	
Flt Protected		0.982			0.991			0.994			0.999	
Satd. Flow (prot)	0	1878	0	0	1900	0	0	1775	0	0	1726	0
Flt Permitted		0.982			0.991			0.994			0.999	
Satd. Flow (perm)	0	1878	0	0	1900	0	0	1775	0	0	1726	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		204			694			593			2225	
Travel Time (s)		4.6			15.8			9.0			33.7	
Peak Hour Factor	0.65	0.50	0.69	0.38	0.42	0.63	0.83	0.88	0.38	0.33	0.69	0.70
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	0%	0%	0%	2%	2%	2%
Adj. Flow (vph)	42	4	67	8	12	24	41	277	8	12	397	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	113	0	0	44	0	0	326	0	0	429	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.08	1.08	1.08	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 50.0% ICU Level of Service A
Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	27	2	46	3	5	15	34	244	3	4	274	14
Sign Control		Stop			Stop			Free			Free	
Grade		5%			0%			-2%			0%	
Peak Hour Factor	0.65	0.50	0.69	0.38	0.42	0.63	0.83	0.88	0.38	0.33	0.69	0.70
Hourly flow rate (vph)	42	4	67	8	12	24	41	277	8	12	397	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	824	798	407	863	804	281	417			285		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	824	798	407	863	804	281	417			285		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	99	90	97	96	97	96			99		
cM capacity (veh/h)	265	305	646	234	300	753	1153			1277		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	112	44	326	429
Volume Left	42	8	41	12
Volume Right	67	24	8	20
cSH	411	415	1153	1277
Volume to Capacity	0.27	0.11	0.04	0.01
Queue Length 95th (ft)	27	9	3	1
Control Delay (s)	17.0	14.7	1.3	0.3
Lane LOS	C	B	A	A
Approach Delay (s)	17.0	14.7	1.3	0.3
Approach LOS	C	B		

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	119	21	32	243	221	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.981				0.942	
Flt Protected	0.959			0.993		
Satd. Flow (prot)	1772	0	0	1855	1743	0
Flt Permitted	0.959			0.993		
Satd. Flow (perm)	1772	0	0	1855	1743	0
Link Speed (mph)	25			40	40	
Link Distance (ft)	1326			936	303	
Travel Time (s)	36.2			16.0	5.2	
Peak Hour Factor	0.81	0.88	0.78	0.94	0.87	0.87
Heavy Vehicles (%)	1%	0%	0%	2%	4%	1%
Adj. Flow (vph)	147	24	41	259	254	193
Shared Lane Traffic (%)						
Lane Group Flow (vph)	171	0	0	300	447	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	22			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 54.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	119	21	32	243	221	168
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.88	0.78	0.94	0.87	0.87
Hourly flow rate (vph)	147	24	41	259	254	193
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	691	351	447			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	691	351	447			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	63	97	96			
cM capacity (veh/h)	397	697	1124			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	171	300	447
Volume Left	147	41	0
Volume Right	24	0	193
cSH	422	1124	1700
Volume to Capacity	0.40	0.04	0.26
Queue Length 95th (ft)	48	3	0
Control Delay (s)	19.2	1.4	0.0
Lane LOS	C	A	
Approach Delay (s)	19.2	1.4	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	132	36	180	161	44	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.966		0.934			
Flt Protected	0.964					0.991
Satd. Flow (prot)	1688	0	1739	0	0	2041
Flt Permitted	0.964					0.991
Satd. Flow (perm)	1688	0	1739	0	0	2041
Link Speed (mph)	35		40			40
Link Distance (ft)	884		303			673
Travel Time (s)	17.2		5.2			11.5
Peak Hour Factor	0.92	0.73	0.86	0.80	0.72	0.90
Heavy Vehicles (%)	2%	9%	3%	1%	0%	5%
Adj. Flow (vph)	143	49	209	201	61	259
Shared Lane Traffic (%)						
Lane Group Flow (vph)	192	0	410	0	0	320
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.00	1.00	0.85	0.85
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 53.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	132	36	180	161	44	233
Sign Control	Stop		Free			Free
Grade	2%		0%			1%
Peak Hour Factor	0.92	0.73	0.86	0.80	0.72	0.90
Hourly flow rate (vph)	143	49	209	201	61	259
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	691	310			411	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	691	310			411	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	63	93			95	
cM capacity (veh/h)	388	714			1159	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	193	411	320
Volume Left	143	0	61
Volume Right	49	201	0
cSH	440	1700	1159
Volume to Capacity	0.44	0.24	0.05
Queue Length 95th (ft)	55	0	4
Control Delay (s)	19.4	0.0	2.0
Lane LOS	C		A
Approach Delay (s)	19.4	0.0	2.0
Approach LOS	C		

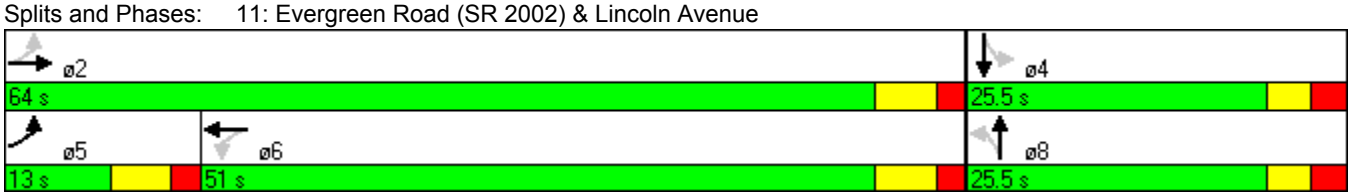
Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	64	261	4	284	12	12	26	29
Lane Group Flow (vph)	89	338	8	362	0	44	0	169
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	13.0	64.0	51.0	51.0	25.5	25.5	25.5	25.5
Total Split (%)	14.5%	71.5%	57.0%	57.0%	28.5%	28.5%	28.5%	28.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.17	0.36	0.02	0.52		0.13		0.47
Control Delay	6.1	7.3	12.2	15.9		18.0		17.6
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.1	7.3	12.2	15.9		18.0		17.6
Queue Length 50th (ft)	10	42	2	84		9		27
Queue Length 95th (ft)	22	85	5	173		19		58
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	531	1664	910	1539		740		730
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.17	0.20	0.01	0.24		0.06		0.23

Intersection Summary

Cycle Length: 89.5
Actuated Cycle Length: 48
Natural Cycle: 45
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	261	13	4	284	28	12	12	1	26	29	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1702	1695		1727	1712			1880			1717	
Flt Permitted	0.38	1.00		0.56	1.00			0.87			0.91	
Satd. Flow (perm)	681	1695		1013	1712			1673			1580	
Peak-hour factor, PHF	0.72	0.81	0.81	0.50	0.91	0.56	0.75	0.50	0.25	0.69	0.70	0.90
Adj. Flow (vph)	89	322	16	8	312	50	16	24	4	38	41	90
RTOR Reduction (vph)	0	3	0	0	8	0	0	3	0	0	48	0
Lane Group Flow (vph)	89	335	0	8	354	0	0	41	0	0	121	0
Heavy Vehicles (%)	2%	7%	8%	0%	4%	4%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	29.2	29.2		19.5	19.5			9.5			9.5	
Effective Green, g (s)	29.2	29.2		19.5	19.5			9.5			9.5	
Actuated g/C Ratio	0.58	0.58		0.39	0.39			0.19			0.19	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	471	986		393	665			317			299	
v/s Ratio Prot	0.01	c0.20			c0.21							
v/s Ratio Perm	0.10			0.01				0.02			c0.08	
v/c Ratio	0.19	0.34		0.02	0.53			0.13			0.41	
Uniform Delay, d1	5.3	5.5		9.5	11.8			16.9			17.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.6		0.1	1.9			0.2			0.9	
Delay (s)	5.5	6.1		9.5	13.8			17.1			18.8	
Level of Service	A	A		A	B			B			B	
Approach Delay (s)		5.9			13.7			17.1			18.8	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	17.5
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

2025 BASE CONDITIONS

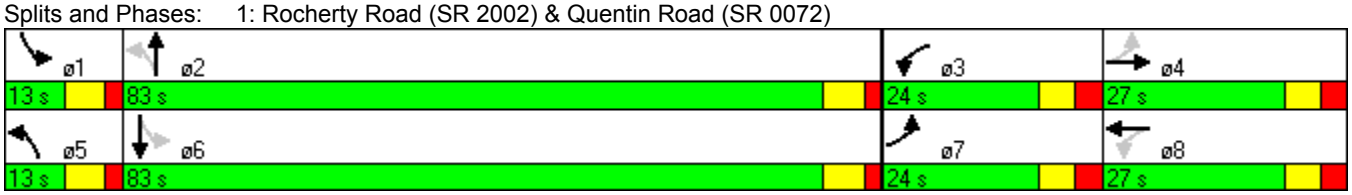
1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	107	293	210	197	18	465	112	336
Lane Group Flow (vph)	147	366	231	352	24	772	124	413
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.5	21.5	13.5	21.5
Total Split (s)	24.0	27.0	24.0	27.0	13.0	83.0	13.0	83.0
Total Split (%)	16.3%	18.4%	16.3%	18.4%	8.8%	56.5%	8.8%	56.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.64	1.41	0.94	1.14	0.06	0.96	0.70	0.48
Control Delay	50.7	247.6	84.1	142.3	12.3	57.4	36.0	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	247.6	84.1	142.3	12.3	57.4	36.0	23.3
Queue Length 50th (ft)	101	~460	171	~395	9	631	48	243
Queue Length 95th (ft)	136	#627	#378	#584	18	781	#98	336
Internal Link Dist (ft)		569		654		721		1806
Turn Bay Length (ft)	190		300		105		225	
Base Capacity (vph)	263	259	247	309	382	939	177	938
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	1.41	0.94	1.14	0.06	0.82	0.70	0.44

Intersection Summary

Cycle Length: 147
Actuated Cycle Length: 136.4
Natural Cycle: 140
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	293	9	210	197	83	18	465	203	112	336	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	11	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1677	1750		1577	1767		1425	1646		1640	1657	
Flt Permitted	0.20	1.00		0.17	1.00		0.44	1.00		0.11	1.00	
Satd. Flow (perm)	351	1750		290	1767		656	1646		197	1657	
Peak-hour factor, PHF	0.73	0.83	0.70	0.91	0.84	0.71	0.76	0.86	0.88	0.90	0.90	0.78
Adj. Flow (vph)	147	353	13	231	235	117	24	541	231	124	373	40
RTOR Reduction (vph)	0	1	0	0	12	0	0	11	0	0	2	0
Lane Group Flow (vph)	147	365	0	231	340	0	24	761	0	124	411	0
Heavy Vehicles (%)	3%	3%	13%	9%	3%	6%	20%	10%	4%	8%	12%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	34.4	20.1		40.0	22.9		72.0	68.3		77.6	71.1	
Effective Green, g (s)	34.4	20.1		40.0	22.9		72.0	68.3		77.6	71.1	
Actuated g/C Ratio	0.25	0.14		0.29	0.16		0.52	0.49		0.56	0.51	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	223	253		242	291		360	809		177	848	
v/s Ratio Prot	0.07	c0.21		c0.12	c0.19		0.00	c0.46		c0.03	0.25	
v/s Ratio Perm	0.10			0.16			0.03			c0.36		
v/c Ratio	0.66	1.44		0.95	1.17		0.07	0.94		0.70	0.48	
Uniform Delay, d1	44.2	59.4		42.8	58.0		16.9	33.4		25.5	22.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.6	220.4		45.2	106.7		0.1	19.6		12.6	1.2	
Delay (s)	51.7	279.9		88.0	164.8		17.0	53.0		38.2	23.3	
Level of Service	D	F		F	F		B	D		D	C	
Approach Delay (s)		214.5			134.4			51.9			26.7	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM Average Control Delay	100.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	139.0	Sum of lost time (s)	40.5
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	6	1	27	2	32	33	578	46	37	421
Lane Group Flow (vph)	0	56	0	38	36	40	642	53	42	485
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	22.0	14.0	22.0
Total Split (s)	18.0	18.0	18.0	18.0	15.0	75.0	75.0	75.0	15.0	90.0
Total Split (%)	16.7%	16.7%	16.7%	16.7%	13.9%	69.4%	69.4%	69.4%	13.9%	83.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	Min	None	Min
v/c Ratio		0.22		0.21	0.10	0.07	0.53	0.04	0.10	0.35
Control Delay		15.9		32.7	7.9	10.8	14.5	3.5	4.4	5.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		15.9		32.7	7.9	10.8	14.5	3.5	4.4	5.0
Queue Length 50th (ft)		5		15	0	9	223	0	5	79
Queue Length 95th (ft)		0		25	20	24	365	15	14	135
Internal Link Dist (ft)		216		230			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		323		232	372	782	1678	1627	404	1712
Starvation Cap Reductn		0		0	0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.17		0.16	0.10	0.05	0.38	0.03	0.10	0.28

Intersection Summary

Cycle Length: 108
Actuated Cycle Length: 60.9
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1	27	27	2	32	33	578	46	37	421	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1521			1439	1226	1609	1770	1714	1305	1712	
Flt Permitted		0.94			0.77	1.00	0.49	1.00	1.00	0.26	1.00	
Satd. Flow (perm)		1443			1163	1226	824	1770	1714	364	1712	
Peak-hour factor, PHF	0.75	0.25	0.61	0.80	0.50	0.90	0.83	0.90	0.86	0.88	0.89	0.42
Adj. Flow (vph)	8	4	44	34	4	36	40	642	53	42	473	12
RTOR Reduction (vph)	0	41	0	0	0	31	0	0	23	0	1	0
Lane Group Flow (vph)	0	15	0	0	38	5	40	642	30	42	484	0
Heavy Vehicles (%)	17%	0%	4%	25%	50%	33%	15%	10%	3%	33%	14%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		4.9			4.9	8.8	37.5	37.5	37.5	48.4	48.4	
Effective Green, g (s)		4.9			4.9	8.8	37.5	37.5	37.5	48.4	48.4	
Actuated g/C Ratio		0.07			0.07	0.13	0.56	0.56	0.56	0.72	0.72	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		105			85	288	459	986	955	316	1231	
v/s Ratio Prot						0.00		c0.36		0.01	c0.28	
v/s Ratio Perm		0.01			c0.03	0.00	0.05		0.02	0.09		
v/c Ratio		0.14			0.45	0.02	0.09	0.65	0.03	0.13	0.39	
Uniform Delay, d1		29.2			29.9	25.5	6.9	10.4	6.7	4.9	3.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.9			5.0	0.1	0.2	2.5	0.0	0.5	0.6	
Delay (s)		30.1			34.9	25.5	7.2	12.8	6.8	5.5	4.3	
Level of Service		C			C	C	A	B	A	A	A	
Approach Delay (s)		30.1			30.4			12.1			4.4	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	67.3	Sum of lost time (s)	21.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

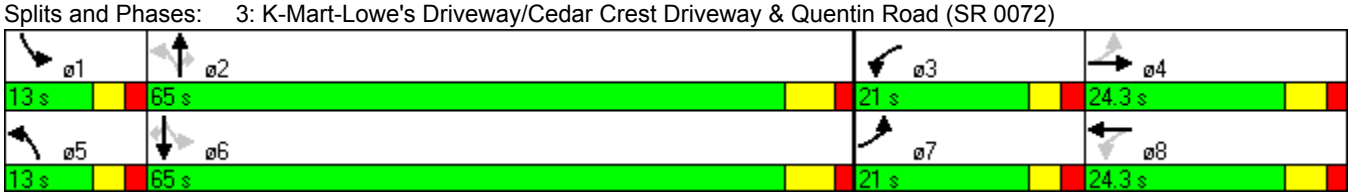
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	78	7	19	6	35	503	32	63	440	39
Lane Group Flow (vph)	104	40	32	135	48	565	48	89	478	68
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	21.0	24.3	21.0	24.3	13.0	65.0	65.0	13.0	65.0	65.0
Total Split (%)	17.0%	19.7%	17.0%	19.7%	10.5%	52.7%	52.7%	10.5%	52.7%	52.7%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.32	0.14	0.10	0.46	0.11	0.79	0.07	0.23	0.61	0.09
Control Delay	27.0	19.3	25.1	16.2	9.0	30.2	5.0	9.9	21.9	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	19.3	25.1	16.2	9.0	30.2	5.0	9.9	21.9	4.4
Queue Length 50th (ft)	38	5	11	6	9	240	0	18	186	0
Queue Length 95th (ft)	82	18	25	0	23	440	10	36	353	6
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	443	428	570	568	461	1269	1230	412	1278	1136
Starvation Cap Reductn	0	0	0	0	0	7	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.09	0.06	0.24	0.10	0.45	0.04	0.22	0.37	0.06

Intersection Summary

Cycle Length: 123.3
Actuated Cycle Length: 76.5
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	7	19	19	6	74	35	503	32	63	440	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1567	1429		1902	1722		1618	1673	1607	1778	1686	1476
Flt Permitted	0.45	1.00		0.73	1.00		0.38	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	735	1429		1464	1722		644	1673	1607	463	1686	1476
Peak-hour factor, PHF	0.75	0.58	0.68	0.59	0.50	0.60	0.73	0.89	0.67	0.71	0.92	0.57
Adj. Flow (vph)	104	12	28	32	12	123	48	565	48	89	478	68
RTOR Reduction (vph)	0	23	0	0	109	0	0	0	28	0	0	38
Lane Group Flow (vph)	104	17	0	32	26	0	48	565	20	89	478	30
Heavy Vehicles (%)	8%	14%	16%	0%	0%	4%	11%	13%	0%	2%	17%	10%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.5	14.0		13.1	9.3		37.6	33.9	33.9	41.0	35.6	35.6
Effective Green, g (s)	22.5	14.0		13.1	9.3		37.6	33.9	33.9	41.0	35.6	35.6
Actuated g/C Ratio	0.28	0.18		0.16	0.12		0.47	0.43	0.43	0.52	0.45	0.45
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	297	252		263	202		350	714	686	329	756	662
v/s Ratio Prot	c0.04	0.01		0.01	0.02		0.01	c0.34		c0.02	0.28	
v/s Ratio Perm	c0.06			0.01			0.06		0.01	0.12		0.02
v/c Ratio	0.35	0.07		0.12	0.13		0.14	0.79	0.03	0.27	0.63	0.05
Uniform Delay, d1	22.0	27.3		28.2	31.4		11.7	19.7	13.2	11.6	16.9	12.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1		0.2	0.3		0.2	7.3	0.1	0.4	2.9	0.1
Delay (s)	22.7	27.4		28.4	31.7		11.9	26.9	13.3	12.0	19.7	12.4
Level of Service	C	C		C	C		B	C	B	B	B	B
Approach Delay (s)		24.0			31.1			24.9			17.9	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	22.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	21.5
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	25	33	530	55	58	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Grade (%)	-2%		3%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.930		0.979			
Flt Protected	0.976					0.994
Satd. Flow (prot)	1898	0	1610	0	0	1685
Flt Permitted	0.976					0.994
Satd. Flow (perm)	1898	0	1610	0	0	1685
Link Speed (mph)	30		45			45
Link Distance (ft)	408		1653			553
Travel Time (s)	9.3		25.0			8.4
Peak Hour Factor	0.63	0.76	0.90	0.51	0.66	0.83
Heavy Vehicles (%)	4%	4%	10%	10%	10%	10%
Adj. Flow (vph)	40	43	589	108	88	693
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	0	697	0	0	781
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.84	0.84	1.07	1.07	1.02	1.02
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 78.1%	ICU Level of Service D
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	25	33	530	55	58	575
Sign Control	Stop		Free			Free
Grade	-2%		3%			-3%
Peak Hour Factor	0.63	0.76	0.90	0.51	0.66	0.83
Hourly flow rate (vph)	40	43	589	108	88	693
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1511	643			697	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1511	643			697	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	66	91			90	
cM capacity (veh/h)	118	470			863	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	83	697	781
Volume Left	40	0	88
Volume Right	43	108	0
cSH	194	1700	863
Volume to Capacity	0.43	0.41	0.10
Queue Length 95th (ft)	49	0	8
Control Delay (s)	36.9	0.0	2.6
Lane LOS	E		A
Approach Delay (s)	36.9	0.0	2.6
Approach LOS	E		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

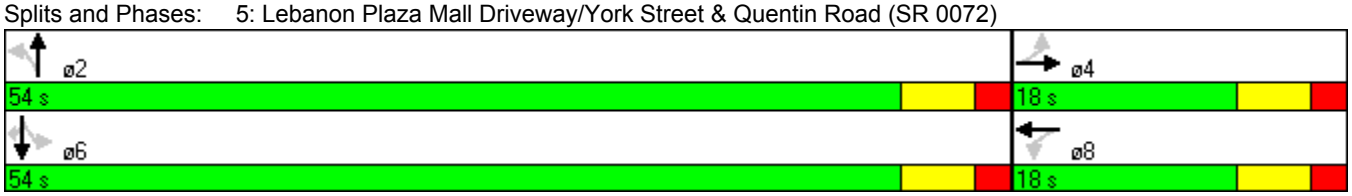
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	4	5	62	10	6	483	32	579	4
Lane Group Flow (vph)	8	20	76	40	20	628	43	636	8
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	18.0	18.0	18.0	18.0	54.0	54.0	54.0	54.0	54.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.05	0.07	0.35	0.13	0.05	0.50	0.09	0.50	0.01
Control Delay	22.5	17.9	28.0	13.1	4.8	7.5	5.1	7.6	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	17.9	28.0	13.1	4.8	7.5	5.1	7.6	2.8
Queue Length 50th (ft)	3	4	26	4	2	106	5	110	0
Queue Length 95th (ft)	7	8	55	23	3	168	14	205	2
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	204	310	252	344	491	1431	546	1449	1323
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.06	0.30	0.12	0.04	0.44	0.08	0.44	0.01

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 62.2
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	5	5	62	10	20	6	483	27	32	579	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.90		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1375	1575		1668	1667		1535	1754		1686	1778	1623
Flt Permitted	0.73	1.00		0.74	1.00		0.37	1.00		0.38	1.00	1.00
Satd. Flow (perm)	1058	1575		1307	1667		602	1754		670	1778	1623
Peak-hour factor, PHF	0.50	0.42	0.63	0.82	0.83	0.71	0.30	0.82	0.69	0.75	0.91	0.50
Adj. Flow (vph)	8	12	8	76	12	28	20	589	39	43	636	8
RTOR Reduction (vph)	0	7	0	0	24	0	0	3	0	0	0	3
Lane Group Flow (vph)	8	13	0	76	16	0	20	625	0	43	636	5
Heavy Vehicles (%)	25%	0%	20%	2%	10%	0%	17%	11%	0%	4%	11%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.4	8.4		8.4	8.4		43.1	43.1		43.1	43.1	43.1
Effective Green, g (s)	8.4	8.4		8.4	8.4		43.1	43.1		43.1	43.1	43.1
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.68	0.68		0.68	0.68	0.68
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	140	208		173	221		409	1191		455	1207	1102
v/s Ratio Prot		0.01			0.01			0.36			c0.36	
v/s Ratio Perm	0.01			c0.06			0.03			0.06		0.00
v/c Ratio	0.06	0.06		0.44	0.07		0.05	0.52		0.09	0.53	0.00
Uniform Delay, d1	24.1	24.1		25.4	24.1		3.4	5.1		3.5	5.1	3.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2		2.4	0.2		0.0	0.4		0.1	0.4	0.0
Delay (s)	24.3	24.3		27.8	24.3		3.4	5.5		3.6	5.5	3.3
Level of Service	C	C		C	C		A	A		A	A	A
Approach Delay (s)		24.3			26.6			5.4			5.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	63.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

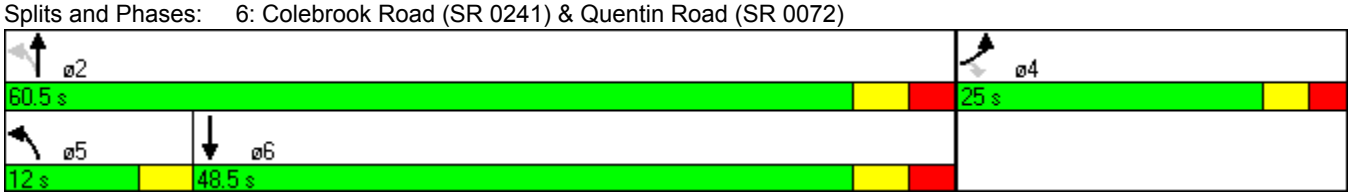
6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	161	206	149	453	469
Lane Group Flow (vph)	233	248	169	533	661
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	25.0	25.0	12.0	60.5	48.5
Total Split (%)	29.2%	29.2%	14.0%	70.8%	56.7%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.66	0.49	0.48	0.50	0.87
Control Delay	36.1	7.7	10.1	10.0	30.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	7.7	10.1	10.0	30.4
Queue Length 50th (ft)	87	0	23	111	231
Queue Length 95th (ft)	137	43	51	187	345
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	495	607	356	1440	1200
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.41	0.47	0.37	0.55

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 67
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	161	206	149	453	469	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1627	1428	1625	1769	1824	
Flt Permitted	0.95	1.00	0.16	1.00	1.00	
Satd. Flow (perm)	1627	1428	273	1769	1824	
Peak-hour factor, PHF	0.69	0.83	0.88	0.85	0.83	0.81
Adj. Flow (vph)	233	248	169	533	565	96
RTOR Reduction (vph)	0	194	0	0	8	0
Lane Group Flow (vph)	233	54	169	533	653	0
Heavy Vehicles (%)	3%	5%	9%	9%	13%	12%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	14.5	14.5	40.0	40.0	28.0	
Effective Green, g (s)	14.5	14.5	40.0	40.0	28.0	
Actuated g/C Ratio	0.22	0.22	0.60	0.60	0.42	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	355	311	337	1064	768	
v/s Ratio Prot	c0.14		0.06	c0.30	c0.36	
v/s Ratio Perm		0.04	0.24			
v/c Ratio	0.66	0.17	0.50	0.50	0.85	
Uniform Delay, d1	23.7	21.1	9.6	7.6	17.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.3	0.3	1.2	1.0	10.2	
Delay (s)	28.1	21.4	10.8	8.6	27.5	
Level of Service	C	C	B	A	C	
Approach Delay (s)	24.6			9.1	27.5	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	66.5	Sum of lost time (s)	18.5
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

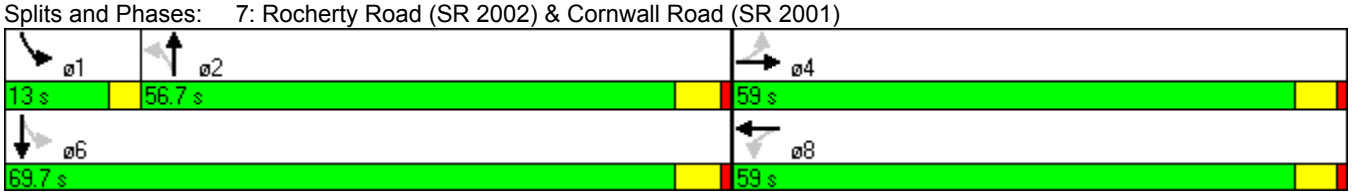
7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	59	483	39	378	22	243	192	122
Lane Group Flow (vph)	0	677	0	696	0	606	0	431
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.2	9.2	9.2	9.2	20.5	20.5	6.0	20.5
Total Split (s)	59.0	59.0	59.0	59.0	56.7	56.7	13.0	69.7
Total Split (%)	45.8%	45.8%	45.8%	45.8%	44.1%	44.1%	10.1%	54.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.4	4.4	3.0	4.4
All-Red Time (s)	1.2	1.2	1.2	1.2	1.1	1.1	0.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	5.5	5.5	3.0	5.5
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Max	Min
v/c Ratio		1.46		1.16		0.89		1.24
Control Delay		250.0		124.9		51.4		157.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		250.0		124.9		51.4		157.9
Queue Length 50th (ft)		~776		~679		447		~340
Queue Length 95th (ft)		#1015		#920		457		#559
Internal Link Dist (ft)		1052		2233		731		2352
Turn Bay Length (ft)								
Base Capacity (vph)		463		598		678		347
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		1.46		1.16		0.89		1.24

Intersection Summary

Cycle Length: 128.7
Actuated Cycle Length: 128.7
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	483	31	39	378	169	22	243	212	192	122	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	10	10	10
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)		5.2			5.2			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			0.94			0.98	
Flt Protected		0.99			1.00			1.00			0.97	
Satd. Flow (prot)		1631			1602			1706			1551	
Flt Permitted		0.67			0.87			0.97			0.36	
Satd. Flow (perm)		1102			1395			1654			571	
Peak-hour factor, PHF	0.60	0.91	0.65	0.74	0.92	0.73	0.81	0.75	0.83	0.86	0.86	0.85
Adj. Flow (vph)	98	531	48	53	411	232	27	324	255	223	142	66
RTOR Reduction (vph)	0	2	0	0	14	0	0	20	0	0	5	0
Lane Group Flow (vph)	0	675	0	0	682	0	0	586	0	0	426	0
Heavy Vehicles (%)	4%	6%	8%	16%	9%	6%	0%	1%	3%	12%	3%	9%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		53.8			53.8			51.2			64.2	
Effective Green, g (s)		53.8			53.8			51.2			64.2	
Actuated g/C Ratio		0.42			0.42			0.40			0.50	
Clearance Time (s)		5.2			5.2			5.5			5.5	
Vehicle Extension (s)		4.0			4.0			7.0			7.0	
Lane Grp Cap (vph)		461			583			658			361	
v/s Ratio Prot											c0.09	
v/s Ratio Perm		c0.61			0.49			0.35			c0.50	
v/c Ratio		1.46			1.17			0.89			1.18	
Uniform Delay, d1		37.4			37.4			36.1			32.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		220.2			93.8			16.0			106.0	
Delay (s)		257.7			131.2			52.1			138.2	
Level of Service		F			F			D			F	
Approach Delay (s)		257.7			131.2			52.1			138.2	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM Average Control Delay	148.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	128.7	Sum of lost time (s)	10.7
Intersection Capacity Utilization	106.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

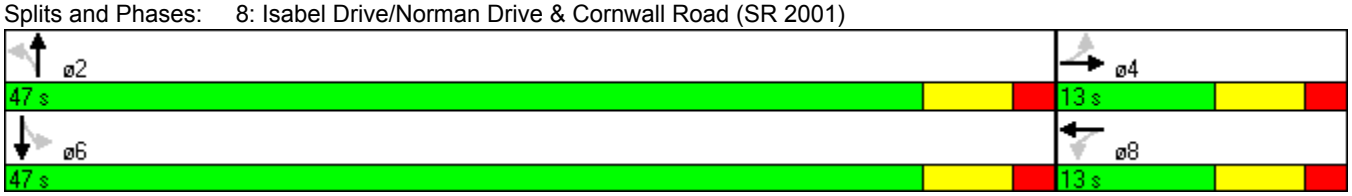
8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	6	26	35	13	32	408	111	403
Lane Group Flow (vph)	0	105	0	140	0	608	0	667
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	13.0	13.0	13.0	13.0	47.0	47.0	47.0	47.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	78.3%	78.3%	78.3%	78.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.34		0.45		0.54		0.74
Control Delay		18.8		18.4		6.9		13.2
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		18.8		18.4		6.9		13.2
Queue Length 50th (ft)		16		18		82		124
Queue Length 95th (ft)		29		41		137		201
Internal Link Dist (ft)		124		614		513		2141
Turn Bay Length (ft)								
Base Capacity (vph)		305		311		1328		1075
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.34		0.45		0.46		0.62

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 49.3
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	26	32	35	13	50	32	408	86	111	403	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.94			0.93			0.98			1.00	
Flt Protected		0.99			0.98			1.00			0.99	
Satd. Flow (prot)		1895			1970			1679			1678	
Flt Permitted		0.95			0.84			0.94			0.76	
Satd. Flow (perm)		1820			1692			1580			1283	
Peak-hour factor, PHF	0.42	0.54	0.74	0.73	0.65	0.69	0.82	0.87	0.86	0.73	0.82	0.50
Adj. Flow (vph)	14	48	43	48	20	72	39	469	100	152	491	24
RTOR Reduction (vph)	0	38	0	0	64	0	0	13	0	0	2	0
Lane Group Flow (vph)	0	67	0	0	76	0	0	595	0	0	665	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.4			5.4			33.1			33.1	
Effective Green, g (s)		5.4			5.4			33.1			33.1	
Actuated g/C Ratio		0.11			0.11			0.66			0.66	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		195			181			1036			841	
v/s Ratio Prot												
v/s Ratio Perm		0.04			c0.04			0.38			c0.52	
v/c Ratio		0.34			0.42			0.57			0.79	
Uniform Delay, d1		20.9			21.1			4.8			6.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			1.6			0.8			5.1	
Delay (s)		22.0			22.6			5.6			11.3	
Level of Service		C			C			A			B	
Approach Delay (s)		22.0			22.6			5.6			11.3	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	51	25	28	416	610	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.958				0.985	
Flt Protected	0.967			0.996		
Satd. Flow (prot)	1707	0	0	1781	1809	0
Flt Permitted	0.967			0.996		
Satd. Flow (perm)	1707	0	0	1781	1809	0
Link Speed (mph)	25			40	40	
Link Distance (ft)	1308			929	312	
Travel Time (s)	35.7			15.8	5.3	
Peak Hour Factor	0.70	0.75	0.64	0.83	0.82	0.73
Heavy Vehicles (%)	0%	10%	9%	6%	3%	7%
Adj. Flow (vph)	73	33	44	501	744	92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	106	0	0	545	836	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	22			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 55.9%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	51	25	28	416	610	67
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.75	0.64	0.83	0.82	0.73
Hourly flow rate (vph)	73	33	44	501	744	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1378	790	836			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1378	790	836			
tC, single (s)	6.4	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.3			
p0 queue free %	52	91	94			
cM capacity (veh/h)	152	378	769			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	106	545	836
Volume Left	73	44	0
Volume Right	33	0	92
cSH	187	769	1700
Volume to Capacity	0.57	0.06	0.49
Queue Length 95th (ft)	76	5	0
Control Delay (s)	46.9	1.5	0.0
Lane LOS	E	A	
Approach Delay (s)	46.9	1.5	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	116	31	299	73	141	468
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.961		0.971			
Flt Protected	0.966					0.988
Satd. Flow (prot)	1683	0	1789	0	0	2035
Flt Permitted	0.966					0.988
Satd. Flow (perm)	1683	0	1789	0	0	2035
Link Speed (mph)	35		40			40
Link Distance (ft)	1025		312			921
Travel Time (s)	20.0		5.3			15.7
Peak Hour Factor	0.87	0.57	0.80	0.71	0.71	0.74
Heavy Vehicles (%)	2%	8%	4%	0%	1%	5%
Adj. Flow (vph)	133	54	374	103	199	632
Shared Lane Traffic (%)						
Lane Group Flow (vph)	187	0	477	0	0	831
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.00	1.00	0.85	0.85
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 70.9%	ICU Level of Service C
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	116	31	299	73	141	468
Sign Control	Stop		Free			Free
Grade	2%		0%			1%
Peak Hour Factor	0.87	0.57	0.80	0.71	0.71	0.74
Hourly flow rate (vph)	133	54	374	103	199	632
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1455	425			477	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1455	425			477	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	0	91			82	
cM capacity (veh/h)	117	616			1091	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	188	477	831
Volume Left	133	0	199
Volume Right	54	103	0
cSH	153	1700	1091
Volume to Capacity	1.23	0.28	0.18
Queue Length 95th (ft)	271	0	17
Control Delay (s)	205.0	0.0	4.2
Lane LOS	F		A
Approach Delay (s)	205.0	0.0	4.2
Approach LOS	F		

Intersection Summary			
Average Delay	28.0		
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

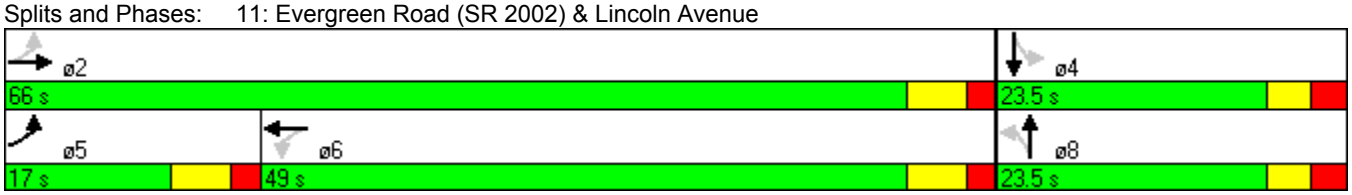
11: Evergreen Road (SR 2002) & Lincoln Avenue

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	329	592	16	525	18	22	126	15
Lane Group Flow (vph)	370	724	34	836	0	103	0	300
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	17.0	66.0	49.0	49.0	23.5	23.5	23.5	23.5
Total Split (%)	19.0%	73.7%	54.7%	54.7%	26.3%	26.3%	26.3%	26.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	1.28	0.64	0.11	1.05		0.32		0.99
Control Delay	172.9	11.8	13.9	70.9		23.7		84.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	172.9	11.8	13.9	70.9		23.7		84.4
Queue Length 50th (ft)	~220	207	10	~512		32		153
Queue Length 95th (ft)	#388	270	14	#740		56		135
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	290	1129	319	794		322		302
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	1.28	0.64	0.11	1.05		0.32		0.99

Intersection Summary

Cycle Length: 89.5
Actuated Cycle Length: 89.5
Natural Cycle: 110
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



11: Evergreen Road (SR 2002) & Lincoln Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	329	592	4	16	525	172	18	22	32	126	15	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.95			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1702	1682		1614	1615			1712			1661	
Flt Permitted	0.08	1.00		0.39	1.00			0.84			0.80	
Satd. Flow (perm)	146	1682		663	1615			1458			1366	
Peak-hour factor, PHF	0.89	0.83	0.38	0.47	0.90	0.68	0.63	0.72	0.75	0.82	0.57	0.90
Adj. Flow (vph)	370	713	11	34	583	253	29	31	43	154	26	120
RTOR Reduction (vph)	0	1	0	0	18	0	0	29	0	0	27	0
Lane Group Flow (vph)	370	723	0	34	818	0	0	74	0	0	273	0
Heavy Vehicles (%)	2%	8%	33%	7%	9%	4%	7%	0%	8%	4%	0%	6%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	60.0	60.0		43.0	43.0			18.0			18.0	
Effective Green, g (s)	60.0	60.0		43.0	43.0			18.0			18.0	
Actuated g/C Ratio	0.67	0.67		0.48	0.48			0.20			0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	289	1128		319	776			293			275	
v/s Ratio Prot	c0.16	0.43			0.51							
v/s Ratio Perm	c0.70			0.05				0.05			c0.20	
v/c Ratio	1.28	0.64		0.11	1.05			0.25			0.99	
Uniform Delay, d1	28.3	8.5		12.7	23.2			30.1			35.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	150.0	2.1		0.4	47.7			0.5			51.9	
Delay (s)	178.4	10.6		13.1	70.9			30.6			87.6	
Level of Service	F	B		B	E			C			F	
Approach Delay (s)		67.3			68.6			30.6			87.6	
Approach LOS		E			E			C			F	

Intersection Summary			
HCM Average Control Delay	68.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	11.5
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

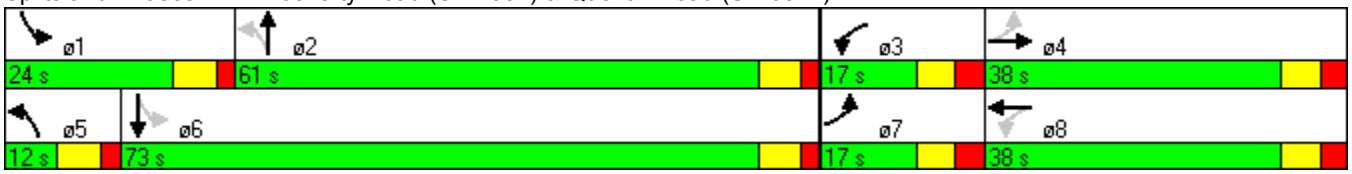
1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	96	249	256	255	9	535	180	517
Lane Group Flow (vph)	128	313	298	496	14	696	196	676
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.5	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.0	21.5	13.5	21.5
Total Split (s)	17.0	38.0	17.0	38.0	12.0	61.0	24.0	73.0
Total Split (%)	12.1%	27.1%	12.1%	27.1%	8.6%	43.6%	17.1%	52.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.74	0.80	1.32	1.19	0.06	0.98	0.78	0.75
Control Delay	58.7	66.9	207.4	149.6	15.4	70.6	44.1	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.7	66.9	207.4	149.6	15.4	70.6	44.1	26.3
Queue Length 50th (ft)	83	269	~247	~523	5	~662	93	444
Queue Length 95th (ft)	111	#366	#400	#749	12	#908	#217	585
Internal Link Dist (ft)		569		654		721		1806
Turn Bay Length (ft)	190		300		105		225	
Base Capacity (vph)	174	393	225	418	246	709	275	905
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.80	1.32	1.19	0.06	0.98	0.71	0.75

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 1 (1%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	249	19	256	255	169	9	535	121	180	517	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	11	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.93		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1766		1653	1791		1710	1739		1771	1710	
Flt Permitted	0.13	1.00		0.28	1.00		0.25	1.00		0.07	1.00	
Satd. Flow (perm)	232	1766		482	1791		443	1739		123	1710	
Peak-hour factor, PHF	0.75	0.86	0.81	0.86	0.95	0.74	0.66	0.96	0.87	0.92	0.93	0.88
Adj. Flow (vph)	128	290	23	298	268	228	14	557	139	196	556	120
RTOR Reduction (vph)	0	2	0	0	22	0	0	7	0	0	6	0
Lane Group Flow (vph)	128	311	0	298	474	0	14	689	0	196	670	0
Heavy Vehicles (%)	1%	2%	0%	4%	1%	0%	0%	4%	4%	0%	7%	2%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.0	31.0		41.0	31.0		58.7	56.5		78.5	69.8	
Effective Green, g (s)	41.0	31.0		41.0	31.0		58.7	56.5		78.5	69.8	
Actuated g/C Ratio	0.29	0.22		0.29	0.22		0.42	0.40		0.56	0.50	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	174	391		225	397		206	702		251	853	
v/s Ratio Prot	0.05	0.18		c0.09	0.26		0.00	c0.40		c0.09	c0.39	
v/s Ratio Perm	0.16			c0.29			0.03			0.35		
v/c Ratio	0.74	0.79		1.32	1.19		0.07	0.98		0.78	0.79	
Uniform Delay, d1	40.6	51.5		47.5	54.5		25.6	41.3		39.8	28.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.80	0.79	
Incremental Delay, d2	15.8	11.2		173.5	109.7		0.2	29.9		12.8	5.9	
Delay (s)	56.4	62.7		221.0	164.2		25.8	71.1		44.5	28.7	
Level of Service	E	E		F	F		C	E		D	C	
Approach Delay (s)		60.9			185.5			70.2			32.3	
Approach LOS		E			F			E			C	

Intersection Summary			
HCM Average Control Delay	89.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	33.5
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	10	3	112	3	76	60	725	97	76	644
Lane Group Flow (vph)	0	92	0	173	90	72	763	110	87	690
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0	13.0	35.0	35.0	35.0	13.0	48.0
Total Split (%)	31.4%	31.4%	31.4%	31.4%	18.6%	50.0%	50.0%	50.0%	18.6%	68.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.28		0.71	0.14	0.21	0.92	0.13	0.40	0.61
Control Delay		11.3		43.4	4.4	17.8	34.7	5.5	12.6	10.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		11.3		43.4	4.4	17.8	34.7	5.5	12.6	10.8
Queue Length 50th (ft)		7		68	1	30	~548	14	12	295
Queue Length 95th (ft)		30		47	22	m31	m#542	m16	m43	224
Internal Link Dist (ft)		216		230			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		359		269	649	348	832	867	220	1136
Starvation Cap Reductn		0		0	0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.26		0.64	0.14	0.21	0.92	0.13	0.40	0.61

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 61 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	3	53	112	3	76	60	725	97	76	644	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1532			1787	1568	1796	1820	1766	1536	1875	
Flt Permitted		0.91			0.67	1.00	0.40	1.00	1.00	0.11	1.00	
Satd. Flow (perm)		1411			1254	1568	761	1820	1766	172	1875	
Peak-hour factor, PHF	0.63	0.75	0.74	0.68	0.38	0.84	0.83	0.95	0.88	0.87	0.95	0.68
Adj. Flow (vph)	16	4	72	165	8	90	72	763	110	87	678	12
RTOR Reduction (vph)	0	58	0	0	0	63	0	0	62	0	1	0
Lane Group Flow (vph)	0	34	0	0	173	27	72	763	48	87	689	0
Heavy Vehicles (%)	0%	0%	6%	1%	33%	4%	3%	7%	0%	13%	4%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		13.6			13.6	18.4	30.6	30.6	30.6	42.4	42.4	
Effective Green, g (s)		13.6			13.6	18.4	30.6	30.6	30.6	42.4	42.4	
Actuated g/C Ratio		0.19			0.19	0.26	0.44	0.44	0.44	0.61	0.61	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		274			244	569	333	796	772	198	1136	
v/s Ratio Prot						0.00		c0.42		0.03	c0.37	
v/s Ratio Perm		0.02			c0.14	0.01	0.09		0.03	0.24		
v/c Ratio		0.12			0.71	0.05	0.22	0.96	0.06	0.44	0.61	
Uniform Delay, d1		23.3			26.4	19.3	12.2	19.1	11.4	12.6	8.6	
Progression Factor		1.00			1.00	1.00	1.26	1.41	2.37	1.32	0.96	
Incremental Delay, d2		0.3			9.7	0.1	0.4	10.0	0.0	3.6	2.0	
Delay (s)		23.6			36.1	19.4	15.9	37.0	27.0	20.2	10.3	
Level of Service		C			D	B	B	D	C	C	B	
Approach Delay (s)		23.6			30.3			34.2			11.4	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

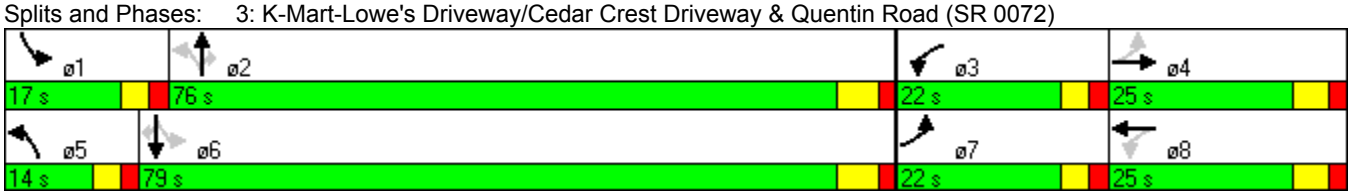
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	182	19	77	20	49	603	62	142	583	65
Lane Group Flow (vph)	225	96	96	402	56	701	68	167	678	80
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	22.0	25.0	22.0	25.0	14.0	76.0	76.0	17.0	79.0	79.0
Total Split (%)	15.7%	17.9%	15.7%	17.9%	10.0%	54.3%	54.3%	12.1%	56.4%	56.4%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.88	0.31	0.30	0.93	0.16	0.75	0.08	0.49	0.65	0.09
Control Delay	75.0	25.0	40.1	50.2	4.5	19.7	5.7	15.1	26.3	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Total Delay	75.0	25.0	40.1	50.2	4.5	20.6	5.7	15.1	26.3	5.3
Queue Length 50th (ft)	166	28	65	138	10	355	17	59	443	6
Queue Length 95th (ft)	#245	36	98	53	m13	m404	m22	86	561	27
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	255	308	403	460	382	940	871	363	1041	870
Starvation Cap Reductn	0	0	0	0	0	77	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.31	0.24	0.87	0.15	0.81	0.08	0.46	0.65	0.09

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 74 (53%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	19	55	77	20	245	49	603	62	142	583	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1600		1902	1761		1796	1783	1607	1814	1844	1489
Flt Permitted	0.18	1.00		0.69	1.00		0.26	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	328	1600		1392	1761		491	1783	1607	370	1844	1489
Peak-hour factor, PHF	0.81	0.59	0.86	0.80	0.56	0.67	0.88	0.86	0.91	0.85	0.86	0.81
Adj. Flow (vph)	225	32	64	96	36	366	56	701	68	167	678	80
RTOR Reduction (vph)	0	50	0	0	225	0	0	0	24	0	0	29
Lane Group Flow (vph)	225	46	0	96	177	0	56	701	44	167	678	51
Heavy Vehicles (%)	0%	11%	0%	0%	5%	1%	0%	6%	0%	0%	7%	9%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	38.6	22.4		27.7	16.6		79.9	73.8	73.8	88.5	78.1	78.1
Effective Green, g (s)	38.6	22.4		27.7	16.6		79.9	73.8	73.8	88.5	78.1	78.1
Actuated g/C Ratio	0.28	0.16		0.20	0.12		0.57	0.53	0.53	0.63	0.56	0.56
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	255	256		316	209		337	940	847	341	1029	831
v/s Ratio Prot	c0.11	0.03		0.02	0.10		0.01	c0.39		c0.04	c0.37	
v/s Ratio Perm	c0.14			0.04			0.09		0.03	0.27		0.03
v/c Ratio	0.88	0.18		0.30	0.85		0.17	0.75	0.05	0.49	0.66	0.06
Uniform Delay, d1	43.6	50.8		47.4	60.5		16.1	25.8	16.1	17.8	21.6	14.2
Progression Factor	1.00	1.00		1.00	1.00		0.40	0.60	0.83	1.00	1.00	1.00
Incremental Delay, d2	28.0	0.3		0.5	25.9		0.1	2.9	0.1	1.1	3.3	0.1
Delay (s)	71.6	51.2		48.0	86.4		6.5	18.5	13.4	18.9	24.9	14.3
Level of Service	E	D		D	F		A	B	B	B	C	B
Approach Delay (s)		65.5			79.0			17.3			22.9	
Approach LOS		E			E			B			C	

Intersection Summary			
HCM Average Control Delay	37.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.8
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	39	105	926	68	76	841
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Grade (%)	-2%		3%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.904		0.989			
Flt Protected	0.986					0.994
Satd. Flow (prot)	1901	0	1754	0	0	1765
Flt Permitted	0.986					0.994
Satd. Flow (perm)	1901	0	1754	0	0	1765
Link Speed (mph)	30		45			45
Link Distance (ft)	408		1653			553
Travel Time (s)	9.3		25.0			8.4
Peak Hour Factor	0.80	0.86	0.96	0.78	0.62	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	5%	5%
Adj. Flow (vph)	49	122	965	87	123	867
Shared Lane Traffic (%)						
Lane Group Flow (vph)	171	0	1052	0	0	990
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.84	0.84	1.07	1.07	1.02	1.02
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 119.9%	ICU Level of Service H
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	39	105	926	68	76	841
Sign Control	Stop		Free			Free
Grade	-2%		3%			-3%
Peak Hour Factor	0.80	0.86	0.96	0.78	0.62	0.97
Hourly flow rate (vph)	49	122	965	87	123	867
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2120	1008			1052	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2120	1008			1052	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	58			81	
cM capacity (veh/h)	45	292			650	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	171	1052	990
Volume Left	49	0	123
Volume Right	122	87	0
cSH	114	1700	650
Volume to Capacity	1.50	0.62	0.19
Queue Length 95th (ft)	308	0	17
Control Delay (s)	334.4	0.0	5.4
Lane LOS	F		A
Approach Delay (s)	334.4	0.0	5.4
Approach LOS	F		

Intersection Summary			
Average Delay	28.3		
Intersection Capacity Utilization	119.9%	ICU Level of Service	H
Analysis Period (min)	15		

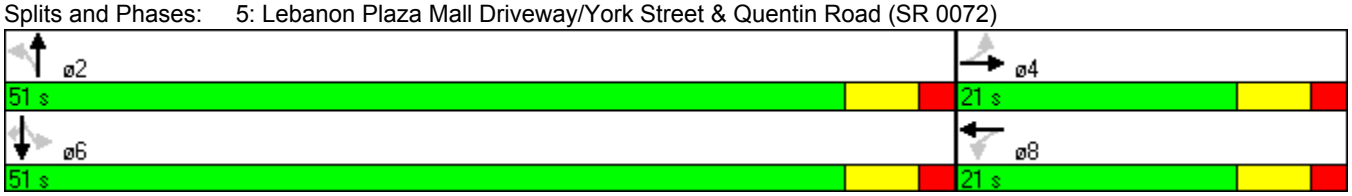
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	52	55	120	94	61	755	36	720	44
Lane Group Flow (vph)	68	152	145	173	72	884	42	766	56
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	21.0	21.0	21.0	21.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.32	0.41	0.65	0.47	0.24	0.76	0.19	0.65	0.05
Control Delay	27.5	16.0	39.6	24.5	8.4	14.3	8.4	11.3	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	16.0	39.6	24.5	8.4	14.3	8.4	11.3	1.9
Queue Length 50th (ft)	23	25	53	51	11	217	6	168	0
Queue Length 95th (ft)	50	63	105	92	30	394	21	295	9
Internal Link Dist (ft)		341		1234		612		2055	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	259	433	268	437	334	1285	243	1305	1134
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.35	0.54	0.40	0.22	0.69	0.17	0.59	0.05

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 65.6
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	58	120	94	45	61	755	41	36	720	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1653	1627		1685	1816		1744	1863		1754	1897	1623
Flt Permitted	0.65	1.00		0.66	1.00		0.26	1.00		0.19	1.00	1.00
Satd. Flow (perm)	1127	1627		1171	1816		484	1863		353	1897	1623
Peak-hour factor, PHF	0.77	0.81	0.69	0.83	0.78	0.86	0.85	0.92	0.65	0.86	0.94	0.79
Adj. Flow (vph)	68	68	84	145	121	52	72	821	63	42	766	56
RTOR Reduction (vph)	0	63	0	0	22	0	0	4	0	0	0	21
Lane Group Flow (vph)	68	89	0	145	151	0	72	880	0	42	766	35
Heavy Vehicles (%)	4%	2%	2%	1%	0%	3%	3%	4%	0%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	12.5	12.5		12.5	12.5		41.0	41.0		41.0	41.0	41.0
Effective Green, g (s)	12.5	12.5		12.5	12.5		41.0	41.0		41.0	41.0	41.0
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.63	0.63		0.63	0.63	0.63
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	215	310		223	347		303	1166		221	1187	1016
v/s Ratio Prot		0.05			0.08			c0.47			0.40	
v/s Ratio Perm	0.06			c0.12			0.15			0.12		0.02
v/c Ratio	0.32	0.29		0.65	0.44		0.24	0.75		0.19	0.65	0.03
Uniform Delay, d1	22.8	22.7		24.5	23.4		5.4	8.7		5.2	7.7	4.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	0.7		7.3	1.2		0.4	2.8		0.4	1.2	0.0
Delay (s)	24.0	23.4		31.8	24.6		5.8	11.5		5.6	8.9	4.7
Level of Service	C	C		C	C		A	B		A	A	A
Approach Delay (s)		23.6			27.9			11.1			8.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

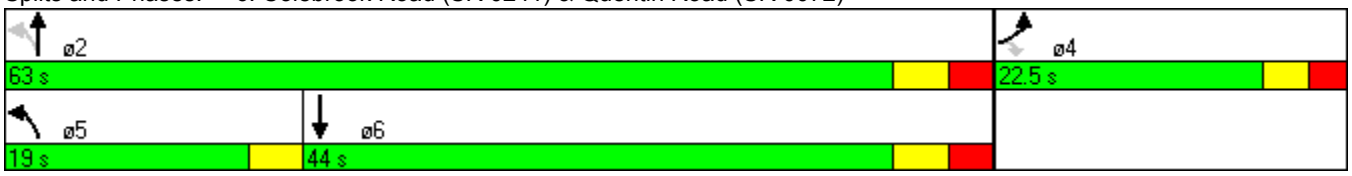
6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	185	203	266	720	675
Lane Group Flow (vph)	253	248	369	774	864
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	22.5	22.5	19.0	63.0	44.0
Total Split (%)	26.3%	26.3%	22.2%	73.7%	51.5%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.81	0.52	0.89	0.62	0.98
Control Delay	54.3	8.5	45.2	10.8	50.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	54.3	8.5	45.2	10.8	50.0
Queue Length 50th (ft)	130	0	138	211	438
Queue Length 95th (ft)	165	43	#172	318	#704
Internal Link Dist (ft)	516			127	360
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	338	497	416	1266	898
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.75	0.50	0.89	0.61	0.96

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 83.7
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	203	266	720	675	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1470	1736	1872	1984	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1660	1470	181	1872	1984	
Peak-hour factor, PHF	0.73	0.82	0.72	0.93	0.93	0.87
Adj. Flow (vph)	253	248	369	774	726	138
RTOR Reduction (vph)	0	201	0	0	8	0
Lane Group Flow (vph)	253	47	369	774	856	0
Heavy Vehicles (%)	1%	2%	2%	3%	4%	1%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	15.7	15.7	56.0	56.0	37.0	
Effective Green, g (s)	15.7	15.7	56.0	56.0	37.0	
Actuated g/C Ratio	0.19	0.19	0.67	0.67	0.44	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	311	276	409	1252	877	
v/s Ratio Prot	c0.15		c0.17	0.41	c0.43	
v/s Ratio Perm		0.03	0.44			
v/c Ratio	0.81	0.17	0.90	0.62	0.98	
Uniform Delay, d1	32.6	28.5	24.5	7.8	22.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.9	0.3	22.5	1.6	24.9	
Delay (s)	47.5	28.8	47.1	9.4	47.8	
Level of Service	D	C	D	A	D	
Approach Delay (s)	38.3			21.6	47.8	
Approach LOS	D			C	D	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	15.5
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

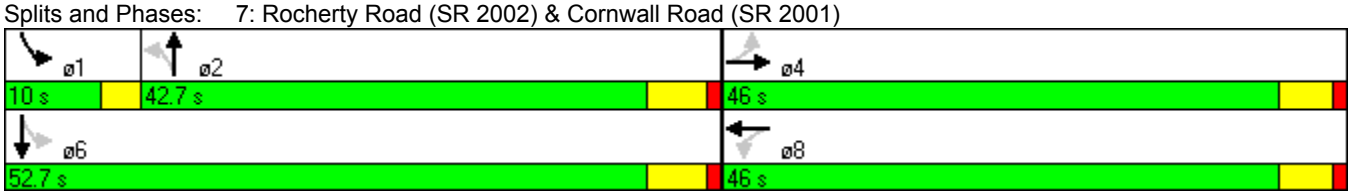
7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	63	405	75	482	48	180	163	226
Lane Group Flow (vph)	0	586	0	821	0	389	0	609
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.2	9.2	9.2	9.2	20.5	20.5	6.0	20.5
Total Split (s)	46.0	46.0	46.0	46.0	42.7	42.7	10.0	52.7
Total Split (%)	46.6%	46.6%	46.6%	46.6%	43.3%	43.3%	10.1%	53.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.4	4.4	3.0	4.4
All-Red Time (s)	1.2	1.2	1.2	1.2	1.1	1.1	0.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	5.5	5.5	3.0	5.5
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Max	Min
v/c Ratio		1.23		1.36		0.67		1.21
Control Delay		148.5		201.1		30.9		135.2
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		148.5		201.1		30.9		135.2
Queue Length 50th (ft)		~457		~684		189		~417
Queue Length 95th (ft)		#668		#844		262		#678
Internal Link Dist (ft)		1052		2233		731		2352
Turn Bay Length (ft)								
Base Capacity (vph)		477		602		578		505
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		1.23		1.36		0.67		1.21

Intersection Summary

Cycle Length: 98.7
Actuated Cycle Length: 98.7
Natural Cycle: 140
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	405	46	75	482	137	48	180	102	163	226	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	10	10	10
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)		5.2			5.2			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.96			0.96	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		1654			1721			1750			1563	
Flt Permitted		0.69			0.83			0.85			0.61	
Satd. Flow (perm)		1145			1432			1491			974	
Peak-hour factor, PHF	0.75	0.92	0.74	0.86	0.85	0.82	0.84	0.83	0.89	0.77	0.96	0.84
Adj. Flow (vph)	84	440	62	87	567	167	57	217	115	212	235	162
RTOR Reduction (vph)	0	4	0	0	9	0	0	16	0	0	13	0
Lane Group Flow (vph)	0	582	0	0	812	0	0	373	0	0	596	0
Heavy Vehicles (%)	4%	4%	3%	5%	2%	4%	0%	1%	0%	7%	9%	4%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		40.8			40.8			37.2			47.2	
Effective Green, g (s)		40.8			40.8			37.2			47.2	
Actuated g/C Ratio		0.41			0.41			0.38			0.48	
Clearance Time (s)		5.2			5.2			5.5			5.5	
Vehicle Extension (s)		4.0			4.0			7.0			7.0	
Lane Grp Cap (vph)		473			592			562			508	
v/s Ratio Prot											c0.08	
v/s Ratio Perm		0.51			c0.57			0.25			c0.48	
v/c Ratio		1.23			1.37			0.66			1.17	
Uniform Delay, d1		29.0			29.0			25.6			25.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		121.0			177.5			5.3			97.2	
Delay (s)		150.0			206.5			30.9			122.9	
Level of Service		F			F			C			F	
Approach Delay (s)		150.0			206.5			30.9			122.9	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM Average Control Delay	143.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	98.7	Sum of lost time (s)	10.7
Intersection Capacity Utilization	109.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

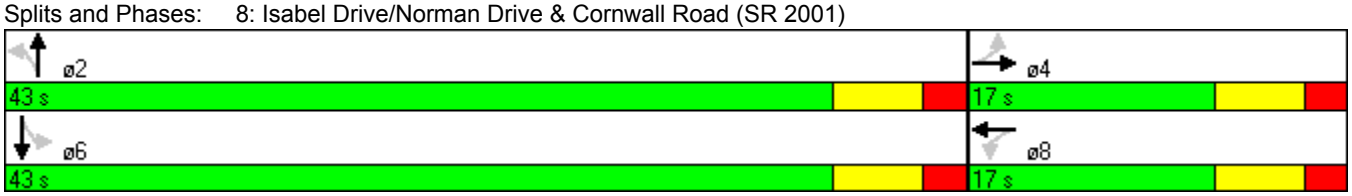
8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	34	16	69	18	42	346	51	451
Lane Group Flow (vph)	0	145	0	247	0	476	0	637
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	17.0	17.0	17.0	17.0	43.0	43.0	43.0	43.0
Total Split (%)	28.3%	28.3%	28.3%	28.3%	71.7%	71.7%	71.7%	71.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.38		0.62		0.57		0.80
Control Delay		13.8		21.5		9.9		17.4
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		13.8		21.5		9.9		17.4
Queue Length 50th (ft)		15		38		72		121
Queue Length 95th (ft)		40		69		136		207
Internal Link Dist (ft)		124		614		513		2144
Turn Bay Length (ft)								
Base Capacity (vph)		450		468		1288		1237
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.32		0.53		0.37		0.51

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 46.3
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	16	62	69	18	113	42	346	39	51	451	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			0.93			0.99			0.99	
Flt Protected		0.99			0.98			0.99			0.99	
Satd. Flow (prot)		1864			1926			1740			1667	
Flt Permitted		0.83			0.83			0.90			0.90	
Satd. Flow (perm)		1578			1634			1573			1510	
Peak-hour factor, PHF	0.78	0.67	0.81	0.78	0.64	0.86	0.88	0.91	0.81	0.71	0.85	0.61
Adj. Flow (vph)	44	24	77	88	28	131	48	380	48	72	531	34
RTOR Reduction (vph)	0	61	0	0	66	0	0	8	0	0	4	0
Lane Group Flow (vph)	0	84	0	0	181	0	0	468	0	0	633	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.5			9.5			24.3			24.3	
Effective Green, g (s)		9.5			9.5			24.3			24.3	
Actuated g/C Ratio		0.21			0.21			0.53			0.53	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		327			339			835			801	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.11			0.30			c0.42	
v/c Ratio		0.26			0.53			0.56			0.79	
Uniform Delay, d1		15.2			16.2			7.2			8.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.4			1.6			0.8			5.2	
Delay (s)		15.6			17.8			8.0			13.9	
Level of Service		B			B			A			B	
Approach Delay (s)		15.6			17.8			8.0			13.9	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	118	36	81	559	464	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963				0.966	
Flt Protected	0.965			0.993		
Satd. Flow (prot)	1751	0	0	1850	1740	0
Flt Permitted	0.965			0.993		
Satd. Flow (perm)	1751	0	0	1850	1740	0
Link Speed (mph)	25			40	40	
Link Distance (ft)	1314			931	299	
Travel Time (s)	35.8			15.9	5.1	
Peak Hour Factor	0.75	0.60	0.84	0.89	0.88	0.90
Heavy Vehicles (%)	0%	3%	2%	2%	7%	1%
Adj. Flow (vph)	157	60	96	628	527	178
Shared Lane Traffic (%)						
Lane Group Flow (vph)	217	0	0	724	705	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	22			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 86.8%	ICU Level of Service E
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	118	36	81	559	464	160
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.60	0.84	0.89	0.88	0.90
Hourly flow rate (vph)	157	60	96	628	527	178
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1437	616	705			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1437	616	705			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	88	89			
cM capacity (veh/h)	132	489	893			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	217	725	705
Volume Left	157	96	0
Volume Right	60	0	178
cSH	166	893	1700
Volume to Capacity	1.31	0.11	0.41
Queue Length 95th (ft)	320	9	0
Control Delay (s)	230.1	2.7	0.0
Lane LOS	F	A	
Approach Delay (s)	230.1	2.7	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	31.5		
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	172	75	447	241	72	429
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.958		0.954			
Flt Protected	0.967					0.991
Satd. Flow (prot)	1731	0	1789	0	0	2023
Flt Permitted	0.967					0.991
Satd. Flow (perm)	1731	0	1789	0	0	2023
Link Speed (mph)	35		40			40
Link Distance (ft)	1198		299			807
Travel Time (s)	23.3		5.1			13.8
Peak Hour Factor	0.87	0.83	0.88	0.91	0.71	0.91
Heavy Vehicles (%)	1%	0%	2%	0%	0%	6%
Adj. Flow (vph)	198	90	508	265	101	471
Shared Lane Traffic (%)						
Lane Group Flow (vph)	288	0	773	0	0	572
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.00	1.00	0.85	0.85
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 88.9%	ICU Level of Service E
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	172	75	447	241	72	429
Sign Control	Stop		Free			Free
Grade	2%		0%			1%
Peak Hour Factor	0.87	0.83	0.88	0.91	0.71	0.91
Hourly flow rate (vph)	198	90	508	265	101	471
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1315	640			773	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1315	640			773	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	81			88	
cM capacity (veh/h)	154	479			851	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	288	773	573
Volume Left	198	0	101
Volume Right	90	265	0
cSH	196	1700	851
Volume to Capacity	1.47	0.45	0.12
Queue Length 95th (ft)	442	0	10
Control Delay (s)	282.7	0.0	3.1
Lane LOS	F		A
Approach Delay (s)	282.7	0.0	3.1
Approach LOS	F		

Intersection Summary			
Average Delay	50.9		
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

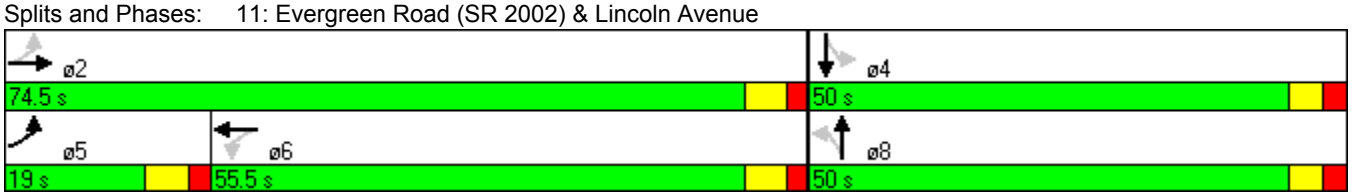
11: Evergreen Road (SR 2002) & Lincoln Avenue

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	172	499	11	420	11	16	38	47
Lane Group Flow (vph)	207	590	16	541	0	70	0	535
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	19.0	74.5	55.5	55.5	50.0	50.0	50.0	50.0
Total Split (%)	15.3%	59.8%	44.6%	44.6%	40.2%	40.2%	40.2%	40.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.59	0.62	0.06	0.88		0.15		0.87
Control Delay	20.3	19.4	23.4	46.4		23.7		38.2
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	20.3	19.4	23.4	46.4		23.7		38.2
Queue Length 50th (ft)	62	234	7	309		27		228
Queue Length 95th (ft)	115	431	18	495		27		287
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	364	1255	435	935		690		852
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.57	0.47	0.04	0.58		0.10		0.63

Intersection Summary

Cycle Length: 124.5
Actuated Cycle Length: 97.6
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



11: Evergreen Road (SR 2002) & Lincoln Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	172	499	24	11	420	46	11	16	7	38	47	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.98			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1702	1719		1727	1722			1735			1639	
Flt Permitted	0.17	1.00		0.44	1.00			0.80			0.96	
Satd. Flow (perm)	296	1719		803	1722			1408			1583	
Peak-hour factor, PHF	0.83	0.92	0.50	0.70	0.87	0.79	0.56	0.42	0.56	0.71	0.73	0.66
Adj. Flow (vph)	207	542	48	16	483	58	20	38	12	54	64	417
RTOR Reduction (vph)	0	3	0	0	4	0	0	6	0	0	108	0
Lane Group Flow (vph)	207	587	0	16	537	0	0	64	0	0	427	0
Heavy Vehicles (%)	2%	5%	5%	0%	4%	3%	0%	14%	0%	0%	5%	2%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	54.0	54.0		35.2	35.2			31.3			31.3	
Effective Green, g (s)	54.0	54.0		35.2	35.2			31.3			31.3	
Actuated g/C Ratio	0.56	0.56		0.36	0.36			0.32			0.32	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	351	959		292	626			455			512	
v/s Ratio Prot	0.08	c0.34			c0.31							
v/s Ratio Perm	0.25			0.02				0.05			c0.27	
v/c Ratio	0.59	0.61		0.05	0.86			0.14			0.83	
Uniform Delay, d1	15.6	14.4		20.0	28.5			23.2			30.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.5	2.0		0.2	12.8			0.1			11.2	
Delay (s)	18.1	16.4		20.2	41.2			23.4			41.6	
Level of Service	B	B		C	D			C			D	
Approach Delay (s)		16.8			40.6			23.4			41.6	
Approach LOS		B			D			C			D	

Intersection Summary			
HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	96.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

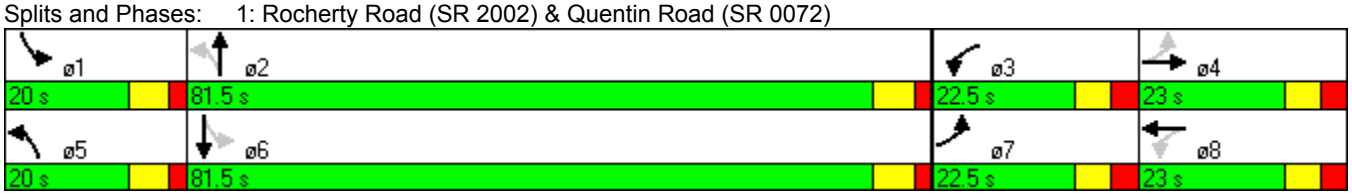
1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	87	120	184	132	20	543	222	510
Lane Group Flow (vph)	105	152	209	327	27	680	239	732
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.5	21.5	13.5	21.5
Total Split (s)	22.5	23.0	22.5	23.0	20.0	81.5	20.0	81.5
Total Split (%)	15.3%	15.6%	15.3%	15.6%	13.6%	55.4%	13.6%	55.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.47	0.71	0.64	1.16	0.12	0.92	0.85	0.81
Control Delay	41.5	69.9	45.9	146.6	12.2	51.2	49.6	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	69.9	45.9	146.6	12.2	51.2	49.6	34.0
Queue Length 50th (ft)	59	111	127	~272	9	495	106	508
Queue Length 95th (ft)	119	#255	#262	#525	17	662	#271	683
Internal Link Dist (ft)		569		654		721		1806
Turn Bay Length (ft)	190		300		105		225	
Base Capacity (vph)	278	229	339	281	314	1153	291	1138
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.66	0.62	1.16	0.09	0.59	0.82	0.64

Intersection Summary

Cycle Length: 147
Actuated Cycle Length: 119.7
Natural Cycle: 100
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	120	18	184	132	118	20	543	85	222	510	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	11	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.92		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	1651		1669	1694		1613	1799		1736	1772	
Flt Permitted	0.26	1.00		0.45	1.00		0.19	1.00		0.11	1.00	
Satd. Flow (perm)	460	1651		786	1694		315	1799		202	1772	
Peak-hour factor, PHF	0.83	0.93	0.77	0.88	0.82	0.71	0.73	0.93	0.89	0.93	0.89	0.71
Adj. Flow (vph)	105	129	23	209	161	166	27	584	96	239	573	159
RTOR Reduction (vph)	0	4	0	0	24	0	0	5	0	0	7	0
Lane Group Flow (vph)	105	148	0	209	303	0	27	675	0	239	725	0
Heavy Vehicles (%)	4%	9%	0%	3%	6%	5%	6%	1%	4%	2%	2%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.2	15.2		33.2	18.2		56.4	52.0		71.5	60.6	
Effective Green, g (s)	27.2	15.2		33.2	18.2		56.4	52.0		71.5	60.6	
Actuated g/C Ratio	0.22	0.12		0.27	0.15		0.46	0.43		0.59	0.50	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	220	205		322	252		192	766		281	879	
v/s Ratio Prot	0.05	0.09		c0.08	c0.18		0.01	0.38		c0.09	c0.41	
v/s Ratio Perm	0.06			0.10			0.06			c0.41		
v/c Ratio	0.48	0.72		0.65	1.20		0.14	0.88		0.85	0.82	
Uniform Delay, d1	40.0	51.5		37.2	52.0		21.2	32.3		27.5	26.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	12.5		5.0	122.9		0.5	12.9		21.8	7.4	
Delay (s)	42.2	63.9		42.2	174.9		21.6	45.2		49.2	33.7	
Level of Service	D	E		D	F		C	D		D	C	
Approach Delay (s)		55.1			123.1			44.3			37.5	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM Average Control Delay	59.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	122.2	Sum of lost time (s)	27.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	13	9	101	10	94	104	637	93	91	720
Lane Group Flow (vph)	0	124	0	139	109	132	700	104	108	790
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	22.0	14.0	22.0
Total Split (s)	28.0	28.0	28.0	28.0	14.0	66.0	66.0	66.0	14.0	80.0
Total Split (%)	25.9%	25.9%	25.9%	25.9%	13.0%	61.1%	61.1%	61.1%	13.0%	74.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	Min	None	Min
v/c Ratio		0.36		0.53	0.17	0.44	0.83	0.12	0.39	0.66
Control Delay		15.8		38.9	5.2	20.5	29.0	3.2	10.3	12.7
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		15.8		38.9	5.2	20.5	29.0	3.2	10.3	12.8
Queue Length 50th (ft)		16		59	0	42	282	0	18	212
Queue Length 95th (ft)		25		93	32	81	472	24	40	388
Internal Link Dist (ft)		216		230			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		468		390	660	533	1486	1398	278	1732
Starvation Cap Reductn		0		0	0	0	0	0	0	101
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.26		0.36	0.17	0.25	0.47	0.07	0.39	0.48

Intersection Summary

Cycle Length: 108
Actuated Cycle Length: 78.1
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	9	66	101	10	94	104	637	93	91	720	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.91			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1595			1838	1584	1832	1909	1766	1638	1910	
Flt Permitted		0.91			0.73	1.00	0.35	1.00	1.00	0.14	1.00	
Satd. Flow (perm)		1460			1399	1584	684	1909	1766	235	1910	
Peak-hour factor, PHF	0.54	0.56	0.79	0.82	0.63	0.86	0.79	0.91	0.89	0.84	0.93	0.81
Adj. Flow (vph)	24	16	84	123	16	109	132	700	104	108	774	16
RTOR Reduction (vph)	0	68	0	0	0	78	0	0	58	0	1	0
Lane Group Flow (vph)	0	56	0	0	139	31	132	700	46	108	789	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%	1%	2%	0%	6%	2%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		14.7			14.7	22.0	34.6	34.6	34.6	48.9	48.9	
Effective Green, g (s)		14.7			14.7	22.0	34.6	34.6	34.6	48.9	48.9	
Actuated g/C Ratio		0.19			0.19	0.28	0.45	0.45	0.45	0.63	0.63	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		277			265	592	305	851	787	280	1204	
v/s Ratio Prot						0.00		c0.37		0.04	c0.41	
v/s Ratio Perm		0.04			c0.10	0.01	0.19		0.03	0.21		
v/c Ratio		0.20			0.52	0.05	0.43	0.82	0.06	0.39	0.66	
Uniform Delay, d1		26.5			28.3	20.2	14.8	18.8	12.2	11.4	9.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.5			2.4	0.1	2.8	7.6	0.1	2.5	2.1	
Delay (s)		27.0			30.7	20.3	17.5	26.4	12.3	13.9	11.1	
Level of Service		C			C	C	B	C	B	B	B	
Approach Delay (s)		27.0			26.2			23.6			11.5	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	21.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	277	37	81	40	56	629	72	192	596	154
Lane Group Flow (vph)	315	163	133	264	68	715	104	204	648	164
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	23.0	24.3	23.0	24.3	19.0	57.0	57.0	19.0	57.0	57.0
Total Split (%)	18.7%	19.7%	18.7%	19.7%	15.4%	46.2%	46.2%	15.4%	46.2%	46.2%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.93	0.48	0.37	0.79	0.22	0.93	0.15	0.76	0.70	0.20
Control Delay	67.6	33.2	31.8	40.0	13.4	52.4	9.0	43.2	29.8	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0
Total Delay	67.6	33.2	31.8	40.0	13.4	54.3	9.0	43.2	29.8	6.0
Queue Length 50th (ft)	202	72	75	93	21	501	14	92	377	14
Queue Length 95th (ft)	#376	81	81	138	40	#748	30	#207	569	56
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	340	348	474	418	412	870	779	299	954	859
Starvation Cap Reductn	0	0	0	0	0	62	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.47	0.28	0.63	0.17	0.88	0.13	0.68	0.68	0.19

Intersection Summary

Cycle Length: 123.3
Actuated Cycle Length: 111.8
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

ø1	ø2	ø3	ø4
19 s	57 s	23 s	24.3 s
ø5	ø6	ø7	ø8
19 s	57 s	23 s	24.3 s

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	37	89	81	40	178	56	629	72	192	596	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1650		1902	1804		1796	1890	1607	1814	1954	1623
Flt Permitted	0.22	1.00		0.65	1.00		0.23	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	389	1650		1309	1804		435	1890	1607	148	1954	1623
Peak-hour factor, PHF	0.88	0.62	0.86	0.61	0.77	0.84	0.82	0.88	0.69	0.94	0.92	0.94
Adj. Flow (vph)	315	60	103	133	52	212	68	715	104	204	648	164
RTOR Reduction (vph)	0	49	0	0	124	0	0	0	43	0	0	69
Lane Group Flow (vph)	315	114	0	133	140	0	68	715	61	204	648	95
Heavy Vehicles (%)	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	36.5	19.9		24.7	13.2		52.8	46.7	46.7	63.9	52.9	52.9
Effective Green, g (s)	36.5	19.9		24.7	13.2		52.8	46.7	46.7	63.9	52.9	52.9
Actuated g/C Ratio	0.32	0.18		0.22	0.12		0.47	0.41	0.41	0.57	0.47	0.47
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	336	291		347	211		277	783	666	266	917	762
v/s Ratio Prot	c0.15	0.07		0.04	0.08		0.01	c0.38		c0.08	0.33	
v/s Ratio Perm	c0.15			0.04			0.10		0.04	0.35		0.06
v/c Ratio	0.94	0.39		0.38	0.67		0.25	0.91	0.09	0.77	0.71	0.12
Uniform Delay, d1	32.8	41.1		36.9	47.6		18.7	31.1	20.1	29.1	23.7	16.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.9	0.9		0.7	7.7		0.5	16.2	0.2	12.4	3.7	0.2
Delay (s)	65.6	41.9		37.6	55.3		19.2	47.3	20.3	41.6	27.4	17.1
Level of Service	E	D		D	E		B	D	C	D	C	B
Approach Delay (s)		57.6			49.4			41.9			28.6	
Approach LOS		E			D			D			C	

Intersection Summary			
HCM Average Control Delay	40.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	112.7	Sum of lost time (s)	16.4
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	31	61	994	73	49	1092
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Grade (%)	-2%		3%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.913		0.991			
Flt Protected	0.983					0.997
Satd. Flow (prot)	1952	0	1793	0	0	1840
Flt Permitted	0.983					0.997
Satd. Flow (perm)	1952	0	1793	0	0	1840
Link Speed (mph)	30		45			45
Link Distance (ft)	408		1653			553
Travel Time (s)	9.3		25.0			8.4
Peak Hour Factor	0.78	0.83	0.88	0.88	0.69	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Adj. Flow (vph)	40	73	1130	83	71	1162
Shared Lane Traffic (%)						
Lane Group Flow (vph)	113	0	1213	0	0	1233
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.84	0.84	1.07	1.07	1.02	1.02
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 109.4%	ICU Level of Service H
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	31	61	994	73	49	1092
Sign Control	Stop		Free			Free
Grade	-2%		3%			-3%
Peak Hour Factor	0.78	0.83	0.88	0.88	0.69	0.94
Hourly flow rate (vph)	40	73	1130	83	71	1162
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2475	1171			1212	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2475	1171			1212	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	69			88	
cM capacity (veh/h)	29	237			579	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	113	1212	1233
Volume Left	40	0	71
Volume Right	73	83	0
cSH	68	1700	579
Volume to Capacity	1.66	0.71	0.12
Queue Length 95th (ft)	248	0	10
Control Delay (s)	455.4	0.0	5.1
Lane LOS	F		A
Approach Delay (s)	455.4	0.0	5.1
Approach LOS	F		

Intersection Summary			
Average Delay	22.6		
Intersection Capacity Utilization	109.4%	ICU Level of Service	H
Analysis Period (min)	15		

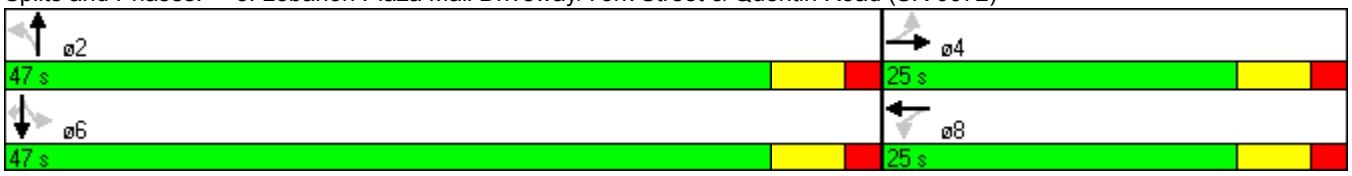
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	50	64	135	111	96	708	40	848	61
Lane Group Flow (vph)	60	204	167	203	112	906	56	912	115
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	34.7%	34.7%	34.7%	34.7%	65.3%	65.3%	65.3%	65.3%	65.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.25	0.46	0.72	0.49	0.65	0.80	0.33	0.78	0.11
Control Delay	24.3	14.1	42.3	24.7	33.0	18.4	14.6	17.5	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	14.1	42.3	24.7	33.0	18.4	14.6	17.5	1.9
Queue Length 50th (ft)	21	31	65	66	27	254	10	254	0
Queue Length 95th (ft)	46	74	111	91	#113	#445	28	#554	2
Internal Link Dist (ft)		350		1246		556		2069	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	307	541	300	532	175	1146	172	1177	1014
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.38	0.56	0.38	0.64	0.79	0.33	0.77	0.11

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 67.6
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	64	109	135	111	33	96	708	60	40	848	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1629		1685	1835		1778	1876		1702	1934	1591
Flt Permitted	0.60	1.00		0.60	1.00		0.15	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1087	1629		1061	1835		289	1876		283	1934	1591
Peak-hour factor, PHF	0.83	0.84	0.85	0.81	0.71	0.70	0.86	0.86	0.72	0.71	0.93	0.53
Adj. Flow (vph)	60	76	128	167	156	47	112	823	83	56	912	115
RTOR Reduction (vph)	0	89	0	0	16	0	0	5	0	0	0	46
Lane Group Flow (vph)	60	115	0	167	187	0	112	901	0	56	912	69
Heavy Vehicles (%)	0%	0%	1%	1%	0%	4%	1%	3%	0%	3%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	14.8	14.8		14.8	14.8		40.7	40.7		40.7	40.7	40.7
Effective Green, g (s)	14.8	14.8		14.8	14.8		40.7	40.7		40.7	40.7	40.7
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.60	0.60		0.60	0.60	0.60
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	238	357		233	402		174	1131		171	1166	959
v/s Ratio Prot		0.07			0.10			c0.48			0.47	
v/s Ratio Perm	0.06			c0.16			0.39			0.20		0.04
v/c Ratio	0.25	0.32		0.72	0.47		0.64	0.80		0.33	0.78	0.07
Uniform Delay, d1	21.8	22.1		24.4	22.9		8.7	10.2		6.6	10.1	5.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.7		10.7	1.2		7.9	4.0		1.1	3.5	0.0
Delay (s)	22.5	22.9		35.1	24.1		16.6	14.2		7.8	13.6	5.6
Level of Service	C	C		D	C		B	B		A	B	A
Approach Delay (s)		22.8			29.1			14.5			12.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	67.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.2%	ICU Level of Service	H
Analysis Period (min)	15		

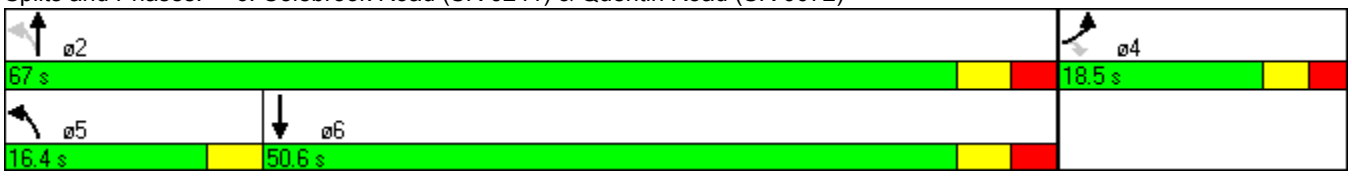
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	101	316	242	690	790
Lane Group Flow (vph)	119	322	269	726	920
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	18.5	18.5	16.4	67.0	50.6
Total Split (%)	21.6%	21.6%	19.2%	78.4%	59.2%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.52	0.66	0.67	0.55	0.93
Control Delay	41.1	11.6	23.4	7.5	35.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	11.6	23.4	7.5	35.1
Queue Length 50th (ft)	57	0	63	140	386
Queue Length 95th (ft)	105	75	#173	232	#668
Internal Link Dist (ft)	583			118	332
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	298	533	420	1541	1248
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.40	0.60	0.64	0.47	0.74

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 74.8
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	101	316	242	690	790	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1500	1771	1909	2043	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1660	1500	188	1909	2043	
Peak-hour factor, PHF	0.85	0.98	0.90	0.95	0.96	0.61
Adj. Flow (vph)	119	322	269	726	823	97
RTOR Reduction (vph)	0	277	0	0	5	0
Lane Group Flow (vph)	119	45	269	726	915	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	4%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.4	10.4	52.1	52.1	36.2	
Effective Green, g (s)	10.4	10.4	52.1	52.1	36.2	
Actuated g/C Ratio	0.14	0.14	0.70	0.70	0.49	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	232	209	395	1335	993	
v/s Ratio Prot	c0.07		c0.11	0.38	c0.45	
v/s Ratio Perm		0.03	0.36			
v/c Ratio	0.51	0.22	0.68	0.54	0.92	
Uniform Delay, d1	29.7	28.4	18.2	5.4	17.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.9	0.5	4.8	1.0	14.4	
Delay (s)	31.6	28.9	23.0	6.5	32.2	
Level of Service	C	C	C	A	C	
Approach Delay (s)	29.7			10.9	32.2	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	22.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	15.5
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

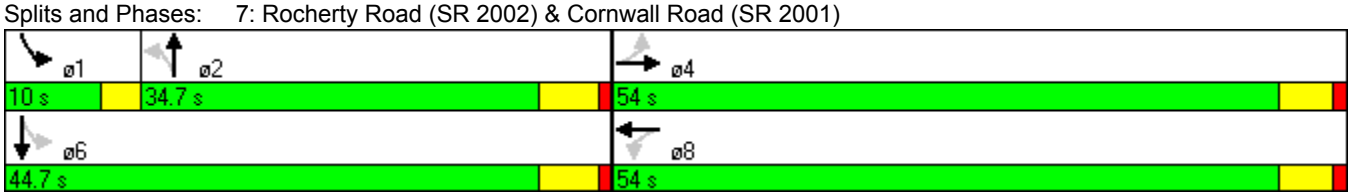
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	53	286	66	314	61	113	66	143
Lane Group Flow (vph)	0	490	0	532	0	305	0	336
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.2	9.2	9.2	9.2	20.5	20.5	6.0	20.5
Total Split (s)	54.0	54.0	54.0	54.0	34.7	34.7	10.0	44.7
Total Split (%)	54.7%	54.7%	54.7%	54.7%	35.2%	35.2%	10.1%	45.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.4	4.4	3.0	4.4
All-Red Time (s)	1.2	1.2	1.2	1.2	1.1	1.1	0.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	5.5	5.5	3.0	5.5
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Max	Min
v/c Ratio		0.80		0.83		0.75		0.55
Control Delay		29.1		31.2		38.1		21.5
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		29.1		31.2		38.1		21.5
Queue Length 50th (ft)		182		202		123		104
Queue Length 95th (ft)		321		367		222		218
Internal Link Dist (ft)		1052		2233		731		2352
Turn Bay Length (ft)								
Base Capacity (vph)		953		992		569		769
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.51		0.54		0.54		0.44

Intersection Summary

Cycle Length: 98.7
Actuated Cycle Length: 76.6
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	286	71	66	314	63	61	113	54	66	143	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	10	10	10
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)		5.2			5.2			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.97			0.96	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1682			1755			1734			1648	
Flt Permitted		0.83			0.83			0.79			0.83	
Satd. Flow (perm)		1412			1472			1391			1376	
Peak-hour factor, PHF	0.66	0.86	0.92	0.73	0.88	0.74	0.69	0.80	0.71	0.81	0.87	0.85
Adj. Flow (vph)	80	333	77	90	357	85	88	141	76	81	164	91
RTOR Reduction (vph)	0	7	0	0	8	0	0	12	0	0	13	0
Lane Group Flow (vph)	0	483	0	0	524	0	0	293	0	0	323	0
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	2%	2%	3%	0%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		33.0			33.0			21.9			32.3	
Effective Green, g (s)		33.0			33.0			21.9			32.3	
Actuated g/C Ratio		0.43			0.43			0.29			0.42	
Clearance Time (s)		5.2			5.2			5.5			5.5	
Vehicle Extension (s)		4.0			4.0			7.0			7.0	
Lane Grp Cap (vph)		613			639			401			611	
v/s Ratio Prot											c0.05	
v/s Ratio Perm		0.34			c0.36			c0.21			0.17	
v/c Ratio		0.79			0.82			0.73			0.53	
Uniform Delay, d1		18.5			18.9			24.4			16.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		7.0			8.7			10.1			2.6	
Delay (s)		25.5			27.6			34.5			18.8	
Level of Service		C			C			C			B	
Approach Delay (s)		25.5			27.6			34.5			18.8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

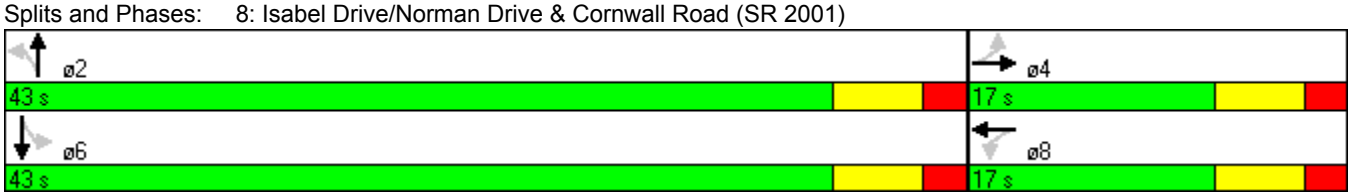
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	32	2	3	5	40	287	4	322
Lane Group Flow (vph)	0	130	0	44	0	382	0	482
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	17.0	17.0	17.0	17.0	43.0	43.0	43.0	43.0
Total Split (%)	28.3%	28.3%	28.3%	28.3%	71.7%	71.7%	71.7%	71.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.33		0.12		0.41		0.48
Control Delay		9.6		9.6		8.2		8.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		9.6		9.6		8.2		8.8
Queue Length 50th (ft)		8		3		45		59
Queue Length 95th (ft)		15		7		102		95
Internal Link Dist (ft)		124		614		513		2145
Turn Bay Length (ft)								
Base Capacity (vph)		536		527		1547		1640
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.24		0.08		0.25		0.29

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 37.8
Natural Cycle: 40
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	2	54	3	5	15	40	287	3	4	322	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.93			1.00			0.99	
Flt Protected		0.98			0.99			0.99			1.00	
Satd. Flow (prot)		1877			1901			1775			1725	
Flt Permitted		0.86			0.90			0.90			0.99	
Satd. Flow (perm)		1640			1735			1609			1705	
Peak-hour factor, PHF	0.65	0.50	0.70	0.38	0.42	0.63	0.83	0.88	0.38	0.33	0.72	0.70
Adj. Flow (vph)	49	4	77	8	12	24	48	326	8	12	447	23
RTOR Reduction (vph)	0	65	0	0	20	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	65	0	0	24	0	0	381	0	0	478	0
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	0%	0%	0%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.2			6.2			20.7			20.7	
Effective Green, g (s)		6.2			6.2			20.7			20.7	
Actuated g/C Ratio		0.16			0.16			0.53			0.53	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		261			277			856			907	
v/s Ratio Prot												
v/s Ratio Perm		c0.04			0.01			0.24			c0.28	
v/c Ratio		0.25			0.09			0.44			0.53	
Uniform Delay, d1		14.3			13.9			5.6			5.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			0.1			0.4			0.6	
Delay (s)		14.8			14.1			5.9			6.5	
Level of Service		B			B			A			A	
Approach Delay (s)		14.8			14.1			5.9			6.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	38.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	25	38	286	261	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.981				0.942	
Flt Protected	0.959			0.993		
Satd. Flow (prot)	1772	0	0	1855	1743	0
Flt Permitted	0.959			0.993		
Satd. Flow (perm)	1772	0	0	1855	1743	0
Link Speed (mph)	25			40	40	
Link Distance (ft)	1326			936	303	
Travel Time (s)	36.2			16.0	5.2	
Peak Hour Factor	0.82	0.88	0.78	0.94	0.88	0.87
Heavy Vehicles (%)	1%	0%	0%	2%	4%	1%
Adj. Flow (vph)	171	28	49	304	297	226
Shared Lane Traffic (%)						
Lane Group Flow (vph)	199	0	0	353	523	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	22			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	140	25	38	286	261	197
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.88	0.78	0.94	0.88	0.87
Hourly flow rate (vph)	171	28	49	304	297	226
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	812	410	523			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	812	410	523			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	49	96	95			
cM capacity (veh/h)	334	646	1054			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	199	353	523
Volume Left	171	49	0
Volume Right	28	0	226
cSH	359	1054	1700
Volume to Capacity	0.56	0.05	0.31
Queue Length 95th (ft)	81	4	0
Control Delay (s)	26.9	1.6	0.0
Lane LOS	D	A	
Approach Delay (s)	26.9	1.6	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	155	42	214	189	52	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.965		0.934			
Flt Protected	0.964					0.991
Satd. Flow (prot)	1686	0	1739	0	0	2041
Flt Permitted	0.964					0.991
Satd. Flow (perm)	1686	0	1739	0	0	2041
Link Speed (mph)	35		40			40
Link Distance (ft)	884		303			673
Travel Time (s)	17.2		5.2			11.5
Peak Hour Factor	0.92	0.73	0.87	0.81	0.72	0.90
Heavy Vehicles (%)	2%	9%	3%	1%	0%	5%
Adj. Flow (vph)	168	58	246	233	72	306
Shared Lane Traffic (%)						
Lane Group Flow (vph)	226	0	479	0	0	378
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.00	1.00	0.85	0.85
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	155	42	214	189	52	275
Sign Control	Stop		Free			Free
Grade	2%		0%			1%
Peak Hour Factor	0.92	0.73	0.87	0.81	0.72	0.90
Hourly flow rate (vph)	168	58	246	233	72	306
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	813	363			479	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	813	363			479	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	48	91			93	
cM capacity (veh/h)	325	667			1094	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	226	479	378
Volume Left	168	0	72
Volume Right	58	233	0
cSH	374	1700	1094
Volume to Capacity	0.60	0.28	0.07
Queue Length 95th (ft)	95	0	5
Control Delay (s)	28.3	0.0	2.2
Lane LOS	D		A
Approach Delay (s)	28.3	0.0	2.2
Approach LOS	D		

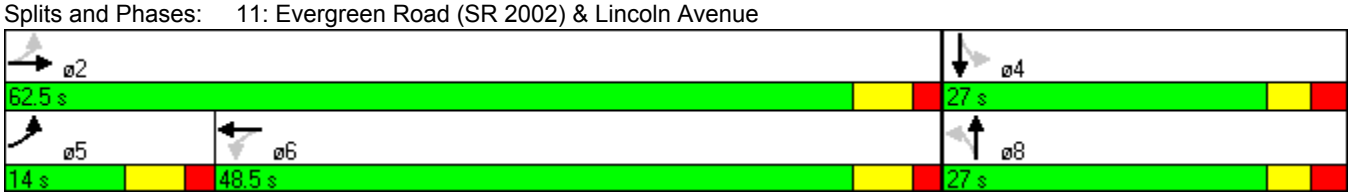
Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	75	307	5	334	14	14	31	34
Lane Group Flow (vph)	103	393	10	426	0	49	0	199
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	14.0	62.5	48.5	48.5	27.0	27.0	27.0	27.0
Total Split (%)	15.6%	69.8%	54.2%	54.2%	30.2%	30.2%	30.2%	30.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.21	0.40	0.03	0.64		0.15		0.55
Control Delay	6.5	7.8	12.8	20.4		20.0		21.7
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.5	7.8	12.8	20.4		20.0		21.7
Queue Length 50th (ft)	12	56	2	114		12		40
Queue Length 95th (ft)	28	114	6	230		23		77
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	499	1600	768	1366		697		698
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.21	0.25	0.01	0.31		0.07		0.29

Intersection Summary

Cycle Length: 89.5
Actuated Cycle Length: 54
Natural Cycle: 50
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



11: Evergreen Road (SR 2002) & Lincoln Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	307	15	5	334	33	14	14	1	31	34	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1702	1695		1727	1712			1880			1717	
Flt Permitted	0.31	1.00		0.53	1.00			0.86			0.91	
Satd. Flow (perm)	556	1695		963	1712			1652			1576	
Peak-hour factor, PHF	0.73	0.82	0.81	0.50	0.91	0.56	0.75	0.53	0.25	0.69	0.71	0.90
Adj. Flow (vph)	103	374	19	10	367	59	19	26	4	45	48	106
RTOR Reduction (vph)	0	2	0	0	7	0	0	3	0	0	48	0
Lane Group Flow (vph)	103	391	0	10	419	0	0	46	0	0	151	0
Heavy Vehicles (%)	2%	7%	8%	0%	4%	4%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	32.6	32.6		20.7	20.7			10.7			10.7	
Effective Green, g (s)	32.6	32.6		20.7	20.7			10.7			10.7	
Actuated g/C Ratio	0.59	0.59		0.38	0.38			0.20			0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	454	1008		364	647			323			308	
v/s Ratio Prot	0.02	c0.23			c0.24							
v/s Ratio Perm	0.11			0.01				0.03			c0.10	
v/c Ratio	0.23	0.39		0.03	0.65			0.14			0.49	
Uniform Delay, d1	5.9	5.8		10.7	14.0			18.2			19.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	0.7		0.1	3.6			0.2			1.2	
Delay (s)	6.2	6.5		10.8	17.7			18.5			20.8	
Level of Service	A	A		B	B			B			C	
Approach Delay (s)		6.5			17.5			18.5			20.8	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

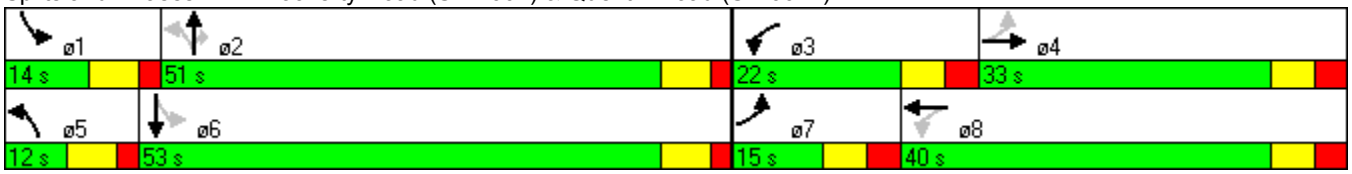
2025 PROJECTED CONDITIONS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	107	308	229	203	18	465	247	127	336
Lane Group Flow (vph)	147	380	252	364	24	541	278	140	413
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	15.0	33.0	22.0	40.0	12.0	51.0	51.0	14.0	53.0
Total Split (%)	12.5%	27.5%	18.3%	33.3%	10.0%	42.5%	42.5%	11.7%	44.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.57	1.00	0.99	0.73	0.08	0.86	0.37	0.62	0.58
Control Delay	36.0	93.5	85.8	46.7	17.1	50.1	4.9	28.2	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	93.5	85.8	46.7	17.1	50.1	4.9	28.2	26.1
Queue Length 50th (ft)	74	296	149	242	9	383	4	66	247
Queue Length 95th (ft)	97	#448	#323	323	21	#535	58	#102	362
Internal Link Dist (ft)		569		654		721			1806
Turn Bay Length (ft)	190		300		105		250	225	
Base Capacity (vph)	256	380	255	501	286	629	754	225	711
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	1.00	0.99	0.73	0.08	0.86	0.37	0.62	0.58

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 65 (54%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	308	9	229	203	89	18	465	247	127	336	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	12	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1677	1750		1577	1766		1425	1695	1576	1640	1657	
Flt Permitted	0.38	1.00		0.13	1.00		0.40	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	663	1750		212	1766		596	1695	1576	304	1657	
Peak-hour factor, PHF	0.73	0.84	0.70	0.91	0.84	0.73	0.76	0.86	0.89	0.91	0.90	0.78
Adj. Flow (vph)	147	367	13	252	242	122	24	541	278	140	373	40
RTOR Reduction (vph)	0	1	0	0	15	0	0	0	170	0	3	0
Lane Group Flow (vph)	147	379	0	252	349	0	24	541	108	140	410	0
Heavy Vehicles (%)	3%	3%	13%	9%	3%	6%	20%	10%	4%	8%	12%	0%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	34.0	26.0		48.0	33.0		47.8	44.5	44.5	56.2	48.7	
Effective Green, g (s)	34.0	26.0		48.0	33.0		47.8	44.5	44.5	56.2	48.7	
Actuated g/C Ratio	0.28	0.22		0.40	0.28		0.40	0.37	0.37	0.47	0.41	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	255	379		255	486		260	629	584	226	672	
v/s Ratio Prot	0.04	0.22		c0.12	c0.20		0.00	c0.32		c0.04	c0.25	
v/s Ratio Perm	0.12			c0.27			0.03		0.07	0.25		
v/c Ratio	0.58	1.00		0.99	0.72		0.09	0.86	0.19	0.62	0.61	
Uniform Delay, d1	34.3	47.0		33.1	39.3		22.6	34.9	25.5	23.1	28.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.86	0.82	
Incremental Delay, d2	3.8	46.4		52.7	5.4		0.2	14.3	0.7	5.5	3.9	
Delay (s)	38.1	93.4		85.8	44.7		22.8	49.2	26.2	25.4	27.0	
Level of Service	D	F		F	D		C	D	C	C	C	
Approach Delay (s)		77.9			61.5			40.9			26.6	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	50.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.5
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

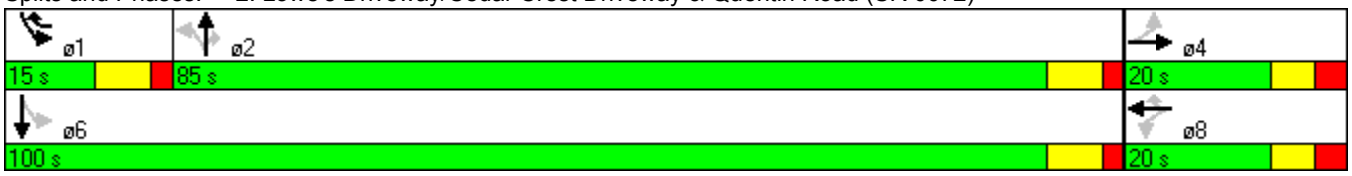
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	6	1	27	2	32	33	584	46	37	436
Lane Group Flow (vph)	0	56	0	38	36	40	649	53	42	502
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	20.0	20.0	20.0	20.0	15.0	85.0	85.0	85.0	15.0	100.0
Total Split (%)	16.7%	16.7%	16.7%	16.7%	12.5%	70.8%	70.8%	70.8%	12.5%	83.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.34		0.36	0.14	0.07	0.50	0.04	0.10	0.35
Control Delay		25.3		60.2	12.7	6.0	6.7	1.3	2.9	3.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		25.3		60.2	12.7	6.0	6.7	1.3	2.9	3.2
Queue Length 50th (ft)		9		28	0	6	95	1	5	67
Queue Length 95th (ft)		0		34	28	m9	m140	m2	11	84
Internal Link Dist (ft)		216		277			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		196		134	260	594	1296	1269	422	1425
Starvation Cap Reductn		0		0	0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	5	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.29		0.28	0.14	0.07	0.50	0.04	0.10	0.35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1	27	27	2	32	33	584	46	37	436	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1521			1439	1226	1609	1770	1714	1305	1712	
Flt Permitted		0.94			0.82	1.00	0.48	1.00	1.00	0.32	1.00	
Satd. Flow (perm)		1443			1235	1226	812	1770	1714	445	1712	
Peak-hour factor, PHF	0.75	0.25	0.61	0.80	0.50	0.90	0.83	0.90	0.86	0.88	0.89	0.42
Adj. Flow (vph)	8	4	44	34	4	36	40	649	53	42	490	12
RTOR Reduction (vph)	0	41	0	0	0	31	0	0	16	0	1	0
Lane Group Flow (vph)	0	15	0	0	38	5	40	649	37	42	501	0
Heavy Vehicles (%)	17%	0%	4%	25%	50%	33%	15%	10%	3%	33%	14%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		9.0			9.0	15.4	83.6	83.6	83.6	97.0	97.0	
Effective Green, g (s)		9.0			9.0	15.4	83.6	83.6	83.6	97.0	97.0	
Actuated g/C Ratio		0.08			0.08	0.13	0.70	0.70	0.70	0.81	0.81	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		108			93	229	566	1233	1194	406	1384	
v/s Ratio Prot						0.00		c0.37		0.01	c0.29	
v/s Ratio Perm		0.01			c0.03	0.00	0.05		0.02	0.08		
v/c Ratio		0.14			0.41	0.02	0.07	0.53	0.03	0.10	0.36	
Uniform Delay, d1		51.9			53.0	45.7	5.8	8.7	5.6	4.2	3.1	
Progression Factor		1.00			1.00	1.00	0.78	0.59	0.62	0.84	0.75	
Incremental Delay, d2		0.8			4.0	0.1	0.1	1.0	0.0	0.3	0.7	
Delay (s)		52.7			56.9	45.8	4.6	6.1	3.5	3.8	3.0	
Level of Service		D			E	D	A	A	A	A	A	
Approach Delay (s)		52.7			51.5			5.9			3.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

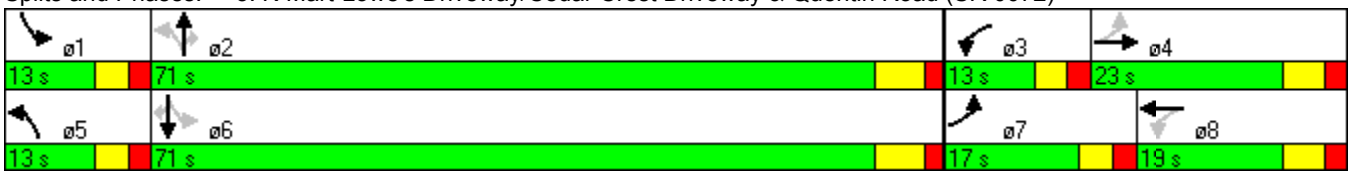
3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	78	7	19	6	35	509	32	63	455	39
Lane Group Flow (vph)	104	40	32	135	48	572	48	89	495	68
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	17.0	23.0	13.0	19.0	13.0	71.0	71.0	13.0	71.0	71.0
Total Split (%)	14.2%	19.2%	10.8%	15.8%	10.8%	59.2%	59.2%	10.8%	59.2%	59.2%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.52	0.18	0.15	0.59	0.09	0.57	0.05	0.18	0.48	0.07
Control Delay	48.8	24.7	38.4	22.3	1.5	9.3	1.0	6.5	13.0	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	48.8	24.7	38.4	22.3	1.5	9.4	1.0	6.5	13.0	2.3
Queue Length 50th (ft)	69	9	20	9	1	136	1	18	136	0
Queue Length 95th (ft)	94	19	29	0	3	519	6	29	255	2
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	208	244	232	297	533	996	977	502	1041	937
Starvation Cap Reductn	0	0	0	0	0	41	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.16	0.14	0.45	0.09	0.60	0.05	0.18	0.48	0.07

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	7	19	19	6	74	35	509	32	63	455	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1567	1429		1902	1722		1618	1673	1607	1778	1686	1476
Flt Permitted	0.31	1.00		0.73	1.00		0.41	1.00	1.00	0.33	1.00	1.00
Satd. Flow (perm)	511	1429		1464	1722		697	1673	1607	620	1686	1476
Peak-hour factor, PHF	0.75	0.58	0.68	0.59	0.50	0.60	0.73	0.89	0.67	0.71	0.92	0.57
Adj. Flow (vph)	104	12	28	32	12	123	48	572	48	89	495	68
RTOR Reduction (vph)	0	24	0	0	113	0	0	0	20	0	0	28
Lane Group Flow (vph)	104	16	0	32	22	0	48	572	28	89	495	40
Heavy Vehicles (%)	8%	14%	16%	0%	0%	4%	11%	13%	0%	2%	17%	10%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	26.1	16.4		14.6	10.0		75.1	69.5	69.5	78.3	71.1	71.1
Effective Green, g (s)	26.1	16.4		14.6	10.0		75.1	69.5	69.5	78.3	71.1	71.1
Actuated g/C Ratio	0.22	0.14		0.12	0.08		0.63	0.58	0.58	0.65	0.59	0.59
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	208	195		195	144		479	969	931	474	999	875
v/s Ratio Prot	c0.05	0.01		0.01	0.01		0.00	c0.34		c0.01	0.29	
v/s Ratio Perm	c0.06			0.01			0.06		0.02	0.11		0.03
v/c Ratio	0.50	0.08		0.16	0.15		0.10	0.59	0.03	0.19	0.50	0.05
Uniform Delay, d1	39.7	45.2		47.1	51.1		9.1	16.1	10.8	9.3	14.1	10.2
Progression Factor	1.00	1.00		1.00	1.00		0.19	0.44	0.26	0.94	0.81	0.71
Incremental Delay, d2	1.9	0.2		0.4	0.5		0.1	2.4	0.1	0.2	1.6	0.1
Delay (s)	41.5	45.4		47.5	51.6		1.8	9.4	2.9	8.9	13.0	7.3
Level of Service	D	D		D	D		A	A	A	A	B	A
Approach Delay (s)		42.6			50.8			8.4			11.8	
Approach LOS		D			D			A			B	

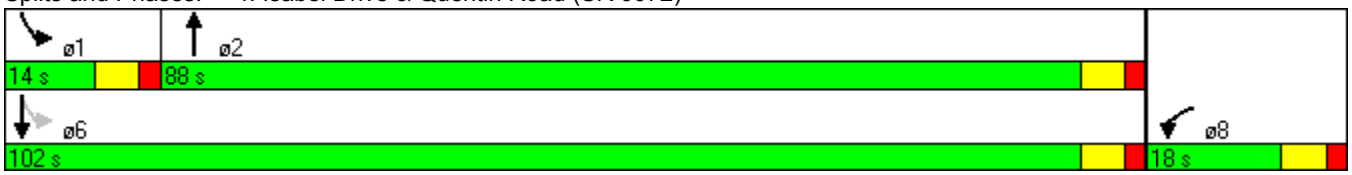
Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	25	536	94	590
Lane Group Flow (vph)	99	704	124	711
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	18.0	88.0	14.0	102.0
Total Split (%)	15.0%	73.3%	11.7%	85.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.53	0.61	0.25	0.49
Control Delay	38.9	5.8	3.4	4.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	38.9	5.8	3.4	4.6
Queue Length 50th (ft)	38	117	14	122
Queue Length 95th (ft)	52	171	24	180
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			275	
Base Capacity (vph)	233	1153	495	1446
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.42	0.61	0.25	0.49

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 61 (51%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	25	48	536	55	94	590
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.92		0.98		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1885		1611		1610	1753
Flt Permitted	0.98		1.00		0.30	1.00
Satd. Flow (perm)	1885		1611		511	1753
Peak-hour factor, PHF	0.63	0.81	0.90	0.51	0.76	0.83
Adj. Flow (vph)	40	59	596	108	124	711
RTOR Reduction (vph)	45	0	5	0	0	0
Lane Group Flow (vph)	54	0	699	0	124	711
Heavy Vehicles (%)	4%	4%	10%	10%	10%	10%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	9.0		85.6		99.0	99.0
Effective Green, g (s)	9.0		85.6		99.0	99.0
Actuated g/C Ratio	0.08		0.71		0.82	0.82
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	141		1149		489	1446
v/s Ratio Prot	c0.03		c0.43		0.02	c0.41
v/s Ratio Perm					0.19	
v/c Ratio	0.38		0.61		0.25	0.49
Uniform Delay, d1	52.8		8.7		4.5	3.1
Progression Factor	1.00		0.41		1.00	1.00
Incremental Delay, d2	1.7		2.0		0.3	1.2
Delay (s)	54.6		5.6		4.8	4.3
Level of Service	D		A		A	A
Approach Delay (s)	54.6		5.6			4.4
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

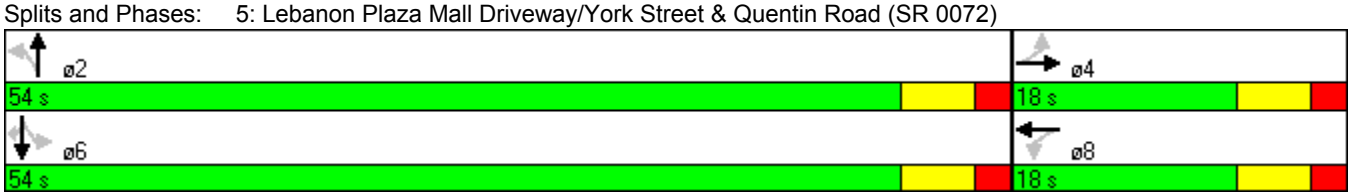
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	4	5	62	10	6	504	32	630	4
Lane Group Flow (vph)	8	20	76	40	20	646	43	692	8
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	18.0	18.0	18.0	18.0	54.0	54.0	54.0	54.0	54.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.05	0.07	0.35	0.13	0.05	0.52	0.09	0.55	0.01
Control Delay	22.5	17.9	28.0	13.1	4.8	7.7	5.2	8.2	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	17.9	28.0	13.1	4.8	7.7	5.2	8.2	2.8
Queue Length 50th (ft)	3	4	26	4	2	112	5	126	0
Queue Length 95th (ft)	7	8	55	23	3	180	14	236	2
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	204	310	252	344	446	1431	530	1449	1323
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.06	0.30	0.12	0.04	0.45	0.08	0.48	0.01

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 62.2
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	5	5	62	10	20	6	504	27	32	630	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.90		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1375	1575		1668	1667		1535	1754		1686	1778	1623
Flt Permitted	0.73	1.00		0.74	1.00		0.34	1.00		0.37	1.00	1.00
Satd. Flow (perm)	1058	1575		1307	1667		548	1754		651	1778	1623
Peak-hour factor, PHF	0.50	0.42	0.63	0.82	0.83	0.71	0.30	0.83	0.69	0.75	0.91	0.50
Adj. Flow (vph)	8	12	8	76	12	28	20	607	39	43	692	8
RTOR Reduction (vph)	0	7	0	0	24	0	0	3	0	0	0	3
Lane Group Flow (vph)	8	13	0	76	16	0	20	643	0	43	692	5
Heavy Vehicles (%)	25%	0%	20%	2%	10%	0%	17%	11%	0%	4%	11%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.4	8.4		8.4	8.4		43.1	43.1		43.1	43.1	43.1
Effective Green, g (s)	8.4	8.4		8.4	8.4		43.1	43.1		43.1	43.1	43.1
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.68	0.68		0.68	0.68	0.68
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	140	208		173	221		372	1191		442	1207	1102
v/s Ratio Prot		0.01			0.01			0.37			c0.39	
v/s Ratio Perm	0.01			c0.06			0.04			0.07		0.00
v/c Ratio	0.06	0.06		0.44	0.07		0.05	0.54		0.10	0.57	0.00
Uniform Delay, d1	24.1	24.1		25.4	24.1		3.4	5.2		3.5	5.4	3.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2		2.4	0.2		0.1	0.5		0.1	0.7	0.0
Delay (s)	24.3	24.3		27.8	24.3		3.5	5.6		3.6	6.0	3.3
Level of Service	C	C		C	C		A	A		A	A	A
Approach Delay (s)		24.3			26.6			5.6			5.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	63.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

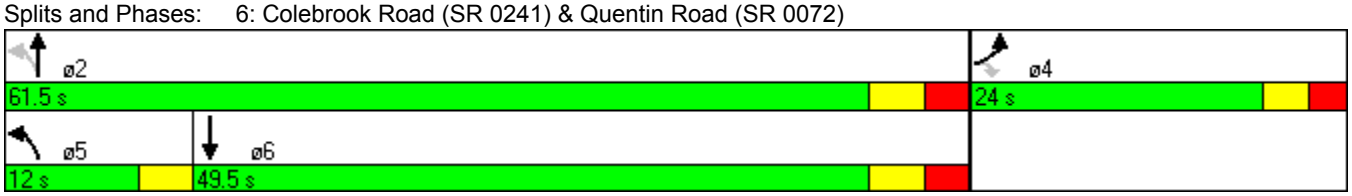
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	161	213	152	471	513
Lane Group Flow (vph)	233	254	173	548	707
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	24.0	24.0	12.0	61.5	49.5
Total Split (%)	28.1%	28.1%	14.0%	71.9%	57.9%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.69	0.51	0.53	0.51	0.88
Control Delay	38.8	8.1	12.9	9.7	31.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	8.1	12.9	9.7	31.4
Queue Length 50th (ft)	92	0	25	118	262
Queue Length 95th (ft)	139	47	66	191	381
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	453	581	332	1420	1186
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.51	0.44	0.52	0.39	0.60

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 69.3
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	161	213	152	471	513	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1627	1428	1625	1769	1826	
Flt Permitted	0.95	1.00	0.14	1.00	1.00	
Satd. Flow (perm)	1627	1428	236	1769	1826	
Peak-hour factor, PHF	0.69	0.84	0.88	0.86	0.84	0.81
Adj. Flow (vph)	233	254	173	548	611	96
RTOR Reduction (vph)	0	200	0	0	7	0
Lane Group Flow (vph)	233	54	173	548	700	0
Heavy Vehicles (%)	3%	5%	9%	9%	13%	12%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	14.5	14.5	42.3	42.3	30.2	
Effective Green, g (s)	14.5	14.5	42.3	42.3	30.2	
Actuated g/C Ratio	0.21	0.21	0.61	0.61	0.44	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	343	301	319	1088	802	
v/s Ratio Prot	c0.14		0.07	c0.31	c0.38	
v/s Ratio Perm		0.04	0.27			
v/c Ratio	0.68	0.18	0.54	0.50	0.87	
Uniform Delay, d1	25.0	22.3	10.4	7.4	17.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	0.3	1.9	1.0	11.6	
Delay (s)	30.3	22.5	12.3	8.4	29.1	
Level of Service	C	C	B	A	C	
Approach Delay (s)	26.2			9.4	29.1	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	18.5
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

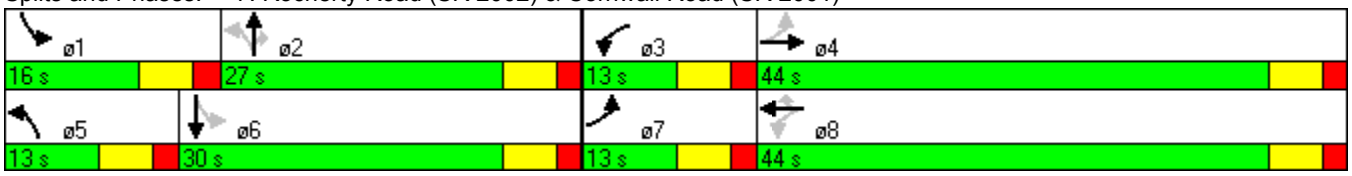
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	96	520	45	409	174	22	251	219	200	122
Lane Group Flow (vph)	133	619	59	445	235	27	330	264	230	207
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	15.0	7.0	15.0	15.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0	21.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	44.0	13.0	44.0	44.0	13.0	27.0	27.0	16.0	30.0
Total Split (%)	13.0%	44.0%	13.0%	44.0%	44.0%	13.0%	27.0%	27.0%	16.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.44	0.91	0.32	0.73	0.34	0.07	0.84	0.49	0.89	0.39
Control Delay	18.3	47.6	17.7	34.2	4.3	21.2	56.8	7.8	61.1	29.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	47.6	17.7	34.2	4.3	21.2	56.8	7.8	61.1	29.4
Queue Length 50th (ft)	43	369	18	233	0	11	203	0	107	101
Queue Length 95th (ft)	60	#594	33	346	21	26	247	47	#218	163
Internal Link Dist (ft)		1052		405			731			260
Turn Bay Length (ft)	225		225		325	150		350	240	
Base Capacity (vph)	303	714	183	705	756	373	424	559	259	533
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.87	0.32	0.63	0.31	0.07	0.78	0.47	0.89	0.39

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 94.9
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	520	31	45	409	174	22	251	219	200	122	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1751		1497	1734	1516	1754	1891	1576	1550	1718	
Flt Permitted	0.28	1.00		0.13	1.00	1.00	0.63	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	482	1751		200	1734	1516	1160	1891	1576	366	1718	
Peak-hour factor, PHF	0.72	0.91	0.65	0.76	0.92	0.74	0.81	0.76	0.83	0.87	0.86	0.86
Adj. Flow (vph)	133	571	48	59	445	235	27	330	264	230	142	65
RTOR Reduction (vph)	0	3	0	0	0	152	0	0	204	0	16	0
Lane Group Flow (vph)	133	616	0	59	445	83	27	330	60	230	191	0
Heavy Vehicles (%)	4%	6%	8%	16%	9%	6%	0%	1%	3%	12%	3%	9%
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	43.9	36.8		40.3	35.0	35.0	26.5	22.5	22.5	38.6	28.6	
Effective Green, g (s)	43.9	36.8		40.3	35.0	35.0	26.5	22.5	22.5	38.6	28.6	
Actuated g/C Ratio	0.44	0.37		0.41	0.35	0.35	0.27	0.23	0.23	0.39	0.29	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	299	653		151	615	538	336	431	359	264	498	
v/s Ratio Prot	c0.03	c0.35		0.02	0.26		0.00	0.17		c0.09	0.11	
v/s Ratio Perm	0.17			0.14		0.05	0.02		0.04	c0.25		
v/c Ratio	0.44	0.94		0.39	0.72	0.15	0.08	0.77	0.17	0.87	0.38	
Uniform Delay, d1	18.2	29.9		21.4	27.7	21.8	26.8	35.6	30.6	24.0	28.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	22.4		1.7	4.5	0.2	0.1	10.9	0.8	25.4	1.7	
Delay (s)	19.3	52.3		23.0	32.1	21.9	26.9	46.6	31.4	49.4	29.8	
Level of Service	B	D		C	C	C	C	D	C	D	C	
Approach Delay (s)		46.4			28.2			39.3			40.1	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	38.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	98.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

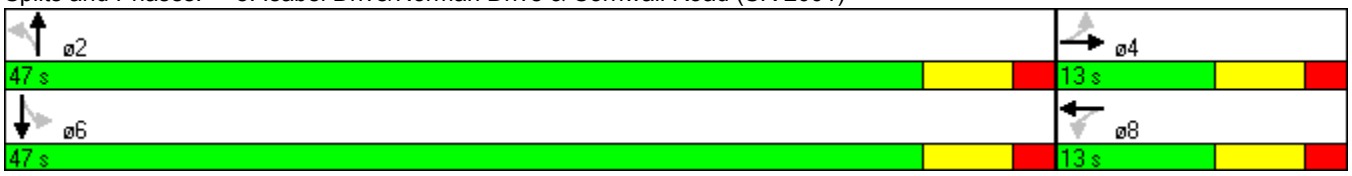
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	6	42	35	15	45	445	159	462
Lane Group Flow (vph)	0	140	0	149	0	659	0	782
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	13.0	13.0	13.0	13.0	47.0	47.0	47.0	47.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	78.3%	78.3%	78.3%	78.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.50		0.50		0.57		0.86
Control Delay		23.0		20.6		7.1		21.7
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		23.0		20.6		7.1		21.7
Queue Length 50th (ft)		28		25		97		196
Queue Length 95th (ft)		50		47		171		#413
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		282		296		1148		911
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.50		0.50		0.57		0.86

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 56
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	42	52	35	15	57	45	445	86	159	462	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.94			0.93			0.98			1.00	
Flt Protected		1.00			0.98			1.00			0.99	
Satd. Flow (prot)		1885			1968			1680			1677	
Flt Permitted		0.96			0.89			0.90			0.72	
Satd. Flow (perm)		1817			1786			1524			1217	
Peak-hour factor, PHF	0.42	0.68	0.81	0.73	0.69	0.72	0.85	0.88	0.86	0.79	0.83	0.50
Adj. Flow (vph)	14	62	64	48	22	79	53	506	100	201	557	24
RTOR Reduction (vph)	0	52	0	0	70	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	88	0	0	79	0	0	649	0	0	780	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.2			5.2			40.2			40.2	
Effective Green, g (s)		5.2			5.2			40.2			40.2	
Actuated g/C Ratio		0.09			0.09			0.70			0.70	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		165			162			1067			852	
v/s Ratio Prot												
v/s Ratio Perm		c0.05			0.04			0.43			c0.64	
v/c Ratio		0.53			0.49			0.61			0.92	
Uniform Delay, d1		24.9			24.8			4.5			7.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.3			2.3			1.0			14.3	
Delay (s)		28.2			27.1			5.5			21.5	
Level of Service		C			C			A			C	
Approach Delay (s)		28.2			27.1			5.5			21.5	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		

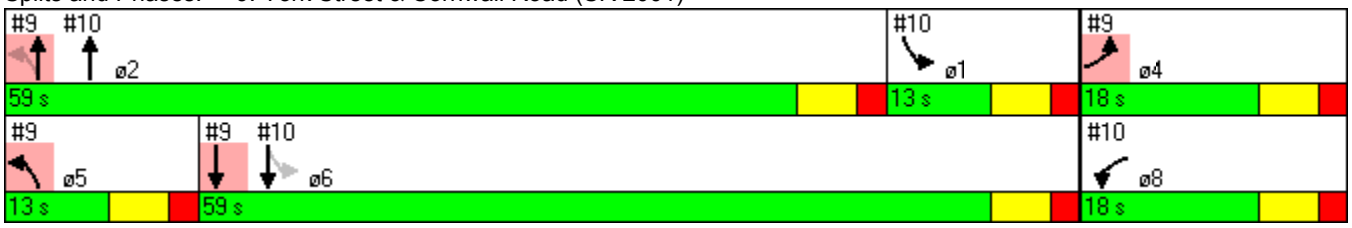
c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	ø1	ø8
Lane Configurations						
Volume (vph)	51	28	460	717		
Lane Group Flow (vph)	106	0	592	946		
Turn Type		pm+pt				
Protected Phases	4	5	2	6	1	8
Permitted Phases		2				
Detector Phase	4	5	2	6		
Switch Phase						
Minimum Initial (s)	7.0	7.0	15.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	21.0	13.0	13.0
Total Split (s)	18.0	13.0	59.0	59.0	13.0	18.0
Total Split (%)	20.0%	14.4%	65.6%	65.6%	14%	20%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lead	Lag	Lag	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	None
v/c Ratio	0.37		0.57	0.76		
Control Delay	27.8		8.9	7.8		
Queue Delay	0.0		0.0	6.8		
Total Delay	27.8		8.9	14.6		
Queue Length 50th (ft)	37		122	123		
Queue Length 95th (ft)	60		177	m184		
Internal Link Dist (ft)	1228		849	232		
Turn Bay Length (ft)						
Base Capacity (vph)	284		1032	1252		
Starvation Cap Reductn	0		0	260		
Spillback Cap Reductn	0		0	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.37		0.57	0.95		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77
Natural Cycle: 90
Control Type: Semi Act-Uncoord
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: York Street & Cornwall Road (SR 2001)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	51	25	28	460	717	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.96			1.00	0.99	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1706			1782	1814	
Flt Permitted	0.97			0.84	1.00	
Satd. Flow (perm)	1706			1499	1814	
Peak-hour factor, PHF	0.70	0.75	0.64	0.84	0.84	0.73
Adj. Flow (vph)	73	33	44	548	854	92
RTOR Reduction (vph)	18	0	0	0	3	0
Lane Group Flow (vph)	88	0	0	592	943	0
Heavy Vehicles (%)	0%	10%	9%	6%	3%	7%
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	12.0			53.0	53.0	
Effective Green, g (s)	12.0			53.0	53.0	
Actuated g/C Ratio	0.16			0.69	0.69	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	266			1032	1249	
v/s Ratio Prot	c0.05				c0.52	
v/s Ratio Perm				0.39		
v/c Ratio	0.33			0.57	0.75	
Uniform Delay, d1	28.9			6.2	7.8	
Progression Factor	1.00			1.00	0.64	
Incremental Delay, d2	0.7			0.8	1.5	
Delay (s)	29.7			7.0	6.5	
Level of Service	C			A	A	
Approach Delay (s)	29.7			7.0	6.5	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

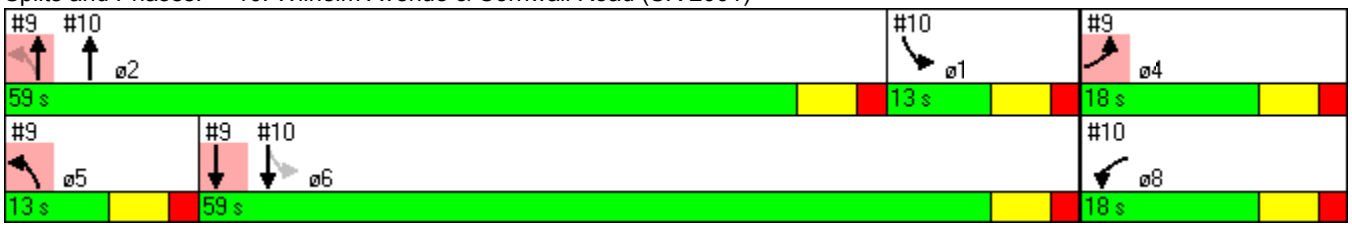
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT	ø4	ø5
Lane Configurations						
Volume (vph)	146	331	141	545		
Lane Group Flow (vph)	220	524	0	907		
Turn Type			pm+pt			
Protected Phases	8	2	1	6	4	5
Permitted Phases			6			
Detector Phase	8	2	1	6		
Switch Phase						
Minimum Initial (s)	7.0	15.0	7.0	15.0	7.0	7.0
Minimum Split (s)	13.0	21.0	13.0	21.0	13.0	13.0
Total Split (s)	18.0	59.0	13.0	59.0	18.0	13.0
Total Split (%)	20.0%	65.6%	14.4%	65.6%	20%	14%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lag	Lag		Lead
Lead-Lag Optimize?		Yes	Yes	Yes		Yes
Recall Mode	None	Min	None	Min	None	None
v/c Ratio	0.79	0.42		0.89		
Control Delay	51.8	3.2		23.3		
Queue Delay	0.0	0.3		3.5		
Total Delay	51.8	3.5		26.8		
Queue Length 50th (ft)	96	40		293		
Queue Length 95th (ft)	#201	53		341		
Internal Link Dist (ft)	945	232		841		
Turn Bay Length (ft)						
Base Capacity (vph)	277	1238		1019		
Starvation Cap Reductn	0	273		0		
Spillback Cap Reductn	0	0		60		
Storage Cap Reductn	0	0		0		
Reduced v/c Ratio	0.79	0.54		0.95		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	146	31	331	85	141	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Total Lost time (s)	6.0		6.0			6.0
Lane Util. Factor	1.00		1.00			1.00
Frt	0.97		0.97			1.00
Flt Protected	0.96		1.00			0.99
Satd. Flow (prot)	1694		1788			2035
Flt Permitted	0.96		1.00			0.72
Satd. Flow (perm)	1694		1788			1480
Peak-hour factor, PHF	0.88	0.57	0.81	0.74	0.71	0.77
Adj. Flow (vph)	166	54	409	115	199	708
RTOR Reduction (vph)	13	0	8	0	0	0
Lane Group Flow (vph)	207	0	516	0	0	907
Heavy Vehicles (%)	2%	8%	4%	0%	1%	5%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	12.0		53.0			53.0
Effective Green, g (s)	12.0		53.0			53.0
Actuated g/C Ratio	0.16		0.69			0.69
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	264		1231			1019
v/s Ratio Prot	c0.12		0.29			
v/s Ratio Perm						c0.61
v/c Ratio	0.79		0.42			0.89
Uniform Delay, d1	31.3		5.3			9.7
Progression Factor	1.00		0.45			1.00
Incremental Delay, d2	14.2		0.2			9.8
Delay (s)	45.4		2.5			19.5
Level of Service	D		A			B
Approach Delay (s)	45.4		2.5			19.5
Approach LOS	D		A			B

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

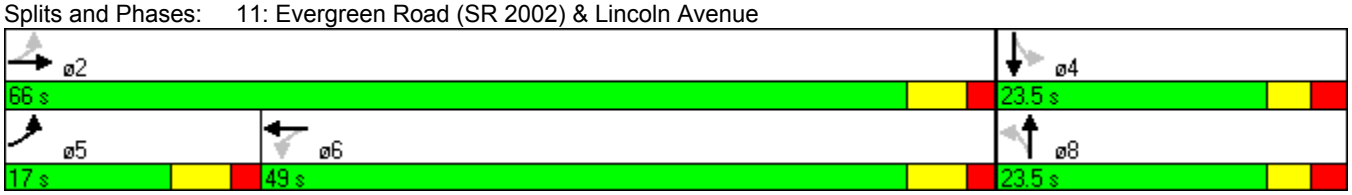
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	329	598	16	540	18	22	126	15
Lane Group Flow (vph)	370	731	34	853	0	103	0	300
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	17.0	66.0	49.0	49.0	23.5	23.5	23.5	23.5
Total Split (%)	19.0%	73.7%	54.7%	54.7%	26.3%	26.3%	26.3%	26.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	1.28	0.65	0.11	1.07		0.32		0.99
Control Delay	172.9	11.9	13.9	78.0		23.7		84.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	172.9	11.9	13.9	78.0		23.7		84.4
Queue Length 50th (ft)	~220	211	10	~533		32		153
Queue Length 95th (ft)	#388	274	14	#763		56		135
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	290	1129	317	794		322		302
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	1.28	0.65	0.11	1.07		0.32		0.99

Intersection Summary

Cycle Length: 89.5
Actuated Cycle Length: 89.5
Natural Cycle: 110
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	329	598	4	16	540	172	18	22	32	126	15	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.96			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1702	1682		1614	1616			1712			1661	
Flt Permitted	0.08	1.00		0.39	1.00			0.84			0.80	
Satd. Flow (perm)	146	1682		659	1616			1458			1366	
Peak-hour factor, PHF	0.89	0.83	0.38	0.47	0.90	0.68	0.63	0.72	0.75	0.82	0.57	0.90
Adj. Flow (vph)	370	720	11	34	600	253	29	31	43	154	26	120
RTOR Reduction (vph)	0	1	0	0	17	0	0	29	0	0	27	0
Lane Group Flow (vph)	370	730	0	34	836	0	0	74	0	0	273	0
Heavy Vehicles (%)	2%	8%	33%	7%	9%	4%	7%	0%	8%	4%	0%	6%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	60.0	60.0		43.0	43.0			18.0			18.0	
Effective Green, g (s)	60.0	60.0		43.0	43.0			18.0			18.0	
Actuated g/C Ratio	0.67	0.67		0.48	0.48			0.20			0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	289	1128		317	776			293			275	
v/s Ratio Prot	c0.16	0.43			0.52							
v/s Ratio Perm	c0.70			0.05				0.05			c0.20	
v/c Ratio	1.28	0.65		0.11	1.08			0.25			0.99	
Uniform Delay, d1	28.6	8.6		12.7	23.2			30.1			35.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	150.0	2.1		0.4	55.1			0.5			51.9	
Delay (s)	178.6	10.7		13.2	78.4			30.6			87.6	
Level of Service	F	B		B	E			C			F	
Approach Delay (s)		67.1			75.9			30.6			87.6	
Approach LOS		E			E			C			F	

Intersection Summary			
HCM Average Control Delay	71.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	11.5
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	52	866	577	11	6	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997		0.892	
Flt Protected	0.950				0.990	
Satd. Flow (prot)	1676	1825	1894	0	1645	0
Flt Permitted	0.950				0.990	
Satd. Flow (perm)	1676	1825	1894	0	1645	0
Link Speed (mph)		40	40		25	
Link Distance (ft)		480	1348		405	
Travel Time (s)		8.2	23.0		11.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	941	627	12	7	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	57	941	639	0	35	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.07	1.03	0.97	0.97	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 55.6%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	52	866	577	11	6	26
Sign Control		Free	Free		Stop	
Grade		4%	-4%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	941	627	12	7	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)		965				
pX, platoon unblocked					0.62	
vC, conflicting volume	639				1688	633
vC1, stage 1 conf vol					633	
vC2, stage 2 conf vol					1054	
vCu, unblocked vol	639				1802	633
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	94				97	94
cM capacity (veh/h)	945				232	480

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	57	941	639	35
Volume Left	57	0	0	7
Volume Right	0	0	12	28
cSH	945	1700	1700	400
Volume to Capacity	0.06	0.55	0.38	0.09
Queue Length 95th (ft)	5	0	0	7
Control Delay (s)	9.1	0.0	0.0	14.9
Lane LOS	A			B
Approach Delay (s)	0.5		0.0	14.9
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	918	599	4	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1879	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1879	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	998	651	4	0	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	998	655	0	0	17
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	918	599	4	0	16
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	998	651	4	0	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485				
pX, platoon unblocked					0.56	
vC, conflicting volume	655				1651	653
vC1, stage 1 conf vol					653	
vC2, stage 2 conf vol					998	
vCu, unblocked vol	655				1768	653
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	96
cM capacity (veh/h)	932				259	467

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	998	655	17
Volume Left	0	0	0
Volume Right	0	4	17
cSH	1700	1700	467
Volume to Capacity	0.59	0.39	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.0	13.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	13.0
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	45	466	45	71	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	150	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1836	1591	1702	1835
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1836	1591	1702	1835
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			2010
Travel Time (s)	4.7		5.2			30.5
Peak Hour Factor	0.92	0.92	0.88	0.92	0.92	0.86
Heavy Vehicles (%)	2%	2%	4%	2%	2%	3%
Adj. Flow (vph)	0	49	530	49	77	430
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	49	530	49	77	430
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 35.1% ICU Level of Service A
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	45	466	45	71	370
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.88	0.92	0.92	0.86
Hourly flow rate (vph)	0	49	530	49	77	430
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			340			
pX, platoon unblocked	0.83	0.83			0.83	
vC, conflicting volume	1114	530			578	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1037	335			394	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	92			92	
cM capacity (veh/h)	196	589			970	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	530	49	77	430
Volume Left	0	0	0	77	0
Volume Right	49	0	49	0	0
cSH	589	1700	1700	970	1700
Volume to Capacity	0.08	0.31	0.03	0.08	0.25
Queue Length 95th (ft)	7	0	0	6	0
Control Delay (s)	11.7	0.0	0.0	9.0	0.0
Lane LOS	B			A	
Approach Delay (s)	11.7	0.0		1.4	
Approach LOS	B				

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	223	64	0	98	9	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.976					
Flt Protected					0.950	
Satd. Flow (prot)	1789	0	0	1900	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1789	0	0	1900	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.68	0.92	0.92	0.69	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	0%	2%	2%
Adj. Flow (vph)	328	70	0	142	10	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	398	0	0	142	10	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 25.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	223	64	0	98	9	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.92	0.92	0.69	0.92	0.92
Hourly flow rate (vph)	328	70	0	142	10	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			398		505	363
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			398		505	363
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1161		527	682

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	398	142	10
Volume Left	0	0	10
Volume Right	70	0	0
cSH	1700	1161	527
Volume to Capacity	0.23	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	12.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	12.0
Approach LOS			B

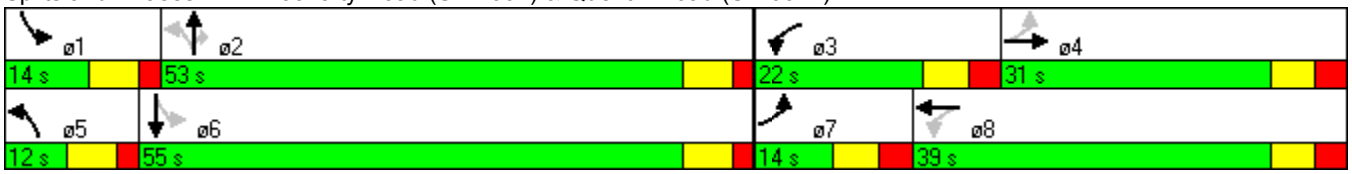
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	96	256	296	268	9	535	141	187	517
Lane Group Flow (vph)	128	321	340	526	14	557	160	203	676
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	14.0	31.0	22.0	39.0	12.0	53.0	53.0	14.0	55.0
Total Split (%)	11.7%	25.8%	18.3%	32.5%	10.0%	44.2%	44.2%	11.7%	45.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.80	0.90	1.17	1.05	0.08	0.80	0.23	0.81	0.85
Control Delay	62.9	75.4	137.0	92.9	16.1	43.0	4.9	41.6	38.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.9	75.4	137.0	92.9	16.1	43.0	4.9	41.6	38.1
Queue Length 50th (ft)	65	243	~246	~422	5	379	2	98	438
Queue Length 95th (ft)	#100	#382	#410	#642	12	530	43	#168	#743
Internal Link Dist (ft)		569		654		721			1806
Turn Bay Length (ft)	190		300		105		250	225	
Base Capacity (vph)	160	356	290	503	185	695	706	251	799
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.90	1.17	1.05	0.08	0.80	0.23	0.81	0.85

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 88 (73%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	256	19	296	268	183	9	535	141	187	517	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	12	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.93		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1710	1766		1653	1790		1710	1793	1576	1771	1710	
Flt Permitted	0.17	1.00		0.19	1.00		0.15	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	300	1766		323	1790		273	1793	1576	329	1710	
Peak-hour factor, PHF	0.75	0.86	0.81	0.87	0.95	0.75	0.66	0.96	0.88	0.92	0.93	0.88
Adj. Flow (vph)	128	298	23	340	282	244	14	557	160	203	556	120
RTOR Reduction (vph)	0	2	0	0	26	0	0	0	95	0	6	0
Lane Group Flow (vph)	128	319	0	340	500	0	14	557	65	203	670	0
Heavy Vehicles (%)	1%	2%	0%	4%	1%	0%	0%	4%	4%	0%	7%	2%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	31.0	24.0		46.0	32.0		48.7	46.5	46.5	59.3	51.8	
Effective Green, g (s)	31.0	24.0		46.0	32.0		48.7	46.5	46.5	59.3	51.8	
Actuated g/C Ratio	0.26	0.20		0.38	0.27		0.41	0.39	0.39	0.49	0.43	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	160	353		290	477		137	695	611	253	738	
v/s Ratio Prot	0.05	0.18		c0.15	c0.28		0.00	0.31		c0.05	c0.39	
v/s Ratio Perm	0.16			c0.30			0.04		0.04	0.35		
v/c Ratio	0.80	0.90		1.17	1.05		0.10	0.80	0.11	0.80	0.91	
Uniform Delay, d1	37.9	46.9		31.1	44.0		25.0	32.6	23.5	23.8	31.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.96	0.95	
Incremental Delay, d2	25.3	25.6		107.9	54.6		0.4	9.5	0.4	15.3	15.1	
Delay (s)	63.2	72.5		139.0	98.6		25.4	42.1	23.8	38.2	45.5	
Level of Service	E	E		F	F		C	D	C	D	D	
Approach Delay (s)		69.8			114.5			37.8			43.8	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM Average Control Delay	67.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

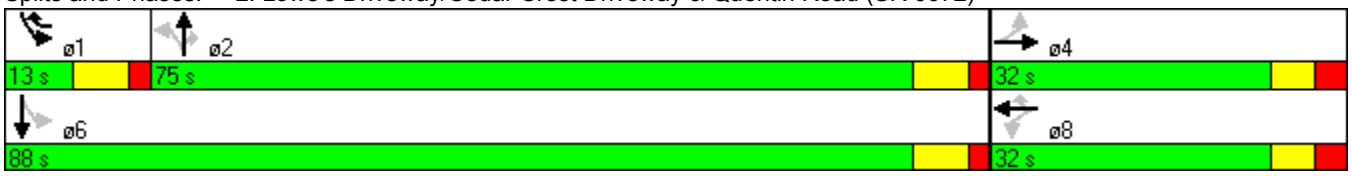
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	10	3	112	3	76	60	739	97	76	651
Lane Group Flow (vph)	0	92	0	173	90	72	778	110	87	697
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	32.0	32.0	32.0	32.0	13.0	75.0	75.0	75.0	13.0	88.0
Total Split (%)	26.7%	26.7%	26.7%	26.7%	10.8%	62.5%	62.5%	62.5%	10.8%	73.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.30		0.77	0.18	0.16	0.71	0.10	0.30	0.52
Control Delay		15.9		68.9	6.8	10.7	15.5	2.4	8.5	8.6
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.0	0.1
Total Delay		15.9		68.9	6.8	10.7	15.7	2.4	8.5	8.8
Queue Length 50th (ft)		13		128	0	22	257	4	15	133
Queue Length 95th (ft)		40		75	31	m28	m292	m8	m35	279
Internal Link Dist (ft)		216		277			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		353		269	507	442	1093	1101	290	1330
Starvation Cap Reductn		0		0	0	0	0	0	0	109
Spillback Cap Reductn		1		0	1	0	34	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.26		0.64	0.18	0.16	0.73	0.10	0.30	0.57

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	3	53	112	3	76	60	739	97	76	651	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1532			1787	1568	1796	1820	1766	1536	1875	
Flt Permitted		0.92			0.69	1.00	0.39	1.00	1.00	0.20	1.00	
Satd. Flow (perm)		1424			1290	1568	735	1820	1766	323	1875	
Peak-hour factor, PHF	0.63	0.75	0.74	0.68	0.38	0.84	0.83	0.95	0.88	0.87	0.95	0.68
Adj. Flow (vph)	16	4	72	165	8	90	72	778	110	87	685	12
RTOR Reduction (vph)	0	59	0	0	0	70	0	0	40	0	1	0
Lane Group Flow (vph)	0	33	0	0	173	20	72	778	70	87	696	0
Heavy Vehicles (%)	0%	0%	6%	1%	33%	4%	3%	7%	0%	13%	4%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		20.9			20.9	26.9	72.1	72.1	72.1	85.1	85.1	
Effective Green, g (s)		20.9			20.9	26.9	72.1	72.1	72.1	85.1	85.1	
Actuated g/C Ratio		0.17			0.17	0.22	0.60	0.60	0.60	0.71	0.71	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		248			225	443	442	1094	1061	290	1330	
v/s Ratio Prot						0.00		c0.43		0.02	c0.37	
v/s Ratio Perm		0.02			c0.13	0.01	0.10		0.04	0.20		
v/c Ratio		0.13			0.77	0.05	0.16	0.71	0.07	0.30	0.52	
Uniform Delay, d1		41.9			47.2	36.5	10.6	16.7	10.0	11.9	8.1	
Progression Factor		1.00			1.00	1.00	0.85	0.73	0.81	1.05	0.84	
Incremental Delay, d2		0.3			15.4	0.1	0.4	2.1	0.1	1.3	1.2	
Delay (s)		42.2			62.6	36.6	9.4	14.3	8.1	13.7	7.9	
Level of Service		D			E	D	A	B	A	B	A	
Approach Delay (s)		42.2			53.7			13.2			8.5	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

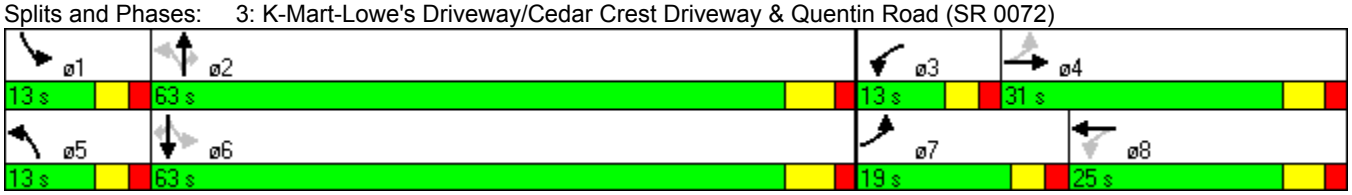
3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	182	19	77	20	49	617	62	142	590	65
Lane Group Flow (vph)	225	96	96	402	56	717	68	167	686	80
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	19.0	31.0	13.0	25.0	13.0	63.0	63.0	13.0	63.0	63.0
Total Split (%)	15.8%	25.8%	10.8%	20.8%	10.8%	52.5%	52.5%	10.8%	52.5%	52.5%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.87	0.28	0.31	0.90	0.17	0.80	0.08	0.57	0.70	0.10
Control Delay	66.6	18.3	33.5	41.7	3.1	14.7	0.6	19.6	22.8	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Total Delay	66.6	18.3	33.5	41.7	3.1	15.1	0.6	19.6	22.8	4.2
Queue Length 50th (ft)	137	20	53	114	2	356	2	52	366	3
Queue Length 95th (ft)	#195	29	83	49	m5	369	m1	93	338	17
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	258	385	314	494	339	897	836	295	975	819
Starvation Cap Reductn	0	0	0	0	0	25	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.25	0.31	0.81	0.17	0.82	0.08	0.57	0.70	0.10

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 6 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	19	55	77	20	245	49	617	62	142	590	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1600		1902	1761		1796	1783	1607	1814	1844	1489
Flt Permitted	0.19	1.00		0.69	1.00		0.22	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	346	1600		1392	1761		422	1783	1607	329	1844	1489
Peak-hour factor, PHF	0.81	0.59	0.86	0.80	0.56	0.67	0.88	0.86	0.91	0.85	0.86	0.81
Adj. Flow (vph)	225	32	64	96	36	366	56	717	68	167	686	80
RTOR Reduction (vph)	0	52	0	0	221	0	0	0	27	0	0	33
Lane Group Flow (vph)	225	44	0	96	181	0	56	717	41	167	686	47
Heavy Vehicles (%)	0%	11%	0%	0%	5%	1%	0%	6%	0%	0%	7%	9%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	34.5	21.7		23.2	15.5		66.3	60.4	60.4	70.3	62.4	62.4
Effective Green, g (s)	34.5	21.7		23.2	15.5		66.3	60.4	60.4	70.3	62.4	62.4
Actuated g/C Ratio	0.29	0.18		0.19	0.13		0.55	0.50	0.50	0.59	0.52	0.52
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	255	289		302	227		301	897	809	291	959	774
v/s Ratio Prot	c0.10	0.03		0.02	0.10		0.01	c0.40		c0.04	0.37	
v/s Ratio Perm	c0.15			0.04			0.09		0.03	0.30		0.03
v/c Ratio	0.88	0.15		0.32	0.80		0.19	0.80	0.05	0.57	0.72	0.06
Uniform Delay, d1	36.4	41.4		41.1	50.7		15.7	24.8	15.2	17.9	22.0	14.3
Progression Factor	1.00	1.00		1.00	1.00		0.22	0.31	0.07	1.25	0.80	0.77
Incremental Delay, d2	28.0	0.2		0.6	17.4		0.2	5.7	0.1	2.2	3.7	0.1
Delay (s)	64.4	41.6		41.7	68.1		3.7	13.3	1.1	24.6	21.4	11.1
Level of Service	E	D		D	E		A	B	A	C	C	B
Approach Delay (s)		57.6			63.0			11.7			21.1	
Approach LOS		E			E			B			C	

Intersection Summary			
HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

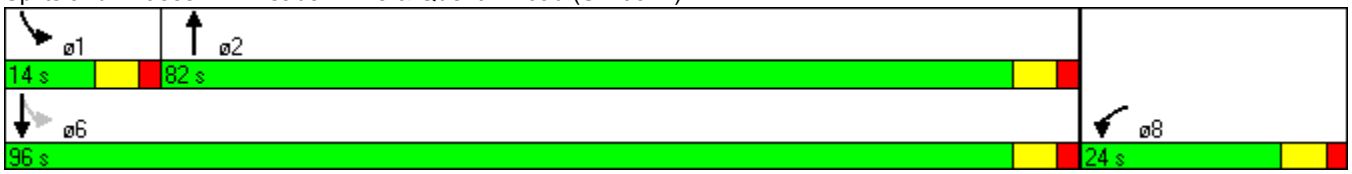
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	39	940	92	848
Lane Group Flow (vph)	206	1066	137	874
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	24.0	82.0	14.0	96.0
Total Split (%)	20.0%	68.3%	11.7%	80.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.71	0.88	0.55	0.59
Control Delay	36.7	18.0	13.6	7.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	36.7	18.0	13.6	7.2
Queue Length 50th (ft)	70	327	18	204
Queue Length 95th (ft)	115	#1066	30	388
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			275	
Base Capacity (vph)	380	1206	253	1470
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.54	0.88	0.54	0.59

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 72 (60%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	39	138	940	68	92	848
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.90		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1890		1754		1687	1837
Flt Permitted	0.99		1.00		0.11	1.00
Satd. Flow (perm)	1890		1754		191	1837
Peak-hour factor, PHF	0.80	0.88	0.96	0.78	0.67	0.97
Adj. Flow (vph)	49	157	979	87	137	874
RTOR Reduction (vph)	102	0	2	0	0	0
Lane Group Flow (vph)	104	0	1064	0	137	874
Heavy Vehicles (%)	2%	2%	2%	2%	5%	5%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	12.0		82.3		96.0	96.0
Effective Green, g (s)	12.0		82.3		96.0	96.0
Actuated g/C Ratio	0.10		0.69		0.80	0.80
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	189		1203		249	1470
v/s Ratio Prot	c0.06		c0.61		0.04	c0.48
v/s Ratio Perm					0.41	
v/c Ratio	0.55		0.88		0.55	0.59
Uniform Delay, d1	51.4		15.0		19.8	4.6
Progression Factor	1.00		0.68		1.00	1.00
Incremental Delay, d2	3.5		5.7		2.6	1.8
Delay (s)	54.9		16.0		22.4	6.4
Level of Service	D		B		C	A
Approach Delay (s)	54.9		16.0			8.5
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

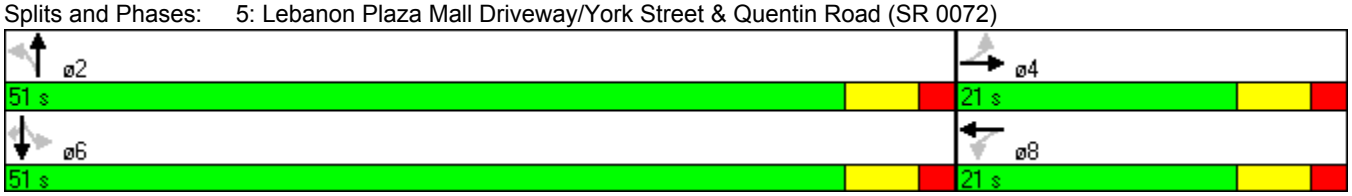
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	52	55	120	94	61	802	36	743	44
Lane Group Flow (vph)	68	152	145	173	72	935	42	790	56
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	21.0	21.0	21.0	21.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.32	0.41	0.66	0.48	0.25	0.79	0.22	0.66	0.05
Control Delay	28.4	16.5	41.1	25.3	8.5	15.9	9.3	11.4	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	16.5	41.1	25.3	8.5	15.9	9.3	11.4	1.8
Queue Length 50th (ft)	23	25	53	51	11	242	6	177	0
Queue Length 95th (ft)	50	63	105	92	31	446	22	312	9
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	255	428	265	432	314	1269	205	1288	1119
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.36	0.55	0.40	0.23	0.74	0.20	0.61	0.05

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 66.6
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	58	120	94	45	61	802	41	36	743	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1653	1627		1685	1816		1744	1864		1754	1897	1623
Flt Permitted	0.65	1.00		0.66	1.00		0.25	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1127	1627		1171	1816		462	1864		303	1897	1623
Peak-hour factor, PHF	0.77	0.81	0.69	0.83	0.78	0.86	0.85	0.92	0.65	0.86	0.94	0.79
Adj. Flow (vph)	68	68	84	145	121	52	72	872	63	42	790	56
RTOR Reduction (vph)	0	63	0	0	22	0	0	4	0	0	0	21
Lane Group Flow (vph)	68	89	0	145	151	0	72	931	0	42	790	35
Heavy Vehicles (%)	4%	2%	2%	1%	0%	3%	3%	4%	0%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	12.5	12.5		12.5	12.5		42.0	42.0		42.0	42.0	42.0
Effective Green, g (s)	12.5	12.5		12.5	12.5		42.0	42.0		42.0	42.0	42.0
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.63	0.63		0.63	0.63	0.63
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	212	306		220	341		292	1177		191	1198	1025
v/s Ratio Prot		0.05			0.08			c0.50			0.42	
v/s Ratio Perm	0.06			c0.12			0.16			0.14		0.02
v/c Ratio	0.32	0.29		0.66	0.44		0.25	0.79		0.22	0.66	0.03
Uniform Delay, d1	23.3	23.2		25.0	23.9		5.3	9.0		5.2	7.7	4.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	0.7		7.7	1.3		0.4	3.7		0.6	1.3	0.0
Delay (s)	24.5	23.9		32.7	25.2		5.8	12.7		5.8	9.1	4.6
Level of Service	C	C		C	C		A	B		A	A	A
Approach Delay (s)		24.1			28.6			12.2			8.6	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	66.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

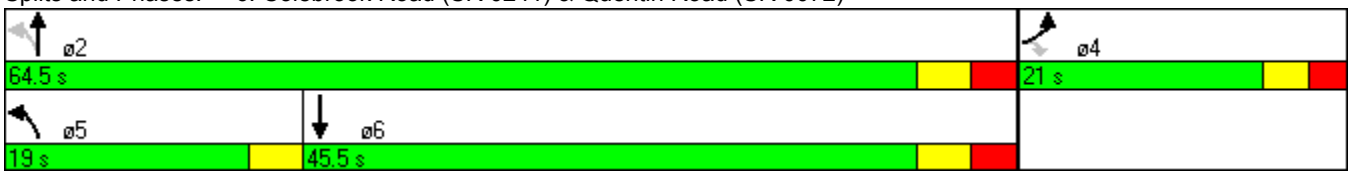
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	185	206	273	760	695
Lane Group Flow (vph)	253	251	374	817	885
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	21.0	21.0	19.0	64.5	45.5
Total Split (%)	24.6%	24.6%	22.2%	75.4%	53.2%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.86	0.54	0.90	0.64	0.98
Control Delay	61.7	9.1	47.5	10.7	49.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	9.1	47.5	10.7	49.3
Queue Length 50th (ft)	133	0	141	217	441
Queue Length 95th (ft)	#174	44	#192	329	#710
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	308	477	416	1299	934
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.82	0.53	0.90	0.63	0.95

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 83.7
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	206	273	760	695	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1470	1736	1872	1985	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1660	1470	177	1872	1985	
Peak-hour factor, PHF	0.73	0.82	0.73	0.93	0.93	0.87
Adj. Flow (vph)	253	251	374	817	747	138
RTOR Reduction (vph)	0	206	0	0	8	0
Lane Group Flow (vph)	253	45	374	817	877	0
Heavy Vehicles (%)	1%	2%	2%	3%	4%	1%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	14.9	14.9	56.8	56.8	37.8	
Effective Green, g (s)	14.9	14.9	56.8	56.8	37.8	
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.45	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	296	262	409	1270	896	
v/s Ratio Prot	c0.15		c0.17	0.44	c0.44	
v/s Ratio Perm		0.03	0.45			
v/c Ratio	0.85	0.17	0.91	0.64	0.98	
Uniform Delay, d1	33.4	29.2	24.9	7.7	22.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	20.7	0.3	24.6	1.8	25.2	
Delay (s)	54.0	29.5	49.5	9.5	47.7	
Level of Service	D	C	D	A	D	
Approach Delay (s)	41.8			22.1	47.7	
Approach LOS	D			C	D	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	15.5
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

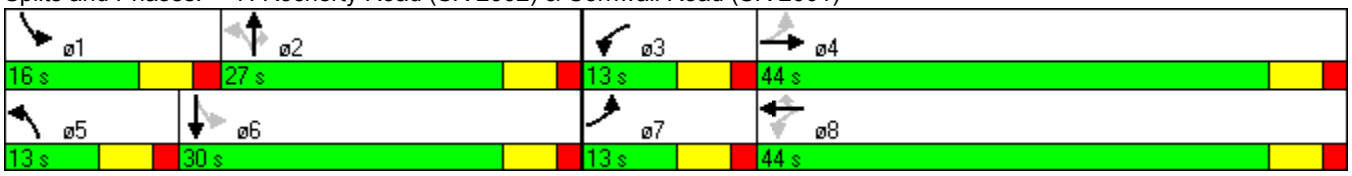
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	75	427	88	549	144	48	182	107	168	226
Lane Group Flow (vph)	96	526	101	646	176	57	219	120	215	395
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	15.0	7.0	15.0	15.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0	21.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	44.0	13.0	44.0	44.0	13.0	27.0	27.0	16.0	30.0
Total Split (%)	13.0%	44.0%	13.0%	44.0%	44.0%	13.0%	27.0%	27.0%	16.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.48	0.77	0.38	0.92	0.25	0.22	0.54	0.27	0.62	0.81
Control Delay	22.1	35.0	17.5	48.3	4.3	23.4	40.3	8.2	31.9	47.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	35.0	17.5	48.3	4.3	23.4	40.3	8.2	31.9	47.5
Queue Length 50th (ft)	30	286	32	386	0	23	126	0	98	230
Queue Length 95th (ft)	50	419	58	#547	31	47	183	44	135	#414
Internal Link Dist (ft)		1052		405			731			260
Turn Bay Length (ft)	225		225		325	150		350	240	
Base Capacity (vph)	198	747	264	773	747	255	436	467	353	487
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.70	0.38	0.84	0.24	0.22	0.50	0.26	0.61	0.81

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 93.4
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	427	46	88	549	144	48	182	107	168	226	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1779		1653	1853	1545	1754	1891	1623	1623	1660	
Flt Permitted	0.11	1.00		0.22	1.00	1.00	0.31	1.00	1.00	0.41	1.00	
Satd. Flow (perm)	196	1779		381	1853	1545	564	1891	1623	698	1660	
Peak-hour factor, PHF	0.78	0.92	0.74	0.87	0.85	0.82	0.84	0.83	0.89	0.78	0.96	0.85
Adj. Flow (vph)	96	464	62	101	646	176	57	219	120	215	235	160
RTOR Reduction (vph)	0	5	0	0	0	111	0	0	93	0	23	0
Lane Group Flow (vph)	96	521	0	101	646	65	57	219	27	215	372	0
Heavy Vehicles (%)	4%	4%	3%	5%	2%	4%	0%	1%	0%	7%	9%	4%
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	40.8	35.6		40.8	35.6	35.6	26.7	21.5	21.5	35.9	26.1	
Effective Green, g (s)	40.8	35.6		40.8	35.6	35.6	26.7	21.5	21.5	35.9	26.1	
Actuated g/C Ratio	0.42	0.37		0.42	0.37	0.37	0.28	0.22	0.22	0.37	0.27	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	162	659		231	686	572	221	423	363	355	451	
v/s Ratio Prot	c0.03	0.29		0.02	c0.35		0.01	0.12		c0.06	c0.22	
v/s Ratio Perm	0.22			0.16		0.04	0.06		0.02	0.16		
v/c Ratio	0.59	0.79		0.44	0.94	0.11	0.26	0.52	0.07	0.61	0.82	
Uniform Delay, d1	21.4	26.9		19.1	29.2	19.9	26.4	32.7	29.4	22.3	32.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.7	6.8		1.3	21.4	0.1	0.6	3.5	0.3	2.9	14.0	
Delay (s)	27.1	33.7		20.4	50.6	20.0	27.0	36.3	29.8	25.2	46.9	
Level of Service	C	C		C	D	C	C	D	C	C	D	
Approach Delay (s)		32.7			41.5			33.0			39.2	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	37.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	96.1	Sum of lost time (s)	24.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

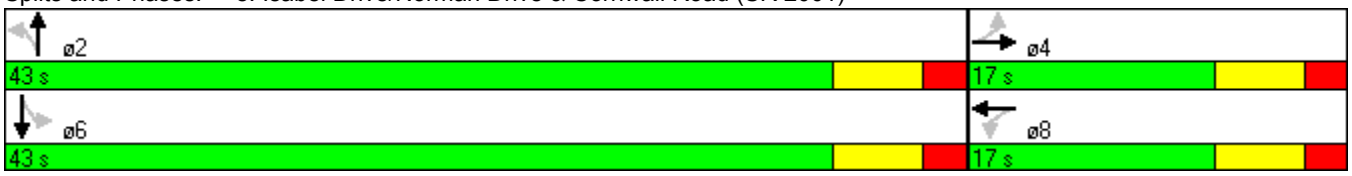
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	34	18	69	33	60	398	58	491
Lane Group Flow (vph)	0	162	0	308	0	552	0	683
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	17.0	17.0	17.0	17.0	43.0	43.0	43.0	43.0
Total Split (%)	28.3%	28.3%	28.3%	28.3%	71.7%	71.7%	71.7%	71.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.41		0.70		0.69		0.88
Control Delay		13.5		24.6		13.0		23.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		13.5		24.6		13.0		23.9
Queue Length 50th (ft)		15		50		99		147
Queue Length 95th (ft)		44		#133		178		249
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		434		488		1220		1189
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.37		0.63		0.45		0.57

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 47.2
Natural Cycle: 60
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	18	76	69	33	156	60	398	39	58	491	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.92			0.99			0.99	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1857			1920			1742			1668	
Flt Permitted		0.80			0.87			0.87			0.89	
Satd. Flow (perm)		1500			1699			1521			1485	
Peak-hour factor, PHF	0.78	0.70	0.83	0.78	0.77	0.88	0.89	0.91	0.81	0.74	0.86	0.61
Adj. Flow (vph)	44	26	92	88	43	177	67	437	48	78	571	34
RTOR Reduction (vph)	0	72	0	0	78	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	90	0	0	230	0	0	545	0	0	679	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		10.1			10.1			24.6			24.6	
Effective Green, g (s)		10.1			10.1			24.6			24.6	
Actuated g/C Ratio		0.22			0.22			0.53			0.53	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		324			367			801			782	
v/s Ratio Prot												
v/s Ratio Perm		0.06			c0.14			0.36			c0.46	
v/c Ratio		0.28			0.63			0.68			0.87	
Uniform Delay, d1		15.3			16.6			8.1			9.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			3.3			2.4			10.1	
Delay (s)		15.7			19.9			10.5			19.7	
Level of Service		B			B			B			B	
Approach Delay (s)		15.7			19.9			10.5			19.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

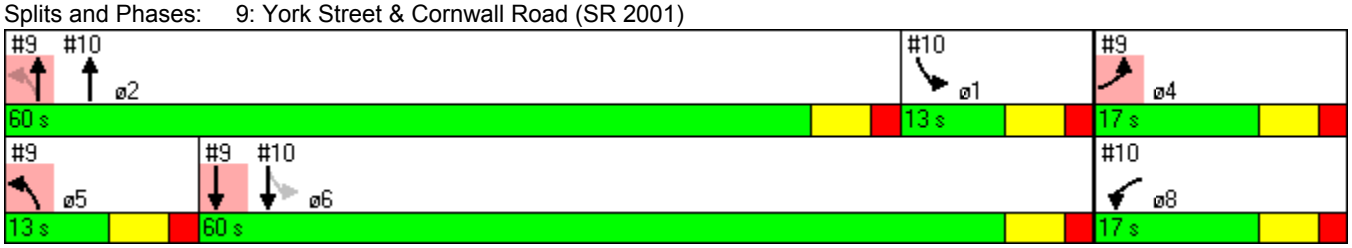
c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	ø1	ø8
Lane Configurations						
Volume (vph)	118	81	654	511		
Lane Group Flow (vph)	217	0	823	752		
Turn Type		pm+pt				
Protected Phases	4	5	2	6	1	8
Permitted Phases		2				
Detector Phase	4	5	2	6		
Switch Phase						
Minimum Initial (s)	7.0	7.0	15.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	21.0	13.0	13.0
Total Split (s)	17.0	13.0	60.0	60.0	13.0	17.0
Total Split (%)	18.9%	14.4%	66.7%	66.7%	14%	19%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lead	Lag	Lag	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	None
v/c Ratio	0.82		0.78	0.61		
Control Delay	55.6		14.6	6.8		
Queue Delay	0.0		0.2	1.3		
Total Delay	55.6		14.8	8.2		
Queue Length 50th (ft)	94		216	127		
Queue Length 95th (ft)	#150		391	m161		
Internal Link Dist (ft)	1228		849	232		
Turn Bay Length (ft)						
Base Capacity (vph)	265		1051	1231		
Starvation Cap Reductn	0		0	274		
Spillback Cap Reductn	0		22	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.82		0.80	0.79		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77
Natural Cycle: 150
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: York Street & Cornwall Road (SR 2001)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	118	36	81	654	511	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.96			1.00	0.97	
Flt Protected	0.97			0.99	1.00	
Satd. Flow (prot)	1751			1852	1742	
Flt Permitted	0.97			0.80	1.00	
Satd. Flow (perm)	1751			1498	1742	
Peak-hour factor, PHF	0.75	0.60	0.84	0.90	0.89	0.90
Adj. Flow (vph)	157	60	96	727	574	178
RTOR Reduction (vph)	15	0	0	0	9	0
Lane Group Flow (vph)	202	0	0	823	743	0
Heavy Vehicles (%)	0%	3%	2%	2%	7%	1%
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	11.0			54.0	54.0	
Effective Green, g (s)	11.0			54.0	54.0	
Actuated g/C Ratio	0.14			0.70	0.70	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	250			1051	1222	
v/s Ratio Prot	c0.12				0.43	
v/s Ratio Perm				c0.55		
v/c Ratio	0.81			0.78	0.61	
Uniform Delay, d1	32.0			7.6	6.0	
Progression Factor	1.00			1.00	0.89	
Incremental Delay, d2	17.3			3.9	0.5	
Delay (s)	49.3			11.5	5.9	
Level of Service	D			B	A	
Approach Delay (s)	49.3			11.5	5.9	
Approach LOS	D			B	A	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		

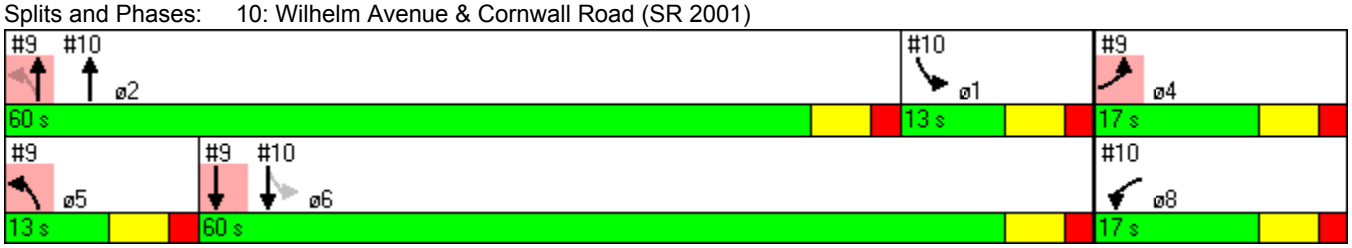
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT	ø4	ø5
Lane Configurations						
Volume (vph)	185	515	72	463		
Lane Group Flow (vph)	300	874	0	610		
Turn Type			pm+pt			
Protected Phases	8	2	1	6	4	5
Permitted Phases			6			
Detector Phase	8	2	1	6		
Switch Phase						
Minimum Initial (s)	7.0	15.0	7.0	15.0	7.0	7.0
Minimum Split (s)	13.0	21.0	13.0	21.0	13.0	13.0
Total Split (s)	17.0	60.0	13.0	60.0	17.0	13.0
Total Split (%)	18.9%	66.7%	14.4%	66.7%	19%	14%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lag	Lag		Lead
Lead-Lag Optimize?		Yes	Yes	Yes		Yes
Recall Mode	None	Min	None	Min	None	None
v/c Ratio	1.13	0.69		0.66		
Control Delay	127.6	5.5		10.6		
Queue Delay	0.0	1.6		0.3		
Total Delay	127.6	7.1		10.9		
Queue Length 50th (ft)	~162	97		134		
Queue Length 95th (ft)	#304	m136		238		
Internal Link Dist (ft)	945	232		841		
Turn Bay Length (ft)						
Base Capacity (vph)	265	1270		929		
Starvation Cap Reductn	0	223		0		
Spillback Cap Reductn	0	0		48		
Storage Cap Reductn	0	0		0		
Reduced v/c Ratio	1.13	0.83		0.69		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	185	75	515	268	72	463
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Total Lost time (s)	6.0		6.0			6.0
Lane Util. Factor	1.00		1.00			1.00
Frt	0.96		0.95			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1732		1790			2024
Flt Permitted	0.97		1.00			0.65
Satd. Flow (perm)	1732		1790			1325
Peak-hour factor, PHF	0.88	0.83	0.89	0.91	0.71	0.91
Adj. Flow (vph)	210	90	579	295	101	509
RTOR Reduction (vph)	17	0	15	0	0	0
Lane Group Flow (vph)	283	0	859	0	0	610
Heavy Vehicles (%)	1%	0%	2%	0%	0%	6%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	11.0		54.0			54.0
Effective Green, g (s)	11.0		54.0			54.0
Actuated g/C Ratio	0.14		0.70			0.70
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	247		1255			929
v/s Ratio Prot	c0.16		c0.48			
v/s Ratio Perm						0.46
v/c Ratio	1.15		0.68			0.66
Uniform Delay, d1	33.0		6.6			6.4
Progression Factor	1.00		0.55			1.00
Incremental Delay, d2	102.1		0.9			1.7
Delay (s)	135.1		4.6			8.1
Level of Service	F		A			A
Approach Delay (s)	135.1		4.6			8.1
Approach LOS	F		A			A

Intersection Summary			
HCM Average Control Delay	27.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		

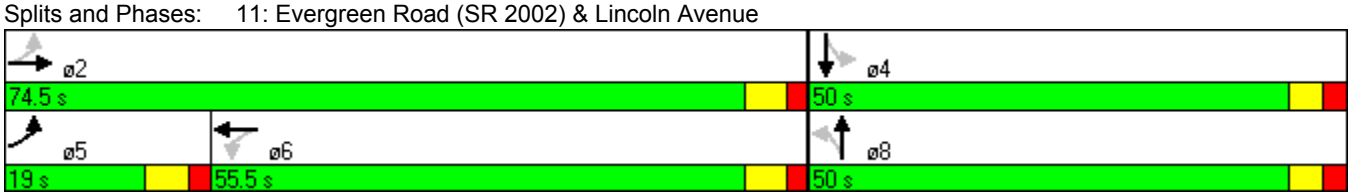
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	172	512	11	427	11	16	38	47
Lane Group Flow (vph)	207	605	16	549	0	70	0	535
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	19.0	74.5	55.5	55.5	50.0	50.0	50.0	50.0
Total Split (%)	15.3%	59.8%	44.6%	44.6%	40.2%	40.2%	40.2%	40.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.60	0.63	0.06	0.88		0.15		0.87
Control Delay	21.0	19.8	23.4	46.8		23.9		38.5
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	21.0	19.8	23.4	46.8		23.9		38.5
Queue Length 50th (ft)	63	245	7	317		27		232
Queue Length 95th (ft)	115	448	18	505		27		287
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	359	1245	425	926		682		845
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.58	0.49	0.04	0.59		0.10		0.63

Intersection Summary

Cycle Length: 124.5
Actuated Cycle Length: 98.5
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	172	512	24	11	427	46	11	16	7	38	47	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.98			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1702	1720		1727	1722			1735			1639	
Flt Permitted	0.16	1.00		0.44	1.00			0.80			0.96	
Satd. Flow (perm)	289	1720		792	1722			1406			1583	
Peak-hour factor, PHF	0.83	0.92	0.50	0.70	0.87	0.79	0.56	0.42	0.56	0.71	0.73	0.66
Adj. Flow (vph)	207	557	48	16	491	58	20	38	12	54	64	417
RTOR Reduction (vph)	0	3	0	0	4	0	0	6	0	0	108	0
Lane Group Flow (vph)	207	602	0	16	545	0	0	64	0	0	427	0
Heavy Vehicles (%)	2%	5%	5%	0%	4%	3%	0%	14%	0%	0%	5%	2%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	54.7	54.7		35.9	35.9			31.6			31.6	
Effective Green, g (s)	54.7	54.7		35.9	35.9			31.6			31.6	
Actuated g/C Ratio	0.56	0.56		0.37	0.37			0.32			0.32	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	347	962		291	632			454			511	
v/s Ratio Prot	0.08	c0.35			c0.32							
v/s Ratio Perm	0.26			0.02				0.05			c0.27	
v/c Ratio	0.60	0.63		0.05	0.86			0.14			0.84	
Uniform Delay, d1	15.9	14.6		20.0	28.7			23.5			30.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.8	2.2		0.2	13.2			0.1			11.4	
Delay (s)	18.6	16.8		20.2	41.8			23.6			42.1	
Level of Service	B	B		C	D			C			D	
Approach Delay (s)		17.3			41.2			23.6			42.1	
Approach LOS		B			D			C			D	

Intersection Summary			
HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	97.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	32	656	680	4	13	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1676	1825	1898	0	1649	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1676	1825	1898	0	1649	0
Link Speed (mph)		40	40		25	
Link Distance (ft)		480	1348		405	
Travel Time (s)		8.2	23.0		11.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	713	739	4	14	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	713	743	0	63	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.07	1.03	0.97	0.97	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 46.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	32	656	680	4	13	45
Sign Control		Free	Free		Stop	
Grade		4%	-4%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	713	739	4	14	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)		965				
pX, platoon unblocked					0.71	
vC, conflicting volume	743				1524	741
vC1, stage 1 conf vol					741	
vC2, stage 2 conf vol					783	
vCu, unblocked vol	743				1534	741
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				96	88
cM capacity (veh/h)	864				317	416

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	35	713	743	63
Volume Left	35	0	0	14
Volume Right	0	0	4	49
cSH	864	1700	1700	389
Volume to Capacity	0.04	0.42	0.44	0.16
Queue Length 95th (ft)	3	0	0	14
Control Delay (s)	9.3	0.0	0.0	16.0
Lane LOS	A			C
Approach Delay (s)	0.4		0.0	16.0
Approach LOS				C

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	688	722	3	0	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1879	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1879	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	748	785	3	0	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	748	788	0	0	46
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane			Yes		Yes	
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 48.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	688	722	3	0	42
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	748	785	3	0	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh)			2			
Upstream signal (ft)		485				
pX, platoon unblocked					0.66	
vC, conflicting volume	788				1534	786
vC1, stage 1 conf vol					786	
vC2, stage 2 conf vol					748	
vCu, unblocked vol	788				1552	786
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	88
cM capacity (veh/h)	831				324	392

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	748	788	46
Volume Left	0	0	0
Volume Right	0	3	46
cSH	1700	1700	392
Volume to Capacity	0.44	0.46	0.12
Queue Length 95th (ft)	0	0	10
Control Delay (s)	0.0	0.0	15.4
Lane LOS			C
Approach Delay (s)	0.0	0.0	15.4
Approach LOS			C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	63	378	14	49	519
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	150	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			2010
Travel Time (s)	4.7		5.2			30.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	68	411	15	53	564
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	68	411	15	53	564
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	63	378	14	49	519
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	68	411	15	53	564
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			340			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1082	411			426	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1034	288			305	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	90			95	
cM capacity (veh/h)	220	675			1129	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	68	411	15	53	564
Volume Left	0	0	0	53	0
Volume Right	68	0	15	0	0
cSH	675	1700	1700	1129	1700
Volume to Capacity	0.10	0.24	0.01	0.05	0.33
Queue Length 95th (ft)	8	0	0	4	0
Control Delay (s)	10.9	0.0	0.0	8.3	0.0
Lane LOS	B			A	
Approach Delay (s)	10.9	0.0		0.7	
Approach LOS	B				

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	106	9	0	200	58	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992					
Flt Protected					0.950	
Satd. Flow (prot)	1831	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1831	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.77	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	151	10	0	260	63	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	161	0	0	260	63	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 20.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	106	9	0	200	58	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.77	0.92	0.92
Hourly flow rate (vph)	151	10	0	260	63	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			161		416	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			161		416	156
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		89	100
cM capacity (veh/h)			1418		593	889

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	161	260	63
Volume Left	0	0	63
Volume Right	10	0	0
cSH	1700	1418	593
Volume to Capacity	0.09	0.00	0.11
Queue Length 95th (ft)	0	0	9
Control Delay (s)	0.0	0.0	11.8
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.8
Approach LOS			B

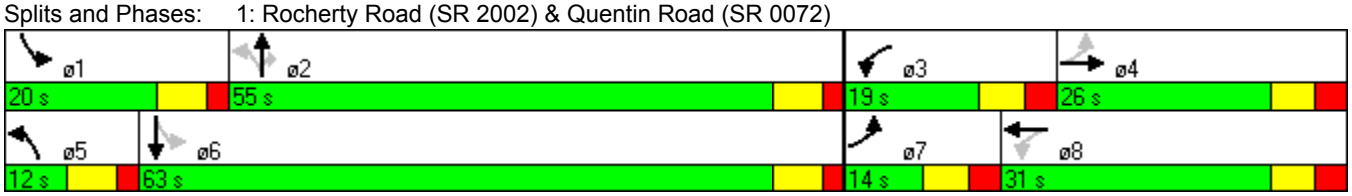
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	87	126	197	136	20	543	102	228	510
Lane Group Flow (vph)	105	158	224	338	27	584	115	245	732
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	14.0	26.0	19.0	31.0	12.0	55.0	55.0	20.0	63.0
Total Split (%)	11.7%	21.7%	15.8%	25.8%	10.0%	45.8%	45.8%	16.7%	52.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.64	0.61	0.70	0.93	0.13	0.77	0.16	0.72	0.80
Control Delay	51.0	56.2	46.6	74.8	13.7	38.8	5.3	27.6	31.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	56.2	46.6	74.8	13.7	38.8	5.3	27.6	31.3
Queue Length 50th (ft)	59	111	137	231	9	388	3	114	456
Queue Length 95th (ft)	96	184	206	#343	18	540	38	#185	#703
Internal Link Dist (ft)		569		654		721			1806
Turn Bay Length (ft)	190		300		105		250	225	
Base Capacity (vph)	163	266	319	370	206	761	714	344	919
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.59	0.70	0.91	0.13	0.77	0.16	0.71	0.80

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 80 (67%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	126	18	197	136	122	20	543	102	228	510	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	12	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.92		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1652		1669	1693		1613	1846	1576	1736	1772	
Flt Permitted	0.25	1.00		0.44	1.00		0.19	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	431	1652		772	1693		319	1846	1576	321	1772	
Peak-hour factor, PHF	0.83	0.93	0.77	0.88	0.82	0.71	0.73	0.93	0.89	0.93	0.89	0.71
Adj. Flow (vph)	105	135	23	224	166	172	27	584	115	245	573	159
RTOR Reduction (vph)	0	5	0	0	31	0	0	0	64	0	8	0
Lane Group Flow (vph)	105	153	0	224	307	0	27	584	51	245	724	0
Heavy Vehicles (%)	4%	9%	0%	3%	6%	5%	6%	1%	4%	2%	2%	1%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	25.5	18.5		35.5	23.5		52.8	49.5	49.5	69.0	59.2	
Effective Green, g (s)	25.5	18.5		35.5	23.5		52.8	49.5	49.5	69.0	59.2	
Actuated g/C Ratio	0.21	0.15		0.30	0.20		0.44	0.41	0.41	0.57	0.49	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	163	255		318	332		176	761	650	338	874	
v/s Ratio Prot	0.04	0.09		c0.07	c0.18		0.00	0.32		c0.08	c0.41	
v/s Ratio Perm	0.10			0.14			0.06		0.03	0.34		
v/c Ratio	0.64	0.60		0.70	0.92		0.15	0.77	0.08	0.72	0.83	
Uniform Delay, d1	40.2	47.3		35.3	47.4		22.0	30.3	21.4	19.5	26.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.20	0.98	
Incremental Delay, d2	9.4	4.4		7.4	30.7		0.6	7.3	0.2	6.8	7.6	
Delay (s)	49.6	51.7		42.7	78.1		22.5	37.6	21.6	30.1	33.1	
Level of Service	D	D		D	E		C	D	C	C	C	
Approach Delay (s)		50.9			64.0			34.5			32.4	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM Average Control Delay	41.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

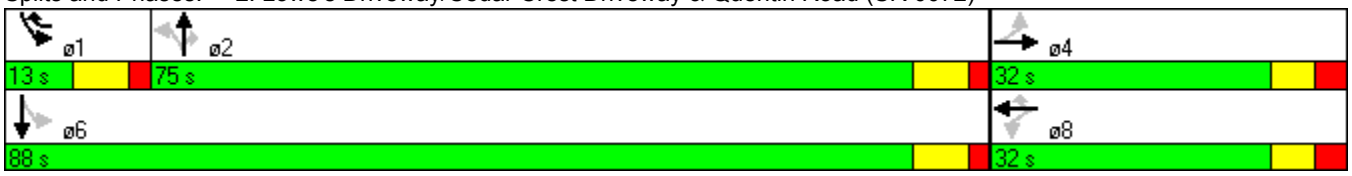
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	13	9	101	10	94	104	641	93	91	726
Lane Group Flow (vph)	0	124	0	139	109	132	704	104	108	797
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	32.0	32.0	32.0	32.0	13.0	75.0	75.0	75.0	13.0	88.0
Total Split (%)	26.7%	26.7%	26.7%	26.7%	10.8%	62.5%	62.5%	62.5%	10.8%	73.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.41		0.74	0.22	0.33	0.60	0.09	0.29	0.58
Control Delay		21.3		69.4	6.6	9.8	10.5	1.3	5.9	7.1
Queue Delay		0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.1
Total Delay		21.3		69.4	6.6	9.8	10.6	1.3	5.9	7.1
Queue Length 50th (ft)		30		103	0	27	145	2	16	162
Queue Length 95th (ft)		29		109	36	m39	m219	m7	m30	252
Internal Link Dist (ft)		216		277			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		368		247	504	395	1175	1127	374	1383
Starvation Cap Reductn		0		0	0	0	0	0	0	54
Spillback Cap Reductn		2		0	3	0	50	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.34		0.56	0.22	0.33	0.63	0.09	0.29	0.60

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	9	66	101	10	94	104	641	93	91	726	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.91			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1595			1838	1584	1832	1909	1766	1638	1910	
Flt Permitted		0.91			0.62	1.00	0.33	1.00	1.00	0.25	1.00	
Satd. Flow (perm)		1463			1186	1584	642	1909	1766	434	1910	
Peak-hour factor, PHF	0.54	0.56	0.79	0.82	0.63	0.86	0.79	0.91	0.89	0.84	0.93	0.81
Adj. Flow (vph)	24	16	84	123	16	109	132	704	104	108	781	16
RTOR Reduction (vph)	0	67	0	0	0	86	0	0	40	0	1	0
Lane Group Flow (vph)	0	57	0	0	139	23	132	704	64	108	796	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%	1%	2%	0%	6%	2%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		19.2			19.2	25.2	73.8	73.8	73.8	86.8	86.8	
Effective Green, g (s)		19.2			19.2	25.2	73.8	73.8	73.8	86.8	86.8	
Actuated g/C Ratio		0.16			0.16	0.21	0.62	0.62	0.62	0.72	0.72	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		234			190	425	395	1174	1086	374	1382	
v/s Ratio Prot						0.00		c0.37		0.01	c0.42	
v/s Ratio Perm		0.04			c0.12	0.01	0.21		0.04	0.19		
v/c Ratio		0.24			0.73	0.05	0.33	0.60	0.06	0.29	0.58	
Uniform Delay, d1		44.0			47.9	37.9	11.2	14.1	9.2	9.3	7.9	
Progression Factor		1.00			1.00	1.00	0.63	0.58	0.56	0.76	0.63	
Incremental Delay, d2		0.7			14.4	0.1	1.6	1.6	0.1	1.0	1.4	
Delay (s)		44.8			62.3	38.0	8.6	9.7	5.2	8.0	6.4	
Level of Service		D			E	D	A	A	A	A	A	
Approach Delay (s)		44.8			51.6			9.0			6.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

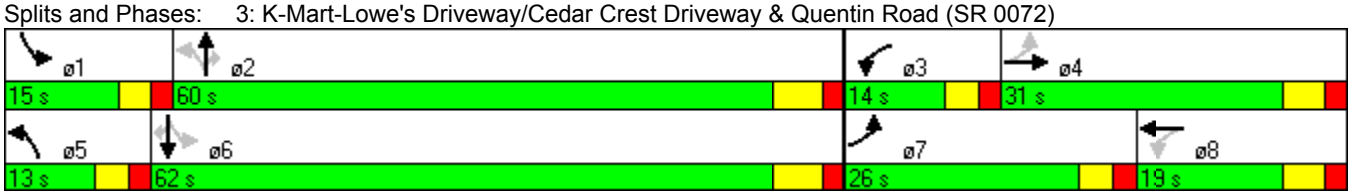
3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	277	37	81	40	56	633	72	192	602	154
Lane Group Flow (vph)	315	163	133	264	68	719	104	204	654	164
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	26.0	31.0	14.0	19.0	13.0	60.0	60.0	15.0	62.0	62.0
Total Split (%)	21.7%	25.8%	11.7%	15.8%	10.8%	50.0%	50.0%	12.5%	51.7%	51.7%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.88	0.43	0.48	0.87	0.22	0.83	0.13	0.78	0.67	0.19
Control Delay	60.6	28.2	37.2	52.8	7.1	24.1	1.1	38.1	23.6	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Total Delay	60.6	28.2	37.2	52.8	7.1	24.6	1.1	38.1	23.6	3.9
Queue Length 50th (ft)	199	64	74	98	8	451	3	79	329	4
Queue Length 95th (ft)	#330	71	81	145	m15	#565	0	m#150	462	m29
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	357	397	280	319	324	865	779	266	973	881
Starvation Cap Reductn	0	0	0	0	0	21	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.41	0.48	0.83	0.21	0.85	0.13	0.77	0.67	0.19

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 119 (99%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	37	89	81	40	178	56	633	72	192	602	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1650		1902	1804		1796	1890	1607	1814	1954	1623
Flt Permitted	0.23	1.00		0.65	1.00		0.23	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	417	1650		1309	1804		432	1890	1607	229	1954	1623
Peak-hour factor, PHF	0.88	0.62	0.86	0.61	0.77	0.84	0.82	0.88	0.69	0.94	0.92	0.94
Adj. Flow (vph)	315	60	103	133	52	212	68	719	104	204	654	164
RTOR Reduction (vph)	0	52	0	0	123	0	0	0	43	0	0	75
Lane Group Flow (vph)	315	111	0	133	141	0	68	719	61	204	654	89
Heavy Vehicles (%)	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	38.0	24.1		20.8	12.0		61.0	54.9	54.9	68.6	58.7	58.7
Effective Green, g (s)	38.0	24.1		20.8	12.0		61.0	54.9	54.9	68.6	58.7	58.7
Actuated g/C Ratio	0.32	0.20		0.17	0.10		0.51	0.46	0.46	0.57	0.49	0.49
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	354	331		270	180		289	865	735	262	956	794
v/s Ratio Prot	c0.15	0.07		0.04	0.08		0.01	c0.38		c0.06	0.33	
v/s Ratio Perm	c0.13			0.05			0.11		0.04	0.38		0.06
v/c Ratio	0.89	0.34		0.49	0.78		0.24	0.83	0.08	0.78	0.68	0.11
Uniform Delay, d1	35.3	41.1		44.1	52.7		17.9	28.5	18.4	21.9	23.5	16.6
Progression Factor	1.00	1.00		1.00	1.00		0.51	0.52	0.12	1.51	0.85	0.88
Incremental Delay, d2	22.7	0.6		1.4	19.5		0.4	8.1	0.2	9.3	2.6	0.2
Delay (s)	58.0	41.7		45.5	72.2		9.5	22.9	2.3	42.5	22.7	14.8
Level of Service	E	D		D	E		A	C	A	D	C	B
Approach Delay (s)		52.5			63.3			19.5			25.4	
Approach LOS		D			E			B			C	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	91.0%	ICU Level of Service	E
Analysis Period (min)	15		

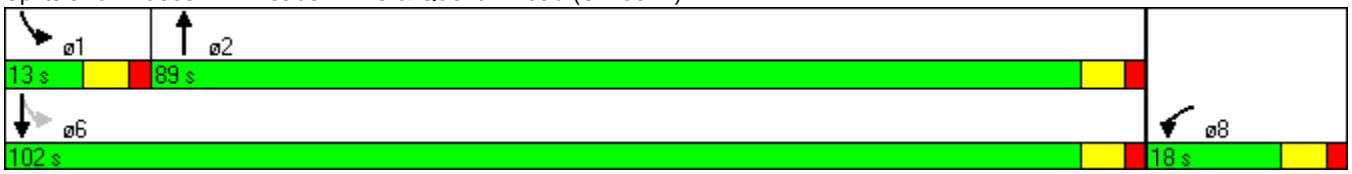
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	31	998	63	1098
Lane Group Flow (vph)	125	1217	85	1168
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	18.0	89.0	13.0	102.0
Total Split (%)	15.0%	74.2%	10.8%	85.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.59	0.92	0.43	0.74
Control Delay	36.1	18.7	12.6	8.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	36.1	18.7	12.6	8.8
Queue Length 50th (ft)	41	401	9	310
Queue Length 95th (ft)	79	#1157	18	547
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			275	
Base Capacity (vph)	258	1324	196	1573
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.48	0.92	0.43	0.74

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 56 (47%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	31	72	998	73	63	1098
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1944		1792		1753	1909
Flt Permitted	0.98		1.00		0.07	1.00
Satd. Flow (perm)	1944		1792		121	1909
Peak-hour factor, PHF	0.78	0.85	0.88	0.88	0.74	0.94
Adj. Flow (vph)	40	85	1134	83	85	1168
RTOR Reduction (vph)	66	0	2	0	0	0
Lane Group Flow (vph)	59	0	1215	0	85	1168
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	9.1		87.3		98.9	98.9
Effective Green, g (s)	9.1		87.3		98.9	98.9
Actuated g/C Ratio	0.08		0.73		0.82	0.82
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	147		1304		176	1573
v/s Ratio Prot	c0.03		c0.68		0.02	c0.61
v/s Ratio Perm					0.37	
v/c Ratio	0.40		0.93		0.48	0.74
Uniform Delay, d1	52.9		13.8		25.9	4.8
Progression Factor	1.00		0.72		1.00	1.00
Incremental Delay, d2	1.8		7.7		2.1	3.2
Delay (s)	54.7		17.6		27.9	8.0
Level of Service	D		B		C	A
Approach Delay (s)	54.7		17.6			9.3
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

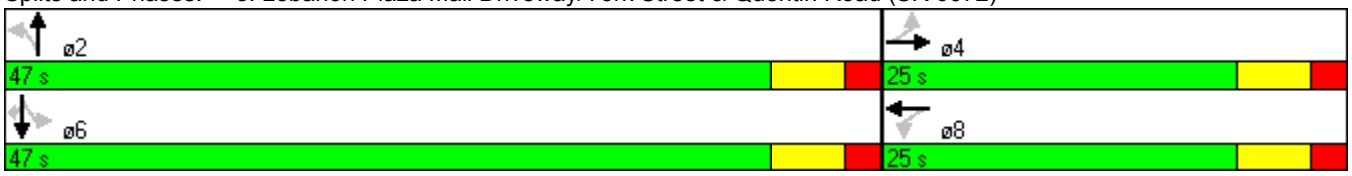
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	50	64	135	111	96	723	40	868	61
Lane Group Flow (vph)	60	204	167	203	112	924	56	933	115
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	34.7%	34.7%	34.7%	34.7%	65.3%	65.3%	65.3%	65.3%	65.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.25	0.46	0.72	0.49	0.69	0.81	0.35	0.80	0.11
Control Delay	24.4	14.1	43.1	24.8	38.8	19.0	15.8	18.3	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	14.1	43.1	24.8	38.8	19.0	15.8	18.3	1.9
Queue Length 50th (ft)	21	31	65	66	28	265	10	266	0
Queue Length 95th (ft)	46	74	111	91	#119	#486	29	#575	2
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	304	539	296	529	162	1139	160	1170	1008
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.38	0.56	0.38	0.69	0.81	0.35	0.80	0.11

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 68
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	64	109	135	111	33	96	723	60	40	868	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1629		1685	1835		1778	1876		1702	1934	1591
Flt Permitted	0.60	1.00		0.60	1.00		0.14	1.00		0.15	1.00	1.00
Satd. Flow (perm)	1083	1629		1058	1835		267	1876		266	1934	1591
Peak-hour factor, PHF	0.83	0.84	0.85	0.81	0.71	0.70	0.86	0.86	0.72	0.71	0.93	0.53
Adj. Flow (vph)	60	76	128	167	156	47	112	841	83	56	933	115
RTOR Reduction (vph)	0	89	0	0	16	0	0	4	0	0	0	45
Lane Group Flow (vph)	60	115	0	167	187	0	112	920	0	56	933	70
Heavy Vehicles (%)	0%	0%	1%	1%	0%	4%	1%	3%	0%	3%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	14.8	14.8		14.8	14.8		41.1	41.1		41.1	41.1	41.1
Effective Green, g (s)	14.8	14.8		14.8	14.8		41.1	41.1		41.1	41.1	41.1
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.61	0.61		0.61	0.61	0.61
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	236	355		231	400		162	1136		161	1171	963
v/s Ratio Prot		0.07			0.10			c0.49			0.48	
v/s Ratio Perm	0.06			c0.16			0.42			0.21		0.04
v/c Ratio	0.25	0.32		0.72	0.47		0.69	0.81		0.35	0.80	0.07
Uniform Delay, d1	22.0	22.3		24.6	23.1		9.1	10.4		6.7	10.2	5.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.7		11.3	1.2		12.0	4.4		1.3	3.9	0.0
Delay (s)	22.8	23.1		36.0	24.3		21.1	14.7		8.0	14.1	5.6
Level of Service	C	C		D	C		C	B		A	B	A
Approach Delay (s)		23.0			29.6			15.4			12.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.2%	ICU Level of Service	H
Analysis Period (min)	15		

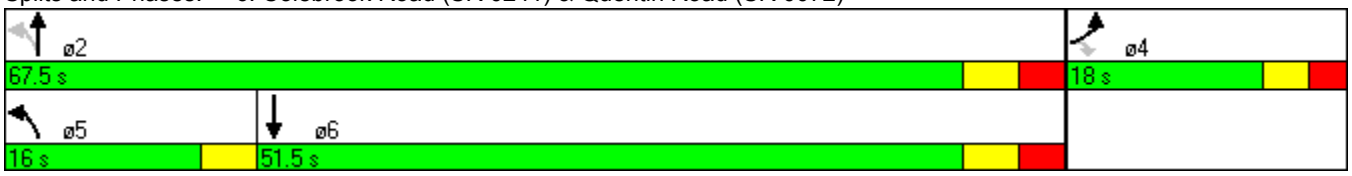
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	101	319	244	703	807
Lane Group Flow (vph)	119	326	271	740	938
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	18.0	18.0	16.0	67.5	51.5
Total Split (%)	21.1%	21.1%	18.7%	78.9%	60.2%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.53	0.67	0.69	0.55	0.93
Control Delay	42.0	11.9	24.9	7.4	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	11.9	24.9	7.4	34.6
Queue Length 50th (ft)	57	0	66	144	396
Queue Length 95th (ft)	106	76	#180	232	#677
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	284	527	408	1543	1263
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.62	0.66	0.48	0.74

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 75.3
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	101	319	244	703	807	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1500	1771	1909	2043	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1660	1500	184	1909	2043	
Peak-hour factor, PHF	0.85	0.98	0.90	0.95	0.96	0.61
Adj. Flow (vph)	119	326	271	740	841	97
RTOR Reduction (vph)	0	282	0	0	5	0
Lane Group Flow (vph)	119	44	271	740	933	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	4%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.2	10.2	52.7	52.7	37.0	
Effective Green, g (s)	10.2	10.2	52.7	52.7	37.0	
Actuated g/C Ratio	0.14	0.14	0.70	0.70	0.49	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	226	204	388	1343	1009	
v/s Ratio Prot	c0.07		c0.11	0.39	c0.46	
v/s Ratio Perm		0.03	0.38			
v/c Ratio	0.53	0.22	0.70	0.55	0.92	
Uniform Delay, d1	30.1	28.8	18.8	5.4	17.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.5	5.4	1.1	14.6	
Delay (s)	32.3	29.3	24.3	6.4	32.2	
Level of Service	C	C	C	A	C	
Approach Delay (s)	30.1			11.2	32.2	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	15.5
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

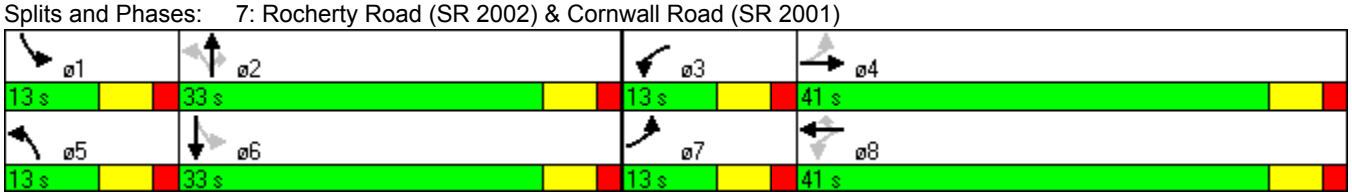
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	66	302	70	335	67	61	115	57	71	143
Lane Group Flow (vph)	93	424	96	381	89	88	144	79	87	255
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	15.0	7.0	15.0	15.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0	21.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	41.0	13.0	41.0	41.0	13.0	33.0	33.0	13.0	33.0
Total Split (%)	13.0%	41.0%	13.0%	41.0%	41.0%	13.0%	33.0%	33.0%	13.0%	33.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.25	0.71	0.29	0.62	0.15	0.24	0.31	0.17	0.20	0.56
Control Delay	14.5	31.3	15.2	28.7	5.7	19.7	30.1	8.0	19.3	31.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	31.3	15.2	28.7	5.7	19.7	30.1	8.0	19.3	31.4
Queue Length 50th (ft)	23	177	24	157	0	28	60	0	27	102
Queue Length 95th (ft)	45	305	48	276	20	51	110	20	61	194
Internal Link Dist (ft)		1052		405			731			260
Turn Bay Length (ft)	225		225		325	150		350	240	
Base Capacity (vph)	365	919	329	949	858	369	732	670	428	703
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.46	0.29	0.40	0.10	0.24	0.20	0.12	0.20	0.36

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 75.1
Natural Cycle: 70
Control Type: Semi Act-Uncoord

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	302	71	70	335	67	61	115	57	71	143	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1727	1800		1702	1872	1607	1754	1872	1591	1702	1755	
Flt Permitted	0.36	1.00		0.30	1.00	1.00	0.48	1.00	1.00	0.67	1.00	
Satd. Flow (perm)	649	1800		536	1872	1607	890	1872	1591	1192	1755	
Peak-hour factor, PHF	0.71	0.87	0.92	0.73	0.88	0.75	0.69	0.80	0.72	0.82	0.87	0.85
Adj. Flow (vph)	93	347	77	96	381	89	88	144	79	87	164	91
RTOR Reduction (vph)	0	8	0	0	0	61	0	0	60	0	21	0
Lane Group Flow (vph)	93	416	0	96	381	28	88	144	19	87	234	0
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	2%	2%	3%	0%
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	29.6	24.5		29.6	24.5	24.5	23.7	18.6	18.6	23.7	18.6	
Effective Green, g (s)	29.6	24.5		29.6	24.5	24.5	23.7	18.6	18.6	23.7	18.6	
Actuated g/C Ratio	0.38	0.32		0.38	0.32	0.32	0.31	0.24	0.24	0.31	0.24	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	320	571		282	593	509	330	450	383	399	422	
v/s Ratio Prot	0.02	c0.23		c0.02	0.20		c0.02	0.08		0.01	c0.13	
v/s Ratio Perm	0.09			0.11		0.02	0.06		0.01	0.05		
v/c Ratio	0.29	0.73		0.34	0.64	0.06	0.27	0.32	0.05	0.22	0.56	
Uniform Delay, d1	16.0	23.4		16.4	22.6	18.4	19.7	24.1	22.6	19.6	25.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	4.9		0.7	2.7	0.1	0.4	1.5	0.2	0.3	4.1	
Delay (s)	16.5	28.4		17.1	25.3	18.4	20.1	25.6	22.7	19.9	29.9	
Level of Service	B	C		B	C	B	C	C	C	B	C	
Approach Delay (s)		26.2			22.8			23.3			27.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

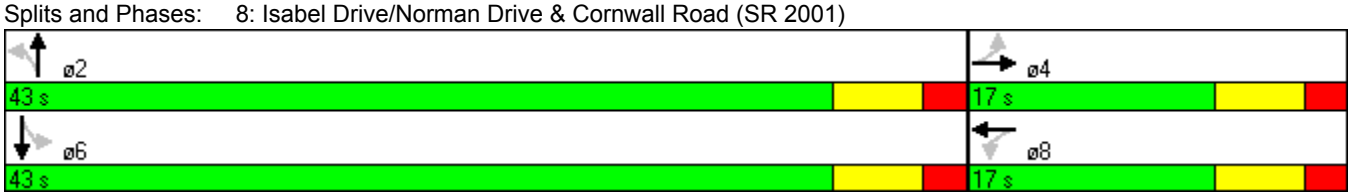
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	32	3	3	6	50	317	6	360
Lane Group Flow (vph)	0	145	0	46	0	423	0	520
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	17.0	17.0	17.0	17.0	43.0	43.0	43.0	43.0
Total Split (%)	28.3%	28.3%	28.3%	28.3%	71.7%	71.7%	71.7%	71.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.35		0.12		0.48		0.54
Control Delay		8.9		9.0		9.3		9.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		8.9		9.0		9.3		9.9
Queue Length 50th (ft)		8		3		52		66
Queue Length 95th (ft)		24		10		122		111
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		565		544		1517		1654
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.26		0.08		0.28		0.31

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 36.6
Natural Cycle: 40
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	3	67	3	6	17	50	317	3	6	360	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.92			1.00			0.99	
Flt Protected		0.98			0.99			0.99			1.00	
Satd. Flow (prot)		1871			1896			1774			1726	
Flt Permitted		0.87			0.90			0.88			0.99	
Satd. Flow (perm)		1654			1731			1566			1708	
Peak-hour factor, PHF	0.65	0.64	0.74	0.38	0.50	0.66	0.85	0.89	0.38	0.53	0.74	0.70
Adj. Flow (vph)	49	5	91	8	12	26	59	356	8	11	486	23
RTOR Reduction (vph)	0	76	0	0	22	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	69	0	0	24	0	0	422	0	0	517	0
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	0%	0%	0%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.3			6.3			19.4			19.4	
Effective Green, g (s)		6.3			6.3			19.4			19.4	
Actuated g/C Ratio		0.17			0.17			0.51			0.51	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		276			289			806			879	
v/s Ratio Prot												
v/s Ratio Perm		c0.04			0.01			0.27			c0.30	
v/c Ratio		0.25			0.08			0.52			0.59	
Uniform Delay, d1		13.6			13.3			6.1			6.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			0.1			0.6			1.0	
Delay (s)		14.1			13.4			6.7			7.4	
Level of Service		B			B			A			A	
Approach Delay (s)		14.1			13.4			6.7			7.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

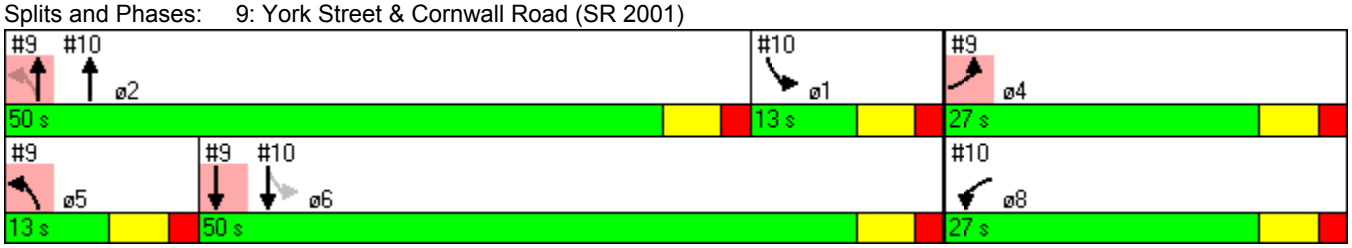
c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	ø1	ø8
Lane Configurations						
Volume (vph)	140	38	318	301		
Lane Group Flow (vph)	199	0	387	568		
Turn Type		pm+pt				
Protected Phases	4	5	2	6	1	8
Permitted Phases		2				
Detector Phase	4	5	2	6		
Switch Phase						
Minimum Initial (s)	7.0	7.0	15.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	21.0	13.0	13.0
Total Split (s)	27.0	13.0	50.0	50.0	13.0	27.0
Total Split (%)	30.0%	14.4%	55.6%	55.6%	14%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lead	Lag	Lag	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	None
v/c Ratio	0.42		0.49	0.66		
Control Delay	19.0		11.4	10.8		
Queue Delay	0.0		0.0	0.0		
Total Delay	19.0		11.5	10.8		
Queue Length 50th (ft)	42		64	68		
Queue Length 95th (ft)	106		155	135		
Internal Link Dist (ft)	1228		849	232		
Turn Bay Length (ft)						
Base Capacity (vph)	816		1446	1536		
Starvation Cap Reductn	0		0	55		
Spillback Cap Reductn	0		8	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.24		0.27	0.38		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 48.9
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 9: York Street & Cornwall Road (SR 2001)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	25	38	318	301	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.98			1.00	0.95	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1772			1856	1749	
Flt Permitted	0.96			0.88	1.00	
Satd. Flow (perm)	1772			1652	1749	
Peak-hour factor, PHF	0.82	0.88	0.78	0.94	0.88	0.87
Adj. Flow (vph)	171	28	49	338	342	226
RTOR Reduction (vph)	7	0	0	0	27	0
Lane Group Flow (vph)	192	0	0	387	541	0
Heavy Vehicles (%)	1%	0%	0%	2%	4%	1%
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	12.8			23.3	23.3	
Effective Green, g (s)	12.8			23.3	23.3	
Actuated g/C Ratio	0.27			0.48	0.48	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	472			800	847	
v/s Ratio Prot	c0.11				c0.31	
v/s Ratio Perm				0.23		
v/c Ratio	0.41			0.48	0.64	
Uniform Delay, d1	14.5			8.4	9.3	
Progression Factor	1.00			1.00	0.74	
Incremental Delay, d2	0.6			0.5	1.6	
Delay (s)	15.1			8.8	8.4	
Level of Service	B			A	A	
Approach Delay (s)	15.1			8.8	8.4	
Approach LOS	B			A	A	

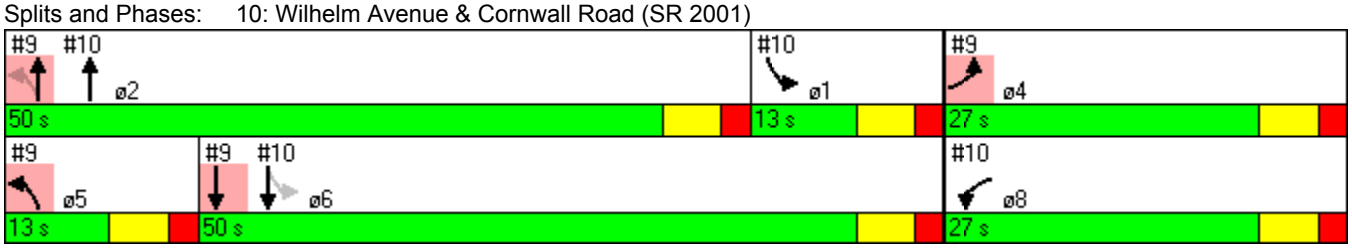
Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	48.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT	ø4	ø5
Lane Configurations						
Volume (vph)	166	237	52	304		
Lane Group Flow (vph)	238	499	0	410		
Turn Type			pm+pt			
Protected Phases	8	2	1	6	4	5
Permitted Phases			6			
Detector Phase	8	2	1	6		
Switch Phase						
Minimum Initial (s)	7.0	15.0	7.0	15.0	7.0	7.0
Minimum Split (s)	13.0	21.0	13.0	21.0	13.0	13.0
Total Split (s)	27.0	50.0	13.0	50.0	27.0	13.0
Total Split (%)	30.0%	55.6%	14.4%	55.6%	30%	14%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lag	Lag		Lead
Lead-Lag Optimize?		Yes	Yes	Yes		Yes
Recall Mode	None	Min	None	Min	None	None
v/c Ratio	0.52	0.57		0.49		
Control Delay	20.4	8.4		11.3		
Queue Delay	0.0	0.0		0.0		
Total Delay	20.4	8.4		11.3		
Queue Length 50th (ft)	50	52		68		
Queue Length 95th (ft)	140	112		163		
Internal Link Dist (ft)	945	232		841		
Turn Bay Length (ft)						
Base Capacity (vph)	784	1533		1524		
Starvation Cap Reductn	0	75		0		
Spillback Cap Reductn	0	0		42		
Storage Cap Reductn	0	0		0		
Reduced v/c Ratio	0.30	0.34		0.28		

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 48.9
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	166	42	237	198	52	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Total Lost time (s)	6.0		6.0			6.0
Lane Util. Factor	1.00		1.00			1.00
Frt	0.97		0.94			1.00
Flt Protected	0.96		1.00			0.99
Satd. Flow (prot)	1690		1743			2040
Flt Permitted	0.96		1.00			0.85
Satd. Flow (perm)	1690		1743			1743
Peak-hour factor, PHF	0.92	0.73	0.90	0.84	0.72	0.90
Adj. Flow (vph)	180	58	263	236	72	338
RTOR Reduction (vph)	12	0	36	0	0	0
Lane Group Flow (vph)	226	0	463	0	0	410
Heavy Vehicles (%)	2%	9%	3%	1%	0%	5%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	12.8		23.3			23.3
Effective Green, g (s)	12.8		23.3			23.3
Actuated g/C Ratio	0.27		0.48			0.48
Clearance Time (s)	6.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	450		844			844
v/s Ratio Prot	c0.13		c0.27			
v/s Ratio Perm						0.24
v/c Ratio	0.50		0.55			0.49
Uniform Delay, d1	14.9		8.7			8.4
Progression Factor	1.00		0.68			1.00
Incremental Delay, d2	0.9		0.7			0.4
Delay (s)	15.8		6.7			8.8
Level of Service	B		A			A
Approach Delay (s)	15.8		6.7			8.8
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	48.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

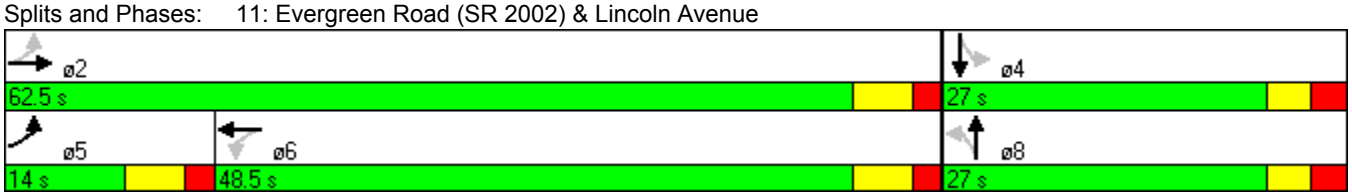
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	75	311	5	340	14	14	31	34
Lane Group Flow (vph)	100	398	10	433	0	49	0	199
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	14.0	62.5	48.5	48.5	27.0	27.0	27.0	27.0
Total Split (%)	15.6%	69.8%	54.2%	54.2%	30.2%	30.2%	30.2%	30.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.21	0.41	0.03	0.65		0.15		0.55
Control Delay	6.5	7.9	12.8	20.5		20.1		21.8
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.5	7.9	12.8	20.5		20.1		21.8
Queue Length 50th (ft)	12	57	2	117		12		40
Queue Length 95th (ft)	28	116	6	235		23		78
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	495	1595	759	1360		694		694
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.20	0.25	0.01	0.32		0.07		0.29

Intersection Summary

Cycle Length: 89.5
Actuated Cycle Length: 54.3
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	311	15	5	340	33	14	14	1	31	34	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1702	1695		1727	1713			1880			1717	
Flt Permitted	0.31	1.00		0.53	1.00			0.86			0.91	
Satd. Flow (perm)	547	1695		959	1713			1654			1576	
Peak-hour factor, PHF	0.75	0.82	0.81	0.50	0.91	0.56	0.75	0.53	0.25	0.69	0.71	0.90
Adj. Flow (vph)	100	379	19	10	374	59	19	26	4	45	48	106
RTOR Reduction (vph)	0	2	0	0	7	0	0	3	0	0	48	0
Lane Group Flow (vph)	100	396	0	10	426	0	0	46	0	0	151	0
Heavy Vehicles (%)	2%	7%	8%	0%	4%	4%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	32.8	32.8		20.9	20.9			10.8			10.8	
Effective Green, g (s)	32.8	32.8		20.9	20.9			10.8			10.8	
Actuated g/C Ratio	0.60	0.60		0.38	0.38			0.20			0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	449	1009		364	650			324			309	
v/s Ratio Prot	0.02	c0.23			c0.25							
v/s Ratio Perm	0.11			0.01				0.03			c0.10	
v/c Ratio	0.22	0.39		0.03	0.65			0.14			0.49	
Uniform Delay, d1	6.0	5.9		10.7	14.1			18.3			19.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	0.7		0.1	3.8			0.2			1.2	
Delay (s)	6.2	6.6		10.8	17.9			18.5			20.9	
Level of Service	A	A		B	B			B			C	
Approach Delay (s)		6.5			17.8			18.5			20.9	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	17.5
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	24	396	437	3	4	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999		0.892	
Flt Protected	0.950				0.990	
Satd. Flow (prot)	1676	1825	1898	0	1645	0
Flt Permitted	0.950				0.990	
Satd. Flow (perm)	1676	1825	1898	0	1645	0
Link Speed (mph)		40	40		25	
Link Distance (ft)		480	1348		405	
Travel Time (s)		8.2	23.0		11.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	430	475	3	4	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	430	478	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.07	1.03	0.97	0.97	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 33.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	24	396	437	3	4	15
Sign Control		Free	Free		Stop	
Grade		4%	-4%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	430	475	3	4	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)		965				
pX, platoon unblocked					0.89	
vC, conflicting volume	478				959	477
vC1, stage 1 conf vol					477	
vC2, stage 2 conf vol					483	
vCu, unblocked vol	478				890	477
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	97
cM capacity (veh/h)	1084				492	588

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	26	430	478	21
Volume Left	26	0	0	4
Volume Right	0	0	3	16
cSH	1084	1700	1700	565
Volume to Capacity	0.02	0.25	0.28	0.04
Queue Length 95th (ft)	2	0	0	3
Control Delay (s)	8.4	0.0	0.0	11.6
Lane LOS	A			B
Approach Delay (s)	0.5		0.0	11.6
Approach LOS				B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	420	449	3	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1879	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1879	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	457	488	3	0	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	457	491	0	0	15
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 33.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	420	449	3	0	14
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	457	488	3	0	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485				
pX, platoon unblocked					0.83	
vC, conflicting volume	491				946	490
vC1, stage 1 conf vol					490	
vC2, stage 2 conf vol					457	
vCu, unblocked vol	491				830	490
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	97
cM capacity (veh/h)	1072				506	579

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	457	491	15
Volume Left	0	0	0
Volume Right	0	3	15
cSH	1700	1700	579
Volume to Capacity	0.27	0.29	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	11.4
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.4
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	36	219	15	46	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	150	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1909	1591	1702	1835
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1909	1591	1702	1835
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			2010
Travel Time (s)	4.7		5.2			30.5
Peak Hour Factor	0.92	0.92	0.89	0.92	0.92	0.87
Heavy Vehicles (%)	2%	2%	0%	2%	2%	3%
Adj. Flow (vph)	0	39	246	16	50	318
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	39	246	16	50	318
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 21.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	36	219	15	46	277
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.89	0.92	0.92	0.87
Hourly flow rate (vph)	0	39	246	16	50	318
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			340			
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	664	246			262	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	635	202			219	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			96	
cM capacity (veh/h)	411	810			1305	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	39	246	16	50	318
Volume Left	0	0	0	50	0
Volume Right	39	0	16	0	0
cSH	810	1700	1700	1305	1700
Volume to Capacity	0.05	0.14	0.01	0.04	0.19
Queue Length 95th (ft)	4	0	0	3	0
Control Delay (s)	9.7	0.0	0.0	7.9	0.0
Lane LOS	A			A	
Approach Delay (s)	9.7	0.0		1.1	
Approach LOS	A				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	9	3	0	23	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.976					
Flt Protected					0.950	
Satd. Flow (prot)	1833	0	0	1827	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1833	0	0	1827	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.64	0.92	0.92	0.50	0.92	0.92
Heavy Vehicles (%)	1%	2%	2%	4%	2%	2%
Adj. Flow (vph)	14	3	0	46	3	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	46	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 13.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	9	3	0	23	3	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.64	0.92	0.92	0.50	0.92	0.92
Hourly flow rate (vph)	14	3	0	46	3	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			17		62	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		62	16
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1600		945	1064

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	46	3
Volume Left	0	0	3
Volume Right	3	0	0
cSH	1700	1600	945
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

2035 BASE CONDITIONS

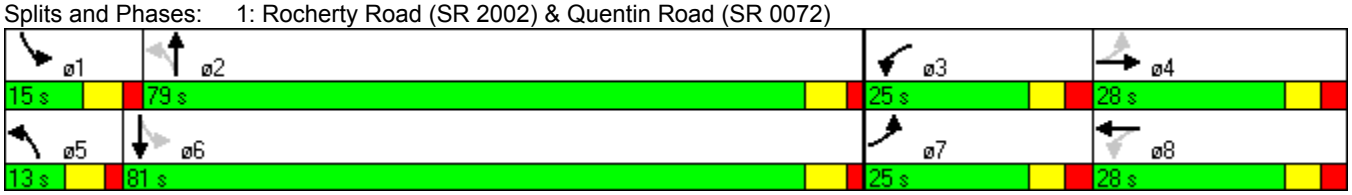
1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	120	328	236	222	20	548	116	406
Lane Group Flow (vph)	130	370	257	343	22	844	126	478
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.5	21.5	12.5	21.5
Total Split (s)	25.0	28.0	25.0	28.0	13.0	79.0	15.0	81.0
Total Split (%)	17.0%	19.0%	17.0%	19.0%	8.8%	53.7%	10.2%	55.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.60	1.47	1.08	1.13	0.06	1.03	0.80	0.53
Control Delay	50.6	275.7	122.4	142.3	13.0	74.2	59.9	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	275.7	122.4	142.3	13.0	74.2	59.9	25.3
Queue Length 50th (ft)	93	~488	~228	~374	8	~850	59	308
Queue Length 95th (ft)	151	#698	#426	#616	21	#1108	#173	420
Internal Link Dist (ft)		569		654		721		1806
Turn Bay Length (ft)	190		300		105		225	
Base Capacity (vph)	253	251	238	304	357	822	157	901
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	1.47	1.08	1.13	0.06	1.03	0.80	0.53

Intersection Summary

Cycle Length: 147
Actuated Cycle Length: 147
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	328	12	236	222	94	20	548	228	116	406	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	11	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1677	1750		1577	1778		1425	1646		1640	1659	
Flt Permitted	0.19	1.00		0.16	1.00		0.40	1.00		0.07	1.00	
Satd. Flow (perm)	336	1750		273	1778		596	1646		120	1659	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	357	13	257	241	102	22	596	248	126	441	37
RTOR Reduction (vph)	0	1	0	0	10	0	0	10	0	0	2	0
Lane Group Flow (vph)	130	369	0	257	333	0	22	834	0	126	476	0
Heavy Vehicles (%)	3%	3%	13%	9%	3%	6%	20%	10%	4%	8%	12%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.7	21.0		42.3	24.3		79.0	75.1		88.2	79.7	
Effective Green, g (s)	35.7	21.0		42.3	24.3		79.0	75.1		88.2	79.7	
Actuated g/C Ratio	0.24	0.14		0.28	0.16		0.53	0.50		0.59	0.53	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	212	246		234	289		336	826		157	884	
v/s Ratio Prot	0.06	c0.21		c0.13	c0.19		0.00	c0.51		c0.05	c0.29	
v/s Ratio Perm	0.09			0.18			0.03			0.43		
v/c Ratio	0.61	1.50		1.10	1.15		0.07	1.01		0.80	0.54	
Uniform Delay, d1	48.0	64.3		47.4	62.6		17.6	37.2		32.7	22.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.9	245.4		87.6	100.5		0.1	33.7		26.0	1.5	
Delay (s)	54.0	309.7		135.0	163.2		17.7	71.0		58.7	24.4	
Level of Service	D	F		F	F		B	E		E	C	
Approach Delay (s)		243.2			151.1			69.6			31.6	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM Average Control Delay	113.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	149.6	Sum of lost time (s)	40.5
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	6	1	27	2	32	33	649	46	37	491
Lane Group Flow (vph)	0	56	0	33	35	40	705	50	40	546
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	22.0	14.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0	14.0	72.0	72.0	72.0	14.0	86.0
Total Split (%)	20.4%	20.4%	20.4%	20.4%	13.0%	66.7%	66.7%	66.7%	13.0%	79.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	Min	None	Min
v/c Ratio		0.23		0.20	0.10	0.07	0.56	0.04	0.11	0.39
Control Delay		16.8		35.0	9.0	9.9	14.3	3.2	4.5	5.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		16.8		35.0	9.0	9.9	14.3	3.2	4.5	5.3
Queue Length 50th (ft)		5		13	0	9	249	0	5	92
Queue Length 95th (ft)		0		24	22	24	424	15	15	174
Internal Link Dist (ft)		216		230			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		405		285	335	696	1582	1537	365	1664
Starvation Cap Reductn		0		0	0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.14		0.12	0.10	0.06	0.45	0.03	0.11	0.33

Intersection Summary

Cycle Length: 108
Actuated Cycle Length: 64.9
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1	27	27	2	32	33	649	46	37	491	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1521			1436	1226	1609	1770	1714	1305	1713	
Flt Permitted		0.94			0.74	1.00	0.46	1.00	1.00	0.24	1.00	
Satd. Flow (perm)		1444			1104	1226	779	1770	1714	332	1713	
Peak-hour factor, PHF	0.75	0.25	0.61	0.92	0.50	0.92	0.83	0.92	0.92	0.92	0.92	0.42
Adj. Flow (vph)	8	4	44	29	4	35	40	705	50	40	534	12
RTOR Reduction (vph)	0	41	0	0	0	31	0	0	21	0	1	0
Lane Group Flow (vph)	0	15	0	0	33	4	40	705	29	40	545	0
Heavy Vehicles (%)	17%	0%	4%	25%	50%	33%	15%	10%	3%	33%	14%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		5.1			5.1	8.6	41.6	41.6	41.6	52.1	52.1	
Effective Green, g (s)		5.1			5.1	8.6	41.6	41.6	41.6	52.1	52.1	
Actuated g/C Ratio		0.07			0.07	0.12	0.58	0.58	0.58	0.73	0.73	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		103			79	269	455	1034	1001	291	1253	
v/s Ratio Prot						0.00		c0.40		0.01	c0.32	
v/s Ratio Perm		0.01			c0.03	0.00	0.05		0.02	0.09		
v/c Ratio		0.15			0.42	0.02	0.09	0.68	0.03	0.14	0.44	
Uniform Delay, d1		31.0			31.6	27.6	6.5	10.2	6.3	5.4	3.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.9			4.8	0.1	0.2	2.8	0.0	0.6	0.7	
Delay (s)		31.9			36.4	27.6	6.7	13.1	6.3	6.0	4.4	
Level of Service		C			D	C	A	B	A	A	A	
Approach Delay (s)		31.9			31.9			12.3			4.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	21.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

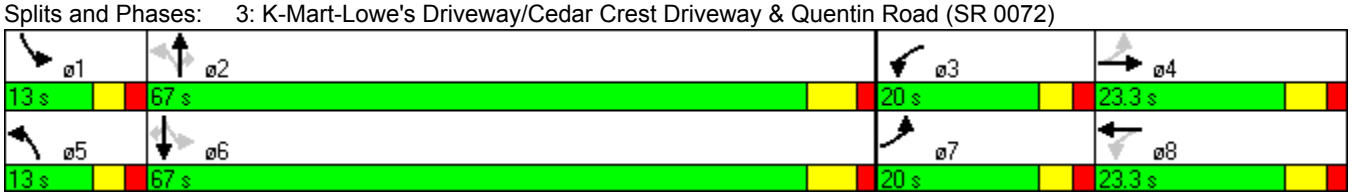
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	78	7	19	6	35	586	32	63	510	39
Lane Group Flow (vph)	104	40	32	135	48	637	48	88	554	68
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	20.0	23.3	20.0	23.3	13.0	67.0	67.0	13.0	67.0	67.0
Total Split (%)	16.2%	18.9%	16.2%	18.9%	10.5%	54.3%	54.3%	10.5%	54.3%	54.3%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.34	0.15	0.11	0.48	0.12	0.80	0.06	0.24	0.65	0.09
Control Delay	31.1	21.3	28.6	17.6	8.4	30.0	5.2	9.5	22.0	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	21.3	28.6	17.6	8.4	30.1	5.2	9.5	22.0	3.9
Queue Length 50th (ft)	43	6	13	6	9	293	1	18	232	0
Queue Length 95th (ft)	90	19	28	0	22	523	11	35	421	5
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	390	378	502	507	434	1227	1190	390	1237	1100
Starvation Cap Reductn	0	0	0	0	0	27	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.11	0.06	0.27	0.11	0.53	0.04	0.23	0.45	0.06

Intersection Summary

Cycle Length: 123.3
Actuated Cycle Length: 82.9
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	7	19	19	6	74	35	586	32	63	510	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1567	1429		1902	1722		1618	1673	1607	1778	1686	1476
Flt Permitted	0.43	1.00		0.73	1.00		0.33	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	713	1429		1464	1722		557	1673	1607	409	1686	1476
Peak-hour factor, PHF	0.75	0.58	0.68	0.59	0.50	0.60	0.73	0.92	0.67	0.72	0.92	0.57
Adj. Flow (vph)	104	12	28	32	12	123	48	637	48	88	554	68
RTOR Reduction (vph)	0	23	0	0	110	0	0	0	23	0	0	35
Lane Group Flow (vph)	104	17	0	32	25	0	48	637	25	88	554	33
Heavy Vehicles (%)	8%	14%	16%	0%	0%	4%	11%	13%	0%	2%	17%	10%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.7	14.1		13.3	9.4		44.1	40.4	40.4	47.5	42.1	42.1
Effective Green, g (s)	22.7	14.1		13.3	9.4		44.1	40.4	40.4	47.5	42.1	42.1
Actuated g/C Ratio	0.26	0.16		0.15	0.11		0.51	0.47	0.47	0.55	0.49	0.49
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	273	234		246	188		331	785	754	311	824	722
v/s Ratio Prot	c0.04	0.01		0.01	0.01		0.01	c0.38		c0.02	0.33	
v/s Ratio Perm	c0.06			0.01			0.07		0.02	0.14		0.02
v/c Ratio	0.38	0.07		0.13	0.14		0.15	0.81	0.03	0.28	0.67	0.05
Uniform Delay, d1	25.2	30.5		31.3	34.7		11.4	19.6	12.3	11.8	16.7	11.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1		0.2	0.3		0.2	7.5	0.1	0.5	3.3	0.1
Delay (s)	26.1	30.6		31.5	35.0		11.6	27.1	12.4	12.3	20.1	11.6
Level of Service	C	C		C	D		B	C	B	B	C	B
Approach Delay (s)		27.3			34.3			25.1			18.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	86.1	Sum of lost time (s)	21.5
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

4: Isabel Drive & Quentin Road (SR 0072)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	28	37	613	62	65	645
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Grade (%)	-2%		3%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.923		0.988			
Flt Protected	0.979					0.995
Satd. Flow (prot)	1890	0	1625	0	0	1686
Flt Permitted	0.979					0.995
Satd. Flow (perm)	1890	0	1625	0	0	1686
Link Speed (mph)	30		45			45
Link Distance (ft)	408		1653			553
Travel Time (s)	9.3		25.0			8.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	10%	10%	10%	10%
Adj. Flow (vph)	30	40	666	67	71	701
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	0	733	0	0	772
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.84	0.84	1.07	1.07	1.02	1.02
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 87.4% ICU Level of Service E
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	28	37	613	62	65	645
Sign Control	Stop		Free			Free
Grade	-2%		3%			-3%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	40	666	67	71	701
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1542	700			734	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1542	700			734	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	73	91			92	
cM capacity (veh/h)	115	436			836	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	71	734	772
Volume Left	30	0	71
Volume Right	40	67	0
cSH	198	1700	836
Volume to Capacity	0.36	0.43	0.08
Queue Length 95th (ft)	38	0	7
Control Delay (s)	33.0	0.0	2.2
Lane LOS	D		A
Approach Delay (s)	33.0	0.0	2.2
Approach LOS	D		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

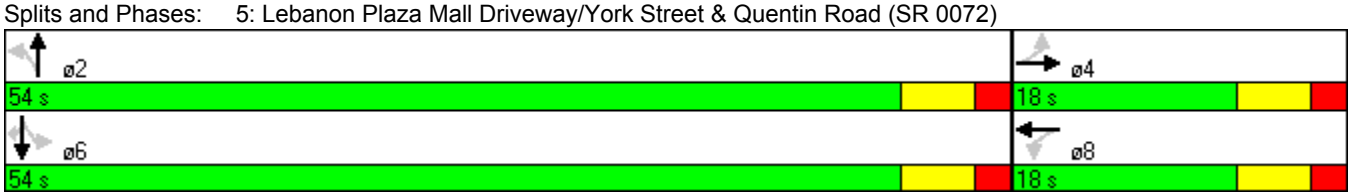
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	4	5	69	10	6	568	36	652	4
Lane Group Flow (vph)	8	20	75	36	20	646	39	709	8
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	18.0	18.0	18.0	18.0	54.0	54.0	54.0	54.0	54.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.05	0.07	0.34	0.12	0.05	0.52	0.08	0.56	0.01
Control Delay	22.5	17.9	27.9	13.8	4.8	7.7	5.1	8.4	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	17.9	27.9	13.8	4.8	7.7	5.1	8.4	2.8
Queue Length 50th (ft)	3	4	25	4	2	112	5	131	0
Queue Length 95th (ft)	7	8	60	22	3	211	16	247	2
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	205	310	252	342	433	1431	530	1449	1323
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.06	0.30	0.11	0.05	0.45	0.07	0.49	0.01

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 62.2
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	5	5	69	10	22	6	568	27	36	652	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.90		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1375	1575		1668	1671		1535	1756		1686	1778	1623
Flt Permitted	0.73	1.00		0.74	1.00		0.33	1.00		0.37	1.00	1.00
Satd. Flow (perm)	1062	1575		1307	1671		532	1756		651	1778	1623
Peak-hour factor, PHF	0.50	0.42	0.63	0.92	0.83	0.92	0.30	0.92	0.92	0.92	0.92	0.50
Adj. Flow (vph)	8	12	8	75	12	24	20	617	29	39	709	8
RTOR Reduction (vph)	0	7	0	0	21	0	0	2	0	0	0	3
Lane Group Flow (vph)	8	13	0	75	15	0	20	644	0	39	709	5
Heavy Vehicles (%)	25%	0%	20%	2%	10%	0%	17%	11%	0%	4%	11%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.4	8.4		8.4	8.4		43.1	43.1		43.1	43.1	43.1
Effective Green, g (s)	8.4	8.4		8.4	8.4		43.1	43.1		43.1	43.1	43.1
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.68	0.68		0.68	0.68	0.68
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	140	208		173	221		361	1192		442	1207	1102
v/s Ratio Prot		0.01			0.01			0.37			c0.40	
v/s Ratio Perm	0.01			c0.06			0.04			0.06		0.00
v/c Ratio	0.06	0.06		0.43	0.07		0.06	0.54		0.09	0.59	0.00
Uniform Delay, d1	24.1	24.1		25.4	24.1		3.4	5.2		3.5	5.4	3.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2		2.4	0.2		0.1	0.5		0.1	0.7	0.0
Delay (s)	24.3	24.3		27.7	24.3		3.5	5.7		3.6	6.2	3.3
Level of Service	C	C		C	C		A	A		A	A	A
Approach Delay (s)		24.3			26.6			5.6			6.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	63.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

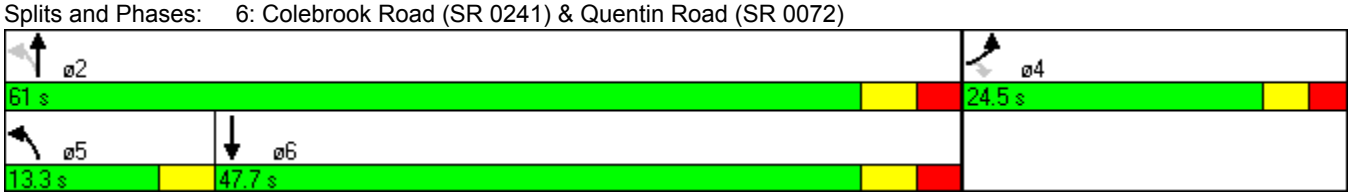
6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	181	231	168	538	542
Lane Group Flow (vph)	197	251	183	585	684
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	24.5	24.5	13.3	61.0	47.7
Total Split (%)	28.7%	28.7%	15.6%	71.3%	55.8%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.61	0.52	0.51	0.54	0.88
Control Delay	35.7	8.3	11.5	9.8	32.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	8.3	11.5	9.8	32.2
Queue Length 50th (ft)	75	0	24	120	245
Queue Length 95th (ft)	162	59	73	231	432
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	478	596	374	1435	1166
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.42	0.49	0.41	0.59

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 67.8
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	181	231	168	538	542	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1627	1428	1625	1769	1825	
Flt Permitted	0.95	1.00	0.15	1.00	1.00	
Satd. Flow (perm)	1627	1428	250	1769	1825	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	251	183	585	589	95
RTOR Reduction (vph)	0	201	0	0	7	0
Lane Group Flow (vph)	197	50	183	585	677	0
Heavy Vehicles (%)	3%	5%	9%	9%	13%	12%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	13.4	13.4	41.8	41.8	28.7	
Effective Green, g (s)	13.4	13.4	41.8	41.8	28.7	
Actuated g/C Ratio	0.20	0.20	0.62	0.62	0.43	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	324	285	352	1100	779	
v/s Ratio Prot	c0.12		0.07	c0.33	c0.37	
v/s Ratio Perm		0.04	0.25			
v/c Ratio	0.61	0.18	0.52	0.53	0.87	
Uniform Delay, d1	24.5	22.3	9.7	7.2	17.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.2	0.3	1.3	1.2	11.4	
Delay (s)	27.7	22.6	11.0	8.4	28.9	
Level of Service	C	C	B	A	C	
Approach Delay (s)	24.9			9.0	28.9	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	18.5
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

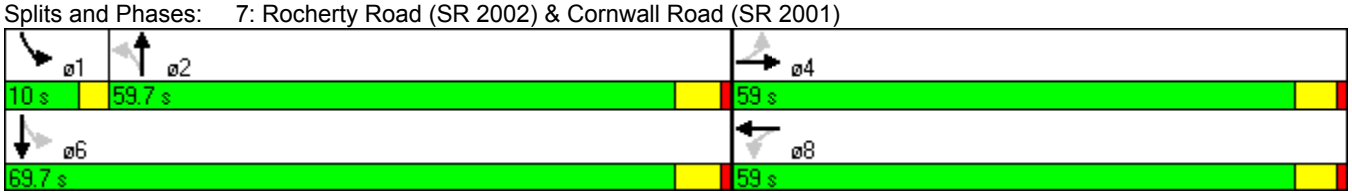
7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	66	542	44	425	25	273	215	137
Lane Group Flow (vph)	0	698	0	717	0	582	0	451
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.2	9.2	9.2	9.2	20.5	20.5	6.0	20.5
Total Split (s)	59.0	59.0	59.0	59.0	59.7	59.7	10.0	69.7
Total Split (%)	45.8%	45.8%	45.8%	45.8%	46.4%	46.4%	7.8%	54.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.4	4.4	3.0	4.4
All-Red Time (s)	1.2	1.2	1.2	1.2	1.1	1.1	0.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	5.5	5.5	3.0	5.5
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Max	Min
v/c Ratio		1.34		1.19		0.82		1.29
Control Delay		196.5		134.5		41.3		177.5
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		196.5		134.5		41.3		177.5
Queue Length 50th (ft)		~760		~713		398		~380
Queue Length 95th (ft)		#1001		#955		564		#675
Internal Link Dist (ft)		1052		2233		731		2352
Turn Bay Length (ft)								
Base Capacity (vph)		522		603		714		350
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		1.34		1.19		0.82		1.29

Intersection Summary

Cycle Length: 128.7
Actuated Cycle Length: 128.7
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	542	34	44	425	190	25	273	237	215	137	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	10	10	10
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)		5.2			5.2			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			0.94			0.98	
Flt Protected		0.99			1.00			1.00			0.97	
Satd. Flow (prot)		1637			1612			1700			1552	
Flt Permitted		0.76			0.87			0.96			0.39	
Satd. Flow (perm)		1244			1415			1644			625	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	589	37	48	462	207	27	297	258	234	149	68
RTOR Reduction (vph)	0	2	0	0	12	0	0	22	0	0	5	0
Lane Group Flow (vph)	0	696	0	0	705	0	0	560	0	0	446	0
Heavy Vehicles (%)	4%	6%	8%	16%	9%	6%	0%	1%	3%	12%	3%	9%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		53.8			53.8			54.2			64.2	
Effective Green, g (s)		53.8			53.8			54.2			64.2	
Actuated g/C Ratio		0.42			0.42			0.42			0.50	
Clearance Time (s)		5.2			5.2			5.5			5.5	
Vehicle Extension (s)		4.0			4.0			7.0			7.0	
Lane Grp Cap (vph)		520			592			692			362	
v/s Ratio Prot											c0.07	
v/s Ratio Perm		c0.56			0.50			0.34			c0.55	
v/c Ratio		1.34			1.19			0.81			1.23	
Uniform Delay, d1		37.4			37.4			32.7			32.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		165.2			102.1			8.6			126.2	
Delay (s)		202.6			139.6			41.3			158.5	
Level of Service		F			F			D			F	
Approach Delay (s)		202.6			139.6			41.3			158.5	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM Average Control Delay	137.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	128.7	Sum of lost time (s)	10.7
Intersection Capacity Utilization	117.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

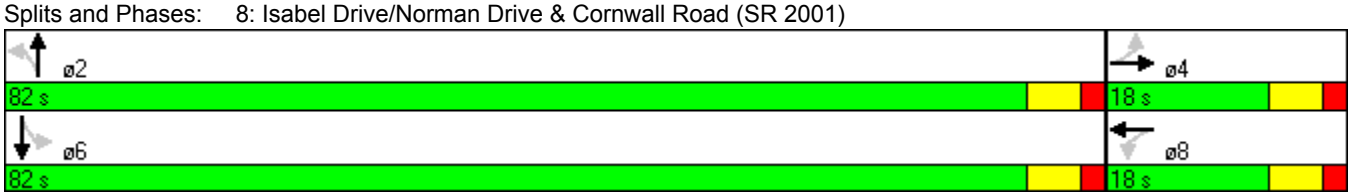
8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	7	26	35	13	36	458	111	452
Lane Group Flow (vph)	0	95	0	140	0	637	0	657
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	18.0	18.0	18.0	18.0	82.0	82.0	82.0	82.0
Total Split (%)	18.0%	18.0%	18.0%	18.0%	82.0%	82.0%	82.0%	82.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.30		0.46		0.56		0.72
Control Delay		23.2		25.4		7.7		12.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		23.2		25.4		7.7		12.9
Queue Length 50th (ft)		19		29		101		137
Queue Length 95th (ft)		39		67		200		305
Internal Link Dist (ft)		124		614		513		2141
Turn Bay Length (ft)								
Base Capacity (vph)		435		416		1551		1242
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.22		0.34		0.41		0.53

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 58
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	26	36	35	13	50	36	458	86	111	452	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.94			0.93			0.98			1.00	
Flt Protected		1.00			0.98			1.00			0.99	
Satd. Flow (prot)		1899			1970			1681			1681	
Flt Permitted		0.97			0.85			0.94			0.75	
Satd. Flow (perm)		1841			1703			1587			1272	
Peak-hour factor, PHF	0.92	0.54	0.92	0.73	0.65	0.69	0.92	0.92	0.86	0.73	0.92	0.92
Adj. Flow (vph)	8	48	39	48	20	72	39	498	100	152	491	14
RTOR Reduction (vph)	0	25	0	0	38	0	0	9	0	0	1	0
Lane Group Flow (vph)	0	70	0	0	102	0	0	628	0	0	656	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.1			7.1			39.6			39.6	
Effective Green, g (s)		7.1			7.1			39.6			39.6	
Actuated g/C Ratio		0.12			0.12			0.67			0.67	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		223			206			1071			858	
v/s Ratio Prot												
v/s Ratio Perm		0.04			c0.06			0.40			c0.52	
v/c Ratio		0.32			0.50			0.59			0.76	
Uniform Delay, d1		23.6			24.1			5.1			6.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.8			1.9			0.8			4.1	
Delay (s)		24.4			26.0			6.0			10.5	
Level of Service		C			C			A			B	
Approach Delay (s)		24.4			26.0			6.0			10.5	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	57	28	32	467	685	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.956				0.987	
Flt Protected	0.967			0.997		
Satd. Flow (prot)	1701	0	0	1784	1814	0
Flt Permitted	0.967			0.997		
Satd. Flow (perm)	1701	0	0	1784	1814	0
Link Speed (mph)	25			40	40	
Link Distance (ft)	1308			929	312	
Travel Time (s)	35.7			15.8	5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	10%	9%	6%	3%	7%
Adj. Flow (vph)	62	30	35	508	745	82
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	0	0	543	827	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	22			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 62.4%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	28	32	467	685	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	30	35	508	745	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1362	785	826			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1362	785	826			
tC, single (s)	6.4	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.3			
p0 queue free %	61	92	96			
cM capacity (veh/h)	157	380	775			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	92	542	826
Volume Left	62	35	0
Volume Right	30	0	82
cSH	195	775	1700
Volume to Capacity	0.47	0.04	0.49
Queue Length 95th (ft)	57	4	0
Control Delay (s)	39.1	1.2	0.0
Lane LOS	E	A	
Approach Delay (s)	39.1	1.2	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	131	34	335	82	158	525
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.972		0.973			
Flt Protected	0.962					0.989
Satd. Flow (prot)	1704	0	1791	0	0	2036
Flt Permitted	0.962					0.989
Satd. Flow (perm)	1704	0	1791	0	0	2036
Link Speed (mph)	35		40			40
Link Distance (ft)	1025		312			921
Travel Time (s)	20.0		5.3			15.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	4%	0%	1%	5%
Adj. Flow (vph)	142	37	364	89	172	571
Shared Lane Traffic (%)						
Lane Group Flow (vph)	179	0	453	0	0	743
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.00	1.00	0.85	0.85
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 78.3%	ICU Level of Service D
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	131	34	335	82	158	525
Sign Control	Stop		Free			Free
Grade	2%		0%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	142	37	364	89	172	571
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1323	409			453	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1323	409			453	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	2	94			85	
cM capacity (veh/h)	146	630			1113	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	179	453	742
Volume Left	142	0	172
Volume Right	37	89	0
cSH	173	1700	1113
Volume to Capacity	1.04	0.27	0.15
Queue Length 95th (ft)	215	0	14
Control Delay (s)	133.1	0.0	3.6
Lane LOS	F		A
Approach Delay (s)	133.1	0.0	3.6
Approach LOS	F		

Intersection Summary			
Average Delay	19.3		
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

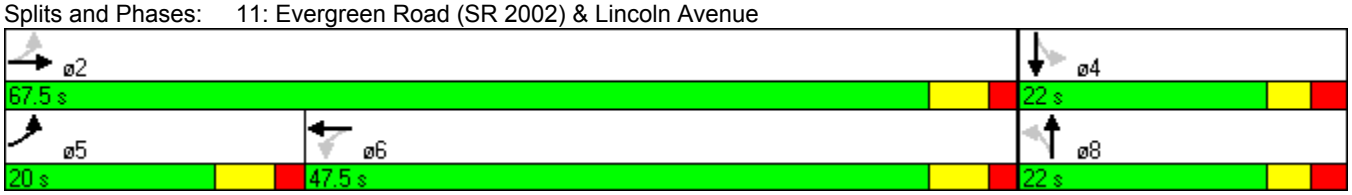
11: Evergreen Road (SR 2002) & Lincoln Avenue

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	369	665	18	590	20	22	141	17
Lane Group Flow (vph)	401	727	20	851	0	85	0	303
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	20.0	67.5	47.5	47.5	22.0	22.0	22.0	22.0
Total Split (%)	22.3%	75.4%	53.1%	53.1%	24.6%	24.6%	24.6%	24.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	1.16	0.63	0.07	1.11		0.28		1.05
Control Delay	125.0	10.7	14.1	91.8		21.6		99.8
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	125.0	10.7	14.1	91.8		21.6		99.8
Queue Length 50th (ft)	~223	195	6	~550		22		~170
Queue Length 95th (ft)	#403	299	19	#779		63		#333
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	346	1160	306	767		303		289
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	1.16	0.63	0.07	1.11		0.28		1.05

Intersection Summary

Cycle Length: 89.5
Actuated Cycle Length: 89.5
Natural Cycle: 110
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



11: Evergreen Road (SR 2002) & Lincoln Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	369	665	4	18	590	193	20	22	36	141	17	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.96			0.94			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1702	1689		1614	1625			1701			1650	
Flt Permitted	0.08	1.00		0.39	1.00			0.85			0.83	
Satd. Flow (perm)	151	1689		661	1625			1470			1398	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	723	4	20	641	210	22	24	39	153	18	132
RTOR Reduction (vph)	0	0	0	0	13	0	0	32	0	0	31	0
Lane Group Flow (vph)	401	727	0	20	838	0	0	53	0	0	272	0
Heavy Vehicles (%)	2%	8%	33%	7%	9%	4%	7%	0%	8%	4%	0%	6%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	61.5	61.5		41.5	41.5			16.5			16.5	
Effective Green, g (s)	61.5	61.5		41.5	41.5			16.5			16.5	
Actuated g/C Ratio	0.69	0.69		0.46	0.46			0.18			0.18	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	346	1161		306	753			271			258	
v/s Ratio Prot	c0.18	0.43			0.52							
v/s Ratio Perm	c0.61			0.03				0.04			c0.19	
v/c Ratio	1.16	0.63		0.07	1.11			0.20			1.05	
Uniform Delay, d1	29.1	7.7		13.3	24.0			30.9			36.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	99.0	1.8		0.3	68.1			0.4			71.0	
Delay (s)	128.1	9.5		13.5	92.1			31.2			107.5	
Level of Service	F	A		B	F			C			F	
Approach Delay (s)		51.6			90.3			31.2			107.5	
Approach LOS		D			F			C			F	

Intersection Summary			
HCM Average Control Delay	72.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	11.5
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

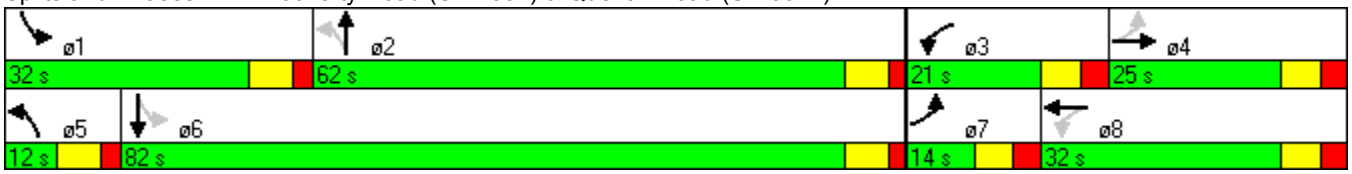
1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	108	280	257	286	12	614	202	591
Lane Group Flow (vph)	117	327	279	508	13	788	220	764
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.5	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.0	21.5	13.5	21.5
Total Split (s)	14.0	25.0	21.0	32.0	12.0	62.0	32.0	82.0
Total Split (%)	10.0%	17.9%	15.0%	22.9%	8.6%	44.3%	22.9%	58.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.85	1.43	1.30	1.49	0.05	1.01	0.77	0.75
Control Delay	89.5	258.1	199.9	274.7	12.5	71.7	64.4	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.5	258.1	199.9	274.7	12.5	71.7	64.4	23.9
Queue Length 50th (ft)	83	~403	~278	~625	4	~717	154	236
Queue Length 95th (ft)	#172	#600	#464	#852	13	#1081	239	787
Internal Link Dist (ft)		569		654		721		1806
Turn Bay Length (ft)	190		300		105		225	
Base Capacity (vph)	137	229	215	340	261	784	370	1016
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	1.43	1.30	1.49	0.05	1.01	0.59	0.75

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 114 (81%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	108	280	21	257	286	190	12	614	136	202	591	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	11	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1766		1653	1805		1710	1742		1771	1712	
Flt Permitted	0.22	1.00		0.16	1.00		0.24	1.00		0.06	1.00	
Satd. Flow (perm)	400	1766		278	1805		434	1742		108	1712	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.96	0.92	0.92	0.93	0.92
Adj. Flow (vph)	117	304	23	279	301	207	13	640	148	220	635	129
RTOR Reduction (vph)	0	2	0	0	18	0	0	6	0	0	5	0
Lane Group Flow (vph)	117	325	0	279	490	0	13	782	0	220	759	0
Heavy Vehicles (%)	1%	2%	0%	4%	1%	0%	0%	4%	4%	0%	7%	2%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	18.0		39.0	25.0		64.8	62.6		87.5	78.8	
Effective Green, g (s)	25.0	18.0		39.0	25.0		64.8	62.6		87.5	78.8	
Actuated g/C Ratio	0.18	0.13		0.28	0.18		0.46	0.45		0.62	0.56	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	137	227		215	322		221	779		286	964	
v/s Ratio Prot	0.04	0.18		c0.13	c0.27		0.00	c0.45		c0.10	c0.44	
v/s Ratio Perm	0.11			0.23			0.03			0.38		
v/c Ratio	0.85	1.43		1.30	1.52		0.06	1.00		0.77	0.79	
Uniform Delay, d1	53.5	61.0		44.9	57.5		22.2	38.7		42.9	24.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.41	0.85	
Incremental Delay, d2	38.3	218.2		163.8	250.0		0.2	33.3		10.6	5.5	
Delay (s)	91.9	279.2		208.7	307.5		22.3	72.0		71.0	26.0	
Level of Service	F	F		F	F		C	E		E	C	
Approach Delay (s)		229.9			272.5			71.2			36.1	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM Average Control Delay	135.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	33.5
Intersection Capacity Utilization	106.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

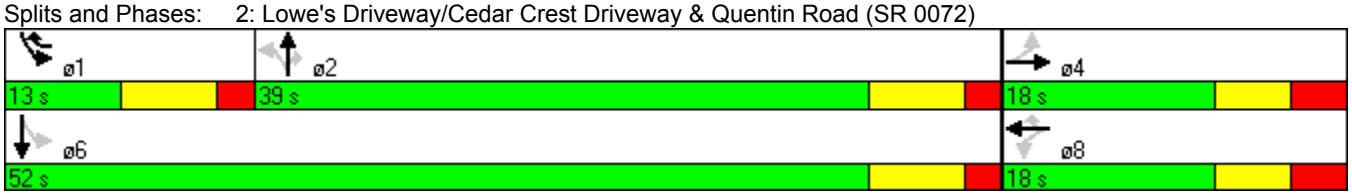
2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	10	3	112	3	76	60	814	97	76	723
Lane Group Flow (vph)	0	92	0	130	83	72	857	105	83	773
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	18.0	18.0	18.0	18.0	13.0	39.0	39.0	39.0	13.0	52.0
Total Split (%)	25.7%	25.7%	25.7%	25.7%	18.6%	55.7%	55.7%	55.7%	18.6%	74.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.35		0.69	0.16	0.18	0.83	0.10	0.37	0.58
Control Delay		14.2		49.3	5.2	8.4	21.8	1.9	12.4	7.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		14.2		49.3	5.2	8.4	21.8	1.9	12.4	7.1
Queue Length 50th (ft)		8		53	0	17	~546	5	13	96
Queue Length 95th (ft)		32		40	26	m17	m392	m4	m44	299
Internal Link Dist (ft)		216		230			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		281		197	516	399	1030	1044	224	1341
Starvation Cap Reductn		0		0	0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.33		0.66	0.16	0.18	0.83	0.10	0.37	0.58

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 64 (91%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	3	53	112	3	76	60	814	97	76	723	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1532			1780	1568	1796	1820	1766	1536	1875	
Flt Permitted		0.91			0.67	1.00	0.37	1.00	1.00	0.09	1.00	
Satd. Flow (perm)		1404			1255	1568	705	1820	1766	153	1875	
Peak-hour factor, PHF	0.63	0.75	0.74	0.92	0.38	0.92	0.83	0.95	0.92	0.92	0.95	0.68
Adj. Flow (vph)	16	4	72	122	8	83	72	857	105	83	761	12
RTOR Reduction (vph)	0	63	0	0	0	67	0	0	52	0	1	0
Lane Group Flow (vph)	0	29	0	0	130	16	72	857	53	83	772	0
Heavy Vehicles (%)	0%	0%	6%	1%	33%	4%	3%	7%	0%	13%	4%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		8.8			8.8	13.6	35.4	35.4	35.4	47.2	47.2	
Effective Green, g (s)		8.8			8.8	13.6	35.4	35.4	35.4	47.2	47.2	
Actuated g/C Ratio		0.13			0.13	0.19	0.51	0.51	0.51	0.67	0.67	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		177			158	461	357	920	893	198	1264	
v/s Ratio Prot						0.00		c0.47		0.03	c0.41	
v/s Ratio Perm		0.02			c0.10	0.01	0.10		0.03	0.25		
v/c Ratio		0.16			0.82	0.03	0.20	0.93	0.06	0.42	0.61	
Uniform Delay, d1		27.3			29.8	22.9	9.5	16.2	8.8	12.1	6.3	
Progression Factor		1.00			1.00	1.00	0.73	1.13	0.99	1.95	0.83	
Incremental Delay, d2		0.6			29.0	0.1	0.1	2.2	0.0	3.1	1.7	
Delay (s)		27.9			58.9	23.0	7.1	20.6	8.8	26.7	6.9	
Level of Service		C			E	C	A	C	A	C	A	
Approach Delay (s)		27.9			44.9			18.4			8.9	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

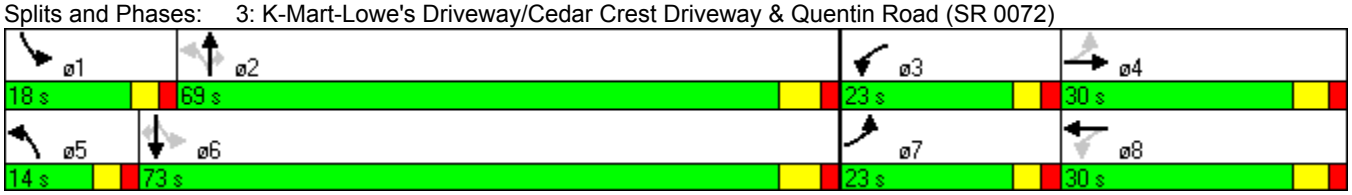
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	182	19	77	20	49	682	62	142	669	65
Lane Group Flow (vph)	225	96	96	402	56	741	68	167	727	80
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	23.0	30.0	23.0	30.0	14.0	69.0	69.0	18.0	73.0	73.0
Total Split (%)	16.4%	21.4%	16.4%	21.4%	10.0%	49.3%	49.3%	12.9%	52.1%	52.1%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.85	0.27	0.27	0.91	0.19	0.84	0.08	0.59	0.73	0.10
Control Delay	65.4	21.3	36.4	49.2	6.2	28.5	7.7	20.9	32.7	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0
Total Delay	65.4	21.3	36.4	49.2	6.2	29.9	7.7	20.9	32.7	7.8
Queue Length 50th (ft)	159	25	62	161	13	379	18	64	530	11
Queue Length 95th (ft)	#219	33	92	72	m19	#873	m26	97	750	34
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	268	362	446	493	310	883	818	306	990	825
Starvation Cap Reductn	0	0	0	0	0	44	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.27	0.22	0.82	0.18	0.88	0.08	0.55	0.73	0.10

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 74 (53%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	19	55	77	20	245	49	682	62	142	669	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1600		1902	1761		1796	1783	1607	1814	1844	1489
Flt Permitted	0.16	1.00		0.69	1.00		0.20	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	289	1600		1392	1761		382	1783	1607	259	1844	1489
Peak-hour factor, PHF	0.81	0.59	0.86	0.80	0.56	0.67	0.88	0.92	0.91	0.85	0.92	0.81
Adj. Flow (vph)	225	32	64	96	36	366	56	741	68	167	727	80
RTOR Reduction (vph)	0	50	0	0	198	0	0	0	22	0	0	26
Lane Group Flow (vph)	225	46	0	96	204	0	56	741	46	167	727	54
Heavy Vehicles (%)	0%	11%	0%	0%	5%	1%	0%	6%	0%	0%	7%	9%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	42.4	26.4		30.5	19.6		75.5	69.3	69.3	85.3	74.2	74.2
Effective Green, g (s)	42.4	26.4		30.5	19.6		75.5	69.3	69.3	85.3	74.2	74.2
Actuated g/C Ratio	0.30	0.19		0.22	0.14		0.54	0.50	0.50	0.61	0.53	0.53
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	265	302		343	247		269	883	795	281	977	789
v/s Ratio Prot	c0.11	0.03		0.02	0.12		0.01	c0.42		c0.05	c0.39	
v/s Ratio Perm	c0.15			0.04			0.10		0.03	0.31		0.04
v/c Ratio	0.85	0.15		0.28	0.83		0.21	0.84	0.06	0.59	0.74	0.07
Uniform Delay, d1	41.0	47.4		45.1	58.5		19.6	30.5	18.4	22.4	25.5	16.0
Progression Factor	1.00	1.00		1.00	1.00		0.43	0.66	0.78	1.00	1.00	1.00
Incremental Delay, d2	21.6	0.2		0.4	19.8		0.2	6.1	0.1	3.4	5.1	0.2
Delay (s)	62.6	47.7		45.5	78.3		8.7	26.2	14.5	25.8	30.7	16.2
Level of Service	E	D		D	E		A	C	B	C	C	B
Approach Delay (s)		58.1			72.0			24.1			28.6	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM Average Control Delay	38.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.8
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

4: Isabel Drive & Quentin Road (SR 0072)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	44	117	1039	76	86	934
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Grade (%)	-2%		3%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.902		0.990			
Flt Protected	0.986					0.996
Satd. Flow (prot)	1896	0	1756	0	0	1768
Flt Permitted	0.986					0.996
Satd. Flow (perm)	1896	0	1756	0	0	1768
Link Speed (mph)	30		45			45
Link Distance (ft)	408		1653			553
Travel Time (s)	9.3		25.0			8.4
Peak Hour Factor	0.92	0.92	0.96	0.92	0.92	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	5%	5%
Adj. Flow (vph)	48	127	1082	83	93	963
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	0	1165	0	0	1056
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.84	0.84	1.07	1.07	1.02	1.02
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 132.8% ICU Level of Service H
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	44	117	1039	76	86	934
Sign Control	Stop		Free			Free
Grade	-2%		3%			-3%
Peak Hour Factor	0.92	0.92	0.96	0.92	0.92	0.97
Hourly flow rate (vph)	48	127	1082	83	93	963
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2273	1124			1165	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2273	1124			1165	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	49			84	
cM capacity (veh/h)	37	250			589	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	175	1165	1056
Volume Left	48	0	93
Volume Right	127	83	0
cSH	98	1700	589
Volume to Capacity	1.79	0.69	0.16
Queue Length 95th (ft)	356	0	14
Control Delay (s)	467.2	0.0	5.2
Lane LOS	F		A
Approach Delay (s)	467.2	0.0	5.2
Approach LOS	F		

Intersection Summary			
Average Delay	36.4		
Intersection Capacity Utilization	132.8%	ICU Level of Service	H
Analysis Period (min)	15		

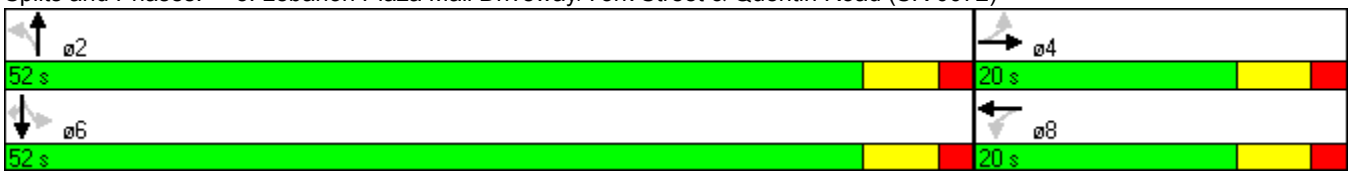
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	52	55	135	94	61	837	41	808	44
Lane Group Flow (vph)	68	152	147	175	72	958	45	860	56
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	20.0	20.0	20.0	20.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%	72.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.33	0.42	0.68	0.49	0.29	0.81	0.25	0.71	0.05
Control Delay	29.2	17.2	43.8	26.0	9.6	16.3	9.9	12.6	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	17.2	43.8	26.0	9.6	16.3	9.9	12.6	1.7
Queue Length 50th (ft)	23	25	54	51	12	262	7	211	0
Queue Length 95th (ft)	51	65	#137	95	32	450	25	349	8
Internal Link Dist (ft)		341		1234		612		2055	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	237	403	247	404	269	1294	195	1312	1140
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.38	0.60	0.43	0.27	0.74	0.23	0.66	0.05

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 66.8
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	58	135	94	50	61	837	44	41	808	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1653	1627		1685	1813		1744	1868		1754	1897	1623
Flt Permitted	0.65	1.00		0.66	1.00		0.21	1.00		0.15	1.00	1.00
Satd. Flow (perm)	1125	1627		1171	1813		389	1868		283	1897	1623
Peak-hour factor, PHF	0.77	0.81	0.69	0.92	0.78	0.92	0.85	0.92	0.92	0.92	0.94	0.79
Adj. Flow (vph)	68	68	84	147	121	54	72	910	48	45	860	56
RTOR Reduction (vph)	0	63	0	0	23	0	0	3	0	0	0	20
Lane Group Flow (vph)	68	89	0	147	152	0	72	955	0	45	860	36
Heavy Vehicles (%)	4%	2%	2%	1%	0%	3%	3%	4%	0%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	12.3	12.3		12.3	12.3		42.4	42.4		42.4	42.4	42.4
Effective Green, g (s)	12.3	12.3		12.3	12.3		42.4	42.4		42.4	42.4	42.4
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.64	0.64		0.64	0.64	0.64
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	207	300		216	334		247	1187		180	1206	1032
v/s Ratio Prot		0.05			0.08			c0.51			0.45	
v/s Ratio Perm	0.06			c0.13			0.19			0.16		0.02
v/c Ratio	0.33	0.30		0.68	0.46		0.29	0.80		0.25	0.71	0.03
Uniform Delay, d1	23.6	23.5		25.4	24.2		5.4	9.1		5.3	8.1	4.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.3	0.8		9.2	1.3		0.7	4.1		0.7	2.0	0.0
Delay (s)	24.9	24.2		34.6	25.6		6.1	13.1		6.0	10.1	4.5
Level of Service	C	C		C	C		A	B		A	B	A
Approach Delay (s)		24.4			29.7			12.6			9.6	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	66.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

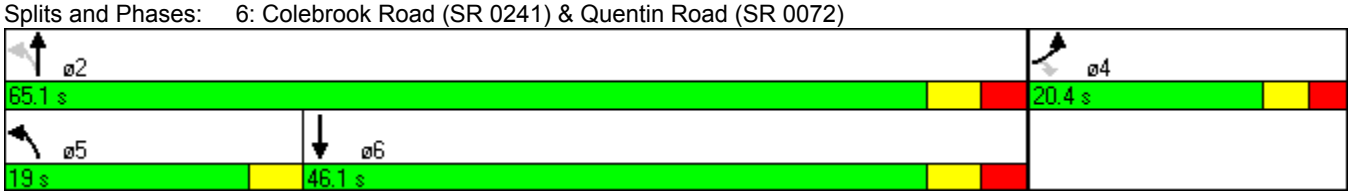
6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	207	228	298	802	763
Lane Group Flow (vph)	225	248	324	862	967
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	20.4	20.4	19.0	65.1	46.1
Total Split (%)	23.9%	23.9%	22.2%	76.1%	53.9%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.82	0.55	0.81	0.67	1.03
Control Delay	57.9	9.5	35.5	10.9	60.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	9.5	35.5	10.9	60.3
Queue Length 50th (ft)	117	0	110	233	~567
Queue Length 95th (ft)	#229	62	#243	354	#801
Internal Link Dist (ft)	516			127	360
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	294	465	412	1306	943
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.77	0.53	0.79	0.66	1.03

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 84.1
Natural Cycle: 90
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	207	228	298	802	763	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1470	1736	1872	1986	
Flt Permitted	0.95	1.00	0.09	1.00	1.00	
Satd. Flow (perm)	1660	1470	169	1872	1986	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.92
Adj. Flow (vph)	225	248	324	862	820	147
RTOR Reduction (vph)	0	207	0	0	7	0
Lane Group Flow (vph)	225	41	324	862	960	0
Heavy Vehicles (%)	1%	2%	2%	3%	4%	1%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	14.0	14.0	58.1	58.1	39.7	
Effective Green, g (s)	14.0	14.0	58.1	58.1	39.7	
Actuated g/C Ratio	0.17	0.17	0.69	0.69	0.47	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	276	245	394	1293	938	
v/s Ratio Prot	c0.14		c0.15	0.46	c0.48	
v/s Ratio Perm		0.03	0.42			
v/c Ratio	0.82	0.17	0.82	0.67	1.02	
Uniform Delay, d1	33.8	30.1	23.9	7.5	22.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	16.7	0.3	13.0	2.1	35.4	
Delay (s)	50.5	30.4	36.9	9.5	57.6	
Level of Service	D	C	D	A	E	
Approach Delay (s)	39.9			17.0	57.6	
Approach LOS	D			B	E	

Intersection Summary			
HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	84.1	Sum of lost time (s)	15.5
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

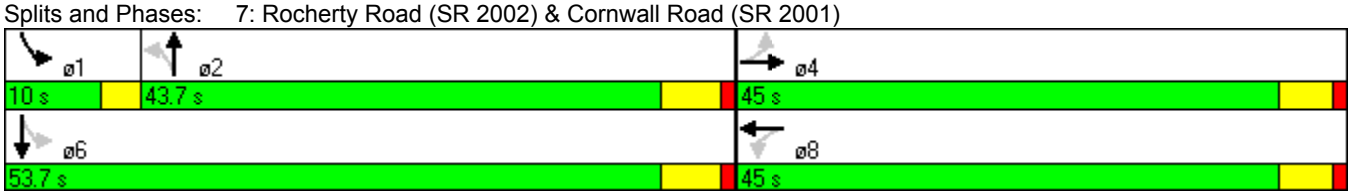
7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	70	455	82	541	54	202	183	253
Lane Group Flow (vph)	0	626	0	844	0	404	0	629
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.2	9.2	9.2	9.2	20.5	20.5	6.0	20.5
Total Split (s)	45.0	45.0	45.0	45.0	43.7	43.7	10.0	53.7
Total Split (%)	45.6%	45.6%	45.6%	45.6%	44.3%	44.3%	10.1%	54.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.4	4.4	3.0	4.4
All-Red Time (s)	1.2	1.2	1.2	1.2	1.1	1.1	0.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	5.5	5.5	3.0	5.5
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Max	Min
v/c Ratio		1.30		1.49		0.68		1.19
Control Delay		176.0		255.3		30.6		128.4
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		176.0		255.3		30.6		128.4
Queue Length 50th (ft)		~507		~739		195		~426
Queue Length 95th (ft)		#725		#975		308		#690
Internal Link Dist (ft)		1052		2233		731		2352
Turn Bay Length (ft)								
Base Capacity (vph)		483		567		590		528
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		1.30		1.49		0.68		1.19

Intersection Summary

Cycle Length: 98.7
Actuated Cycle Length: 98.7
Natural Cycle: 130
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	455	51	82	541	154	54	202	115	183	253	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	10	10	10
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)		5.2			5.2			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.96			0.96	
Flt Protected		0.99			0.99			0.99			0.98	
Satd. Flow (prot)		1659			1723			1746			1565	
Flt Permitted		0.71			0.80			0.84			0.63	
Satd. Flow (perm)		1190			1385			1481			1001	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	76	495	55	89	588	167	59	220	125	199	264	166
RTOR Reduction (vph)	0	4	0	0	9	0	0	17	0	0	13	0
Lane Group Flow (vph)	0	622	0	0	835	0	0	387	0	0	616	0
Heavy Vehicles (%)	4%	4%	3%	5%	2%	4%	0%	1%	0%	7%	9%	4%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		39.8			39.8			38.2			48.2	
Effective Green, g (s)		39.8			39.8			38.2			48.2	
Actuated g/C Ratio		0.40			0.40			0.39			0.49	
Clearance Time (s)		5.2			5.2			5.5			5.5	
Vehicle Extension (s)		4.0			4.0			7.0			7.0	
Lane Grp Cap (vph)		480			558			573			529	
v/s Ratio Prot											c0.08	
v/s Ratio Perm		0.52			c0.60			0.26			c0.49	
v/c Ratio		1.30			1.50			0.68			1.16	
Uniform Delay, d1		29.4			29.4			25.1			25.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		148.3			232.8			5.6			92.9	
Delay (s)		177.7			262.2			30.7			118.2	
Level of Service		F			F			C			F	
Approach Delay (s)		177.7			262.2			30.7			118.2	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM Average Control Delay	167.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	98.7	Sum of lost time (s)	10.7
Intersection Capacity Utilization	121.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

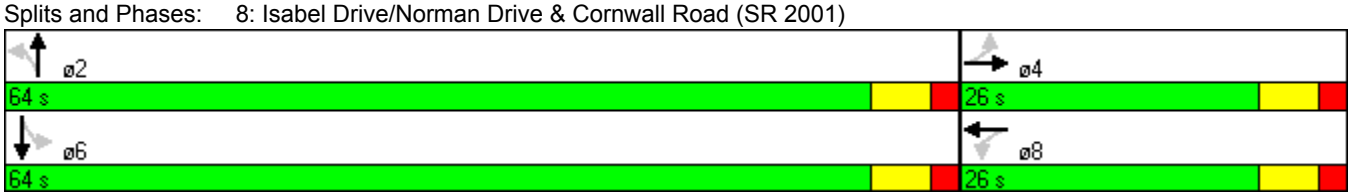
8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	38	16	69	18	47	388	51	506
Lane Group Flow (vph)	0	134	0	218	0	515	0	631
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	26.0	26.0	26.0	26.0	64.0	64.0	64.0	64.0
Total Split (%)	28.9%	28.9%	28.9%	28.9%	71.1%	71.1%	71.1%	71.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.33		0.53		0.62		0.77
Control Delay		14.2		19.8		11.8		17.0
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		14.2		19.8		11.8		17.0
Queue Length 50th (ft)		15		35		83		118
Queue Length 95th (ft)		70		126		205		295
Internal Link Dist (ft)		124		614		513		2144
Turn Bay Length (ft)								
Base Capacity (vph)		719		735		1501		1473
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.19		0.30		0.34		0.43

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 50.8
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	16	70	69	18	113	47	388	39	51	506	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.92			0.99			0.99	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1854			1917			1745			1672	
Flt Permitted		0.85			0.83			0.90			0.92	
Satd. Flow (perm)		1592			1628			1579			1550	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	17	76	75	20	123	51	422	42	55	550	26
RTOR Reduction (vph)	0	52	0	0	52	0	0	5	0	0	2	0
Lane Group Flow (vph)	0	82	0	0	166	0	0	510	0	0	629	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.1			11.1			26.6			26.6	
Effective Green, g (s)		11.1			11.1			26.6			26.6	
Actuated g/C Ratio		0.22			0.22			0.54			0.54	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		356			364			845			830	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.10			0.32			c0.41	
v/c Ratio		0.23			0.46			0.60			0.76	
Uniform Delay, d1		15.8			16.7			7.9			9.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.9			1.2			4.0	
Delay (s)		16.1			17.6			9.2			13.0	
Level of Service		B			B			A			B	
Approach Delay (s)		16.1			17.6			9.2			13.0	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	49.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	132	41	91	628	521	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.968				0.965	
Flt Protected	0.963			0.994		
Satd. Flow (prot)	1759	0	0	1852	1739	0
Flt Permitted	0.963			0.994		
Satd. Flow (perm)	1759	0	0	1852	1739	0
Link Speed (mph)	25			40	40	
Link Distance (ft)	1314			931	299	
Travel Time (s)	35.8			15.9	5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	2%	7%	1%
Adj. Flow (vph)	143	45	99	683	566	195
Shared Lane Traffic (%)						
Lane Group Flow (vph)	188	0	0	782	761	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	22			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 96.2% ICU Level of Service F
Analysis Period (min) 15

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	132	41	91	628	521	179
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	143	45	99	683	566	195
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1544	664	761			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1544	664	761			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	90	88			
cM capacity (veh/h)	113	459	851			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	188	782	761
Volume Left	143	99	0
Volume Right	45	0	195
cSH	137	851	1700
Volume to Capacity	1.37	0.12	0.45
Queue Length 95th (ft)	304	10	0
Control Delay (s)	265.9	2.9	0.0
Lane LOS	F	A	
Approach Delay (s)	265.9	2.9	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	30.2		
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

10: Wilhelm Avenue & Cornwall Road (SR 2001)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	193	84	501	270	80	481
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.959		0.953			
Flt Protected	0.966					0.993
Satd. Flow (prot)	1730	0	1787	0	0	2023
Flt Permitted	0.966					0.993
Satd. Flow (perm)	1730	0	1787	0	0	2023
Link Speed (mph)	35		40			40
Link Distance (ft)	1198		299			807
Travel Time (s)	23.3		5.1			13.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	2%	0%	0%	6%
Adj. Flow (vph)	210	91	545	293	87	523
Shared Lane Traffic (%)						
Lane Group Flow (vph)	301	0	838	0	0	610
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.00	1.00	0.85	0.85
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 98.4% ICU Level of Service F
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	193	84	501	270	80	481
Sign Control	Stop		Free			Free
Grade	2%		0%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	210	91	545	293	87	523
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1388	691			838	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1388	691			838	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	80			89	
cM capacity (veh/h)	141	448			805	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	301	838	610
Volume Left	210	0	87
Volume Right	91	293	0
cSH	178	1700	805
Volume to Capacity	1.69	0.49	0.11
Queue Length 95th (ft)	521	0	9
Control Delay (s)	380.9	0.0	2.8
Lane LOS	F		A
Approach Delay (s)	380.9	0.0	2.8
Approach LOS	F		

Intersection Summary			
Average Delay	66.5		
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		

11: Evergreen Road (SR 2002) & Lincoln Avenue

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	193	561	11	471	12	18	42	53
Lane Group Flow (vph)	210	638	12	567	0	42	0	440
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	20.0	74.0	54.0	54.0	50.5	50.5	50.5	50.5
Total Split (%)	16.1%	59.4%	43.4%	43.4%	40.6%	40.6%	40.6%	40.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.56	0.63	0.04	0.87		0.10		0.81
Control Delay	16.7	16.8	21.3	43.2		22.6		33.5
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	16.7	16.8	21.3	43.2		22.6		33.5
Queue Length 50th (ft)	52	217	4	296		14		163
Queue Length 95th (ft)	127	460	19	#581		44		322
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	404	1319	431	970		785		907
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.52	0.48	0.03	0.58		0.05		0.49

Intersection Summary

Cycle Length: 124.5
Actuated Cycle Length: 91.3
Natural Cycle: 55
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	193	561	26	11	471	51	12	18	8	42	53	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1702	1729		1727	1725			1737			1642	
Flt Permitted	0.16	1.00		0.42	1.00			0.84			0.96	
Satd. Flow (perm)	294	1729		768	1725			1483			1591	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	610	28	12	512	55	13	20	9	46	58	336
RTOR Reduction (vph)	0	1	0	0	3	0	0	6	0	0	105	0
Lane Group Flow (vph)	210	637	0	12	564	0	0	36	0	0	335	0
Heavy Vehicles (%)	2%	5%	5%	0%	4%	3%	0%	14%	0%	0%	5%	2%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.8	53.8		34.5	34.5			25.2			25.2	
Effective Green, g (s)	53.8	53.8		34.5	34.5			25.2			25.2	
Actuated g/C Ratio	0.59	0.59		0.38	0.38			0.28			0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	382	1028		293	658			413			443	
v/s Ratio Prot	0.08	c0.37			c0.33							
v/s Ratio Perm	0.25			0.02				0.02			c0.21	
v/c Ratio	0.55	0.62		0.04	0.86			0.09			0.76	
Uniform Delay, d1	13.4	11.8		17.6	25.7			24.1			29.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.6	2.0		0.2	12.1			0.1			7.2	
Delay (s)	15.1	13.7		17.8	37.9			24.2			37.0	
Level of Service	B	B		B	D			C			D	
Approach Delay (s)		14.1			37.5			24.2			37.0	
Approach LOS		B			D			C			D	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.5	Sum of lost time (s)	17.5
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

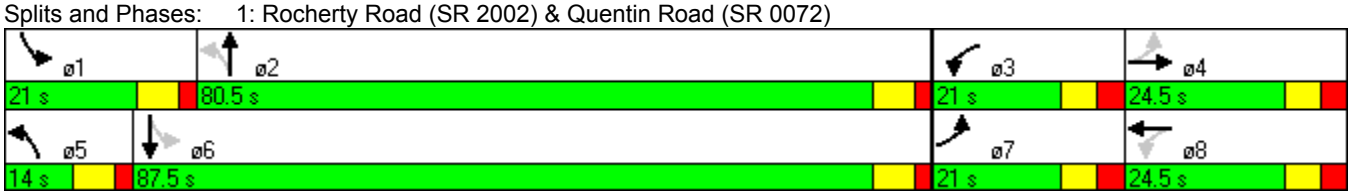
1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	98	135	184	148	22	631	249	605
Lane Group Flow (vph)	107	168	200	304	24	781	268	796
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.5	21.5	13.5	21.5
Total Split (s)	21.0	24.5	21.0	24.5	14.0	80.5	21.0	87.5
Total Split (%)	14.3%	16.7%	14.3%	16.7%	9.5%	54.8%	14.3%	59.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.53	0.80	0.73	1.17	0.11	0.95	1.02	0.80
Control Delay	49.8	83.7	59.4	157.0	11.4	55.3	95.9	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	83.7	59.4	157.0	11.4	55.3	95.9	31.9
Queue Length 50th (ft)	73	142	144	~310	8	636	~188	588
Queue Length 95th (ft)	137	#290	#238	#556	19	845	#395	787
Internal Link Dist (ft)		569		654		721		1806
Turn Bay Length (ft)	190		300		105		225	
Base Capacity (vph)	229	223	276	259	232	1016	262	1101
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.75	0.72	1.17	0.10	0.77	1.02	0.72

Intersection Summary

Cycle Length: 147
Actuated Cycle Length: 133.3
Natural Cycle: 120
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	135	21	184	148	132	22	631	95	249	605	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	11	11	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.93		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	1653		1669	1703		1613	1802		1736	1783	
Flt Permitted	0.24	1.00		0.40	1.00		0.18	1.00		0.08	1.00	
Satd. Flow (perm)	416	1653		709	1703		307	1802		141	1783	
Peak-hour factor, PHF	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.93	0.92	0.92
Adj. Flow (vph)	107	145	23	200	161	143	24	678	103	268	658	138
RTOR Reduction (vph)	0	4	0	0	22	0	0	4	0	0	5	0
Lane Group Flow (vph)	107	164	0	200	282	0	24	777	0	268	791	0
Heavy Vehicles (%)	4%	9%	0%	3%	6%	5%	6%	1%	4%	2%	2%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.9	16.8		32.5	18.6		67.8	63.6		84.8	74.1	
Effective Green, g (s)	28.9	16.8		32.5	18.6		67.8	63.6		84.8	74.1	
Actuated g/C Ratio	0.21	0.12		0.24	0.14		0.50	0.47		0.62	0.54	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	199	204		268	233		193	843		260	971	
v/s Ratio Prot	0.05	0.10		c0.08	c0.17		0.00	0.43		c0.11	0.44	
v/s Ratio Perm	0.07			0.10			0.06			c0.53		
v/c Ratio	0.54	0.81		0.75	1.21		0.12	0.92		1.03	0.81	
Uniform Delay, d1	45.7	58.0		45.1	58.7		21.3	33.9		42.2	25.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.5	21.3		11.4	128.3		0.4	16.4		64.0	6.3	
Delay (s)	49.3	79.3		56.5	187.0		21.7	50.3		106.3	31.6	
Level of Service	D	E		E	F		C	D		F	C	
Approach Delay (s)		67.6			135.2			49.4			50.4	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM Average Control Delay	68.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	136.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	13	9	101	10	94	104	725	93	91	824
Lane Group Flow (vph)	0	124	0	126	102	132	788	101	99	902
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	22.0	14.0	22.0
Total Split (s)	26.0	26.0	26.0	26.0	14.0	68.0	68.0	68.0	14.0	82.0
Total Split (%)	24.1%	24.1%	24.1%	24.1%	13.0%	63.0%	63.0%	63.0%	13.0%	75.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	Min	None	Min
v/c Ratio		0.39		0.51	0.19	0.45	0.81	0.11	0.34	0.65
Control Delay		18.3		42.9	6.4	20.1	25.5	2.8	8.6	11.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay		18.3		42.9	6.4	20.1	25.5	2.8	8.6	11.5
Queue Length 50th (ft)		17		58	0	43	340	0	16	266
Queue Length 95th (ft)		27		94	38	81	539	23	37	455
Internal Link Dist (ft)		216		230			1806			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		438		357	548	440	1448	1364	293	1692
Starvation Cap Reductn		0		0	0	0	0	0	0	149
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.28		0.35	0.19	0.30	0.54	0.07	0.34	0.58

Intersection Summary

Cycle Length: 108
Actuated Cycle Length: 80.2
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	9	66	101	10	94	104	725	93	91	824	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.91			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1595			1839	1584	1832	1909	1766	1638	1911	
Flt Permitted		0.90			0.72	1.00	0.30	1.00	1.00	0.13	1.00	
Satd. Flow (perm)		1450			1375	1584	580	1909	1766	226	1911	
Peak-hour factor, PHF	0.54	0.56	0.79	0.92	0.63	0.92	0.79	0.92	0.92	0.92	0.93	0.81
Adj. Flow (vph)	24	16	84	110	16	102	132	788	101	99	886	16
RTOR Reduction (vph)	0	72	0	0	0	78	0	0	49	0	1	0
Lane Group Flow (vph)	0	52	0	0	126	24	132	788	52	99	901	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%	1%	2%	0%	6%	2%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		11.3			11.3	19.0	41.4	41.4	41.4	56.1	56.1	
Effective Green, g (s)		11.3			11.3	19.0	41.4	41.4	41.4	56.1	56.1	
Actuated g/C Ratio		0.14			0.14	0.23	0.51	0.51	0.51	0.69	0.69	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		201			191	506	295	971	898	289	1317	
v/s Ratio Prot						0.00		c0.41		0.03	c0.47	
v/s Ratio Perm		0.04			c0.09	0.01	0.23		0.03	0.20		
v/c Ratio		0.26			0.66	0.05	0.45	0.81	0.06	0.34	0.68	
Uniform Delay, d1		31.3			33.2	24.2	12.7	16.7	10.1	11.2	7.4	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.9			8.8	0.1	3.0	6.2	0.1	2.0	2.3	
Delay (s)		32.2			42.0	24.3	15.8	22.9	10.2	13.2	9.7	
Level of Service		C			D	C	B	C	B	B	A	
Approach Delay (s)		32.2			34.1			20.7			10.1	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	81.4	Sum of lost time (s)	21.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	277	37	81	40	56	717	72	192	700	154
Lane Group Flow (vph)	315	163	133	264	68	779	104	204	761	164
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	25.0	26.3	21.0	22.3	15.0	58.0	58.0	18.0	61.0	61.0
Total Split (%)	20.3%	21.3%	17.0%	18.1%	12.2%	47.0%	47.0%	14.6%	49.5%	49.5%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
v/c Ratio	0.90	0.47	0.39	0.82	0.30	0.97	0.14	0.82	0.80	0.19
Control Delay	63.2	32.9	33.0	44.9	15.2	58.4	9.5	52.5	35.2	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	15.3	0.0	0.0	0.0	0.0
Total Delay	63.2	32.9	33.0	44.9	15.2	73.7	9.5	52.5	35.2	7.2
Queue Length 50th (ft)	202	71	75	98	22	593	17	103	510	20
Queue Length 95th (ft)	#352	81	81	143	40	#876	32	#230	#776	63
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	349	352	412	370	267	831	744	266	949	848
Starvation Cap Reductn	0	0	0	0	0	67	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.46	0.32	0.71	0.25	1.02	0.14	0.77	0.80	0.19

Intersection Summary

Cycle Length: 123.3
Actuated Cycle Length: 117.9
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	37	89	81	40	178	56	717	72	192	700	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1650		1902	1804		1796	1890	1607	1814	1954	1623
Flt Permitted	0.22	1.00		0.65	1.00		0.14	1.00	1.00	0.07	1.00	1.00
Satd. Flow (perm)	392	1650		1309	1804		256	1890	1607	135	1954	1623
Peak-hour factor, PHF	0.88	0.62	0.86	0.61	0.77	0.84	0.82	0.92	0.69	0.94	0.92	0.94
Adj. Flow (vph)	315	60	103	133	52	212	68	779	104	204	761	164
RTOR Reduction (vph)	0	49	0	0	122	0	0	0	39	0	0	61
Lane Group Flow (vph)	315	114	0	133	142	0	68	779	65	204	761	103
Heavy Vehicles (%)	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	38.2	21.4		24.8	13.1		57.9	51.6	51.6	68.5	57.3	57.3
Effective Green, g (s)	38.2	21.4		24.8	13.1		57.9	51.6	51.6	68.5	57.3	57.3
Actuated g/C Ratio	0.32	0.18		0.21	0.11		0.49	0.43	0.43	0.58	0.48	0.48
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	344	297		331	199		206	820	697	247	941	781
v/s Ratio Prot	c0.15	0.07		0.04	0.08		0.02	c0.41		c0.08	0.39	
v/s Ratio Perm	c0.14			0.04			0.14		0.04	0.39		0.06
v/c Ratio	0.92	0.38		0.40	0.71		0.33	0.95	0.09	0.83	0.81	0.13
Uniform Delay, d1	34.7	43.0		40.1	51.1		21.4	32.5	19.9	33.8	26.2	17.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.0	0.8		0.8	11.5		0.9	20.9	0.2	19.7	6.2	0.2
Delay (s)	62.7	43.8		40.9	62.6		22.3	53.4	20.1	53.4	32.4	17.3
Level of Service	E	D		D	E		C	D	C	D	C	B
Approach Delay (s)		56.3			55.3			47.5			34.0	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	44.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	119.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	34	69	1113	82	55	1217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Grade (%)	-2%		3%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.910		0.991			
Flt Protected	0.984					0.998
Satd. Flow (prot)	1947	0	1793	0	0	1842
Flt Permitted	0.984					0.998
Satd. Flow (perm)	1947	0	1793	0	0	1842
Link Speed (mph)	30		45			45
Link Distance (ft)	408		1653			553
Travel Time (s)	9.3		25.0			8.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Adj. Flow (vph)	37	75	1210	89	60	1295
Shared Lane Traffic (%)						
Lane Group Flow (vph)	112	0	1299	0	0	1355
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	16		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	0.84	0.84	1.07	1.07	1.02	1.02
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 121.5%	ICU Level of Service H
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	34	69	1113	82	55	1217
Sign Control	Stop		Free			Free
Grade	-2%		3%			-3%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.94
Hourly flow rate (vph)	37	75	1210	89	60	1295
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2669	1254			1299	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2669	1254			1299	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	65			89	
cM capacity (veh/h)	22	212			537	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	112	1299	1354
Volume Left	37	0	60
Volume Right	75	89	0
cSH	56	1700	537
Volume to Capacity	2.01	0.76	0.11
Queue Length 95th (ft)	272	0	9
Control Delay (s)	626.9	0.0	6.2
Lane LOS	F		A
Approach Delay (s)	626.9	0.0	6.2
Approach LOS	F		

Intersection Summary			
Average Delay	28.4		
Intersection Capacity Utilization	121.5%	ICU Level of Service	H
Analysis Period (min)	15		

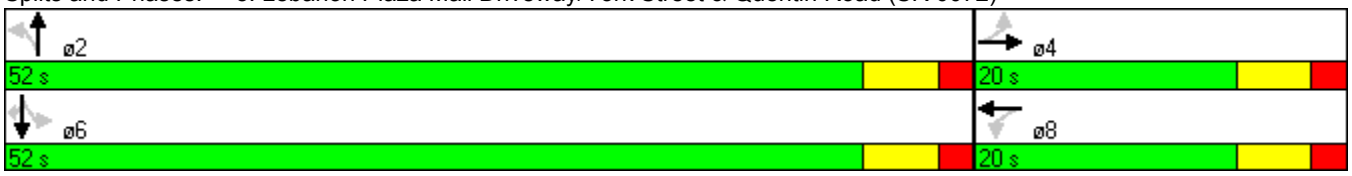
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	50	64	152	111	96	799	45	956	61
Lane Group Flow (vph)	60	204	165	196	112	934	49	1028	115
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	20.0	20.0	20.0	20.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%	72.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.29	0.51	0.84	0.53	0.88	0.78	0.26	0.84	0.11
Control Delay	28.9	18.2	64.4	29.5	71.7	15.1	10.0	18.2	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	18.2	64.4	29.5	71.7	15.1	10.0	18.2	1.4
Queue Length 50th (ft)	23	38	71	72	35	255	8	306	0
Queue Length 95th (ft)	51	87	#174	100	#73	416	27	#535	2
Internal Link Dist (ft)		350		1246		556		2069	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	219	414	208	387	135	1259	198	1291	1100
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.49	0.79	0.51	0.83	0.74	0.25	0.80	0.10

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 69.1
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	64	109	152	111	37	96	799	61	45	956	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1629		1685	1845		1778	1880		1702	1934	1591
Flt Permitted	0.60	1.00		0.58	1.00		0.11	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1077	1629		1022	1845		202	1880		295	1934	1591
Peak-hour factor, PHF	0.83	0.84	0.85	0.92	0.71	0.92	0.86	0.92	0.92	0.92	0.93	0.53
Adj. Flow (vph)	60	76	128	165	156	40	112	868	66	49	1028	115
RTOR Reduction (vph)	0	85	0	0	13	0	0	4	0	0	0	42
Lane Group Flow (vph)	60	119	0	165	183	0	112	930	0	49	1028	73
Heavy Vehicles (%)	0%	0%	1%	1%	0%	4%	1%	3%	0%	3%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	13.3	13.3		13.3	13.3		43.8	43.8		43.8	43.8	43.8
Effective Green, g (s)	13.3	13.3		13.3	13.3		43.8	43.8		43.8	43.8	43.8
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.63	0.63		0.63	0.63	0.63
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	207	314		197	355		128	1192		187	1226	1008
v/s Ratio Prot		0.07			0.10			0.49			0.53	
v/s Ratio Perm	0.06			c0.16			c0.55			0.17		0.05
v/c Ratio	0.29	0.38		0.84	0.52		0.88	0.78		0.26	0.84	0.07
Uniform Delay, d1	23.9	24.3		26.9	25.0		10.4	9.2		5.6	9.9	4.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	1.0		26.4	1.7		43.8	3.4		0.8	5.2	0.0
Delay (s)	24.9	25.4		53.2	26.7		54.2	12.5		6.3	15.1	4.9
Level of Service	C	C		D	C		D	B		A	B	A
Approach Delay (s)		25.3			38.8			17.0			13.7	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	69.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

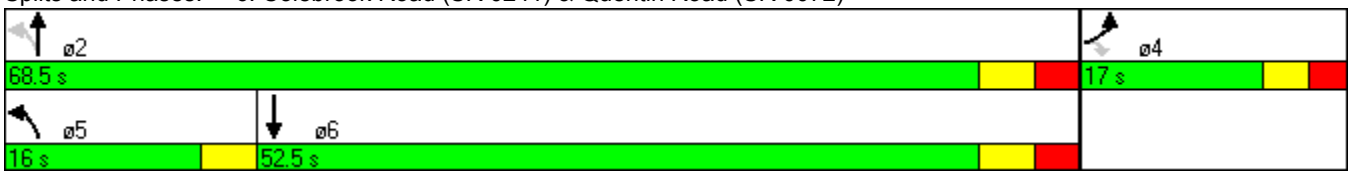
6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	113	355	272	781	898
Lane Group Flow (vph)	123	362	296	822	1007
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	17.0	17.0	16.0	68.5	52.5
Total Split (%)	19.9%	19.9%	18.7%	80.1%	61.4%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.58	0.77	0.77	0.60	0.95
Control Delay	46.2	19.3	33.0	7.8	37.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	19.3	33.0	7.8	37.1
Queue Length 50th (ft)	63	21	91	176	456
Queue Length 95th (ft)	118	#143	#224	264	#745
Internal Link Dist (ft)	583			118	332
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	246	494	387	1518	1222
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.50	0.73	0.76	0.54	0.82

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 78.9
Natural Cycle: 80
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	113	355	272	781	898	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1500	1771	1909	2054	
Flt Permitted	0.95	1.00	0.09	1.00	1.00	
Satd. Flow (perm)	1660	1500	169	1909	2054	
Peak-hour factor, PHF	0.92	0.98	0.92	0.95	0.96	0.92
Adj. Flow (vph)	123	362	296	822	935	72
RTOR Reduction (vph)	0	278	0	0	3	0
Lane Group Flow (vph)	123	84	296	822	1004	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	4%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.0	10.0	56.6	56.6	40.6	
Effective Green, g (s)	10.0	10.0	56.6	56.6	40.6	
Actuated g/C Ratio	0.13	0.13	0.72	0.72	0.52	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	211	191	376	1375	1061	
v/s Ratio Prot	c0.07		c0.13	0.43	c0.49	
v/s Ratio Perm		0.06	0.44			
v/c Ratio	0.58	0.44	0.79	0.60	0.95	
Uniform Delay, d1	32.3	31.7	22.2	5.4	18.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.1	1.6	10.4	1.3	16.9	
Delay (s)	36.4	33.3	32.7	6.7	34.8	
Level of Service	D	C	C	A	C	
Approach Delay (s)	34.1			13.6	34.8	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	78.6	Sum of lost time (s)	15.5
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

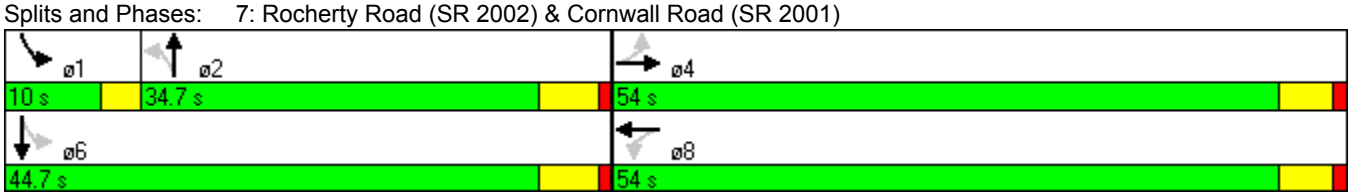
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	53	320	74	352	69	136	74	171
Lane Group Flow (vph)	0	492	0	540	0	289	0	342
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	15.0	15.0	3.0	15.0
Minimum Split (s)	9.2	9.2	9.2	9.2	20.5	20.5	6.0	20.5
Total Split (s)	54.0	54.0	54.0	54.0	34.7	34.7	10.0	44.7
Total Split (%)	54.7%	54.7%	54.7%	54.7%	35.2%	35.2%	10.1%	45.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.4	4.4	3.0	4.4
All-Red Time (s)	1.2	1.2	1.2	1.2	1.1	1.1	0.0	1.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2	5.2	5.5	5.5	3.0	5.5
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Max	Min
v/c Ratio		0.75		0.81		0.72		0.56
Control Delay		25.0		29.1		35.9		21.6
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		25.0		29.1		35.9		21.6
Queue Length 50th (ft)		165		192		111		103
Queue Length 95th (ft)		331		381		245		235
Internal Link Dist (ft)		1052		2233		731		2352
Turn Bay Length (ft)								
Base Capacity (vph)		1050		1058		600		801
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.47		0.51		0.48		0.43

Intersection Summary

Cycle Length: 98.7
Actuated Cycle Length: 74.1
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	320	79	74	352	71	69	136	61	74	171	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	10	10	10
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)		5.2			5.2			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.97			0.97	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1680			1761			1740			1653	
Flt Permitted		0.89			0.86			0.81			0.83	
Satd. Flow (perm)		1512			1523			1430			1395	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	58	348	86	80	383	77	75	148	66	80	178	84
RTOR Reduction (vph)	0	8	0	0	7	0	0	11	0	0	12	0
Lane Group Flow (vph)	0	484	0	0	533	0	0	278	0	0	330	0
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	2%	2%	3%	0%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.9			31.9			20.5			30.9	
Effective Green, g (s)		31.9			31.9			20.5			30.9	
Actuated g/C Ratio		0.43			0.43			0.28			0.42	
Clearance Time (s)		5.2			5.2			5.5			5.5	
Vehicle Extension (s)		4.0			4.0			7.0			7.0	
Lane Grp Cap (vph)		656			661			399			612	
v/s Ratio Prot											c0.05	
v/s Ratio Perm		0.32			c0.35			c0.19			0.17	
v/c Ratio		0.74			0.81			0.70			0.54	
Uniform Delay, d1		17.3			18.1			23.7			16.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		4.6			7.5			8.9			2.7	
Delay (s)		21.9			25.6			32.6			18.6	
Level of Service		C			C			C			B	
Approach Delay (s)		21.9			25.6			32.6			18.6	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	16.2
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

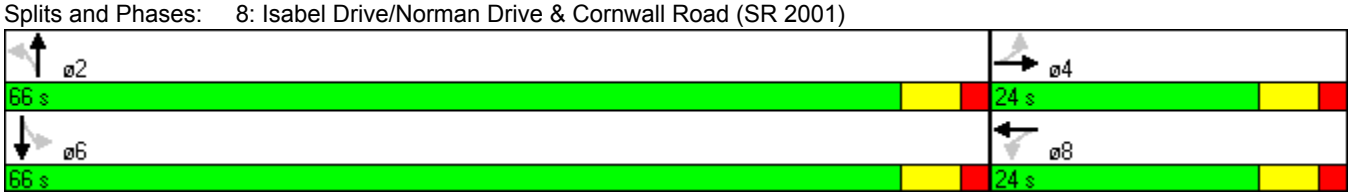
8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	36	2	3	5	45	322	4	361
Lane Group Flow (vph)	0	109	0	44	0	407	0	424
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	24.0	24.0	24.0	24.0	66.0	66.0	66.0	66.0
Total Split (%)	26.7%	26.7%	26.7%	26.7%	73.3%	73.3%	73.3%	73.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.27		0.11		0.37		0.37
Control Delay		8.6		8.9		7.1		6.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		8.6		8.9		7.1		6.9
Queue Length 50th (ft)		6		3		49		50
Queue Length 95th (ft)		13		7		110		112
Internal Link Dist (ft)		124		614		513		2145
Turn Bay Length (ft)								
Base Capacity (vph)		886		915		1632		1702
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.12		0.05		0.25		0.25

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 35
Natural Cycle: 40
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	2	61	3	5	15	45	322	3	4	361	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.93			1.00			0.99	
Flt Protected		0.98			0.99			0.99			1.00	
Satd. Flow (prot)		1875			1901			1776			1725	
Flt Permitted		0.86			0.91			0.91			0.99	
Satd. Flow (perm)		1648			1745			1633			1702	
Peak-hour factor, PHF	0.92	0.50	0.92	0.38	0.42	0.63	0.92	0.92	0.38	0.33	0.92	0.92
Adj. Flow (vph)	39	4	66	8	12	24	49	350	8	12	392	20
RTOR Reduction (vph)	0	58	0	0	21	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	51	0	0	23	0	0	406	0	0	421	0
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	0%	0%	0%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		4.4			4.4			21.1			21.1	
Effective Green, g (s)		4.4			4.4			21.1			21.1	
Actuated g/C Ratio		0.12			0.12			0.56			0.56	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		193			205			919			958	
v/s Ratio Prot												
v/s Ratio Perm		c0.03			0.01			c0.25			0.25	
v/c Ratio		0.26			0.11			0.44			0.44	
Uniform Delay, d1		15.1			14.8			4.8			4.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			0.2			0.3			0.3	
Delay (s)		15.8			15.0			5.1			5.1	
Level of Service		B			B			A			A	
Approach Delay (s)		15.8			15.0			5.1			5.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	37.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	157	28	42	320	291	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.980				0.942	
Flt Protected	0.959			0.994		
Satd. Flow (prot)	1771	0	0	1856	1743	0
Flt Permitted	0.959			0.994		
Satd. Flow (perm)	1771	0	0	1856	1743	0
Link Speed (mph)	25			40	40	
Link Distance (ft)	1326			936	303	
Travel Time (s)	36.2			16.0	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.94	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	2%	4%	1%
Adj. Flow (vph)	171	30	46	340	316	241
Shared Lane Traffic (%)						
Lane Group Flow (vph)	201	0	0	386	557	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	22			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 68.4% ICU Level of Service C
Analysis Period (min) 15

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	157	28	42	320	291	222
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.94	0.92	0.92
Hourly flow rate (vph)	171	30	46	340	316	241
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	869	437	558			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	869	437	558			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	45	95	96			
cM capacity (veh/h)	309	624	1023			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	201	386	558
Volume Left	171	46	0
Volume Right	30	0	241
cSH	335	1023	1700
Volume to Capacity	0.60	0.04	0.33
Queue Length 95th (ft)	92	3	0
Control Delay (s)	30.7	1.5	0.0
Lane LOS	D	A	
Approach Delay (s)	30.7	1.5	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	174	47	237	212	58	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.971		0.936			
Flt Protected	0.962					0.992
Satd. Flow (prot)	1698	0	1743	0	0	2040
Flt Permitted	0.962					0.992
Satd. Flow (perm)	1698	0	1743	0	0	2040
Link Speed (mph)	35		40			40
Link Distance (ft)	884		303			673
Travel Time (s)	17.2		5.2			11.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	9%	3%	1%	0%	5%
Adj. Flow (vph)	189	51	258	230	63	334
Shared Lane Traffic (%)						
Lane Group Flow (vph)	240	0	488	0	0	397
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.00	1.00	0.85	0.85
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	174	47	237	212	58	307
Sign Control	Stop		Free			Free
Grade	2%		0%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	189	51	258	230	63	334
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	833	373			488	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	833	373			488	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	41	92			94	
cM capacity (veh/h)	319	658			1086	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	240	488	397
Volume Left	189	0	63
Volume Right	51	230	0
cSH	358	1700	1086
Volume to Capacity	0.67	0.29	0.06
Queue Length 95th (ft)	116	0	5
Control Delay (s)	33.3	0.0	1.9
Lane LOS	D		A
Approach Delay (s)	33.3	0.0	1.9
Approach LOS	D		

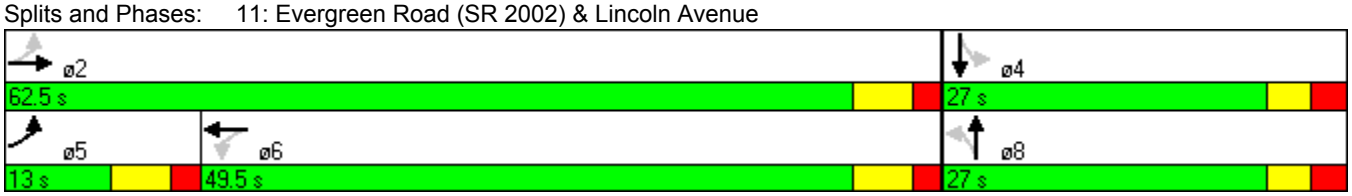
Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	84	344	5	375	16	16	34	38
Lane Group Flow (vph)	91	392	5	448	0	35	0	194
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	13.0	62.5	49.5	49.5	27.0	27.0	27.0	27.0
Total Split (%)	14.5%	69.8%	55.3%	55.3%	30.2%	30.2%	30.2%	30.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.19	0.39	0.01	0.64		0.12		0.54
Control Delay	6.1	7.4	11.8	19.5		20.6		19.5
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.1	7.4	11.8	19.5		20.6		19.5
Queue Length 50th (ft)	10	53	1	116		9		32
Queue Length 95th (ft)	31	124	7	233		33		97
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	480	1619	797	1428		679		718
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.19	0.24	0.01	0.31		0.05		0.27

Intersection Summary

Cycle Length: 89.5
Actuated Cycle Length: 53
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



11: Evergreen Road (SR 2002) & Lincoln Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	344	17	5	375	37	16	16	1	34	38	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			1.00			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1702	1695		1727	1725			1885			1703	
Flt Permitted	0.30	1.00		0.53	1.00			0.83			0.92	
Satd. Flow (perm)	544	1695		964	1725			1604			1589	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	374	18	5	408	40	17	17	1	37	41	116
RTOR Reduction (vph)	0	2	0	0	5	0	0	1	0	0	65	0
Lane Group Flow (vph)	91	390	0	5	443	0	0	34	0	0	129	0
Heavy Vehicles (%)	2%	7%	8%	0%	4%	4%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	32.5	32.5		21.2	21.2			9.8			9.8	
Effective Green, g (s)	32.5	32.5		21.2	21.2			9.8			9.8	
Actuated g/C Ratio	0.60	0.60		0.39	0.39			0.18			0.18	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	443	1024		380	680			292			289	
v/s Ratio Prot	0.02	c0.23			c0.26							
v/s Ratio Perm	0.10			0.01				0.02			c0.08	
v/c Ratio	0.21	0.38		0.01	0.65			0.12			0.45	
Uniform Delay, d1	5.7	5.5		9.9	13.3			18.4			19.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.7		0.0	3.6			0.2			1.1	
Delay (s)	5.9	6.1		10.0	16.9			18.6			20.7	
Level of Service	A	A		A	B			B			C	
Approach Delay (s)		6.1			16.8			18.6			20.7	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

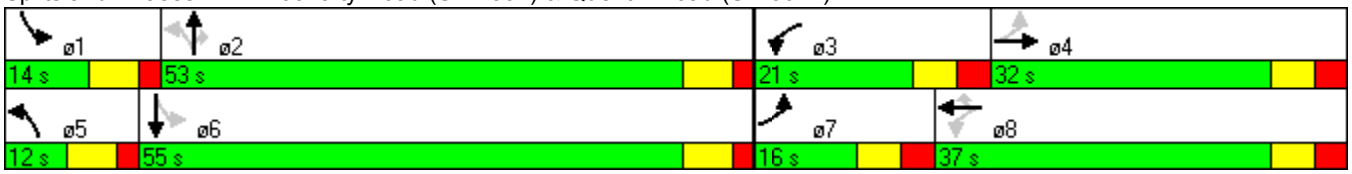
2035 PROJECTED CONDITIONS

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	142	361	259	232	86	20	596	310	111	417
Lane Group Flow (vph)	154	405	282	252	93	22	648	337	121	498
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	16.0	32.0	21.0	37.0	37.0	12.0	53.0	53.0	14.0	55.0
Total Split (%)	13.3%	26.7%	17.5%	30.8%	30.8%	10.0%	44.2%	44.2%	11.7%	45.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.48	1.11	1.18	0.54	0.20	0.09	0.99	0.43	0.70	0.67
Control Delay	32.3	123.1	146.2	43.9	8.2	16.2	69.0	7.1	38.7	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	123.1	146.2	43.9	8.2	16.2	69.0	7.1	38.7	30.9
Queue Length 50th (ft)	80	~359	~217	170	0	8	492	28	59	346
Queue Length 95th (ft)	132	#559	#394	256	42	22	#742	97	#124	441
Internal Link Dist (ft)		569		654			721			1806
Turn Bay Length (ft)	190		300		325	80		250	225	
Base Capacity (vph)	324	366	239	470	470	250	657	782	172	739
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	1.11	1.18	0.54	0.20	0.09	0.99	0.43	0.70	0.67

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 66 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	142	361	12	259	232	86	20	596	310	111	417	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	14	10	11	12	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1677	1751		1577	1878	1601	1425	1695	1576	1640	1658	
Flt Permitted	0.54	1.00		0.13	1.00	1.00	0.32	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	951	1751		221	1878	1601	476	1695	1576	166	1658	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	154	392	13	282	252	93	22	648	337	121	453	45
RTOR Reduction (vph)	0	1	0	0	0	70	0	0	172	0	3	0
Lane Group Flow (vph)	154	404	0	282	252	23	22	648	166	121	495	0
Heavy Vehicles (%)	3%	3%	13%	9%	3%	6%	20%	10%	4%	8%	12%	0%
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	34.0	25.0		44.0	30.0	30.0	49.8	46.5	46.5	58.2	50.7	
Effective Green, g (s)	34.0	25.0		44.0	30.0	30.0	49.8	46.5	46.5	58.2	50.7	
Actuated g/C Ratio	0.28	0.21		0.37	0.25	0.25	0.42	0.39	0.39	0.49	0.42	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	324	365		239	470	400	224	657	611	173	701	
v/s Ratio Prot	0.04	0.23		c0.14	c0.13		0.00	c0.38		c0.04	c0.30	
v/s Ratio Perm	0.10			c0.29		0.01	0.04		0.11	0.30		
v/c Ratio	0.48	1.11		1.18	0.54	0.06	0.10	0.99	0.27	0.70	0.71	
Uniform Delay, d1	34.0	47.5		33.3	39.0	34.2	21.9	36.4	25.1	24.8	28.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.93	
Incremental Delay, d2	1.5	79.3		115.6	1.5	0.1	0.3	31.9	1.1	12.0	5.6	
Delay (s)	35.5	126.8		148.8	40.5	34.3	22.2	68.4	26.2	34.5	32.2	
Level of Service	D	F		F	D	C	C	E	C	C	C	
Approach Delay (s)		101.7			88.3			53.3			32.6	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM Average Control Delay	66.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	33.5
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		

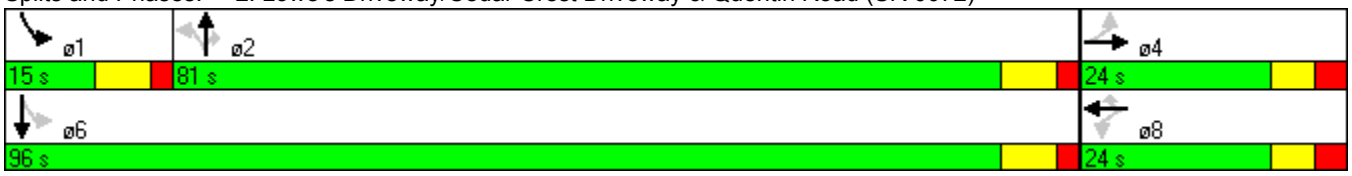
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	6	1	40	2	50	33	650	107	110	491
Lane Group Flow (vph)	0	56	0	45	54	40	707	116	120	546
Turn Type	Perm		Perm		Perm	Perm		Perm	pm+pt	
Protected Phases		4		8			2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	8	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	81.0	81.0	81.0	15.0	96.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	20.0%	67.5%	67.5%	67.5%	12.5%	80.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag						Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.33		0.32	0.28	0.07	0.58	0.09	0.24	0.38
Control Delay		24.7		56.2	16.7	3.2	4.3	0.1	3.2	3.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay		24.7		56.2	16.7	3.2	4.4	0.1	3.2	3.1
Queue Length 50th (ft)		9		33	0	3	50	0	11	69
Queue Length 95th (ft)		0		70	39	m5	m78	m0	24	83
Internal Link Dist (ft)		216		637			1806			599
Turn Bay Length (ft)					115	135		230	200	
Base Capacity (vph)		242		223	273	540	1226	1235	498	1422
Starvation Cap Reductn		0		0	0	0	0	0	0	142
Spillback Cap Reductn		0		0	0	0	25	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.23		0.20	0.20	0.07	0.59	0.09	0.24	0.43

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1	27	40	2	50	33	650	107	110	491	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1521			1796	1599	1609	1770	1731	1702	1713	
Flt Permitted		0.94			0.84	1.00	0.46	1.00	1.00	0.29	1.00	
Satd. Flow (perm)		1441			1572	1599	779	1770	1731	512	1713	
Peak-hour factor, PHF	0.75	0.25	0.61	0.92	0.92	0.92	0.83	0.92	0.92	0.92	0.92	0.42
Adj. Flow (vph)	8	4	44	43	2	54	40	707	116	120	534	12
RTOR Reduction (vph)	0	41	0	0	0	50	0	0	37	0	1	0
Lane Group Flow (vph)	0	15	0	0	45	4	40	707	79	120	545	0
Heavy Vehicles (%)	17%	0%	4%	2%	2%	2%	15%	10%	2%	2%	14%	0%
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		9.3			9.3	9.3	81.7	81.7	81.7	96.7	96.7	
Effective Green, g (s)		9.3			9.3	9.3	81.7	81.7	81.7	96.7	96.7	
Actuated g/C Ratio		0.08			0.08	0.08	0.68	0.68	0.68	0.81	0.81	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	4.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		112			122	124	530	1205	1179	492	1380	
v/s Ratio Prot								c0.40		0.02	c0.32	
v/s Ratio Perm		0.01			c0.03	0.00	0.05		0.05	0.18		
v/c Ratio		0.14			0.37	0.03	0.08	0.59	0.07	0.24	0.40	
Uniform Delay, d1		51.6			52.6	51.2	6.4	10.2	6.4	5.5	3.3	
Progression Factor		1.00			1.00	1.00	0.38	0.29	0.04	0.75	0.62	
Incremental Delay, d2		0.8			2.6	0.2	0.2	1.2	0.1	0.6	0.7	
Delay (s)		52.4			55.1	51.3	2.6	4.1	0.3	4.8	2.8	
Level of Service		D			E	D	A	A	A	A	A	
Approach Delay (s)		52.4			53.1			3.5			3.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

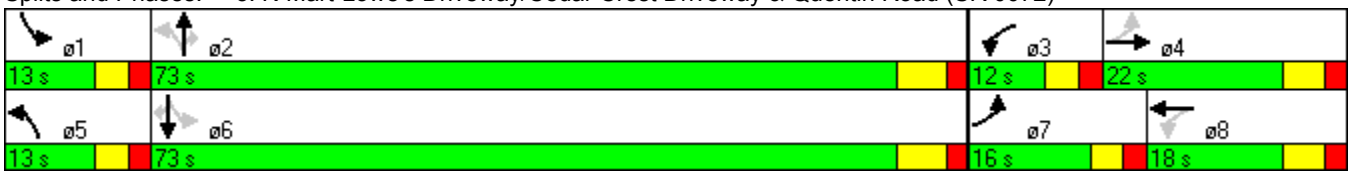
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	78	7	19	6	35	605	32	63	583	39
Lane Group Flow (vph)	104	40	32	135	48	658	48	89	634	68
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	16.0	22.0	12.0	18.0	13.0	73.0	73.0	13.0	73.0	73.0
Total Split (%)	13.3%	18.3%	10.0%	15.0%	10.8%	60.8%	60.8%	10.8%	60.8%	60.8%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.55	0.19	0.15	0.59	0.11	0.65	0.05	0.21	0.60	0.07
Control Delay	51.3	24.8	39.4	22.5	2.0	6.6	0.2	6.6	15.4	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	51.3	24.8	39.4	22.5	2.0	6.7	0.2	6.6	15.4	2.7
Queue Length 50th (ft)	70	9	20	9	1	19	1	18	208	0
Queue Length 95th (ft)	96	19	30	0	5	258	1	30	375	3
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					165		230	235		235
Base Capacity (vph)	195	236	215	284	439	1008	987	443	1052	947
Starvation Cap Reductn	0	0	0	0	0	23	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.17	0.15	0.48	0.11	0.67	0.05	0.20	0.60	0.07

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 4 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	7	19	19	6	74	35	605	32	63	583	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1567	1429		1902	1722		1618	1673	1607	1778	1686	1476
Flt Permitted	0.31	1.00		0.73	1.00		0.31	1.00	1.00	0.28	1.00	1.00
Satd. Flow (perm)	507	1429		1464	1722		536	1673	1607	519	1686	1476
Peak-hour factor, PHF	0.75	0.58	0.68	0.59	0.50	0.60	0.73	0.92	0.67	0.71	0.92	0.57
Adj. Flow (vph)	104	12	28	32	12	123	48	658	48	89	634	68
RTOR Reduction (vph)	0	24	0	0	113	0	0	0	20	0	0	27
Lane Group Flow (vph)	104	16	0	32	22	0	48	658	28	89	634	41
Heavy Vehicles (%)	8%	14%	16%	0%	0%	4%	11%	13%	0%	2%	17%	10%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	25.3	16.1		14.0	9.9		75.9	70.3	70.3	79.1	71.9	71.9
Effective Green, g (s)	25.3	16.1		14.0	9.9		75.9	70.3	70.3	79.1	71.9	71.9
Actuated g/C Ratio	0.21	0.13		0.12	0.08		0.63	0.59	0.59	0.66	0.60	0.60
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	198	192		186	142		390	980	941	418	1010	884
v/s Ratio Prot	c0.05	0.01		0.01	0.01		0.01	c0.39		c0.01	0.38	
v/s Ratio Perm	c0.07			0.01			0.07		0.02	0.13		0.03
v/c Ratio	0.53	0.08		0.17	0.16		0.12	0.67	0.03	0.21	0.63	0.05
Uniform Delay, d1	40.3	45.5		47.6	51.2		9.8	17.0	10.5	10.0	15.5	9.9
Progression Factor	1.00	1.00		1.00	1.00		0.26	0.22	0.03	0.97	0.85	0.90
Incremental Delay, d2	2.5	0.2		0.4	0.5		0.1	3.1	0.0	0.2	2.5	0.1
Delay (s)	42.8	45.7		48.1	51.7		2.7	6.9	0.4	9.9	15.6	9.0
Level of Service	D	D		D	D		A	A	A	A	B	A
Approach Delay (s)		43.6			51.0			6.2			14.4	
Approach LOS		D			D			A			B	

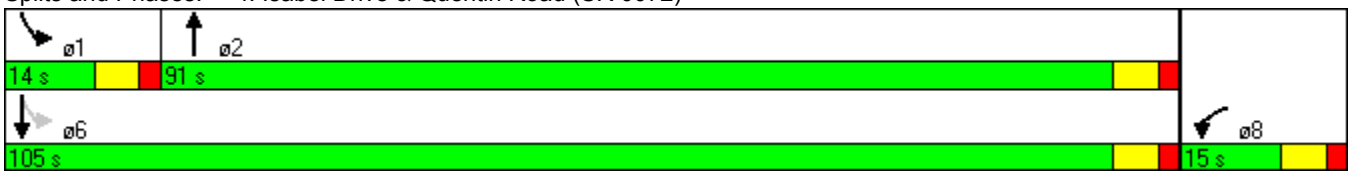
Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	28	632	138	718
Lane Group Flow (vph)	88	754	150	780
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	15.0	91.0	14.0	105.0
Total Split (%)	12.5%	75.8%	11.7%	87.5%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.50	0.64	0.32	0.53
Control Delay	32.3	6.0	3.7	4.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.3	6.0	3.7	4.6
Queue Length 50th (ft)	23	106	15	131
Queue Length 95th (ft)	75	156	29	206
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			275	
Base Capacity (vph)	194	1176	473	1462
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.64	0.32	0.53

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 60 (50%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	28	53	632	62	138	718
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1873		1625		1610	1753
Flt Permitted	0.98		1.00		0.28	1.00
Satd. Flow (perm)	1873		1625		476	1753
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	58	687	67	150	780
RTOR Reduction (vph)	54	0	3	0	0	0
Lane Group Flow (vph)	34	0	751	0	150	780
Heavy Vehicles (%)	4%	4%	10%	10%	10%	10%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	7.9		86.6		100.1	100.1
Effective Green, g (s)	7.9		86.6		100.1	100.1
Actuated g/C Ratio	0.07		0.72		0.83	0.83
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	123		1173		468	1462
v/s Ratio Prot	c0.02		c0.46		0.02	c0.44
v/s Ratio Perm					0.25	
v/c Ratio	0.27		0.64		0.32	0.53
Uniform Delay, d1	53.3		8.6		5.0	3.0
Progression Factor	1.00		0.42		1.00	1.00
Incremental Delay, d2	1.2		2.1		0.4	1.4
Delay (s)	54.5		5.8		5.4	4.4
Level of Service	D		A		A	A
Approach Delay (s)	54.5		5.8			4.5
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

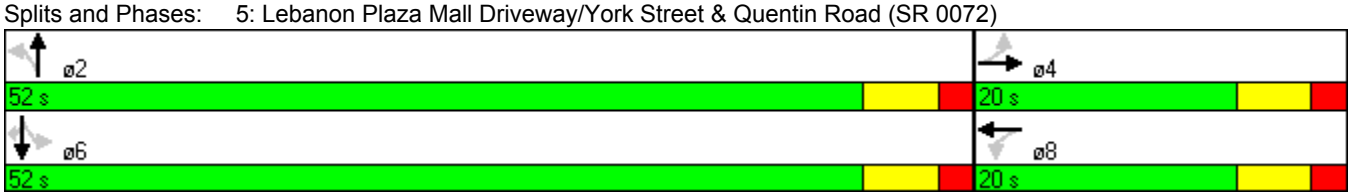
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	4	5	68	10	6	604	36	799	4
Lane Group Flow (vph)	8	20	74	36	20	685	39	868	8
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	20.0	20.0	20.0	20.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%	72.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.05	0.07	0.34	0.12	0.07	0.54	0.09	0.68	0.01
Control Delay	24.0	19.0	29.0	14.5	5.2	8.0	5.1	10.8	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	19.0	29.0	14.5	5.2	8.0	5.1	10.8	2.5
Queue Length 50th (ft)	3	4	25	4	2	124	5	189	0
Queue Length 95th (ft)	8	8	65	24	3	237	16	373	2
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	235	354	289	388	301	1362	473	1378	1259
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.06	0.26	0.09	0.07	0.50	0.08	0.63	0.01

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 63.6
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	5	5	68	10	22	6	604	26	36	799	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.90		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1375	1575		1668	1671		1535	1756		1686	1778	1623
Flt Permitted	0.73	1.00		0.74	1.00		0.24	1.00		0.34	1.00	1.00
Satd. Flow (perm)	1062	1575		1307	1671		388	1756		611	1778	1623
Peak-hour factor, PHF	0.50	0.42	0.63	0.92	0.83	0.92	0.30	0.92	0.92	0.92	0.92	0.50
Adj. Flow (vph)	8	12	8	74	12	24	20	657	28	39	868	8
RTOR Reduction (vph)	0	7	0	0	21	0	0	2	0	0	0	3
Lane Group Flow (vph)	8	13	0	74	15	0	20	683	0	39	868	5
Heavy Vehicles (%)	25%	0%	20%	2%	10%	0%	17%	11%	0%	4%	11%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.5	8.5		8.5	8.5		44.3	44.3		44.3	44.3	44.3
Effective Green, g (s)	8.5	8.5		8.5	8.5		44.3	44.3		44.3	44.3	44.3
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.68	0.68		0.68	0.68	0.68
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	139	207		171	219		265	1200		418	1216	1110
v/s Ratio Prot		0.01			0.01			0.39			c0.49	
v/s Ratio Perm	0.01			c0.06			0.05			0.06		0.00
v/c Ratio	0.06	0.06		0.43	0.07		0.08	0.57		0.09	0.71	0.00
Uniform Delay, d1	24.6	24.7		25.9	24.7		3.4	5.3		3.5	6.3	3.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2		2.4	0.2		0.1	0.6		0.1	2.0	0.0
Delay (s)	24.9	24.8		28.3	24.9		3.5	5.9		3.6	8.3	3.3
Level of Service	C	C		C	C		A	A		A	A	A
Approach Delay (s)		24.8			27.2			5.9			8.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	64.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

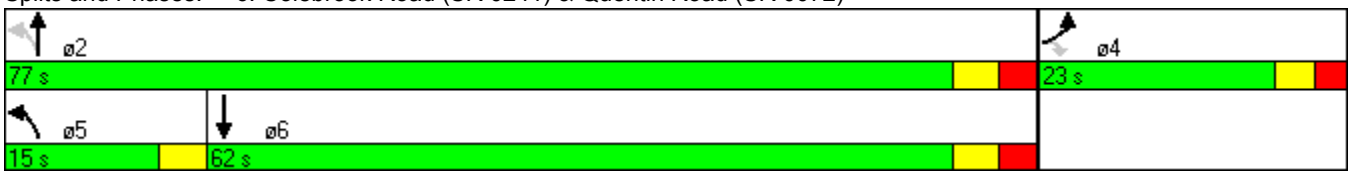
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	181	254	174	568	666
Lane Group Flow (vph)	197	276	189	617	819
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	23.0	23.0	15.0	77.0	62.0
Total Split (%)	23.0%	23.0%	15.0%	77.0%	62.0%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.68	0.57	0.60	0.52	0.92
Control Delay	47.3	10.0	21.6	8.7	35.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	47.3	10.0	21.6	8.7	35.4
Queue Length 50th (ft)	96	0	36	142	370
Queue Length 95th (ft)	#213	72	#121	226	571
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	373	541	337	1521	1323
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.53	0.51	0.56	0.41	0.62

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 80.2
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	181	254	174	568	666	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1627	1428	1625	1769	1831	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1627	1428	167	1769	1831	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	276	189	617	724	95
RTOR Reduction (vph)	0	227	0	0	6	0
Lane Group Flow (vph)	197	49	189	617	813	0
Heavy Vehicles (%)	3%	5%	9%	9%	13%	12%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	14.2	14.2	53.4	53.4	39.0	
Effective Green, g (s)	14.2	14.2	53.4	53.4	39.0	
Actuated g/C Ratio	0.18	0.18	0.67	0.67	0.49	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	290	255	312	1187	897	
v/s Ratio Prot	c0.12		c0.08	0.35	c0.44	
v/s Ratio Perm		0.03	0.32			
v/c Ratio	0.68	0.19	0.61	0.52	0.91	
Uniform Delay, d1	30.6	27.8	15.4	6.6	18.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.2	0.4	3.3	1.0	13.8	
Delay (s)	36.8	28.2	18.7	7.6	32.4	
Level of Service	D	C	B	A	C	
Approach Delay (s)	31.8			10.2	32.4	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	15.5
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

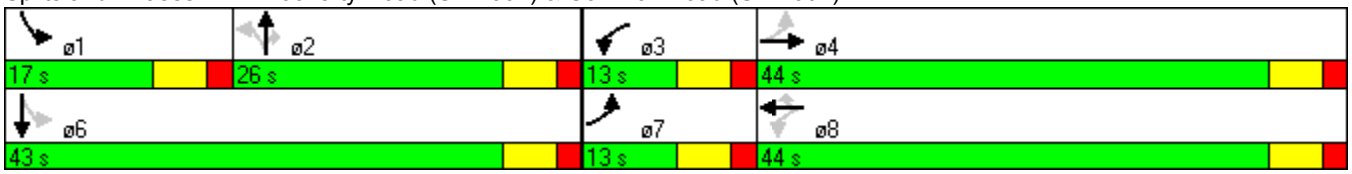
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	113	605	50	442	205	24	296	258	225	142
Lane Group Flow (vph)	123	695	54	480	223	26	322	280	245	232
Turn Type	pm+pt		pm+pt		Perm	Perm		Perm	pm+pt	
Protected Phases	7	4	3	8			2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	15.0	7.0	15.0	15.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0	21.0	21.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	44.0	13.0	44.0	44.0	26.0	26.0	26.0	17.0	43.0
Total Split (%)	13.0%	44.0%	13.0%	44.0%	44.0%	26.0%	26.0%	26.0%	17.0%	43.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio	0.44	1.04	0.33	0.78	0.33	0.10	0.75	0.51	0.91	0.33
Control Delay	19.0	76.6	18.2	38.4	4.3	34.2	50.2	10.9	53.0	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	76.6	18.2	38.4	4.3	34.2	50.2	10.9	53.0	10.1
Queue Length 50th (ft)	40	~479	17	258	0	14	200	20	132	109
Queue Length 95th (ft)	71	#704	37	381	46	37	#347	96	#229	105
Internal Link Dist (ft)		1052		405			731			260
Turn Bay Length (ft)	225		225		325	150		350	240	
Base Capacity (vph)	278	670	166	659	714	256	427	544	269	695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	1.04	0.33	0.73	0.31	0.10	0.75	0.51	0.91	0.33

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 42 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	605	34	50	442	205	24	296	258	225	142	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1759		1497	1734	1516	1754	1891	1576	1550	1709	
Flt Permitted	0.25	1.00		0.11	1.00	1.00	0.61	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	440	1759		172	1734	1516	1133	1891	1576	346	1709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	658	37	54	480	223	26	322	280	245	154	78
RTOR Reduction (vph)	0	2	0	0	0	141	0	0	190	0	18	0
Lane Group Flow (vph)	123	693	0	54	480	82	26	322	90	245	214	0
Heavy Vehicles (%)	4%	6%	8%	16%	9%	6%	0%	1%	3%	12%	3%	9%
Turn Type	pm+pt			pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	45.0	38.0		42.2	36.6	36.6	21.4	21.4	21.4	38.4	38.4	
Effective Green, g (s)	45.0	38.0		42.2	36.6	36.6	21.4	21.4	21.4	38.4	38.4	
Actuated g/C Ratio	0.45	0.38		0.42	0.37	0.37	0.21	0.21	0.21	0.38	0.38	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	7.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	283	668		147	635	555	242	405	337	265	656	
v/s Ratio Prot	c0.03	c0.39		0.02	0.28			0.17		c0.10	0.13	
v/s Ratio Perm	0.16			0.13		0.05	0.02		0.06	c0.25		
v/c Ratio	0.43	1.04		0.37	0.76	0.15	0.11	0.80	0.27	0.92	0.33	
Uniform Delay, d1	18.3	31.0		22.5	27.8	21.2	31.6	37.2	32.8	25.2	21.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.58	0.45	
Incremental Delay, d2	1.1	44.9		1.6	5.4	0.2	0.9	14.9	1.9	34.1	1.2	
Delay (s)	19.4	75.9		24.1	33.2	21.4	32.5	52.1	34.7	48.6	11.0	
Level of Service	B	E		C	C	C	C	D	C	D	B	
Approach Delay (s)		67.4			29.1			43.5			30.3	
Approach LOS		E			C			D			C	

Intersection Summary			
HCM Average Control Delay	44.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	7	39	35	14	51	543	159	735
Lane Group Flow (vph)	0	154	0	113	0	738	0	986
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	17.0	17.0	17.0	17.0	83.0	83.0	83.0	83.0
Total Split (%)	17.0%	17.0%	17.0%	17.0%	83.0%	83.0%	83.0%	83.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio		0.62		0.71		0.59		0.91
Control Delay		32.0		51.1		5.9		22.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		32.0		51.1		5.9		22.8
Queue Length 50th (ft)		42		41		63		399
Queue Length 95th (ft)		106		#117		111		#844
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		271		175		1249		1089
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.57		0.65		0.59		0.91

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	39	96	35	14	55	51	543	86	159	735	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	12	12	11	12	12
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.91			0.93			0.98			1.00	
Flt Protected		1.00			0.98			1.00			0.99	
Satd. Flow (prot)		1830			1966			1807			1808	
Flt Permitted		0.97			0.61			0.87			0.76	
Satd. Flow (perm)		1787			1219			1587			1389	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	42	104	38	15	60	55	590	93	173	799	14
RTOR Reduction (vph)	0	76	0	0	42	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	78	0	0	71	0	0	733	0	0	986	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.6			9.6			78.4			78.4	
Effective Green, g (s)		9.6			9.6			78.4			78.4	
Actuated g/C Ratio		0.10			0.10			0.78			0.78	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		172			117			1244			1089	
v/s Ratio Prot												
v/s Ratio Perm		0.04			c0.06			0.46			c0.71	
v/c Ratio		0.45			0.61			0.59			0.91	
Uniform Delay, d1		42.7			43.4			4.3			8.0	
Progression Factor		1.00			1.00			0.90			1.00	
Incremental Delay, d2		1.9			9.1			1.7			12.2	
Delay (s)		44.6			52.5			5.6			20.3	
Level of Service		D			D			A			C	
Approach Delay (s)		44.6			52.5			5.6			20.3	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.9%	ICU Level of Service	H
Analysis Period (min)	15		

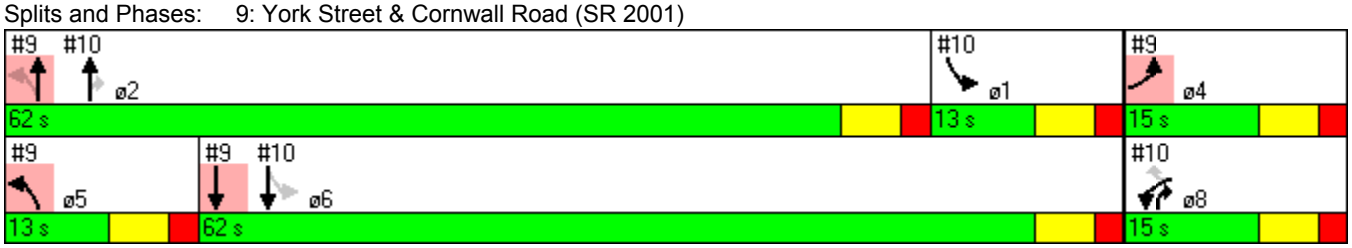
c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	ø1	ø8
Lane Configurations						
Volume (vph)	56	32	557	1016		
Lane Group Flow (vph)	91	0	640	1184		
Turn Type		pm+pt				
Protected Phases	4	5	2	6	1	8
Permitted Phases		2				
Detector Phase	4	5	2	6		
Switch Phase						
Minimum Initial (s)	7.0	7.0	15.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	21.0	13.0	13.0
Total Split (s)	15.0	13.0	62.0	62.0	13.0	15.0
Total Split (%)	16.7%	14.4%	68.9%	68.9%	14%	17%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lead	Lag	Lag	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	None
v/c Ratio	0.42		0.70	0.89		
Control Delay	31.2		10.9	14.8		
Queue Delay	0.0		0.0	10.0		
Total Delay	31.2		10.9	24.8		
Queue Length 50th (ft)	31		136	371		
Queue Length 95th (ft)	74		255	m#476		
Internal Link Dist (ft)	1228		849	232		
Turn Bay Length (ft)						
Base Capacity (vph)	218		919	1328		
Starvation Cap Reductn	0		0	138		
Spillback Cap Reductn	0		0	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.42		0.70	0.99		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77
Natural Cycle: 150
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: York Street & Cornwall Road (SR 2001)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	56	28	32	557	1016	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.96			1.00	0.99	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1701			1785	1823	
Flt Permitted	0.97			0.71	1.00	
Satd. Flow (perm)	1701			1264	1823	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	30	35	605	1104	80
RTOR Reduction (vph)	19	0	0	0	2	0
Lane Group Flow (vph)	72	0	0	640	1182	0
Heavy Vehicles (%)	0%	10%	9%	6%	3%	7%
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	9.0			56.0	56.0	
Effective Green, g (s)	9.0			56.0	56.0	
Actuated g/C Ratio	0.12			0.73	0.73	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	199			919	1326	
v/s Ratio Prot	c0.04				c0.65	
v/s Ratio Perm				0.51		
v/c Ratio	0.36			0.70	0.89	
Uniform Delay, d1	31.3			5.8	8.1	
Progression Factor	1.00			1.00	0.91	
Incremental Delay, d2	1.1			2.3	4.8	
Delay (s)	32.5			8.1	12.2	
Level of Service	C			A	B	
Approach Delay (s)	32.5			8.1	12.2	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

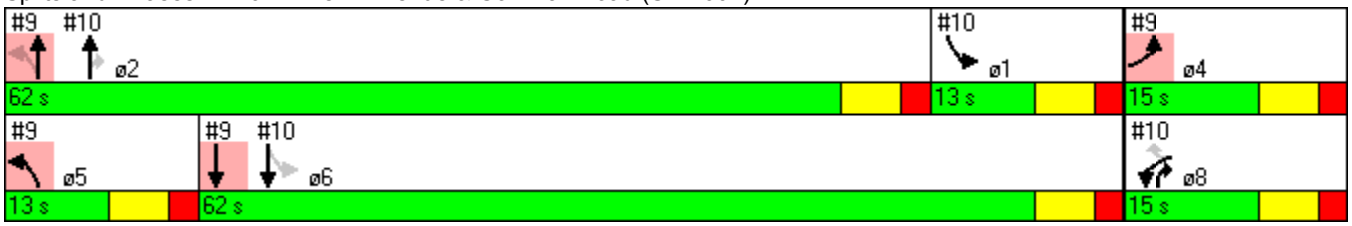
c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø4	ø5
Lane Configurations								
Volume (vph)	219	34	400	106	158	767		
Lane Group Flow (vph)	238	37	435	115	0	1006		
Turn Type		Perm		pm+ov	pm+pt			
Protected Phases	8		2	8	1	6	4	5
Permitted Phases		8		2	6			
Detector Phase	8	8	2	8	1	6		
Switch Phase								
Minimum Initial (s)	7.0	7.0	15.0	7.0	7.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	13.0	13.0	21.0	13.0	13.0
Total Split (s)	15.0	15.0	62.0	15.0	13.0	62.0	15.0	13.0
Total Split (%)	16.7%	16.7%	68.9%	16.7%	14.4%	68.9%	17%	14%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		
Lead/Lag			Lead		Lag	Lag		Lead
Lead-Lag Optimize?			Yes		Yes	Yes		Yes
Recall Mode	None	None	Min	None	None	Min	None	None
v/c Ratio	1.16	0.18	0.33	0.07		0.80		
Control Delay	147.5	13.4	2.4	0.1		13.3		
Queue Delay	4.7	0.0	0.5	0.0		7.2		
Total Delay	152.2	13.4	2.9	0.1		20.5		
Queue Length 50th (ft)	~138	0	31	0		252		
Queue Length 95th (ft)	#273	26	46	m0		443		
Internal Link Dist (ft)	945		232			841		
Turn Bay Length (ft)		150		265				
Base Capacity (vph)	205	206	1329	1615		1256		
Starvation Cap Reductn	0	0	510	0		0		
Spillback Cap Reductn	2	0	0	0		212		
Storage Cap Reductn	0	0	0	0		0		
Reduced v/c Ratio	1.17	0.18	0.53	0.07		0.96		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	219	34	400	106	158	767
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		0.99
Satd. Flow (prot)	1752	1480	1827	1615		2037
Flt Permitted	0.95	1.00	1.00	1.00		0.84
Satd. Flow (perm)	1752	1480	1827	1615		1727
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	37	435	115	172	834
RTOR Reduction (vph)	0	33	0	18	0	0
Lane Group Flow (vph)	238	4	435	97	0	1006
Heavy Vehicles (%)	2%	8%	4%	0%	1%	5%
Turn Type		Perm		pm+ov	pm+pt	
Protected Phases	8		2	8	1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	9.0	9.0	56.0	65.0		56.0
Effective Green, g (s)	9.0	9.0	56.0	65.0		56.0
Actuated g/C Ratio	0.12	0.12	0.73	0.84		0.73
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	205	173	1329	1615		1256
v/s Ratio Prot	c0.14		0.24	0.01		
v/s Ratio Perm		0.00		0.05		c0.58
v/c Ratio	1.16	0.02	0.33	0.06		0.80
Uniform Delay, d1	34.0	30.1	3.8	1.0		6.9
Progression Factor	1.00	1.00	0.48	1.00		1.00
Incremental Delay, d2	113.0	0.1	0.1	0.0		3.8
Delay (s)	147.0	30.2	1.9	1.0		10.6
Level of Service	F	C	A	A		B
Approach Delay (s)	131.3		1.7			10.6
Approach LOS	F		A			B

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		

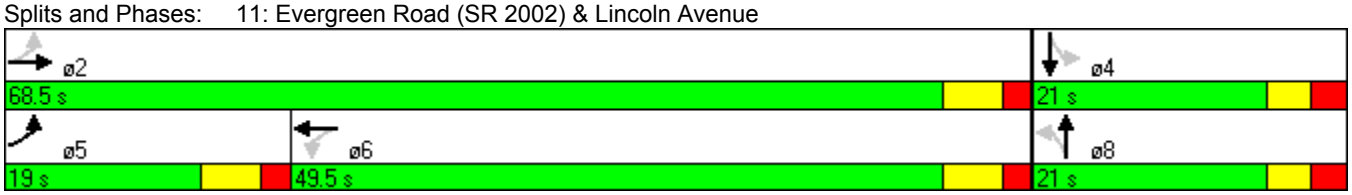
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	369	680	18	640	21	22	141	17
Lane Group Flow (vph)	401	744	20	906	0	86	0	303
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	19.0	68.5	49.5	49.5	21.0	21.0	21.0	21.0
Total Split (%)	21.2%	76.5%	55.3%	55.3%	23.5%	23.5%	23.5%	23.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	1.23	0.63	0.06	1.13		0.30		1.11
Control Delay	151.6	10.3	13.0	97.4		22.7		119.9
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	151.6	10.3	13.0	97.4		22.7		119.9
Queue Length 50th (ft)	~234	194	6	~595		23		~179
Queue Length 95th (ft)	#414	299	18	#828		65		#342
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	327	1179	316	803		283		273
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	1.23	0.63	0.06	1.13		0.30		1.11

Intersection Summary

Cycle Length: 89.5
Actuated Cycle Length: 89.5
Natural Cycle: 120
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	369	680	5	18	640	193	21	22	36	141	17	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.97			0.94			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1702	1688		1614	1627			1702			1650	
Flt Permitted	0.08	1.00		0.38	1.00			0.84			0.83	
Satd. Flow (perm)	145	1688		651	1627			1449			1398	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	739	5	20	696	210	23	24	39	153	18	132
RTOR Reduction (vph)	0	0	0	0	12	0	0	32	0	0	31	0
Lane Group Flow (vph)	401	744	0	20	894	0	0	54	0	0	272	0
Heavy Vehicles (%)	2%	8%	33%	7%	9%	4%	7%	0%	8%	4%	0%	6%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	62.5	62.5		43.5	43.5			15.5			15.5	
Effective Green, g (s)	62.5	62.5		43.5	43.5			15.5			15.5	
Actuated g/C Ratio	0.70	0.70		0.49	0.49			0.17			0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	327	1179		316	791			251			242	
v/s Ratio Prot	c0.18	0.44			0.55							
v/s Ratio Perm	c0.68			0.03				0.04			c0.19	
v/c Ratio	1.23	0.63		0.06	1.13			0.21			1.12	
Uniform Delay, d1	29.6	7.3		12.2	23.0			31.8			37.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	126.0	1.8		0.2	74.0			0.4			94.7	
Delay (s)	155.5	9.1		12.4	97.0			32.2			131.7	
Level of Service	F	A		B	F			C			F	
Approach Delay (s)		60.4			95.2			32.2			131.7	
Approach LOS		E			F			C			F	

Intersection Summary			
HCM Average Control Delay	81.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	11.5
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		

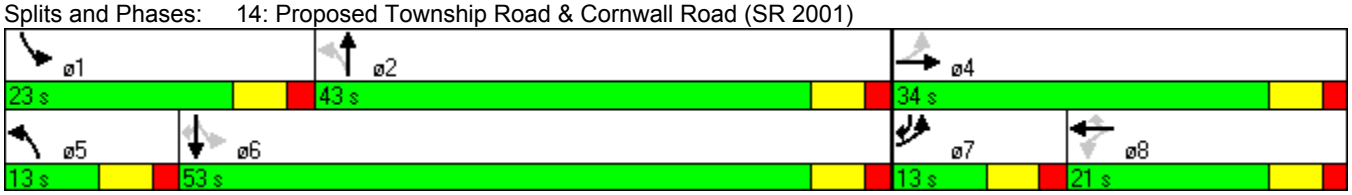
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	38	125	3	50	54	26	525	269	438	42
Lane Group Flow (vph)	41	145	3	54	59	28	596	292	476	46
Turn Type	pm+pt		Perm		Perm	pm+pt		pm+pt		pm+ov
Protected Phases	7	4		8		5	2	1	6	7
Permitted Phases	4		8		8	2		6		6
Detector Phase	7	4	8	8	8	5	2	1	6	7
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	21.0	21.0	13.0	21.0	13.0	21.0	13.0
Total Split (s)	13.0	34.0	21.0	21.0	21.0	13.0	43.0	23.0	53.0	13.0
Total Split (%)	13.0%	34.0%	21.0%	21.0%	21.0%	13.0%	43.0%	23.0%	53.0%	13.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
v/c Ratio	0.19	0.41	0.03	0.33	0.31	0.05	0.69	0.62	0.42	0.04
Control Delay	33.0	36.7	41.0	47.9	15.6	6.5	29.5	12.3	17.1	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	36.7	41.0	47.9	15.6	6.5	29.5	12.3	17.1	3.1
Queue Length 50th (ft)	21	78	2	33	0	5	366	90	229	2
Queue Length 95th (ft)	48	131	11	70	38	m9	#558	m106	m280	m4
Internal Link Dist (ft)		240		318			830		570	
Turn Bay Length (ft)	180		100		100	225		400		275
Base Capacity (vph)	214	519	180	279	288	531	864	504	1136	1183
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.28	0.02	0.19	0.20	0.05	0.69	0.58	0.42	0.04

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Proposed Township Road & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	125	8	3	50	54	26	525	23	269	438	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1845		1711	1863	1583	1702	1842		1711	1863	1583
Flt Permitted	0.43	1.00		0.66	1.00	1.00	0.49	1.00		0.21	1.00	1.00
Satd. Flow (perm)	773	1845		1197	1863	1583	880	1842		380	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	136	9	3	54	59	28	571	25	292	476	46
RTOR Reduction (vph)	0	2	0	0	0	54	0	2	0	0	0	17
Lane Group Flow (vph)	41	143	0	3	54	5	28	594	0	292	476	29
Turn Type	pm+pt			Perm		Perm	pm+pt			pm+pt		pm+ov
Protected Phases	7	4			8		5	2		1	6	7
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	20.4	20.4		8.8	8.8	8.8	49.9	45.7		67.6	57.4	63.0
Effective Green, g (s)	20.4	20.4		8.8	8.8	8.8	49.9	45.7		67.6	57.4	63.0
Actuated g/C Ratio	0.20	0.20		0.09	0.09	0.09	0.50	0.46		0.68	0.57	0.63
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	210	376		105	164	139	474	842		469	1069	1092
v/s Ratio Prot	0.01	c0.08			0.03		0.00	c0.32		c0.10	0.26	0.00
v/s Ratio Perm	0.03			0.00		0.00	0.03			0.32		0.02
v/c Ratio	0.20	0.38		0.03	0.33	0.04	0.06	0.71		0.62	0.45	0.03
Uniform Delay, d1	32.6	34.3		41.7	42.8	41.7	12.8	21.8		12.1	12.2	7.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.78	1.05		1.21	1.27	1.51
Incremental Delay, d2	0.5	0.6		0.1	1.2	0.1	0.0	4.2		1.3	0.7	0.0
Delay (s)	33.1	35.0		41.8	44.0	41.8	10.0	27.1		15.9	16.2	10.5
Level of Service	C	C		D	D	D	B	C		B	B	B
Approach Delay (s)		34.6			42.8			26.4			15.8	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	140	13	36	70	12	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.989				0.910	
Flt Protected			0.950		0.984	
Satd. Flow (prot)	1842	0	1770	1863	1668	0
Flt Permitted			0.950		0.984	
Satd. Flow (perm)	1842	0	1770	1863	1668	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	525			320	264	
Travel Time (s)	14.3			7.3	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	152	14	39	76	13	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	0	39	76	39	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 24.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	140	13	36	70	12	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	152	14	39	76	13	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				320		
pX, platoon unblocked						
vC, conflicting volume			166		314	159
vC1, stage 1 conf vol					159	
vC2, stage 2 conf vol					154	
vCu, unblocked vol			166		314	159
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	97
cM capacity (veh/h)			1412		774	886

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	166	39	76	39
Volume Left	0	39	0	13
Volume Right	14	0	0	26
cSH	1700	1412	1700	845
Volume to Capacity	0.10	0.03	0.04	0.05
Queue Length 95th (ft)	0	2	0	4
Control Delay (s)	0.0	7.6	0.0	9.5
Lane LOS		A		A
Approach Delay (s)	0.0	2.6		9.5
Approach LOS				A

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	128	31	36	46	12	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		175	150		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.909	
Flt Protected			0.950		0.984	
Satd. Flow (prot)	1863	1583	1770	1863	1666	0
Flt Permitted			0.950		0.984	
Satd. Flow (perm)	1863	1583	1770	1863	1666	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	356			525	240	
Travel Time (s)	9.7			11.9	6.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	139	34	39	50	13	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	139	34	39	50	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 23.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	128	31	36	46	12	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	34	39	50	13	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1073			845		
pX, platoon unblocked						
vC, conflicting volume			173		267	139
vC1, stage 1 conf vol					139	
vC2, stage 2 conf vol					128	
vCu, unblocked vol			173		267	139
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	97
cM capacity (veh/h)			1404		801	909

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	139	34	39	50	40
Volume Left	0	0	39	0	13
Volume Right	0	34	0	0	27
cSH	1700	1700	1404	1700	871
Volume to Capacity	0.08	0.02	0.03	0.03	0.05
Queue Length 95th (ft)	0	0	2	0	4
Control Delay (s)	0.0	0.0	7.6	0.0	9.3
Lane LOS			A		A
Approach Delay (s)	0.0		3.4		9.3
Approach LOS					A

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	159	2	1	57	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.998					
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1859	0	1770	1863	1770	0
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1859	0	1770	1863	1770	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	717			356	195	
Travel Time (s)	19.6			9.7	5.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	173	2	1	62	1	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	0	1	62	1	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 18.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	159	2	1	57	1	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	173	2	1	62	1	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	717			1201		
pX, platoon unblocked						
vC, conflicting volume			175		238	174
vC1, stage 1 conf vol					174	
vC2, stage 2 conf vol					64	
vCu, unblocked vol			175		238	174
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1401		821	870

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	175	1	62	1
Volume Left	0	1	0	1
Volume Right	2	0	0	0
cSH	1700	1401	1700	821
Volume to Capacity	0.10	0.00	0.04	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	7.6	0.0	9.4
Lane LOS		A		A
Approach Delay (s)	0.0	0.1		9.4
Approach LOS				A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	18.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	91	975	651	44	13	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.991		0.913	
Flt Protected	0.950				0.982	
Satd. Flow (prot)	1676	1825	1883	0	1670	0
Flt Permitted	0.950				0.982	
Satd. Flow (perm)	1676	1825	1883	0	1670	0
Link Speed (mph)		40	40		25	
Link Distance (ft)		480	1348		405	
Travel Time (s)		8.2	23.0		11.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Adj. Flow (vph)	99	1060	708	48	14	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	99	1060	756	0	39	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.07	1.03	0.97	0.97	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	91	975	651	44	13	23
Sign Control		Free	Free		Stop	
Grade		4%	-4%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	99	1060	708	48	14	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)		965				
pX, platoon unblocked					0.59	
vC, conflicting volume	755				1989	732
vC1, stage 1 conf vol					732	
vC2, stage 2 conf vol					1258	
vCu, unblocked vol	755				2332	732
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	88				91	94
cM capacity (veh/h)	855				153	421

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	99	1060	755	39
Volume Left	99	0	0	14
Volume Right	0	0	48	25
cSH	855	1700	1700	258
Volume to Capacity	0.12	0.62	0.44	0.15
Queue Length 95th (ft)	10	0	0	13
Control Delay (s)	9.8	0.0	0.0	21.4
Lane LOS	A			C
Approach Delay (s)	0.8		0.0	21.4
Approach LOS				C

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	1066	672	2	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		1%	-2%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	0	1
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt						0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1881	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1881	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Adj. Flow (vph)	0	1159	730	2	0	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1159	732	0	0	11
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1066	672	2	0	10
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1159	730	2	0	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485				
pX, platoon unblocked					0.53	
vC, conflicting volume	733				1890	732
vC1, stage 1 conf vol					732	
vC2, stage 2 conf vol					1159	
vCu, unblocked vol	733				2235	732
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	97
cM capacity (veh/h)	872				193	421

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1159	733	11
Volume Left	0	0	0
Volume Right	0	2	11
cSH	1700	1700	421
Volume to Capacity	0.68	0.43	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	13.8
Lane LOS			B
Approach Delay (s)	0.0	0.0	13.8
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	6	568	34	15	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	150	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			450
Travel Time (s)	4.7		5.2			6.8
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	0	7	617	37	16	448
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	617	37	16	448
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			Yes
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	6	568	34	15	430
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Hourly flow rate (vph)	0	7	617	37	16	448
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			340			
pX, platoon unblocked	0.80	0.80			0.80	
vC, conflicting volume	1098	617			654	
vC1, stage 1 conf vol	617					
vC2, stage 2 conf vol	481					
vCu, unblocked vol	1000	403			449	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			98	
cM capacity (veh/h)	442	521			894	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	617	37	16	448
Volume Left	0	0	0	16	0
Volume Right	7	0	37	0	0
cSH	521	1700	1700	894	1700
Volume to Capacity	0.01	0.36	0.02	0.02	0.26
Queue Length 95th (ft)	1	0	0	1	0
Control Delay (s)	12.0	0.0	0.0	9.1	0.0
Lane LOS	B			A	
Approach Delay (s)	12.0	0.0		0.3	
Approach LOS	B				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	11	0	574	434	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			150
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	1863	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	1583
Link Speed (mph)	25			45	45	
Link Distance (ft)	247			450	910	
Travel Time (s)	6.7			6.8	13.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	0	12	0	624	472	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	12	0	624	472	16
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			11	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 33.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	11	0	574	434	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	0	624	472	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				790	910	
pX, platoon unblocked	0.91	0.85	0.85			
vC, conflicting volume	1096	472	488			
vC1, stage 1 conf vol	472					
vC2, stage 2 conf vol	624					
vCu, unblocked vol	685	293	312			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	495	636	1063			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	12	624	472	16
Volume Left	0	0	0	0
Volume Right	12	0	0	16
cSH	636	1700	1700	1700
Volume to Capacity	0.02	0.37	0.28	0.01
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	10.8	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.8	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	223	61	0	98	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.977					
Flt Protected					0.950	
Satd. Flow (prot)	1805	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1805	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	319	66	0	132	7	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	385	0	0	132	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 25.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	223	61	0	98	6	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Hourly flow rate (vph)	319	66	0	132	7	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			385		484	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			385		484	352
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1174		542	692

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	385	132	7
Volume Left	0	0	7
Volume Right	66	0	0
cSH	1700	1174	542
Volume to Capacity	0.23	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	11.7
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.7
Approach LOS			B

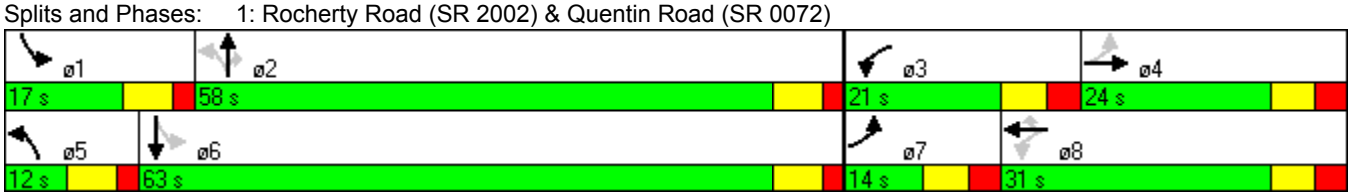
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	135	295	341	322	171	12	654	167	181	646
Lane Group Flow (vph)	147	344	371	339	186	13	681	182	197	859
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	14.0	24.0	21.0	31.0	31.0	12.0	58.0	58.0	17.0	63.0
Total Split (%)	11.7%	20.0%	17.5%	25.8%	25.8%	10.0%	48.3%	48.3%	14.2%	52.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.85	1.36	1.48	0.89	0.38	0.09	0.88	0.24	0.77	0.94
Control Delay	74.4	224.6	263.9	71.9	8.1	13.2	46.5	5.7	36.1	41.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.4	224.6	263.9	71.9	8.1	13.2	46.5	5.7	36.1	41.0
Queue Length 50th (ft)	85	~351	~350	257	0	4	476	12	75	539
Queue Length 95th (ft)	#171	#541	#547	#425	61	13	#708	56	m#162	m#949
Internal Link Dist (ft)		569		654			721			1806
Turn Bay Length (ft)	190		300		325	80		250	225	
Base Capacity (vph)	173	253	251	383	488	138	770	766	257	912
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	1.36	1.48	0.89	0.38	0.09	0.88	0.24	0.77	0.94

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 93 (78%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	295	21	341	322	171	12	654	167	181	646	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	14	10	11	12	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1710	1767		1653	1915	1697	1710	1793	1576	1771	1708	
Flt Permitted	0.29	1.00		0.17	1.00	1.00	0.08	1.00	1.00	0.12	1.00	
Satd. Flow (perm)	514	1767		290	1915	1697	140	1793	1576	215	1708	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.96	0.92	0.92	0.93	0.92
Adj. Flow (vph)	147	321	23	371	339	186	13	681	182	197	695	164
RTOR Reduction (vph)	0	3	0	0	0	149	0	0	88	0	7	0
Lane Group Flow (vph)	147	341	0	371	339	37	13	681	94	197	852	0
Heavy Vehicles (%)	1%	2%	0%	4%	1%	0%	0%	4%	4%	0%	7%	2%
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	24.0	17.0		38.0	24.0	24.0	53.8	51.6	51.6	68.5	59.8	
Effective Green, g (s)	24.0	17.0		38.0	24.0	24.0	53.8	51.6	51.6	68.5	59.8	
Actuated g/C Ratio	0.20	0.14		0.32	0.20	0.20	0.45	0.43	0.43	0.57	0.50	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	173	250		251	383	339	92	771	678	258	851	
v/s Ratio Prot	0.05	0.19		c0.17	0.18		0.00	0.38		c0.07	c0.50	
v/s Ratio Perm	0.12			c0.30		0.02	0.06		0.06	0.37		
v/c Ratio	0.85	1.37		1.48	0.89	0.11	0.14	0.88	0.14	0.76	1.00	
Uniform Delay, d1	44.2	51.5		35.7	46.7	39.3	25.3	31.4	20.7	22.2	30.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.89	
Incremental Delay, d2	31.2	188.1		235.4	21.3	0.2	1.0	14.0	0.4	10.8	27.9	
Delay (s)	75.5	239.6		271.1	68.0	39.5	26.3	45.4	21.1	36.0	54.7	
Level of Service	E	F		F	E	D	C	D	C	D	D	
Approach Delay (s)		190.5			146.2			40.1			51.2	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM Average Control Delay	94.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	105.9%	ICU Level of Service	G
Analysis Period (min)	15		

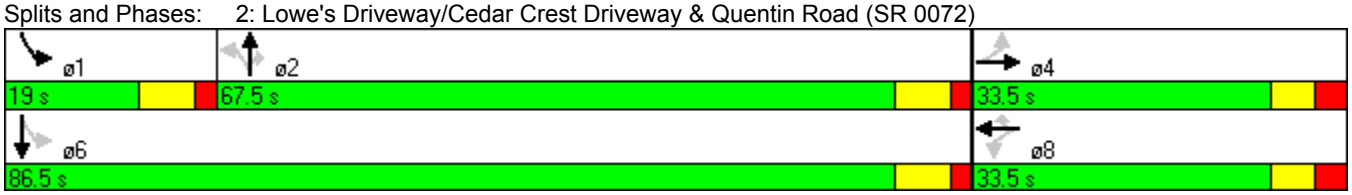
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	10	3	230	3	229	60	754	205	182	671
Lane Group Flow (vph)	0	92	0	253	249	72	794	223	198	718
Turn Type	Perm		Perm		Perm	Perm		Perm	pm+pt	
Protected Phases		4		8			2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	8	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	33.5	33.5	33.5	33.5	33.5	67.5	67.5	67.5	19.0	86.5
Total Split (%)	27.9%	27.9%	27.9%	27.9%	27.9%	56.3%	56.3%	56.3%	15.8%	72.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag						Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.27		0.92	0.49	0.19	0.85	0.23	0.68	0.57
Control Delay		14.8		82.8	11.9	11.3	20.6	1.8	36.6	11.9
Queue Delay		0.0		0.0	0.1	0.0	20.7	0.0	0.0	0.3
Total Delay		14.8		82.8	12.0	11.3	41.3	1.8	36.6	12.2
Queue Length 50th (ft)		12		191	23	15	185	2	99	191
Queue Length 95th (ft)		40		#344	98	m23	m392	m7	m148	315
Internal Link Dist (ft)		216		637			1806			599
Turn Bay Length (ft)					115	135		230	200	
Base Capacity (vph)		355		286	518	378	934	972	293	1256
Starvation Cap Reductn		0		0	0	0	0	0	0	133
Spillback Cap Reductn		6		0	18	0	158	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.26		0.88	0.50	0.19	1.02	0.23	0.68	0.64

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	3	53	230	3	229	60	754	205	182	671	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1532			1793	1599	1796	1820	1731	1702	1875	
Flt Permitted		0.88			0.69	1.00	0.39	1.00	1.00	0.12	1.00	
Satd. Flow (perm)		1354			1295	1599	736	1820	1731	215	1875	
Peak-hour factor, PHF	0.63	0.75	0.74	0.92	0.92	0.92	0.83	0.95	0.92	0.92	0.95	0.67
Adj. Flow (vph)	16	4	72	250	3	249	72	794	223	198	706	12
RTOR Reduction (vph)	0	57	0	0	0	167	0	0	84	0	1	0
Lane Group Flow (vph)	0	35	0	0	253	82	72	794	139	198	717	0
Heavy Vehicles (%)	0%	0%	6%	2%	2%	2%	3%	7%	2%	2%	4%	0%
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		25.6			25.6	25.6	61.6	61.6	61.6	80.4	80.4	
Effective Green, g (s)		25.6			25.6	25.6	61.6	61.6	61.6	80.4	80.4	
Actuated g/C Ratio		0.21			0.21	0.21	0.51	0.51	0.51	0.67	0.67	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	4.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		289			276	341	378	934	889	290	1256	
v/s Ratio Prot								c0.44		0.07	c0.38	
v/s Ratio Perm		0.03			c0.20	0.05	0.10		0.08	0.39		
v/c Ratio		0.12			0.92	0.24	0.19	0.85	0.16	0.68	0.57	
Uniform Delay, d1		38.1			46.2	39.1	15.8	25.2	15.4	20.1	10.6	
Progression Factor		1.00			1.00	1.00	0.63	0.51	0.33	2.25	0.96	
Incremental Delay, d2		0.3			33.2	0.5	0.7	6.6	0.2	6.7	1.3	
Delay (s)		38.4			79.4	39.6	10.6	19.4	5.4	51.8	11.4	
Level of Service		D			E	D	B	B	A	D	B	
Approach Delay (s)		38.4			59.7			15.9			20.2	
Approach LOS		D			E			B			C	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

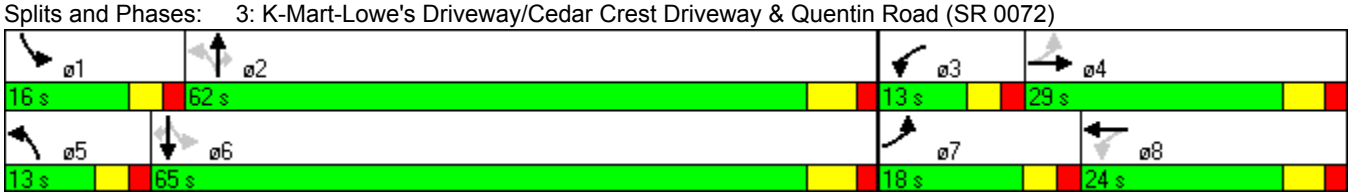
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	182	19	77	20	49	775	62	142	723	65
Lane Group Flow (vph)	225	96	96	402	56	842	68	167	786	80
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	18.0	29.0	13.0	24.0	13.0	62.0	62.0	16.0	65.0	65.0
Total Split (%)	15.0%	24.2%	10.8%	20.0%	10.8%	51.7%	51.7%	13.3%	54.2%	54.2%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.93	0.28	0.29	0.93	0.23	0.98	0.09	0.76	0.81	0.10
Control Delay	77.8	18.9	33.7	52.6	5.9	36.5	1.3	48.8	27.4	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0
Total Delay	77.8	18.9	33.7	52.6	5.9	40.0	1.3	48.8	27.4	6.2
Queue Length 50th (ft)	139	21	54	150	5	~695	0	95	316	5
Queue Length 95th (ft)	#218	29	85	80	m10	m#921	m2	m#164	#771	m22
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					165		230	235		235
Base Capacity (vph)	243	360	330	448	261	857	797	232	968	812
Starvation Cap Reductn	0	0	0	0	0	14	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.27	0.29	0.90	0.21	1.00	0.09	0.72	0.81	0.10

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 10 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	19	55	77	20	245	49	775	62	142	723	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1600		1902	1761		1796	1783	1607	1814	1844	1489
Flt Permitted	0.18	1.00		0.69	1.00		0.15	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	324	1600		1392	1761		283	1783	1607	123	1844	1489
Peak-hour factor, PHF	0.81	0.59	0.86	0.80	0.56	0.67	0.88	0.92	0.91	0.85	0.92	0.81
Adj. Flow (vph)	225	32	64	96	36	366	56	842	68	167	786	80
RTOR Reduction (vph)	0	52	0	0	185	0	0	0	24	0	0	30
Lane Group Flow (vph)	225	44	0	96	217	0	56	842	44	167	786	50
Heavy Vehicles (%)	0%	11%	0%	0%	5%	1%	0%	6%	0%	0%	7%	9%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	34.9	22.1		24.6	16.9		63.6	57.7	57.7	72.2	62.0	62.0
Effective Green, g (s)	34.9	22.1		24.6	16.9		63.6	57.7	57.7	72.2	62.0	62.0
Actuated g/C Ratio	0.29	0.18		0.20	0.14		0.53	0.48	0.48	0.60	0.52	0.52
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	241	295		318	248		224	857	773	218	953	769
v/s Ratio Prot	c0.10	0.03		0.02	0.12		0.01	c0.47		c0.07	0.43	
v/s Ratio Perm	c0.17			0.04			0.12		0.03	0.40		0.03
v/c Ratio	0.93	0.15		0.30	0.88		0.25	0.98	0.06	0.77	0.82	0.07
Uniform Delay, d1	36.5	41.1		39.9	50.5		19.0	30.7	16.6	32.0	24.4	14.5
Progression Factor	1.00	1.00		1.00	1.00		0.45	0.41	0.14	1.34	0.84	1.04
Incremental Delay, d2	39.9	0.2		0.5	27.3		0.4	20.7	0.1	10.9	5.9	0.1
Delay (s)	76.4	41.3		40.5	77.8		8.9	33.2	2.5	53.7	26.4	15.2
Level of Service	E	D		D	E		A	C	A	D	C	B
Approach Delay (s)		65.9			70.6			29.6			29.9	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM Average Control Delay	41.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

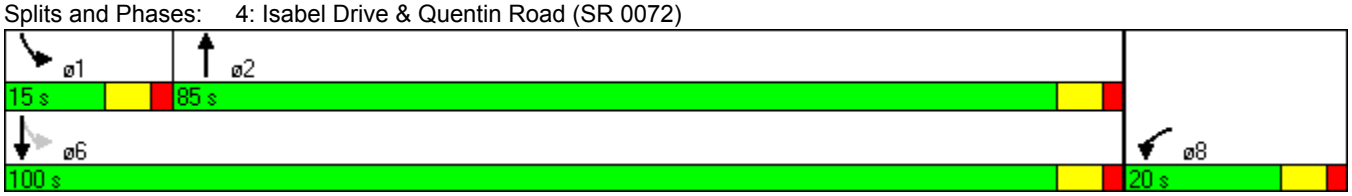
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	44	1132	114	988
Lane Group Flow (vph)	250	1262	124	1019
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	20.0	85.0	15.0	100.0
Total Split (%)	16.7%	70.8%	12.5%	83.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.81	1.05	0.69	0.69
Control Delay	42.1	45.8	42.9	8.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	42.1	45.8	42.9	8.6
Queue Length 50th (ft)	80	~1108	44	301
Queue Length 95th (ft)	#185	m#1217	#129	454
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			275	
Base Capacity (vph)	346	1202	189	1476
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.72	1.05	0.66	0.69

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 78 (65%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	44	186	1132	76	114	988
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.89		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1882		1758		1687	1837
Flt Permitted	0.99		1.00		0.05	1.00
Satd. Flow (perm)	1882		1758		81	1837
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.97
Adj. Flow (vph)	48	202	1179	83	124	1019
RTOR Reduction (vph)	129	0	2	0	0	0
Lane Group Flow (vph)	121	0	1260	0	124	1019
Heavy Vehicles (%)	2%	2%	2%	2%	5%	5%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	11.6		81.9		96.4	96.4
Effective Green, g (s)	11.6		81.9		96.4	96.4
Actuated g/C Ratio	0.10		0.68		0.80	0.80
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	182		1200		179	1476
v/s Ratio Prot	c0.06		c0.72		0.05	c0.55
v/s Ratio Perm					0.51	
v/c Ratio	0.66		1.05		0.69	0.69
Uniform Delay, d1	52.3		19.0		40.6	5.2
Progression Factor	1.00		0.66		1.00	1.00
Incremental Delay, d2	8.8		30.1		11.0	2.7
Delay (s)	61.1		42.6		51.6	7.9
Level of Service	E		D		D	A
Approach Delay (s)	61.1		42.6			12.6
Approach LOS	E		D			B

Intersection Summary			
HCM Average Control Delay	31.4	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

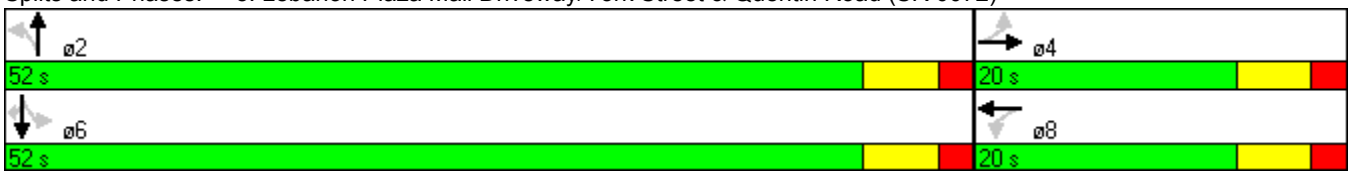
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	52	55	133	94	61	1001	41	892	44
Lane Group Flow (vph)	68	152	145	175	72	1134	45	949	56
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	20.0	20.0	20.0	20.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%	72.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.34	0.43	0.68	0.50	0.37	0.94	0.42	0.77	0.05
Control Delay	30.4	17.8	45.2	27.1	12.6	28.2	21.9	14.7	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	17.8	45.2	27.1	12.6	28.2	21.9	14.7	1.7
Queue Length 50th (ft)	26	28	60	58	13	399	9	265	0
Queue Length 95th (ft)	51	65	#135	95	38	#736	#55	431	8
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	226	390	237	389	203	1246	109	1262	1098
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.39	0.61	0.45	0.35	0.91	0.41	0.75	0.05

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 69.4
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	58	133	94	50	61	1001	42	41	892	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1653	1627		1685	1813		1744	1870		1754	1897	1623
Flt Permitted	0.64	1.00		0.66	1.00		0.17	1.00		0.09	1.00	1.00
Satd. Flow (perm)	1115	1627		1171	1813		304	1870		165	1897	1623
Peak-hour factor, PHF	0.77	0.81	0.69	0.92	0.78	0.92	0.85	0.92	0.92	0.92	0.94	0.79
Adj. Flow (vph)	68	68	84	145	121	54	72	1088	46	45	949	56
RTOR Reduction (vph)	0	63	0	0	23	0	0	2	0	0	0	20
Lane Group Flow (vph)	68	89	0	145	152	0	72	1132	0	45	949	36
Heavy Vehicles (%)	4%	2%	2%	1%	0%	3%	3%	4%	0%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	12.5	12.5		12.5	12.5		44.8	44.8		44.8	44.8	44.8
Effective Green, g (s)	12.5	12.5		12.5	12.5		44.8	44.8		44.8	44.8	44.8
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.65	0.65		0.65	0.65	0.65
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	201	293		211	327		197	1209		107	1226	1049
v/s Ratio Prot		0.05			0.08			c0.61			0.50	
v/s Ratio Perm	0.06			c0.12			0.24			0.27		0.02
v/c Ratio	0.34	0.30		0.69	0.46		0.37	0.94		0.42	0.77	0.03
Uniform Delay, d1	24.8	24.6		26.6	25.4		5.7	11.0		5.9	8.7	4.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.4	0.8		9.7	1.4		1.2	13.3		2.7	3.1	0.0
Delay (s)	26.2	25.4		36.3	26.8		6.8	24.2		8.6	11.8	4.4
Level of Service	C	C		D	C		A	C		A	B	A
Approach Delay (s)		25.7			31.1			23.2			11.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	69.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

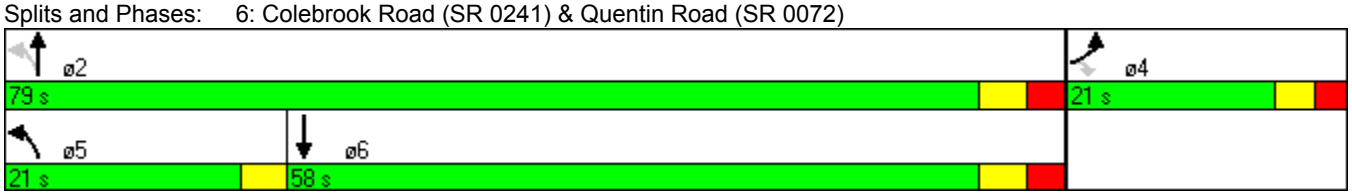
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	207	242	323	941	833
Lane Group Flow (vph)	225	263	351	1012	1043
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	21.0	21.0	21.0	79.0	58.0
Total Split (%)	21.0%	21.0%	21.0%	79.0%	58.0%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.89	0.59	0.92	0.74	1.01
Control Delay	77.5	10.9	57.6	12.4	55.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	77.5	10.9	57.6	12.4	55.4
Queue Length 50th (ft)	142	0	167	329	~660
Queue Length 95th (ft)	#277	72	#338	492	#950
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	258	451	382	1362	1034
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.87	0.58	0.92	0.74	1.01

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 99.6
Natural Cycle: 100
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	207	242	323	941	833	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1470	1736	1872	1988	
Flt Permitted	0.95	1.00	0.07	1.00	1.00	
Satd. Flow (perm)	1660	1470	133	1872	1988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.92
Adj. Flow (vph)	225	263	351	1012	896	147
RTOR Reduction (vph)	0	223	0	0	6	0
Lane Group Flow (vph)	225	40	351	1012	1037	0
Heavy Vehicles (%)	1%	2%	2%	3%	4%	1%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	15.1	15.1	72.5	72.5	51.5	
Effective Green, g (s)	15.1	15.1	72.5	72.5	51.5	
Actuated g/C Ratio	0.15	0.15	0.73	0.73	0.52	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	252	223	378	1363	1028	
v/s Ratio Prot	c0.14		c0.16	0.54	c0.52	
v/s Ratio Perm		0.03	0.51			
v/c Ratio	0.89	0.18	0.93	0.74	1.01	
Uniform Delay, d1	41.5	36.8	32.5	8.0	24.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	30.2	0.4	28.6	3.0	30.3	
Delay (s)	71.6	37.2	61.1	11.0	54.3	
Level of Service	E	D	E	B	D	
Approach Delay (s)	53.1			23.9	54.3	
Approach LOS	D			C	D	

Intersection Summary			
HCM Average Control Delay	39.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	15.5
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		

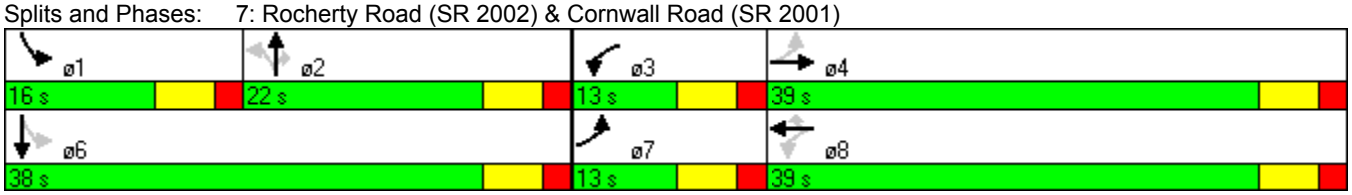
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	96	456	105	592	186	52	222	120	221	279
Lane Group Flow (vph)	104	549	114	643	202	57	241	130	240	514
Turn Type	pm+pt		pm+pt		Perm	Perm		Perm	pm+pt	
Protected Phases	7	4	3	8			2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	15.0	7.0	15.0	15.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0	21.0	21.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	39.0	13.0	39.0	39.0	22.0	22.0	22.0	16.0	38.0
Total Split (%)	14.4%	43.3%	14.4%	43.3%	43.3%	24.4%	24.4%	24.4%	17.8%	42.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio	0.51	0.84	0.47	0.95	0.29	0.32	0.61	0.29	0.73	0.77
Control Delay	22.1	39.2	18.8	54.2	4.2	38.6	41.7	8.1	22.3	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	39.2	18.8	54.2	4.2	38.6	41.7	8.1	22.3	15.0
Queue Length 50th (ft)	29	277	32	349	0	29	130	0	26	64
Queue Length 95th (ft)	59	#458	61	#569	43	67	#233	47	m66	m#370
Internal Link Dist (ft)		1052		405			731			260
Turn Bay Length (ft)	225		225		325	150		350	240	
Base Capacity (vph)	203	659	245	679	694	178	396	442	331	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.83	0.47	0.95	0.29	0.32	0.61	0.29	0.73	0.77

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 45 (50%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	456	49	105	592	186	52	222	120	221	279	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1784		1653	1853	1545	1754	1891	1623	1623	1654	
Flt Permitted	0.12	1.00		0.19	1.00	1.00	0.46	1.00	1.00	0.32	1.00	
Satd. Flow (perm)	213	1784		334	1853	1545	848	1891	1623	547	1654	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	104	496	53	114	643	202	57	241	130	240	291	223
RTOR Reduction (vph)	0	4	0	0	0	128	0	0	105	0	30	0
Lane Group Flow (vph)	104	545	0	114	643	74	57	241	25	240	484	0
Heavy Vehicles (%)	4%	4%	3%	5%	2%	4%	0%	1%	0%	7%	9%	4%
Turn Type	pm+pt			pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	38.4	32.8		38.4	32.8	32.8	17.6	17.6	17.6	33.6	33.6	
Effective Green, g (s)	38.4	32.8		38.4	32.8	32.8	17.6	17.6	17.6	33.6	33.6	
Actuated g/C Ratio	0.43	0.36		0.43	0.36	0.36	0.20	0.20	0.20	0.37	0.37	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	7.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	181	650		225	675	563	166	370	317	324	617	
v/s Ratio Prot	c0.04	0.31		0.03	c0.35			0.13		0.08	c0.29	
v/s Ratio Perm	0.21			0.19		0.05	0.07		0.02	0.19		
v/c Ratio	0.57	0.84		0.51	0.95	0.13	0.34	0.65	0.08	0.74	0.78	
Uniform Delay, d1	19.9	26.2		18.3	27.8	19.1	31.2	33.4	29.6	21.6	25.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.44	0.30	
Incremental Delay, d2	4.4	9.6		1.8	23.6	0.1	5.6	8.6	0.5	7.0	7.7	
Delay (s)	24.3	35.8		20.0	51.5	19.2	36.8	42.0	30.1	16.5	15.1	
Level of Service	C	D		C	D	B	D	D	C	B	B	
Approach Delay (s)		34.0			41.0			37.7			15.5	
Approach LOS		C			D			D			B	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	38	18	69	28	106	715	57	692
Lane Group Flow (vph)	0	165	0	268	0	934	0	840
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	23.0	23.0	23.0	23.0	67.0	67.0	67.0	67.0
Total Split (%)	25.6%	25.6%	25.6%	25.6%	74.4%	74.4%	74.4%	74.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio		0.57		0.83		0.87		0.76
Control Delay		25.3		48.1		19.9		14.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		25.3		48.1		19.9		14.8
Queue Length 50th (ft)		40		104		220		284
Queue Length 95th (ft)		104		#220		#711		466
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		319		356		1078		1112
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.52		0.75		0.87		0.76

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 79 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	18	96	69	28	150	106	715	39	57	692	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	12	12	11	12	12
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.91			0.92			0.99			1.00	
Flt Protected		0.99			0.99			0.99			1.00	
Satd. Flow (prot)		1842			1911			1877			1795	
Flt Permitted		0.71			0.80			0.81			0.88	
Satd. Flow (perm)		1326			1552			1536			1585	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	20	104	75	30	163	115	777	42	62	752	26
RTOR Reduction (vph)	0	70	0	0	64	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	95	0	0	204	0	0	932	0	0	839	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.9			14.9			63.1			63.1	
Effective Green, g (s)		14.9			14.9			63.1			63.1	
Actuated g/C Ratio		0.17			0.17			0.70			0.70	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		220			257			1077			1111	
v/s Ratio Prot												
v/s Ratio Perm		0.07			c0.13			c0.61			0.53	
v/c Ratio		0.43			0.79			0.87			0.75	
Uniform Delay, d1		33.7			36.1			10.2			8.5	
Progression Factor		1.00			1.00			0.91			1.00	
Incremental Delay, d2		1.4			15.3			8.2			4.8	
Delay (s)		35.1			51.4			17.5			13.3	
Level of Service		D			D			B			B	
Approach Delay (s)		35.1			51.4			17.5			13.3	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	ø1	ø8
Lane Configurations						
Volume (vph)	130	91	992	713		
Lane Group Flow (vph)	186	0	1177	967		
Turn Type		pm+pt				
Protected Phases	4	5	2	6	1	8
Permitted Phases		2				
Detector Phase	4	5	2	6		
Switch Phase						
Minimum Initial (s)	7.0	7.0	15.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	21.0	13.0	13.0
Total Split (s)	17.0	13.0	90.0	90.0	13.0	17.0
Total Split (%)	14.2%	10.8%	75.0%	75.0%	11%	14%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lead	Lag	Lag	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	None
v/c Ratio	0.98		1.10	0.70		
Control Delay	106.5		75.0	11.3		
Queue Delay	0.0		1.3	0.8		
Total Delay	106.5		76.3	12.1		
Queue Length 50th (ft)	122		~921	459		
Queue Length 95th (ft)	#265		#1174	m455		
Internal Link Dist (ft)	1228		849	232		
Turn Bay Length (ft)						
Base Capacity (vph)	190		1068	1377		
Starvation Cap Reductn	0		0	168		
Spillback Cap Reductn	0		3	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.98		1.11	0.80		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 107
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: York Street & Cornwall Road (SR 2001)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	130	41	91	992	713	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.97			1.00	0.97	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1758			1855	1748	
Flt Permitted	0.96			0.73	1.00	
Satd. Flow (perm)	1758			1359	1748	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	45	99	1078	775	192
RTOR Reduction (vph)	10	0	0	0	5	0
Lane Group Flow (vph)	176	0	0	1177	962	0
Heavy Vehicles (%)	0%	3%	2%	2%	7%	1%
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	11.0			84.0	84.0	
Effective Green, g (s)	11.0			84.0	84.0	
Actuated g/C Ratio	0.10			0.79	0.79	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	181			1067	1372	
v/s Ratio Prot	c0.10				0.55	
v/s Ratio Perm				c0.87		
v/c Ratio	0.97			1.10	0.70	
Uniform Delay, d1	47.9			11.5	5.5	
Progression Factor	1.00			1.00	1.66	
Incremental Delay, d2	58.6			60.3	0.9	
Delay (s)	106.5			71.8	10.1	
Level of Service	F			E	B	
Approach Delay (s)	106.5			71.8	10.1	
Approach LOS	F			E	B	

Intersection Summary			
HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	107.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	130.2%	ICU Level of Service	H
Analysis Period (min)	15		

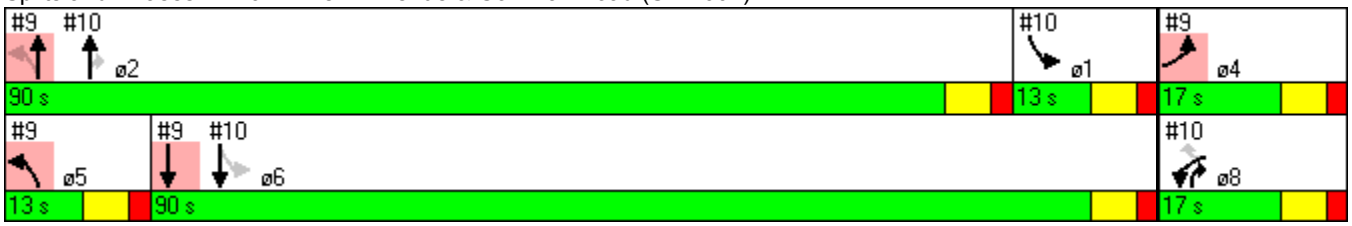
c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø4	ø5
Lane Configurations								
Volume (vph)	240	84	768	365	80	624		
Lane Group Flow (vph)	261	91	835	397	0	765		
Turn Type		Perm		pm+ov	pm+pt			
Protected Phases	8		2	8	1	6	4	5
Permitted Phases		8		2	6			
Detector Phase	8	8	2	8	1	6		
Switch Phase								
Minimum Initial (s)	7.0	7.0	15.0	7.0	7.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	13.0	13.0	21.0	13.0	13.0
Total Split (s)	17.0	17.0	90.0	17.0	13.0	90.0	17.0	13.0
Total Split (%)	14.2%	14.2%	75.0%	14.2%	10.8%	75.0%	14%	11%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		
Lead/Lag			Lead		Lag	Lag		Lead
Lead-Lag Optimize?			Yes		Yes	Yes		Yes
Recall Mode	None	None	Min	None	None	Min	None	None
v/c Ratio	1.43	0.38	0.57	0.25		0.59		
Control Delay	260.0	17.5	2.8	0.0		6.9		
Queue Delay	45.0	0.0	14.2	0.0		0.5		
Total Delay	305.0	17.5	17.0	0.0		7.5		
Queue Length 50th (ft)	~243	6	103	0		170		
Queue Length 95th (ft)	#405	55	m96	m0		252		
Internal Link Dist (ft)	945		232			841		
Turn Bay Length (ft)		150		265				
Base Capacity (vph)	182	237	1463	1615		1287		
Starvation Cap Reductn	0	0	619	0		0		
Spillback Cap Reductn	12	0	0	0		197		
Storage Cap Reductn	0	0	0	0		0		
Reduced v/c Ratio	1.54	0.38	0.99	0.25		0.70		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 107
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	240	84	768	365	80	624
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		0.99
Satd. Flow (prot)	1769	1599	1863	1615		2023
Flt Permitted	0.95	1.00	1.00	1.00		0.81
Satd. Flow (perm)	1769	1599	1863	1615		1640
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	261	91	835	397	87	678
RTOR Reduction (vph)	0	73	0	45	0	0
Lane Group Flow (vph)	261	18	835	352	0	765
Heavy Vehicles (%)	1%	0%	2%	0%	0%	6%
Turn Type		Perm		pm+ov	pm+pt	
Protected Phases	8		2	8	1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	11.0	11.0	84.0	95.0		84.0
Effective Green, g (s)	11.0	11.0	84.0	95.0		84.0
Actuated g/C Ratio	0.10	0.10	0.79	0.89		0.79
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	182	164	1463	1615		1287
v/s Ratio Prot	c0.15		0.45	0.02		
v/s Ratio Perm		0.01		0.20		c0.47
v/c Ratio	1.43	0.11	0.57	0.22		0.59
Uniform Delay, d1	48.0	43.6	4.5	0.8		4.6
Progression Factor	1.00	1.00	0.57	1.00		1.00
Incremental Delay, d2	223.8	0.3	0.0	0.0		0.7
Delay (s)	271.8	43.9	2.6	0.8		5.4
Level of Service	F	D	A	A		A
Approach Delay (s)	212.9		2.0			5.4
Approach LOS	F		A			A

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	107.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.0%	ICU Level of Service	G
Analysis Period (min)	15		

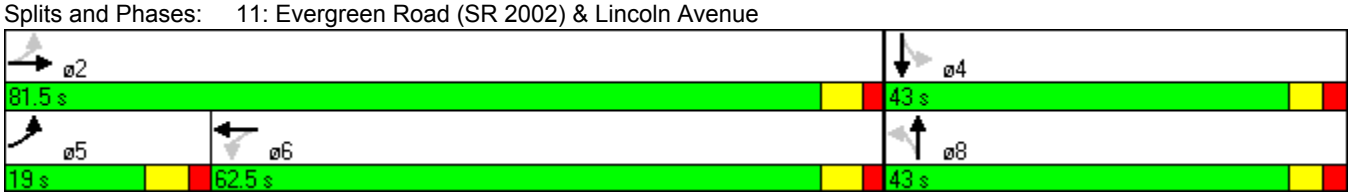
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	193	626	11	510	15	18	42	53
Lane Group Flow (vph)	210	712	12	609	0	45	0	440
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	19.0	81.5	62.5	62.5	43.0	43.0	43.0	43.0
Total Split (%)	15.3%	65.5%	50.2%	50.2%	34.5%	34.5%	34.5%	34.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.59	0.68	0.04	0.88		0.12		0.84
Control Delay	17.8	17.7	19.2	41.5		25.3		39.1
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	17.8	17.7	19.2	41.5		25.3		39.1
Queue Length 50th (ft)	52	263	4	327		16		176
Queue Length 95th (ft)	123	502	18	560		51		365
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	378	1393	458	1105		594		752
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.56	0.51	0.03	0.55		0.08		0.59

Intersection Summary

Cycle Length: 124.5
Actuated Cycle Length: 94.4
Natural Cycle: 70
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	193	626	29	11	510	51	15	18	8	42	53	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1702	1729		1727	1726			1744			1642	
Flt Permitted	0.16	1.00		0.39	1.00			0.78			0.96	
Satd. Flow (perm)	280	1729		717	1726			1386			1590	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	680	32	12	554	55	16	20	9	46	58	336
RTOR Reduction (vph)	0	1	0	0	3	0	0	7	0	0	98	0
Lane Group Flow (vph)	210	711	0	12	606	0	0	38	0	0	342	0
Heavy Vehicles (%)	2%	5%	5%	0%	4%	3%	0%	14%	0%	0%	5%	2%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	56.9	56.9		38.3	38.3			25.3			25.3	
Effective Green, g (s)	56.9	56.9		38.3	38.3			25.3			25.3	
Actuated g/C Ratio	0.61	0.61		0.41	0.41			0.27			0.27	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	361	1050		293	706			374			429	
v/s Ratio Prot	0.08	c0.41			c0.35							
v/s Ratio Perm	0.27			0.02				0.03			c0.22	
v/c Ratio	0.58	0.68		0.04	0.86			0.10			0.80	
Uniform Delay, d1	14.1	12.3		16.7	25.2			25.7			31.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.4	2.7		0.2	11.5			0.1			9.9	
Delay (s)	16.5	15.0		16.8	36.8			25.8			41.7	
Level of Service	B	B		B	D			C			D	
Approach Delay (s)		15.3			36.4			25.8			41.7	
Approach LOS		B			D			C			D	

Intersection Summary			
HCM Average Control Delay	27.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	93.7	Sum of lost time (s)	17.5
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

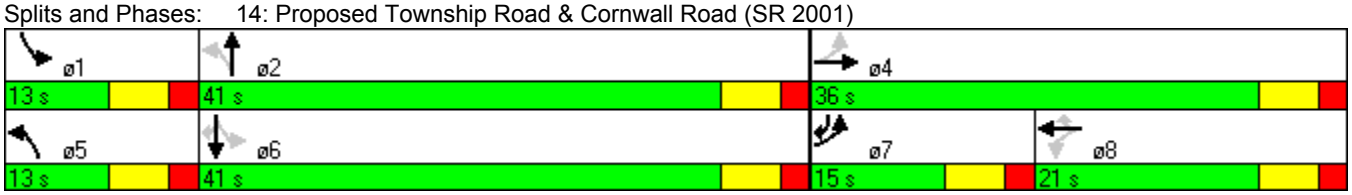
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	186	60	25	159	201	89	416	53	607	128
Lane Group Flow (vph)	202	116	27	173	218	97	454	58	660	139
Turn Type	pm+pt		Perm		Perm	pm+pt		pm+pt		pm+ov
Protected Phases	7	4		8		5	2	1	6	7
Permitted Phases	4		8		8	2		6		6
Detector Phase	7	4	8	8	8	5	2	1	6	7
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	21.0	21.0	13.0	21.0	13.0	21.0	13.0
Total Split (s)	15.0	36.0	21.0	21.0	21.0	13.0	41.0	13.0	41.0	15.0
Total Split (%)	16.7%	40.0%	23.3%	23.3%	23.3%	14.4%	45.6%	14.4%	45.6%	16.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
v/c Ratio	0.66	0.20	0.16	0.66	0.53	0.38	0.55	0.14	0.80	0.14
Control Delay	35.3	14.5	34.9	48.5	10.1	10.0	21.0	12.1	29.2	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	14.5	34.9	48.5	10.1	10.0	21.0	12.1	29.2	1.8
Queue Length 50th (ft)	88	28	14	93	0	11	239	14	247	0
Queue Length 95th (ft)	145	65	37	157	61	m24	339	m24	#562	m10
Internal Link Dist (ft)		240		318			830		570	
Turn Bay Length (ft)	180		100		100	225		400		275
Base Capacity (vph)	307	611	205	311	446	256	821	406	822	1017
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.19	0.13	0.56	0.49	0.38	0.55	0.14	0.80	0.14

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Proposed Township Road & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	186	60	47	25	159	201	89	416	2	53	607	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1740		1711	1863	1583	1702	1852		1711	1863	1583
Flt Permitted	0.36	1.00		0.68	1.00	1.00	0.16	1.00		0.36	1.00	1.00
Satd. Flow (perm)	654	1740		1229	1863	1583	281	1852		642	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	65	51	27	173	218	97	452	2	58	660	139
RTOR Reduction (vph)	0	33	0	0	0	187	0	0	0	0	0	66
Lane Group Flow (vph)	202	83	0	27	173	31	97	454	0	58	660	73
Turn Type	pm+pt			Perm		Perm	pm+pt			pm+pt		pm+ov
Protected Phases	7	4			8		5	2		1	6	7
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	27.7	27.7		12.7	12.7	12.7	44.5	38.7		44.1	38.5	47.5
Effective Green, g (s)	27.7	27.7		12.7	12.7	12.7	44.5	38.7		44.1	38.5	47.5
Actuated g/C Ratio	0.31	0.31		0.14	0.14	0.14	0.49	0.43		0.49	0.43	0.53
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	307	536		173	263	223	231	796		381	797	941
v/s Ratio Prot	c0.07	0.05			0.09		c0.03	0.25		0.01	c0.35	0.01
v/s Ratio Perm	c0.14			0.02		0.02	0.18			0.07		0.04
v/c Ratio	0.66	0.16		0.16	0.66	0.14	0.42	0.57		0.15	0.83	0.08
Uniform Delay, d1	24.9	22.6		33.9	36.6	33.9	15.9	19.4		12.8	22.8	10.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.58	0.89		1.14	0.93	0.88
Incremental Delay, d2	5.0	0.1		0.4	5.8	0.3	1.1	2.7		0.1	6.7	0.0
Delay (s)	29.9	22.8		34.4	42.4	34.1	10.4	19.9		14.7	28.0	9.2
Level of Service	C	C		C	D	C	B	B		B	C	A
Approach Delay (s)		27.3			37.6			18.3			24.0	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	170	65	117	233	111	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963				0.931	
Flt Protected			0.950		0.976	
Satd. Flow (prot)	1794	0	1770	1863	1693	0
Flt Permitted			0.950		0.976	
Satd. Flow (perm)	1794	0	1770	1863	1693	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	525			320	264	
Travel Time (s)	14.3			7.3	7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	71	127	253	121	125
Shared Lane Traffic (%)						
Lane Group Flow (vph)	256	0	127	253	246	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 42.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	170	65	117	233	111	115
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	185	71	127	253	121	125
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				320		
pX, platoon unblocked					0.97	
vC, conflicting volume			255		728	220
vC1, stage 1 conf vol					220	
vC2, stage 2 conf vol					508	
vCu, unblocked vol			255		701	220
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			90		76	85
cM capacity (veh/h)			1310		513	820

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	255	127	253	246
Volume Left	0	127	0	121
Volume Right	71	0	0	125
cSH	1700	1310	1700	634
Volume to Capacity	0.15	0.10	0.15	0.39
Queue Length 95th (ft)	0	8	0	46
Control Delay (s)	0.0	8.0	0.0	14.2
Lane LOS		A		B
Approach Delay (s)	0.0	2.7		14.2
Approach LOS				B

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	123	151	116	228	112	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		175	150		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.932	
Flt Protected			0.950		0.976	
Satd. Flow (prot)	1863	1583	1770	1863	1694	0
Flt Permitted			0.950		0.976	
Satd. Flow (perm)	1863	1583	1770	1863	1694	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	356			525	240	
Travel Time (s)	9.7			11.9	6.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	134	164	126	248	122	122
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	164	126	248	244	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 36.0%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	123	151	116	228	112	112
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	134	164	126	248	122	122
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1073			845		
pX, platoon unblocked						
vC, conflicting volume			298		634	134
vC1, stage 1 conf vol					134	
vC2, stage 2 conf vol					500	
vCu, unblocked vol			298		634	134
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			90		77	87
cM capacity (veh/h)			1263		526	915

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	134	164	126	248	243
Volume Left	0	0	126	0	122
Volume Right	0	164	0	0	122
cSH	1700	1700	1263	1700	668
Volume to Capacity	0.08	0.10	0.10	0.15	0.36
Queue Length 95th (ft)	0	0	8	0	42
Control Delay (s)	0.0	0.0	8.2	0.0	13.4
Lane LOS			A		B
Approach Delay (s)	0.0		2.8		13.4
Approach LOS					B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	273	12	1	339	3	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994				0.966	
Flt Protected			0.950		0.964	
Satd. Flow (prot)	1852	0	1770	1863	1735	0
Flt Permitted			0.950		0.964	
Satd. Flow (perm)	1852	0	1770	1863	1735	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	717			356	195	
Travel Time (s)	19.6			9.7	5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	297	13	1	368	3	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	310	0	1	368	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 27.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	273	12	1	339	3	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	297	13	1	368	3	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	717			1201		
pX, platoon unblocked						
vC, conflicting volume			310		674	303
vC1, stage 1 conf vol					303	
vC2, stage 2 conf vol					371	
vCu, unblocked vol			310		674	303
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1251		605	736

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	310	1	368	4
Volume Left	0	1	0	3
Volume Right	13	0	0	1
cSH	1700	1251	1700	634
Volume to Capacity	0.18	0.00	0.22	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	7.9	0.0	10.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.0		10.7
Approach LOS				B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	29	751	774	28	53	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.995		0.940	
Flt Protected	0.950				0.973	
Satd. Flow (prot)	1676	1825	1890	0	1704	0
Flt Permitted	0.950				0.973	
Satd. Flow (perm)	1676	1825	1890	0	1704	0
Link Speed (mph)		40	40		25	
Link Distance (ft)		480	1348		405	
Travel Time (s)		8.2	23.0		11.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	816	841	30	58	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	32	816	871	0	105	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.07	1.03	0.97	0.97	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 54.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	29	751	774	28	53	43
Sign Control		Free	Free		Stop	
Grade		4%	-4%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	816	841	30	58	47
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)		965				
pX, platoon unblocked					0.67	
vC, conflicting volume	872				1736	857
vC1, stage 1 conf vol					857	
vC2, stage 2 conf vol					879	
vCu, unblocked vol	872				1850	857
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				79	87
cM capacity (veh/h)	774				269	357

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	32	816	872	104
Volume Left	32	0	0	58
Volume Right	0	0	30	47
cSH	774	1700	1700	302
Volume to Capacity	0.04	0.48	0.51	0.35
Queue Length 95th (ft)	3	0	0	37
Control Delay (s)	9.9	0.0	0.0	23.1
Lane LOS	A			C
Approach Delay (s)	0.4		0.0	23.1
Approach LOS				C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	780	815	2	0	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1881	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1881	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	848	886	2	0	55
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	848	888	0	0	55
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 53.0%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	780	815	2	0	51
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	848	886	2	0	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485				
pX, platoon unblocked					0.63	
vC, conflicting volume	888				1735	887
vC1, stage 1 conf vol					887	
vC2, stage 2 conf vol					848	
vCu, unblocked vol	888				1872	887
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	84
cM capacity (veh/h)	763				277	343

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	848	888	55
Volume Left	0	0	0
Volume Right	0	2	55
cSH	1700	1700	343
Volume to Capacity	0.50	0.52	0.16
Queue Length 95th (ft)	0	0	14
Control Delay (s)	0.0	0.0	17.5
Lane LOS			C
Approach Delay (s)	0.0	0.0	17.5
Approach LOS			C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	24	483	12	16	692
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	150	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			450
Travel Time (s)	4.7		5.2			6.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Adj. Flow (vph)	0	26	525	13	17	721
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	525	13	17	721
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			Yes
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	24	483	12	16	692
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Hourly flow rate (vph)	0	26	525	13	17	721
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			340			
pX, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	1281	525			538	
vC1, stage 1 conf vol	525					
vC2, stage 2 conf vol	756					
vCu, unblocked vol	1244	361			376	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			98	
cM capacity (veh/h)	385	585			1012	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	26	525	13	17	721
Volume Left	0	0	0	17	0
Volume Right	26	0	13	0	0
cSH	585	1700	1700	1012	1700
Volume to Capacity	0.04	0.31	0.01	0.02	0.42
Queue Length 95th (ft)	3	0	0	1	0
Control Delay (s)	11.4	0.0	0.0	8.6	0.0
Lane LOS	B			A	
Approach Delay (s)	11.4	0.0		0.2	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	78	0	507	630	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			150
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	1863	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	1583
Link Speed (mph)	25			45	45	
Link Distance (ft)	247			450	910	
Travel Time (s)	6.7			6.8	13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	85	0	551	685	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	85	0	551	685	53
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			11	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 44.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	78	0	507	630	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	0	551	685	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				790	910	
pX, platoon unblocked	0.73	0.68	0.68			
vC, conflicting volume	1236	685	738			
vC1, stage 1 conf vol	685					
vC2, stage 2 conf vol	551					
vCu, unblocked vol	799	295	374			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	83	100			
cM capacity (veh/h)	436	504	802			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	85	551	685	53
Volume Left	0	0	0	0
Volume Right	85	0	0	53
cSH	504	1700	1700	1700
Volume to Capacity	0.17	0.32	0.40	0.03
Queue Length 95th (ft)	15	0	0	0
Control Delay (s)	13.6	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	13.6	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	106	8	0	200	47	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992					
Flt Protected					0.950	
Satd. Flow (prot)	1831	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1831	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	151	9	0	270	51	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	0	0	270	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 20.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	106	8	0	200	47	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Hourly flow rate (vph)	151	9	0	270	51	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			160		426	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			160		426	156
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1419		585	890

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	160	270	51
Volume Left	0	0	51
Volume Right	9	0	0
cSH	1700	1419	585
Volume to Capacity	0.09	0.00	0.09
Queue Length 95th (ft)	0	0	7
Control Delay (s)	0.0	0.0	11.7
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.7
Approach LOS			B

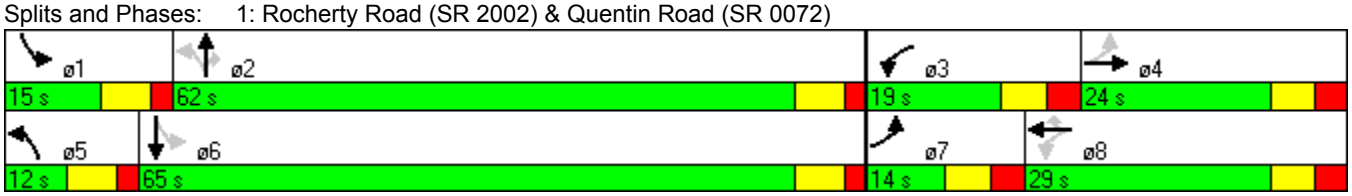
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	145	153	222	172	115	22	692	126	230	646
Lane Group Flow (vph)	158	188	241	187	125	24	744	137	247	874
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	14.0	24.0	19.0	29.0	29.0	12.0	62.0	62.0	15.0	65.0
Total Split (%)	11.7%	20.0%	15.8%	24.2%	24.2%	10.0%	51.7%	51.7%	12.5%	54.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.63	0.82	0.89	0.58	0.32	0.18	0.86	0.17	1.09	0.92
Control Delay	49.2	76.3	69.6	52.9	9.6	14.0	40.5	5.5	102.1	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	76.3	69.6	52.9	9.6	14.0	40.5	5.5	102.1	37.7
Queue Length 50th (ft)	95	139	153	133	0	7	507	10	~135	~531
Queue Length 95th (ft)	155	#258	#242	210	52	19	#748	46	m#285	#937
Internal Link Dist (ft)		569		654			721			1806
Turn Bay Length (ft)	190		300		325	80		250	225	
Base Capacity (vph)	249	239	272	334	398	135	865	798	226	954
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.79	0.89	0.56	0.31	0.18	0.86	0.17	1.09	0.92

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 91 (76%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	153	21	222	172	115	22	692	126	230	646	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	14	10	11	12	11	11	11
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1654		1669	1824	1616	1613	1846	1576	1736	1777	
Flt Permitted	0.64	1.00		0.34	1.00	1.00	0.08	1.00	1.00	0.11	1.00	
Satd. Flow (perm)	1118	1654		591	1824	1616	129	1846	1576	202	1777	
Peak-hour factor, PHF	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.93	0.92	0.92
Adj. Flow (vph)	158	165	23	241	187	125	24	744	137	247	702	172
RTOR Reduction (vph)	0	4	0	0	0	103	0	0	60	0	7	0
Lane Group Flow (vph)	158	184	0	241	187	22	24	744	77	247	867	0
Heavy Vehicles (%)	4%	9%	0%	3%	6%	5%	6%	1%	4%	2%	2%	1%
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	23.3	16.3		33.3	21.3	21.3	59.5	56.2	56.2	69.9	61.4	
Effective Green, g (s)	23.3	16.3		33.3	21.3	21.3	59.5	56.2	56.2	69.9	61.4	
Actuated g/C Ratio	0.19	0.14		0.28	0.18	0.18	0.50	0.47	0.47	0.58	0.51	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	249	225		272	324	287	105	865	738	226	909	
v/s Ratio Prot	0.04	0.11		c0.09	c0.10		0.01	0.40		c0.08	c0.49	
v/s Ratio Perm	0.09			c0.16		0.01	0.11		0.05	c0.56		
v/c Ratio	0.63	0.82		0.89	0.58	0.08	0.23	0.86	0.10	1.09	0.95	
Uniform Delay, d1	43.3	50.4		38.9	45.2	41.2	23.8	28.4	17.8	26.8	28.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.10	0.95	
Incremental Delay, d2	5.8	20.8		27.8	3.0	0.2	1.5	10.9	0.3	78.1	16.5	
Delay (s)	49.1	71.2		66.7	48.2	41.3	25.3	39.3	18.1	107.5	43.0	
Level of Service	D	E		E	D	D	C	D	B	F	D	
Approach Delay (s)		61.1			54.7			35.7			57.2	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM Average Control Delay	50.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

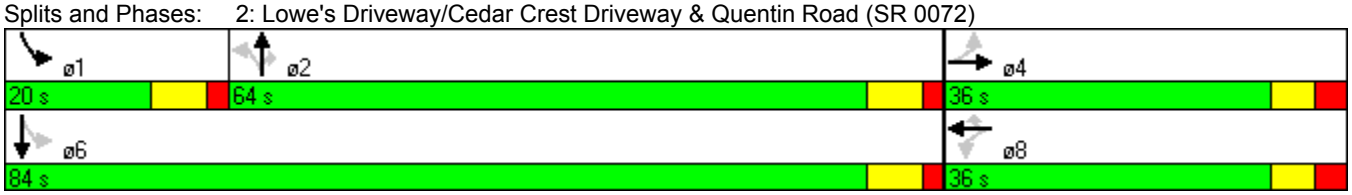
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	13	9	215	10	234	104	656	253	238	763
Lane Group Flow (vph)	0	124	0	245	254	132	713	275	259	836
Turn Type	Perm		Perm		Perm	Perm		Perm	pm+pt	
Protected Phases		4		8			2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	8	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	36.0	36.0	36.0	36.0	36.0	64.0	64.0	64.0	20.0	84.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	30.0%	53.3%	53.3%	53.3%	16.7%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag						Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.33		0.90	0.47	0.47	0.76	0.29	0.78	0.67
Control Delay		16.8		79.4	9.7	15.6	18.1	1.3	38.7	13.1
Queue Delay		0.0		0.0	0.1	0.0	9.7	0.0	0.0	0.4
Total Delay		16.9		79.4	9.8	15.6	27.8	1.3	38.7	13.5
Queue Length 50th (ft)		25		182	14	27	261	2	127	240
Queue Length 95th (ft)		26		#327	85	m43	m399	m9	m182	360
Internal Link Dist (ft)		216		637			1806			599
Turn Bay Length (ft)					115	135		230	200	
Base Capacity (vph)		393		288	561	281	933	960	333	1252
Starvation Cap Reductn		0		0	0	0	0	0	0	108
Spillback Cap Reductn		8		0	23	0	194	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.32		0.85	0.47	0.47	0.96	0.29	0.78	0.73

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	9	66	215	10	234	104	656	253	238	763	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.91			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1595			1796	1599	1832	1909	1731	1702	1910	
Flt Permitted		0.85			0.63	1.00	0.30	1.00	1.00	0.15	1.00	
Satd. Flow (perm)		1364			1194	1599	575	1909	1731	273	1910	
Peak-hour factor, PHF	0.54	0.56	0.79	0.92	0.92	0.92	0.79	0.92	0.92	0.92	0.93	0.81
Adj. Flow (vph)	24	16	84	234	11	254	132	713	275	259	820	16
RTOR Reduction (vph)	0	64	0	0	0	177	0	0	115	0	1	0
Lane Group Flow (vph)	0	60	0	0	245	77	132	713	160	259	835	0
Heavy Vehicles (%)	0%	0%	3%	2%	2%	2%	1%	2%	2%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		27.4			27.4	27.4	58.6	58.6	58.6	78.6	78.6	
Effective Green, g (s)		27.4			27.4	27.4	58.6	58.6	58.6	78.6	78.6	
Actuated g/C Ratio		0.23			0.23	0.23	0.49	0.49	0.49	0.65	0.65	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	4.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		311			273	365	281	932	845	334	1251	
v/s Ratio Prot								0.37		0.08	c0.44	
v/s Ratio Perm		0.04			c0.21	0.05	0.23		0.09	c0.42		
v/c Ratio		0.19			0.90	0.21	0.47	0.77	0.19	0.78	0.67	
Uniform Delay, d1		37.4			44.9	37.5	20.4	25.1	17.3	19.1	12.7	
Progression Factor		1.00			1.00	1.00	0.52	0.52	0.20	2.21	0.83	
Incremental Delay, d2		0.4			29.7	0.4	3.9	4.3	0.4	8.8	1.8	
Delay (s)		37.8			74.6	37.9	14.5	17.4	3.8	51.1	12.4	
Level of Service		D			E	D	B	B	A	D	B	
Approach Delay (s)		37.8			55.9			13.7			21.6	
Approach LOS		D			E			B			C	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

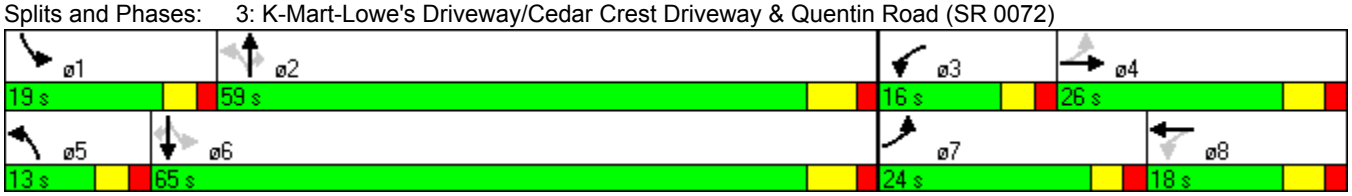
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	277	37	81	40	56	788	72	192	786	154
Lane Group Flow (vph)	315	163	133	264	68	857	104	204	854	164
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	24.0	26.0	16.0	18.0	13.0	59.0	59.0	19.0	65.0	65.0
Total Split (%)	20.0%	21.7%	13.3%	15.0%	10.8%	49.2%	49.2%	15.8%	54.2%	54.2%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.96	0.50	0.45	0.89	0.36	0.99	0.14	0.80	0.84	0.18
Control Delay	77.9	33.5	37.2	57.7	14.4	44.0	1.9	45.3	29.6	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0
Total Delay	77.9	33.5	37.2	57.7	14.4	46.2	1.9	45.3	29.6	7.7
Queue Length 50th (ft)	207	70	77	100	8	~718	0	125	458	18
Queue Length 95th (ft)	#353	77	84	#163	m16	#944	4	m151	m#747	m39
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					165		230	235		235
Base Capacity (vph)	329	329	306	304	203	863	769	277	1014	899
Starvation Cap Reductn	0	0	0	0	0	8	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.50	0.43	0.87	0.33	1.00	0.14	0.74	0.84	0.18

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 7 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	37	89	81	40	178	56	788	72	192	786	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1650		1902	1804		1796	1890	1607	1814	1954	1623
Flt Permitted	0.24	1.00		0.65	1.00		0.09	1.00	1.00	0.07	1.00	1.00
Satd. Flow (perm)	429	1650		1309	1804		173	1890	1607	128	1954	1623
Peak-hour factor, PHF	0.88	0.62	0.86	0.61	0.77	0.84	0.82	0.92	0.69	0.94	0.92	0.94
Adj. Flow (vph)	315	60	103	133	52	212	68	857	104	204	854	164
RTOR Reduction (vph)	0	52	0	0	123	0	0	0	36	0	0	57
Lane Group Flow (vph)	315	111	0	133	141	0	68	857	68	204	854	107
Heavy Vehicles (%)	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	35.5	20.1		21.8	11.5		60.8	54.7	54.7	72.2	61.2	61.2
Effective Green, g (s)	35.5	20.1		21.8	11.5		60.8	54.7	54.7	72.2	61.2	61.2
Actuated g/C Ratio	0.30	0.17		0.18	0.10		0.51	0.46	0.46	0.60	0.51	0.51
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	326	276		289	173		170	862	733	254	997	828
v/s Ratio Prot	c0.15	0.07		0.04	0.08		0.02	c0.45		c0.08	0.44	
v/s Ratio Perm	c0.13			0.04			0.18		0.04	0.40		0.07
v/c Ratio	0.97	0.40		0.46	0.82		0.40	0.99	0.09	0.80	0.86	0.13
Uniform Delay, d1	37.6	44.6		43.2	53.2		22.7	32.5	18.6	35.1	25.6	15.4
Progression Factor	1.00	1.00		1.00	1.00		0.97	0.48	0.19	1.26	0.95	1.31
Incremental Delay, d2	40.4	1.0		1.2	24.6		1.2	25.3	0.2	8.4	4.7	0.1
Delay (s)	78.0	45.6		44.4	77.9		23.1	40.9	3.8	52.5	28.9	20.4
Level of Service	E	D		D	E		C	D	A	D	C	C
Approach Delay (s)		66.9			66.6			36.0			31.7	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	42.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		

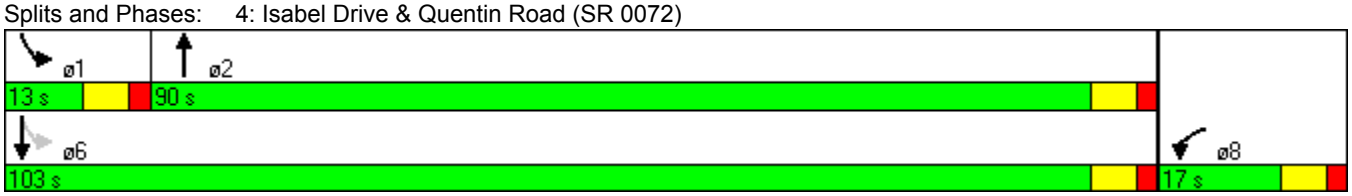
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	34	1184	89	1303
Lane Group Flow (vph)	142	1376	97	1386
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	17.0	90.0	13.0	103.0
Total Split (%)	14.2%	75.0%	10.8%	85.8%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.62	1.07	0.58	0.88
Control Delay	32.5	51.2	33.1	15.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.5	51.2	33.1	15.6
Queue Length 50th (ft)	36	~1193	23	512
Queue Length 95th (ft)	101	m#1288	#90	#993
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			275	
Base Capacity (vph)	262	1287	166	1578
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.54	1.07	0.58	0.88

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 70 (58%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	34	97	1184	82	89	1303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.90		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1933		1793		1753	1909
Flt Permitted	0.99		1.00		0.04	1.00
Satd. Flow (perm)	1933		1793		80	1909
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.94
Adj. Flow (vph)	37	105	1287	89	97	1386
RTOR Reduction (vph)	87	0	2	0	0	0
Lane Group Flow (vph)	55	0	1374	0	97	1386
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	8.8		86.0		99.2	99.2
Effective Green, g (s)	8.8		86.0		99.2	99.2
Actuated g/C Ratio	0.07		0.72		0.83	0.83
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	142		1285		167	1578
v/s Ratio Prot	c0.03		c0.77		0.03	c0.73
v/s Ratio Perm					0.45	
v/c Ratio	0.39		1.07		0.58	0.88
Uniform Delay, d1	53.0		17.0		38.9	6.6
Progression Factor	1.00		0.67		1.00	1.00
Incremental Delay, d2	1.7		36.5		5.1	7.3
Delay (s)	54.8		48.0		43.9	13.9
Level of Service	D		D		D	B
Approach Delay (s)	54.8		48.0			15.8
Approach LOS	D		D			B

Intersection Summary			
HCM Average Control Delay	32.4	HCM Level of Service	C
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	91.8%	ICU Level of Service	F
Analysis Period (min)	15		

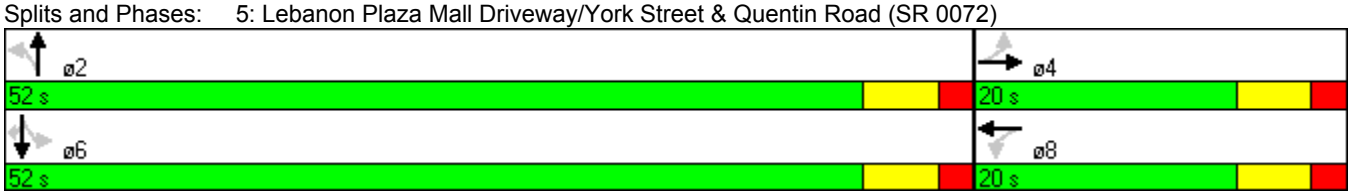
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	50	64	150	111	96	899	45	1078	61
Lane Group Flow (vph)	60	204	163	196	112	1042	49	1159	115
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	20.0	20.0	20.0	20.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%	72.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.31	0.53	0.88	0.55	1.07	0.85	0.39	0.93	0.11
Control Delay	29.7	19.6	72.4	30.6	130.2	19.5	17.6	26.7	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	19.6	72.4	30.6	130.2	19.5	17.6	26.7	1.4
Queue Length 50th (ft)	23	41	70	72	~57	321	9	402	0
Queue Length 95th (ft)	51	90	#174	100	#97	#635	41	#739	2
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	207	399	196	375	105	1219	125	1249	1068
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.51	0.83	0.52	1.07	0.85	0.39	0.93	0.11

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 71.3
Natural Cycle: 65
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	64	109	150	111	37	96	899	60	45	1078	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1629		1685	1845		1778	1882		1702	1934	1591
Flt Permitted	0.58	1.00		0.56	1.00		0.09	1.00		0.11	1.00	1.00
Satd. Flow (perm)	1054	1629		998	1845		163	1882		194	1934	1591
Peak-hour factor, PHF	0.83	0.84	0.85	0.92	0.71	0.92	0.86	0.92	0.92	0.92	0.93	0.53
Adj. Flow (vph)	60	76	128	163	156	40	112	977	65	49	1159	115
RTOR Reduction (vph)	0	80	0	0	13	0	0	3	0	0	0	41
Lane Group Flow (vph)	60	124	0	163	183	0	112	1039	0	49	1159	74
Heavy Vehicles (%)	0%	0%	1%	1%	0%	4%	1%	3%	0%	3%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	13.3	13.3		13.3	13.3		46.0	46.0		46.0	46.0	46.0
Effective Green, g (s)	13.3	13.3		13.3	13.3		46.0	46.0		46.0	46.0	46.0
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.65	0.65		0.65	0.65	0.65
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	197	304		186	344		105	1214		125	1248	1026
v/s Ratio Prot		0.08			0.10			0.55			0.60	
v/s Ratio Perm	0.06			c0.16			c0.69			0.25		0.05
v/c Ratio	0.30	0.41		0.88	0.53		1.07	0.86		0.39	0.93	0.07
Uniform Delay, d1	25.0	25.5		28.2	26.2		12.6	10.0		6.0	11.2	4.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	1.2		34.6	2.0		106.9	6.1		2.0	11.9	0.0
Delay (s)	26.2	26.8		62.8	28.2		119.6	16.1		8.0	23.1	4.7
Level of Service	C	C		E	C		F	B		A	C	A
Approach Delay (s)		26.6			43.9			26.2			21.0	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.2%	ICU Level of Service	H
Analysis Period (min)	15		

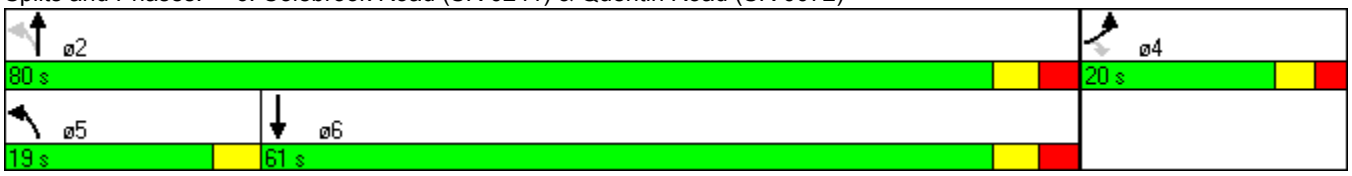
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	113	375	288	865	1000
Lane Group Flow (vph)	123	383	313	911	1114
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	20.0	20.0	19.0	80.0	61.0
Total Split (%)	20.0%	20.0%	19.0%	80.0%	61.0%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.61	0.84	0.86	0.63	0.97
Control Delay	53.3	27.2	48.1	8.5	43.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	27.2	48.1	8.5	43.2
Queue Length 50th (ft)	73	43	135	226	632
Queue Length 95th (ft)	132	#187	#297	361	#987
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	250	488	366	1456	1165
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.78	0.86	0.63	0.96

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 96.6
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	113	375	288	865	1000	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1500	1771	1909	2057	
Flt Permitted	0.95	1.00	0.07	1.00	1.00	
Satd. Flow (perm)	1660	1500	130	1909	2057	
Peak-hour factor, PHF	0.92	0.98	0.92	0.95	0.96	0.92
Adj. Flow (vph)	123	383	313	911	1042	72
RTOR Reduction (vph)	0	271	0	0	2	0
Lane Group Flow (vph)	123	112	313	911	1112	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	4%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.8	11.8	72.7	72.7	53.7	
Effective Green, g (s)	11.8	11.8	72.7	72.7	53.7	
Actuated g/C Ratio	0.12	0.12	0.75	0.75	0.56	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	203	183	362	1438	1145	
v/s Ratio Prot	0.07		c0.14	0.48	c0.54	
v/s Ratio Perm		c0.07	0.51			
v/c Ratio	0.61	0.61	0.86	0.63	0.97	
Uniform Delay, d1	40.1	40.2	31.3	5.6	20.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.0	5.9	18.8	1.5	20.3	
Delay (s)	45.2	46.1	50.1	7.1	40.9	
Level of Service	D	D	D	A	D	
Approach Delay (s)	45.9			18.1	40.9	
Approach LOS	D			B	D	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	96.5	Sum of lost time (s)	15.5
Intersection Capacity Utilization	92.2%	ICU Level of Service	F
Analysis Period (min)	15		

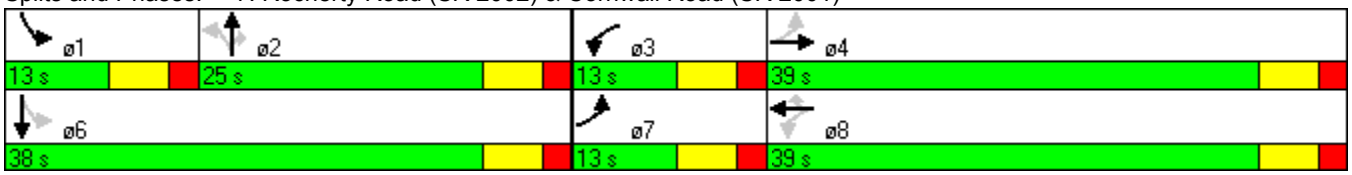
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	89	318	77	352	117	66	168	65	117	199
Lane Group Flow (vph)	97	428	84	383	127	72	183	71	127	343
Turn Type	pm+pt		pm+pt		Perm	Perm		Perm	pm+pt	
Protected Phases	7	4	3	8			2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	15.0	7.0	15.0	15.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0	21.0	21.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	39.0	13.0	39.0	39.0	25.0	25.0	25.0	13.0	38.0
Total Split (%)	14.4%	43.3%	14.4%	43.3%	43.3%	27.8%	27.8%	27.8%	14.4%	42.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio	0.33	0.79	0.33	0.69	0.23	0.23	0.31	0.13	0.27	0.42
Control Delay	17.2	38.7	17.3	34.4	4.9	30.2	28.9	8.2	8.7	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	38.7	17.3	34.4	4.9	30.2	28.9	8.2	8.7	7.3
Queue Length 50th (ft)	31	213	27	190	0	32	83	0	17	31
Queue Length 95th (ft)	53	294	47	261	35	76	156	34	33	58
Internal Link Dist (ft)		1052		405			731			260
Turn Bay Length (ft)	225		225		325	150		350	240	
Base Capacity (vph)	292	668	257	686	670	319	582	544	472	818
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.64	0.33	0.56	0.19	0.23	0.31	0.13	0.27	0.42

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 39 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	318	75	77	352	117	66	168	65	117	199	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1727	1798		1702	1872	1607	1754	1872	1591	1702	1746	
Flt Permitted	0.31	1.00		0.25	1.00	1.00	0.55	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	565	1798		443	1872	1607	1024	1872	1591	899	1746	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	97	346	82	84	383	127	72	183	71	127	207	136
RTOR Reduction (vph)	0	11	0	0	0	89	0	0	50	0	23	0
Lane Group Flow (vph)	97	417	0	84	383	38	72	183	21	127	320	0
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	2%	2%	3%	0%
Turn Type	pm+pt			pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	32.2	26.6		32.2	26.6	26.6	26.8	26.8	26.8	39.8	39.8	
Effective Green, g (s)	32.2	26.6		32.2	26.6	26.6	26.8	26.8	26.8	39.8	39.8	
Actuated g/C Ratio	0.36	0.30		0.36	0.30	0.30	0.30	0.30	0.30	0.44	0.44	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	7.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	274	531		237	553	475	305	557	474	460	772	
v/s Ratio Prot	0.02	c0.23		c0.02	0.20			0.10		0.02	c0.18	
v/s Ratio Perm	0.10			0.10		0.02	0.07		0.01	0.10		
v/c Ratio	0.35	0.79		0.35	0.69	0.08	0.24	0.33	0.04	0.28	0.41	
Uniform Delay, d1	20.4	29.1		20.7	28.1	22.9	23.9	24.6	22.5	15.4	17.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.41	0.34	
Incremental Delay, d2	0.8	8.0		0.9	4.0	0.1	1.8	1.6	0.2	0.3	1.6	
Delay (s)	21.2	37.1		21.6	32.1	23.0	25.7	26.2	22.7	6.7	7.4	
Level of Service	C	D		C	C	C	C	C	C	A	A	
Approach Delay (s)		34.1			28.7			25.3			7.2	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

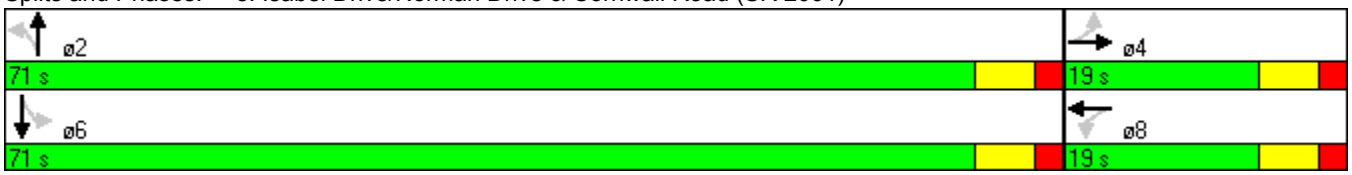
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	36	3	3	6	72	546	7	618
Lane Group Flow (vph)	0	144	0	28	0	674	0	700
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	19.0	19.0	19.0	19.0	71.0	71.0	71.0	71.0
Total Split (%)	21.1%	21.1%	21.1%	21.1%	78.9%	78.9%	78.9%	78.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio		0.55		0.14		0.53		0.50
Control Delay		21.9		22.1		5.0		5.7
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		21.9		22.1		5.0		5.7
Queue Length 50th (ft)		23		5		35		108
Queue Length 95th (ft)		76		29		236		220
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		331		273		1264		1414
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.44		0.10		0.53		0.50

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 60 (67%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	3	94	3	6	17	72	546	3	7	618	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	12	12	11	12	12
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.90			0.91			1.00			1.00	
Flt Protected		0.99			0.99			0.99			1.00	
Satd. Flow (prot)		1855			1881			1907			1855	
Flt Permitted		0.90			0.94			0.86			0.99	
Satd. Flow (perm)		1689			1783			1648			1843	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	3	102	3	7	18	78	593	3	8	672	20
RTOR Reduction (vph)	0	92	0	0	16	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	52	0	0	12	0	0	674	0	0	699	0
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	0%	0%	0%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.0			9.0			69.0			69.0	
Effective Green, g (s)		9.0			9.0			69.0			69.0	
Actuated g/C Ratio		0.10			0.10			0.77			0.77	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		169			178			1263			1413	
v/s Ratio Prot												
v/s Ratio Perm		c0.03			0.01			c0.41			0.38	
v/c Ratio		0.31			0.07			0.53			0.49	
Uniform Delay, d1		37.6			36.7			4.1			3.9	
Progression Factor		1.00			1.00			0.73			1.00	
Incremental Delay, d2		1.0			0.2			1.5			1.2	
Delay (s)		38.7			36.9			4.5			5.2	
Level of Service		D			D			A			A	
Approach Delay (s)		38.7			36.9			4.5			5.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		

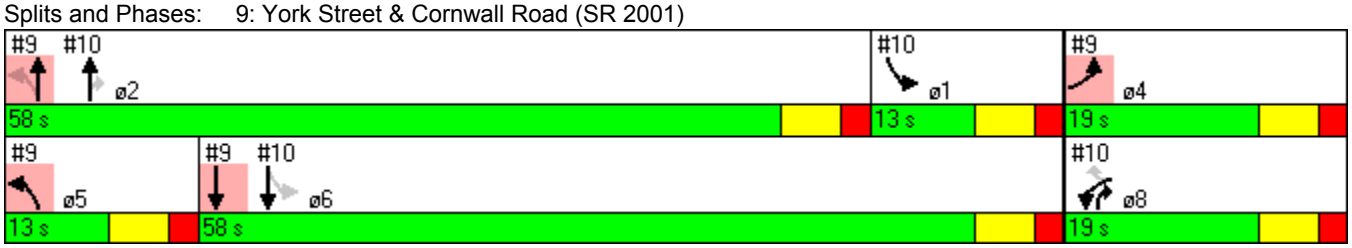
c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	ø1	ø8
Lane Configurations						
Volume (vph)	156	42	546	551		
Lane Group Flow (vph)	200	0	627	838		
Turn Type		pm+pt				
Protected Phases	4	5	2	6	1	8
Permitted Phases		2				
Detector Phase	4	5	2	6		
Switch Phase						
Minimum Initial (s)	7.0	7.0	15.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	21.0	13.0	13.0
Total Split (s)	19.0	13.0	58.0	58.0	13.0	19.0
Total Split (%)	21.1%	14.4%	64.4%	64.4%	14%	21%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lead	Lag	Lag	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	None
v/c Ratio	0.63		0.56	0.70		
Control Delay	38.9		9.0	12.1		
Queue Delay	0.0		0.0	0.2		
Total Delay	38.9		9.0	12.3		
Queue Length 50th (ft)	87		132	306		
Queue Length 95th (ft)	#170		211	m428		
Internal Link Dist (ft)	1228		849	232		
Turn Bay Length (ft)						
Base Capacity (vph)	315		1170	1244		
Starvation Cap Reductn	0		0	63		
Spillback Cap Reductn	0		0	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.63		0.54	0.71		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 74.9
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: York Street & Cornwall Road (SR 2001)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	156	28	42	546	551	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.98			1.00	0.96	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1771			1859	1771	
Flt Permitted	0.96			0.90	1.00	
Satd. Flow (perm)	1771			1682	1771	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.92	0.92
Adj. Flow (vph)	170	30	46	581	599	239
RTOR Reduction (vph)	7	0	0	0	13	0
Lane Group Flow (vph)	193	0	0	627	825	0
Heavy Vehicles (%)	1%	0%	0%	2%	4%	1%
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	13.0			49.8	49.8	
Effective Green, g (s)	13.0			49.8	49.8	
Actuated g/C Ratio	0.17			0.67	0.67	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	308			1120	1179	
v/s Ratio Prot	c0.11				c0.47	
v/s Ratio Perm				0.37		
v/c Ratio	0.63			0.56	0.70	
Uniform Delay, d1	28.7			6.7	7.8	
Progression Factor	1.00			1.00	1.16	
Incremental Delay, d2	4.0			0.6	1.5	
Delay (s)	32.6			7.3	10.6	
Level of Service	C			A	B	
Approach Delay (s)	32.6			7.3	10.6	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø4	ø5
Lane Configurations								
Volume (vph)	239	47	405	269	58	500		
Lane Group Flow (vph)	260	51	440	292	0	606		
Turn Type		Perm		pm+ov	pm+pt			
Protected Phases	8		2	8	1	6	4	5
Permitted Phases		8		2	6			
Detector Phase	8	8	2	8	1	6		
Switch Phase								
Minimum Initial (s)	7.0	7.0	15.0	7.0	7.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	13.0	13.0	21.0	13.0	13.0
Total Split (s)	19.0	19.0	58.0	19.0	13.0	58.0	19.0	13.0
Total Split (%)	21.1%	21.1%	64.4%	21.1%	14.4%	64.4%	21%	14%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		
Lead/Lag			Lead		Lag	Lag		Lead
Lead-Lag Optimize?			Yes		Yes	Yes		Yes
Recall Mode	None	None	Min	None	None	Min	None	None
v/c Ratio	0.85	0.17	0.36	0.18		0.48		
Control Delay	58.3	10.4	4.6	0.2		7.7		
Queue Delay	0.0	0.0	0.4	0.0		0.2		
Total Delay	58.3	10.4	5.0	0.2		7.9		
Queue Length 50th (ft)	123	0	64	0		118		
Queue Length 95th (ft)	#253	28	90	0		182		
Internal Link Dist (ft)	945		232			841		
Turn Bay Length (ft)		150		265				
Base Capacity (vph)	305	297	1285	1599		1312		
Starvation Cap Reductn	0	0	407	0		0		
Spillback Cap Reductn	0	0	0	0		208		
Storage Cap Reductn	0	0	0	0		0		
Reduced v/c Ratio	0.85	0.17	0.50	0.18		0.55		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 74.9
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Wilhelm Avenue & Cornwall Road (SR 2001)

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	239	47	405	269	58	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		0.99
Satd. Flow (prot)	1752	1467	1845	1599		2040
Flt Permitted	0.95	1.00	1.00	1.00		0.92
Satd. Flow (perm)	1752	1467	1845	1599		1882
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	260	51	440	292	63	543
RTOR Reduction (vph)	0	42	0	47	0	0
Lane Group Flow (vph)	260	9	440	245	0	606
Heavy Vehicles (%)	2%	9%	3%	1%	0%	5%
Turn Type		Perm		pm+ov	pm+pt	
Protected Phases	8		2	8	1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	13.0	13.0	49.8	62.8		49.8
Effective Green, g (s)	13.0	13.0	49.8	62.8		49.8
Actuated g/C Ratio	0.17	0.17	0.67	0.84		0.67
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	304	255	1228	1599		1253
v/s Ratio Prot	c0.15		0.24	0.03		
v/s Ratio Perm		0.01		0.13		c0.32
v/c Ratio	0.86	0.03	0.36	0.15		0.48
Uniform Delay, d1	30.0	25.7	5.5	1.1		6.2
Progression Factor	1.00	1.00	0.71	1.00		1.00
Incremental Delay, d2	20.3	0.1	0.2	0.0		0.3
Delay (s)	50.3	25.7	4.0	1.1		6.5
Level of Service	D	C	A	A		A
Approach Delay (s)	46.2		2.9			6.5
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

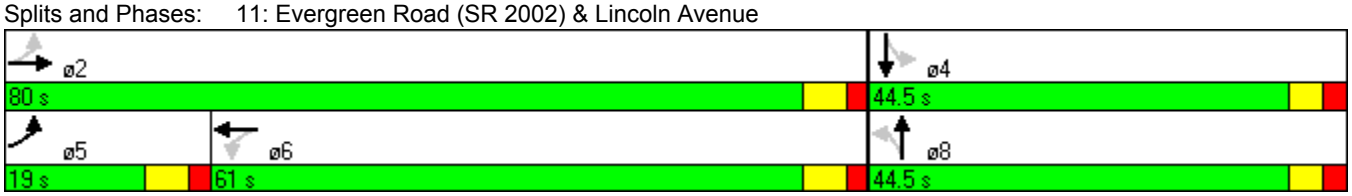
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	84	397	5	435	21	16	34	38
Lane Group Flow (vph)	91	456	5	513	0	41	0	194
Turn Type	pm+pt		Perm		Perm		Perm	
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	19.0	80.0	61.0	61.0	44.5	44.5	44.5	44.5
Total Split (%)	15.3%	64.3%	49.0%	49.0%	35.7%	35.7%	35.7%	35.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?								
Recall Mode	None	Min	Min	Min	None	None	None	None
v/c Ratio	0.20	0.45	0.01	0.74		0.13		0.53
Control Delay	6.2	8.2	13.8	24.8		24.7		23.5
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.2	8.2	13.8	24.8		24.7		23.5
Queue Length 50th (ft)	11	72	1	160		12		43
Queue Length 95th (ft)	33	166	8	338		44		126
Internal Link Dist (ft)		619		423		845		1011
Turn Bay Length (ft)	100		80					
Base Capacity (vph)	559	1644	788	1497		1058		1101
Starvation Cap Reductn	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0		0		0
Reduced v/c Ratio	0.16	0.28	0.01	0.34		0.04		0.18

Intersection Summary

Cycle Length: 124.5
Actuated Cycle Length: 60.8
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	397	22	5	435	37	21	16	1	34	38	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			1.00			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1702	1694		1727	1728			1879			1703	
Flt Permitted	0.25	1.00		0.50	1.00			0.81			0.93	
Satd. Flow (perm)	441	1694		909	1728			1561			1596	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	432	24	5	473	40	23	17	1	37	41	116
RTOR Reduction (vph)	0	2	0	0	2	0	0	1	0	0	51	0
Lane Group Flow (vph)	91	454	0	5	511	0	0	40	0	0	143	0
Heavy Vehicles (%)	2%	7%	8%	0%	4%	4%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	37.6	37.6		24.4	24.4			12.0			12.0	
Effective Green, g (s)	37.6	37.6		24.4	24.4			12.0			12.0	
Actuated g/C Ratio	0.62	0.62		0.40	0.40			0.20			0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0			3.0			3.0	
Lane Grp Cap (vph)	420	1042		363	690			307			313	
v/s Ratio Prot	0.03	c0.27			c0.30							
v/s Ratio Perm	0.11			0.01				0.03			c0.09	
v/c Ratio	0.22	0.44		0.01	0.74			0.13			0.46	
Uniform Delay, d1	6.7	6.2		11.1	15.6			20.2			21.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	0.8		0.0	5.7			0.2			1.1	
Delay (s)	7.0	7.0		11.1	21.4			20.4			22.7	
Level of Service	A	A		B	C			C			C	
Approach Delay (s)		7.0			21.3			20.4			22.7	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	17.5
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

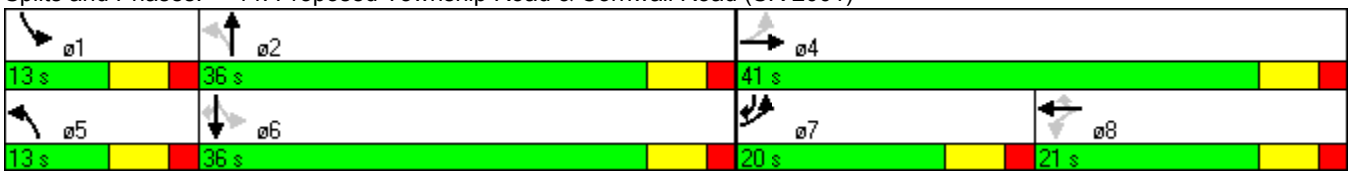
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	232	53	1	45	23	119	236	37	369	187
Lane Group Flow (vph)	252	115	1	49	25	129	258	40	401	203
Turn Type	pm+pt		Perm		Perm	pm+pt		pm+pt		pm+ov
Protected Phases	7	4		8		5	2	1	6	7
Permitted Phases	4		8		8	2		6		6
Detector Phase	7	4	8	8	8	5	2	1	6	7
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	21.0	21.0	13.0	21.0	13.0	21.0	13.0
Total Split (s)	20.0	41.0	21.0	21.0	21.0	13.0	36.0	13.0	36.0	20.0
Total Split (%)	22.2%	45.6%	23.3%	23.3%	23.3%	14.4%	40.0%	14.4%	40.0%	22.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
v/c Ratio	0.73	0.22	0.01	0.29	0.15	0.28	0.28	0.07	0.51	0.19
Control Delay	39.0	13.1	36.0	42.2	16.9	8.5	15.4	9.5	20.7	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	13.1	36.0	42.2	16.9	8.5	15.4	9.5	20.7	1.2
Queue Length 50th (ft)	116	24	1	27	0	42	107	8	176	8
Queue Length 95th (ft)	179	60	5	60	23	45	182	m17	297	13
Internal Link Dist (ft)		240		318			830		570	
Turn Bay Length (ft)	180		100		100	225		400		275
Base Capacity (vph)	355	706	205	311	285	460	924	590	784	1090
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.16	0.00	0.16	0.09	0.28	0.28	0.07	0.51	0.19

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 70
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Proposed Township Road & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	232	53	52	1	45	23	119	236	1	37	369	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1724		1711	1863	1583	1702	1852		1711	1863	1583
Flt Permitted	0.39	1.00		0.68	1.00	1.00	0.35	1.00		0.60	1.00	1.00
Satd. Flow (perm)	694	1724		1230	1863	1583	624	1852		1080	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	58	57	1	49	25	129	257	1	40	401	203
RTOR Reduction (vph)	0	40	0	0	0	23	0	0	0	0	0	90
Lane Group Flow (vph)	252	75	0	1	49	2	129	258	0	40	401	113
Turn Type	pm+pt			Perm		Perm	pm+pt			pm+pt		pm+ov
Protected Phases	7	4			8		5	2		1	6	7
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	26.4	26.4		6.8	6.8	6.8	50.2	41.2		41.0	36.6	50.2
Effective Green, g (s)	26.4	26.4		6.8	6.8	6.8	50.2	41.2		41.0	36.6	50.2
Actuated g/C Ratio	0.29	0.29		0.08	0.08	0.08	0.56	0.46		0.46	0.41	0.56
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	357	506		93	141	120	456	848		523	758	988
v/s Ratio Prot	c0.11	0.04			0.03		c0.03	c0.14		0.00	c0.22	0.02
v/s Ratio Perm	c0.10			0.00		0.00	0.13			0.03		0.05
v/c Ratio	0.71	0.15		0.01	0.35	0.02	0.28	0.30		0.08	0.53	0.11
Uniform Delay, d1	26.6	23.5		38.5	39.5	38.5	10.8	15.4		13.7	20.2	9.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.70	0.88		0.90	0.85	0.58
Incremental Delay, d2	6.2	0.1		0.0	1.5	0.1	0.3	0.9		0.1	2.3	0.0
Delay (s)	32.8	23.6		38.5	41.0	38.6	7.9	14.4		12.4	19.4	5.5
Level of Service	C	C		D	D	D	A	B		B	B	A
Approach Delay (s)		30.0			40.1			12.2			14.6	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	194	93	150	197	140	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.956				0.933	
Flt Protected			0.950		0.975	
Satd. Flow (prot)	1781	0	1770	1863	1694	0
Flt Permitted			0.950		0.975	
Satd. Flow (perm)	1781	0	1770	1863	1694	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	525			320	264	
Travel Time (s)	14.3			7.3	7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	211	101	163	214	152	149
Shared Lane Traffic (%)						
Lane Group Flow (vph)	312	0	163	214	301	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 50.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	194	93	150	197	140	137
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	211	101	163	214	152	149
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				320		
pX, platoon unblocked						
vC, conflicting volume			312		802	261
vC1, stage 1 conf vol					261	
vC2, stage 2 conf vol					540	
vCu, unblocked vol			312		802	261
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			87		68	81
cM capacity (veh/h)			1248		474	777

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	312	163	214	301
Volume Left	0	163	0	152
Volume Right	101	0	0	149
cSH	1700	1248	1700	587
Volume to Capacity	0.18	0.13	0.13	0.51
Queue Length 95th (ft)	0	11	0	73
Control Delay (s)	0.0	8.3	0.0	17.4
Lane LOS		A		C
Approach Delay (s)	0.0	3.6		17.4
Approach LOS				C

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	148	220	151	186	141	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		175	150		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.933	
Flt Protected			0.950		0.975	
Satd. Flow (prot)	1863	1583	1770	1863	1694	0
Flt Permitted			0.950		0.975	
Satd. Flow (perm)	1863	1583	1770	1863	1694	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	356			525	240	
Travel Time (s)	9.7			11.9	6.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	161	239	164	202	153	151
Shared Lane Traffic (%)						
Lane Group Flow (vph)	161	239	164	202	304	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 42.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	148	220	151	186	141	139
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	161	239	164	202	153	151
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1073			845		
pX, platoon unblocked						
vC, conflicting volume			400		691	161
vC1, stage 1 conf vol					161	
vC2, stage 2 conf vol					530	
vCu, unblocked vol			400		691	161
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			86		68	83
cM capacity (veh/h)			1159		485	884

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	161	239	164	202	304
Volume Left	0	0	164	0	153
Volume Right	0	239	0	0	151
cSH	1700	1700	1159	1700	625
Volume to Capacity	0.09	0.14	0.14	0.12	0.49
Queue Length 95th (ft)	0	0	12	0	67
Control Delay (s)	0.0	0.0	8.6	0.0	16.1
Lane LOS			A		C
Approach Delay (s)	0.0		3.9		16.1
Approach LOS					C

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	366	16	2	325	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994				0.955	
Flt Protected			0.950		0.968	
Satd. Flow (prot)	1852	0	1770	1863	1722	0
Flt Permitted			0.950		0.968	
Satd. Flow (perm)	1852	0	1770	1863	1722	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	717			356	195	
Travel Time (s)	19.6			9.7	5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	17	2	353	4	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	415	0	2	353	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 30.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	366	16	2	325	4	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	398	17	2	353	4	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	717			1201		
pX, platoon unblocked						
vC, conflicting volume			415		764	407
vC1, stage 1 conf vol					407	
vC2, stage 2 conf vol					358	
vCu, unblocked vol			415		764	407
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1144		569	644

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	415	2	353	7
Volume Left	0	2	0	4
Volume Right	17	0	0	2
cSH	1700	1144	1700	592
Volume to Capacity	0.24	0.00	0.21	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	8.2	0.0	11.2
Lane LOS		A		B
Approach Delay (s)	0.0	0.0		11.2
Approach LOS				B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	30.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	469	518	34	33	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.992		0.964	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1676	1825	1885	0	1733	0
Flt Permitted	0.950				0.965	
Satd. Flow (perm)	1676	1825	1885	0	1733	0
Link Speed (mph)		40	40		25	
Link Distance (ft)		480	1348		405	
Travel Time (s)		8.2	23.0		11.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	510	563	37	36	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	510	600	0	49	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.07	1.03	0.97	0.97	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	20	469	518	34	33	12
Sign Control		Free	Free		Stop	
Grade		4%	-4%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	510	563	37	36	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)		965				
pX, platoon unblocked					0.83	
vC, conflicting volume	600				1135	582
vC1, stage 1 conf vol					582	
vC2, stage 2 conf vol					553	
vCu, unblocked vol	600				1062	582
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				92	97
cM capacity (veh/h)	977				434	513

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	22	510	600	49
Volume Left	22	0	0	36
Volume Right	0	0	37	13
cSH	977	1700	1700	452
Volume to Capacity	0.02	0.30	0.35	0.11
Queue Length 95th (ft)	2	0	0	9
Control Delay (s)	8.8	0.0	0.0	13.9
Lane LOS	A			B
Approach Delay (s)	0.4		0.0	13.9
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	489	528	2	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1881	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1881	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	532	574	2	0	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	532	576	0	0	9
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 37.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	489	528	2	0	8
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	532	574	2	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485				
pX, platoon unblocked					0.78	
vC, conflicting volume	576				1107	575
vC1, stage 1 conf vol					575	
vC2, stage 2 conf vol					532	
vCu, unblocked vol	576				994	575
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	997				450	518

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	532	576	9
Volume Left	0	0	0
Volume Right	0	2	9
cSH	1700	1700	518
Volume to Capacity	0.31	0.34	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	12.1
Lane LOS			B
Approach Delay (s)	0.0	0.0	12.1
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	13	343	11	16	421
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	150	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			450
Travel Time (s)	4.7		5.2			6.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Adj. Flow (vph)	0	14	373	12	17	439
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	14	373	12	17	439
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			Yes
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 28.1%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	13	343	11	16	421
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Hourly flow rate (vph)	0	14	373	12	17	439
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			340			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	846	373			385	
vC1, stage 1 conf vol	373					
vC2, stage 2 conf vol	473					
vCu, unblocked vol	776	251			265	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	533	711			1173	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	14	373	12	17	439
Volume Left	0	0	0	17	0
Volume Right	14	0	12	0	0
cSH	711	1700	1700	1173	1700
Volume to Capacity	0.02	0.22	0.01	0.01	0.26
Queue Length 95th (ft)	2	0	0	1	0
Control Delay (s)	10.2	0.0	0.0	8.1	0.0
Lane LOS	B			A	
Approach Delay (s)	10.2	0.0		0.3	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	88	0	356	349	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			150
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	1863	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	1583
Link Speed (mph)	25			45	45	
Link Distance (ft)	247			450	910	
Travel Time (s)	6.7			6.8	13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	96	0	387	379	79
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	96	0	387	379	79
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			11	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 30.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	88	0	356	349	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	96	0	387	379	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				790	910	
pX, platoon unblocked	0.89	0.86	0.86			
vC, conflicting volume	766	379	459			
vC1, stage 1 conf vol	379					
vC2, stage 2 conf vol	387					
vCu, unblocked vol	535	200	292			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	606	725	1094			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	96	387	379	79
Volume Left	0	0	0	0
Volume Right	96	0	0	79
cSH	725	1700	1700	1700
Volume to Capacity	0.13	0.23	0.22	0.05
Queue Length 95th (ft)	11	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.7	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	9	4	0	23	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.968					
Flt Protected					0.950	
Satd. Flow (prot)	1790	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1790	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	13	4	0	31	3	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	31	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 13.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	9	4	0	23	3	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Hourly flow rate (vph)	13	4	0	31	3	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			17		46	15
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		46	15
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1600		964	1065

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	31	3
Volume Left	0	0	3
Volume Right	4	0	0
cSH	1700	1600	964
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX K

CAPACITY ANALYSES WORKSHEETS: TOWNSHIP MASTER PLAN GUIDELINES

TABLE K-1
LEVEL OF SERVICE SUMMARY: TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & Rocherty Road	EB	L	C	C	C
	EB	T/R	D	D	D
	WB	L	D	D	D
	WB	T	D	C	C
	WB	R		D	D
	NB	L	C	C	C
	NB	T	D	D	D
	NB	R		C	C
	SB	L	D	B	B
	SB	T/R	C	C	B
	ILOS		**D**	**C**	**C**
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	D	D	D
	WB	L	D	D	D
	WB	T			C
	WB	R	C	C	
	NB	L	B	A	A
	NB	T	B		B
	NB	R	C	A	B
	SB	L	A	A	A
	SB	T/R	A	A	A
	ILOS		**B**	**A**	**B**
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	C	D	D
	EB	T/R	D	D	D
	WB	L	C	D	D
	WB	T/R	D	D	D
	NB	L	A	A	A
	NB	T	A	A	A
	NB	R	A		
	SB	L	A	A	A
	SB	T	B	A	B
	SB	R	A		
	ILOS		**B**	**B**	**B**
Route 72 & Isabel Drive	WB	L/R	D	D	D
	NB	T/R	A	A	A
	SB	L	A	A	A
	SB	T	A	A	A
	ILOS		**A**	**A**	**A**

TABLE K-1 (CONTINUED)
LEVEL OF SERVICE SUMMARY: TOWNSHIP MASTER PLAN GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	C	C	C
	EB	T/R	C	C	C
	WB	L	C	C	C
	WB	T/R	C	C	C
	NB	L	A	A	A
	NB	T/R	A	A	A
	SB	L	A	A	A
	SB	T	A	A	A
	SB	R	A		
	ILOS		**A**	**A**	**A**
Route 72 & Route 241	EB	L	C	C	C
	EB	R	C	C	C
	NB	L	B	A	A
	NB	T	A	A	A
	SB	T/R	C	C	C
	ILOS		**C**	**B**	**B**
Cornwall Road & Rocherty Road	EB	L	B	B	B
	EB	T	D	D	D
	EB	R		B	B
	WB	L	C	C	C
	WB	T	C	C	C
	WB	R	C	C	C
	NB	L	C	C	C
	NB	T	D	D	D
	NB	R	C	C	C
	SB	L	D	D	E
	SB	T/R	C	B	B
	ILOS		**D**	**D**	**D**
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	C	D	D
	WB	L/T/R	C	D	D
	NB	L	A	A	A
	NB	T/R			A
	SB	L	C	C	A
	SB	T/R			B
	ILOS		**B**	**B**	**B**
Cornwall Road & York Street	EB	L/R	C	--	--
	NB	L	A		
	NB	T			
	SB	T/R	A		
	ILOS		**A**		

TABLE K-1 (CONTINUED)
LEVEL OF SERVICE SUMMARY: TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Cornwall Road & Wilhelm Avenue	WB	L	D	--	--
	WB	R	C		
	NB	T/R	A		
	SB	L/T	B		
	ILOS		**B**		
Cornwall Road & York Street/ Wilhelm Avenue	EB	L	--	C	C
	EB	T/R			C
	WB	L		D	D
	WB	T/R			C
	NB	L		B	B
	NB	T		B	B
	NB	R		B	B
	SB	L		A	A
	SB	T/R		C	C
	ILOS			**C**	**C**
Evergreen Road & Lincoln Avenue	EB	L	D	D	D
	EB	T/R	B	A	A
	WB	L	B	B	B
	WB	T	D	C	D
	WB	R	B	B	B
	NB	L/T/R	C	C	C
	SB	L/T	D	D	D
	SB	R		B	B
	ILOS		**C**	**C**	**C**
Cornwall Road & Township Roadway	EB	L	--	C	C
	EB	T/R			C
	WB	L		D	D
	WB	T		D	D
	WB	R		D	D
	NB	L		B	B
	NB	T/R		C	C
	SB	L		B	C
	SB	T		B	B
	SB	R		B	B
	ILOS			**C**	**C**

TABLE K-1 (CONTINUED)
LEVEL OF SERVICE SUMMARY: TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Township Road & Eastern Site Driveway(s)	WB	L	--	A	--
	NB	L		**A**	--
	NB	R			**A**
	SB	R		--	**A**
	ILOS			**A**	**A**
Township Road & Middle Site Driveway(s)	EB	L	--	--	A
	EB	T		--	A
	EB	R		--	A
	WB	L		A	A
	WB	T		--	A
	WB	R		--	A
	NB	L		A	C
	NB	T/R			C
	SB	L		--	C
	SB	L/R		--	C
	ILOS			**A**	**B**
Township Road & Western Site Driveway(s)	EB	L	--	--	A
	WB	L		A	A
	NB	L/T/R		A	A
	SB	L/T/R		--	A
	ILOS			**A**	**A**
Rocherty Road & Eastern Site Driveway	EB	L	A	A	A
	EB	T	--	A	A
	WB	T/R	--	B	B
	SB	L/R	D	C	C
	ILOS		**A**	**A**	**A**
Rocherty Road & Western Site Driveway	SB	R	B	B	B
	ILOS		**A**	**A**	**A**
Cornwall Road & Northern Site Driveway	EB	R	--	--	C
	ILOS				**A**
Cornwall Road & Middle Site Driveway	EB	R	--	B	B
	ILOS			**A**	**A**
Cornwall Road & Southern Site Driveway	WB	R	B	B	B
	SB	L	A	A	A
	ILOS		**A**	**A**	**A**
Norman Drive & Site Driveway	WB	L/T	A	A	A
	NB	L/R	B	B	B
	ILOS		**A**	**A**	**A**

TABLE K-2
LEVEL OF SERVICE SUMMARY: TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & Rocherty Road	EB	L	C	C	C
	EB	T/R	D	D	D
	WB	L	D	D	D
	WB	T	D	C	C
	WB	R		C	C
	NB	L	C	C	C
	NB	T	D	D	D
	NB	R		C	C
	SB	L	D	C	C
	SB	T/R	C	C	C
	ILOS		**D**	**D**	**D**
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	C	C	D
	WB	L	D	D	D
	WB	T			C
	WB	R	C	C	
	NB	L	A	A	B
	NB	T	B		B
	NB	R	B	B	A
	SB	L	A	D	D
	SB	T/R	A	A	A
	ILOS		**B**	**B**	**C**
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	D	D	D
	EB	T/R	C	C	C
	WB	L	C	C	C
	WB	T/R	D	D	D
	NB	L	C	A	A
	NB	T	D	B	B
	NB	R	D		
	SB	L	C	C	C
	SB	T	C	B	B
	SB	R	B		
	ILOS		**D**	**C**	**C**
Route 72 & Isabel Drive	WB	L/R	D	D	D
	NB	T/R	B	A	A
	SB	L	C	A	A
	SB	T	A	A	A
	ILOS		**B**	**A**	**A**

TABLE K-2 (CONTINUED)
LEVEL OF SERVICE SUMMARY: TOWNSHIP MASTER PLAN GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	C	C	C
	EB	T/R	C	C	C
	WB	L	C	C	C
	WB	T/R	C	C	C
	NB	L	A	A	A
	NB	T/R	B	A	A
	SB	L	A	A	A
	SB	T	A	A	A
	SB	R	A		
	ILOS		**B**	**B**	**B**
Route 72 & Route 241	EB	L	D	D	D
	EB	R	C	C	C
	NB	L	D	C	C
	NB	T	A	A	A
	SB	T/R	D	C	C
	ILOS		**C**	**C**	**C**
Cornwall Road & Rocherty Road	EB	L	C	C	C
	EB	T	C	C	C
	EB	R		B	B
	WB	L	C	B	B
	WB	T	D	D	D
	WB	R	C	B	B
	NB	L	C	D	D
	NB	T	D	D	D
	NB	R	C	C	C
	SB	L	C	B	D
	SB	T/R	D	B	C
	ILOS		**D**	**C**	**C**
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	B	D	D
	WB	L/T/R	B	D	D
	NB	L	B	B	B
	NB	T/R			C
	SB	L	B	B	B
	SB	T/R			C
	ILOS		**B**	**C**	**C**
Cornwall Road & York Street	EB	L/R	D	--	--
	NB	L	B		
	NB	T			
	SB	T/R	A		
	ILOS		**B**		

TABLE K-2 (CONTINUED)
LEVEL OF SERVICE SUMMARY: TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Cornwall Road & Wilhelm Avenue	WB	L	D	--	--
	WB	R	C		
	NB	T/R	A		
	SB	L/T	A		
	ILOS		**B**		
Cornwall Road & York Street/ Wilhelm Avenue	EB	L	--	C	C
	EB	T/R			D
	WB	L		D	D
	WB	T/R			D
	NB	L		B	B
	NB	T		C	D
	NB	R		B	B
	SB	L		B	B
	SB	T/R		D	D
	ILOS			**C**	**C**
Evergreen Road & Lincoln Avenue	EB	L	B	A	A
	EB	T/R	B	A	A
	WB	L	B	B	B
	WB	T	C	C	C
	WB	R	B	B	B
	NB	L/T/R	B	C	C
	SB	L/T	C	C	C
	SB	R		B	B
	ILOS		**C**	**B**	**B**
Cornwall Road & Township Roadway	EB	L	--	C	D
	EB	T		C	B
	EB	R			B
	WB	L		C	D
	WB	T		D	D
	WB	R		C	D
	NB	L		B	C
	NB	T/R		B	C
	SB	L		B	A
	SB	T		C	D
	SB	R		A	C
	ILOS			**C**	**D**

TABLE K-2 (CONTINUED)
LEVEL OF SERVICE SUMMARY: TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Township Road & Eastern Site Driveway(s)	WB	L	--	A	--
	NB	L		B	--
	NB	R			B
	SB	R		--	B
	ILOS			**A**	**A**
Township Road & Middle Site Driveway(s)	EB	L	--	--	B
	EB	T		--	B
	EB	R		--	B
	WB	L		A	B
	WB	T		--	B
	WB	R		--	B
	NB	L		B	C
	NB	T/R			B
	SB	L		--	C
	SB	L/R		--	B
	ILOS			**A**	**B**
Township Road & Western Site Driveway(s)	EB	L	--	--	A
	WB	L		A	A
	NB	L/T/R		B	B
	SB	L/T/R		--	B
	ILOS			**A**	**A**
Rocherty Road & Eastern Site Driveway	EB	L	A	A	A
	EB	T	--	A	A
	WB	T/R	--	B	B
	SB	L/R	D	C	C
	ILOS		**A**	**B**	**B**
Rocherty Road & Western Site Driveway	SB	R	C	C	C
	ILOS		**A**	**A**	**A**
Cornwall Road & Northern Site Driveway	EB	R	--	--	C
	ILOS				**A**
Cornwall Road & Middle Site Driveway	EB	R	--	B	B
	ILOS			**A**	**A**
Cornwall Road & Southern Site Driveway	WB	R	B	B	B
	SB	L	A	A	A
	ILOS		**A**	**A**	**A**
Norman Drive & Site Driveway	WB	L/T	A	A	A
	NB	L/R	B	B	B
	ILOS		**A**	**A**	**A**

TABLE K-3
LEVEL OF SERVICE SUMMARY: TOWNHIP MASTER PLAN GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & Rocherty Road	EB	L	C	C	D
	EB	T/R	C	D	D
	WB	L	C	D	D
	WB	T	D	D	D
	WB	R		D	D
	NB	L	B	B	B
	NB	T	C	C	C
	NB	R		C	C
	SB	L	C	C	C
	SB	T/R	B	B	B
	ILOS		**C**	**C**	**C**
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	C	C	D
	WB	L	D	D	D
	WB	T			C
	WB	R	C	C	
	NB	L	B	B	C
	NB	T	B		C
	NB	R	B	B	E
	SB	L	A	D	D
	SB	T/R	A	A	B
	ILOS		**B**	**C**	**D**
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	D	D	D
	EB	T/R	C	D	D
	WB	L	C	C	C
	WB	T/R	D	D	D
	NB	L	B	A	A
	NB	T	D	B	B
	NB	R	B		
	SB	L	C	C	C
	SB	T	C	C	C
	SB	R	B		
	ILOS		**C**	**C**	**C**
Route 72 & Isabel Drive	WB	L/R	D	D	D
	NB	T/R	D	A	A
	SB	L	D	A	A
	SB	T	A	A	A
	ILOS		**C**	**A**	**A**

TABLE K-3 (CONTINUED)
LEVEL OF SERVICE SUMMARY: TOWNSHIP MASTER PLAN GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	C	C	C
	EB	T/R	C	C	C
	WB	L	D	D	D
	WB	T/R	C	C	C
	NB	L	C	B	C
	NB	T/R	B	A	A
	SB	L	A	A	A
	SB	T	B	A	A
	SB	R	A		
	ILOS		**B**	**B**	**B**
Route 72 & Route 241	EB	L	C	C	C
	EB	R	C	C	C
	NB	L	C	B	C
	NB	T	A	A	A
	SB	T/R	C	C	C
	ILOS		**C**	**B**	**B**
Cornwall Road & Rocherty Road	EB	L	B	C	C
	EB	T	C	C	C
	EB	R		C	C
	WB	L	B	C	C
	WB	T	C	D	C
	WB	R	B	C	C
	NB	L	C	C	C
	NB	T	C	C	C
	NB	R	C	C	C
	SB	L	B	A	A
	SB	T/R	C	A	A
	ILOS		**C**	**C**	**C**
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	B	D	D
	WB	L/T/R	B	D	D
	NB	L	A	A	B
	NB	T/R			B
	SB	L	A	A	A
	SB	T/R			B
	ILOS		**A**	**A**	**B**
Cornwall Road & York Street	EB	L/R	B	--	--
	NB	L	A		
	NB	T			
	SB	T/R	A		
	ILOS		**A**		

TABLE K-3 (CONTINUED)
LEVEL OF SERVICE SUMMARY: TOWNHIP MASTER PLAN GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Cornwall Road & Wilhelm Avenue	WB	L	B	--	--
	WB	R	B		
	NB	T/R	A		
	SB	L/T	A		
	ILOS		**A**		
Cornwall Road & York Street/ Wilhelm Avenue	EB	L	--	B	C
	EB	T/R			C
	WB	L		C	C
	WB	T/R			C
	NB	L		B	B
	NB	T		B	B
	NB	R		B	B
	SB	L		B	B
	SB	T/R		C	C
	ILOS			**C**	**C**
Evergreen Road & Lincoln Avenue	EB	L	A	A	A
	EB	T/R	A	A	A
	WB	L	B	A	A
	WB	T	B	B	B
	WB	R	B	A	A
	NB	L/T/R	B	C	C
	SB	L/T	C	C	C
	SB	R		B	B
	ILOS		**B**	**B**	**B**
Cornwall Road & Township Roadway	EB	L	--	C	D
	EB	T/R		C	B
	WB	L		D	D
	WB	T		D	D
	WB	R		D	D
	NB	L		A	B
	NB	T/R		B	B
	SB	L		B	C
	SB	T		B	D
	SB	R		A	B
	ILOS			**B**	**C**

TABLE K-3 (CONTINUED)
LEVEL OF SERVICE SUMMARY: TOWNHIP MASTER PLAN GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Township Road & Eastern Site Driveway(s)	WB	L	--	A	--
	NB	L		C	--
	NB	R			B
	SB	R		--	**B**
	ILOS			**A**	**A**
Township Road & Middle Site Driveway(s)	EB	L	--	--	B
	EB	T		--	C
	EB	R		--	C
	WB	L		A	B
	WB	T		--	C
	WB	R		--	C
	NB	L		C	C
	NB	T/R			B
	SB	L		--	C
	SB	L/R		--	B
	ILOS			**A**	**C**
Township Road & Western Site Driveway(s)	EB	L	--	--	A
	WB	L		A	A
	NB	L/T/R		B	C
	SB	L/T/R		--	B
	ILOS			**A**	**A**
Rocherty Road & Eastern Site Driveway	EB	L	A	A	A
	EB	T	--	A	A
	WB	T/R	--	A	A
	SB	L/R	B	C	C
	ILOS		**A**	**A**	**A**
Rocherty Road & Western Site Driveway	SB	R	B	B	B
	ILOS		**A**	**A**	**A**
Cornwall Road & Northern Site Driveway	EB	R	--	--	**C**
	ILOS				**A**
Cornwall Road & Middle Site Driveway	EB	R	--	B	B
	ILOS			**A**	**A**
Cornwall Road & Southern Site Driveway	WB	R	A	B	B
	SB	L	A	A	A
	ILOS		**A**	**A**	**A**
Norman Drive & Site Driveway	WB	L/T	A	A	A
	NB	L/R	A	A	A
	ILOS		**A**	**A**	**A**

TABLE K-4
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & Rocherty Road	EB	L	69	97	103
	EB	T/R	318	386	401
	WB	L	206	155	145
	WB	T	256	208	214
	WB	R		47	47
	NB	L	20	24	24
	NB	T	305	263	270
	NB	R		66	67
	SB	L	131	56	61
	SB	T/R	129	205	212
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	0	0	0
	WB	L	28	61	38
	WB	T			35
	WB	R	23	34	
	NB	L	21	20	20
	NB	T	416	273	249
	NB	R	14		42
	SB	L	3	23	52
	SB	T/R	23	40	61
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	73	81	81
	EB	T/R	17	18	18
	WB	L	23	25	25
	WB	T/R	3	1	1
	NB	L	12	4	4
	NB	T	120	25	21
	NB	R	3		
	SB	L	27	26	27
	SB	T	235	102	107
	SB	R	5		
Route 72 & Isabel Drive	WB	L/R	38	51	53
	NB	T/R	125	66	68
	SB	L	19	34	35
	SB	T	139	82	85

TABLE K-4 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	7	7	7
	EB	T/R	8	8	8
	WB	L	55	60	60
	WB	T/R	23	22	22
	NB	L	3	3	3
	NB	T/R	180	79	82
	SB	L	14	15	15
	SB	T	236	108	112
	SB	R	2		
Route 72 & Route 241	EB	L	139	154	160
	EB	R	47	60	63
	NB	L	66	59	64
	NB	T	191	87	88
	SB	T/R	381	233	251
Cornwall Road & Rocherty Road	EB	L	60	56	56
	EB	T	594	627	611
	EB	R		10	9
	WB	L	33	37	37
	WB	T	346	381	381
	WB	R	21	46	47
	NB	L	26	37	37
	NB	T	247	347	355
	NB	R	47	95	97
	SB	L	218	229	241
	SB	T/R	163	105	101
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	50	94	110
	WB	L/T/R	47	117	98
	NB	L	171	111	10
	NB	T/R			116
	SB	L	413	844	43
	SB	T/R			528
Cornwall Road & York Street	EB	L/R	60	--	--
	NB	L	172		
	NB	T			
	SB	T/R	203		

TABLE K-4 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Cornwall Road & Wilhelm Avenue	WB	L	134	--	--
	WB	R	10		
	NB	T/R	53		
	SB	L/T	335		
Cornwall Road & York Street/ Wilhelm Avenue	EB	L	--	74	56
	EB	T/R			32
	WB	L		306	255
	WB	T/R			40
	NB	L		16	15
	NB	T		277	283
	NB	R		24	24
	SB	L		57	55
	SB	T/R		672	700
Evergreen Road & Lincoln Avenue	EB	L	289	315	328
	EB	T/R	314	270	292
	WB	L	15	18	18
	WB	T	488	545	572
	WB	R	10	34	35
	NB	L/T/R	53	67	67
	SB	L/T	128	207	199
	SB	R		36	35
Cornwall Road & Township Roadway	EB	L	--	52	74
	EB	T		145	135
	EB	R			
	WB	L		11	11
	WB	T		70	75
	WB	R		38	38
	NB	L		9	12
	NB	T/R		555	555
	SB	L		106	206
	SB	T		280	311
	SB	R		4	13

TABLE K-4 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Township Road & Eastern Site Driveway(s)	WB	L	--	2	--
	NB	L		4	--
	NB	R			2
	SB	R		--	1
Township Road & Middle Site Driveway(s)	EB	L	--	--	13
	EB	T		--	64
	EB	R		--	15
	WB	L		2	21
	WB	T		--	27
	WB	R		--	10
	NB	L		4	22
	NB	T/R			0
	SB	L		--	33
	SB	L/R		--	0
Township Road & Western Site Driveway(s)	EB	L	--	--	0
	WB	L		0	0
	NB	L/T/R		0	0
	SB	L/T/R		--	0
Rocherty Road & Eastern Site Driveway	EB	L	5	19	19
	EB	T	--	375	379
	WB	T/R	--	340	347
	SB	L/R	16	37	40
Rocherty Road & Western Site Driveway	SB	R	3	2	2
Cornwall Road & Northern Site Driveway	EB	R	--	--	1
Cornwall Road & Middle Site Driveway	EB	R	--	1	1
Cornwall Road & Southern Site Driveway	WB	R	7	1	1
	SB	L	6	1	1
Norman Drive & Site Driveway	WB	L/T	0	0	0
	NB	L/R	1	1	1

TABLE K-5
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & Rocherty Road	EB	L	62	95	110
	EB	T/R	284	348	359
	WB	L	249	187	197
	WB	T	464	272	280
	WB	R		65	73
	NB	L	12	16	16
	NB	T	302	274	288
	NB	R		51	52
	SB	L	191	165	171
	SB	T/R	272	394	444
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	36	33	43
	WB	L	62	237	164
	WB	T			68
	WB	R	28	58	
	NB	L	26	21	34
	NB	T	433		277
	NB	R	16	113	2
	SB	L	9	163	228
	SB	T/R	67	121	126
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	169	172	181
	EB	T/R	28	28	28
	WB	L	67	69	69
	WB	T/R	41	63	69
	NB	L	28	11	14
	NB	T	565	84	109
	NB	R	18		
	SB	L	117	98	106
	SB	T	514	174	184
	SB	R	20		
Route 72 & Isabel Drive	WB	L/R	95	111	116
	NB	T/R	297	202	211
	SB	L	36	37	41
	SB	T	229	148	161

TABLE K-5 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	50	46	46
	EB	T/R	63	67	67
	WB	L	105	105	105
	WB	T/R	92	87	87
	NB	L	31	37	39
	NB	T/R	446	207	227
	SB	L	22	28	29
	SB	T	312	173	188
	SB	R	9		
Route 72 & Route 241	EB	L	174	232	243
	EB	R	44	68	71
	NB	L	192	242	280
	NB	T	329	167	173
	SB	T/R	710	386	399
Cornwall Road & Rocherty Road	EB	L	50	59	83
	EB	T	419	364	364
	EB	R		23	23
	WB	L	58	61	61
	WB	T	547	569	569
	WB	R	31	43	45
	NB	L	47	67	81
	NB	T	183	233	240
	NB	R	44	47	46
	SB	L	135	66	109
	SB	T/R	414	370	170
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	44	104	107
	WB	L/T/R	133	220	225
	NB	L	178	711	28
	NB	T/R			712
	SB	L	249	466	22
	SB	T/R			711
Cornwall Road & York Street	EB	L/R	150	--	--
	NB	L	391		
	NB	T			
	SB	T/R	209		

TABLE K-5 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Cornwall Road & Wilhelm Avenue	WB	L	205	--	--
	WB	R	32		
	NB	T/R	136		
	SB	L/T	238		
Cornwall Road & York Street/ Wilhelm Avenue	EB	L	--	145	83
	EB	T/R			72
	WB	L		346	217
	WB	T/R			116
	NB	L		45	43
	NB	T		480	688
	NB	R		48	48
	SB	L		41	38
	SB	T/R		561	638
Evergreen Road & Lincoln Avenue	EB	L	90	54	53
	EB	T/R	349	244	265
	WB	L	15	12	12
	WB	T	334	327	350
	WB	R	18	18	18
	NB	L/T/R	21	47	52
	SB	L/T	190	101	104
	SB	R		85	101
Cornwall Road & Township Roadway	EB	L	--	145	296
	EB	T		65	57
	EB	R			33
	WB	L		37	39
	WB	T		157	204
	WB	R		61	63
	NB	L		24	132
	NB	T/R		339	317
	SB	L		24	14
	SB	T		562	533
	SB	R		10	30

TABLE K-5 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Township Road & Eastern Site Driveway(s)	WB	L	--	8	--
	NB	L		46	--
	NB	R			17
	SB	R		--	8
Township Road & Middle Site Driveway(s)	EB	L	--	--	78
	EB	T		--	90
	EB	R		--	42
	WB	L		8	97
	WB	T		--	122
	WB	R		--	25
	NB	L		42	156
	NB	T/R			0
	SB	L		--	149
	SB	L/R		--	0
Township Road & Western Site Driveway(s)	EB	L	--	--	1
	WB	L		0	0
	NB	L/T/R		1	1
	SB	L/T/R		--	2
Rocherty Road & Eastern Site Driveway	EB	L	3	9	10
	EB	T	--	242	284
	WB	T/R	--	475	542
	SB	L/R	27	96	113
Rocherty Road & Western Site Driveway	SB	R	10	14	14
Cornwall Road & Northern Site Driveway	EB	R	--	--	13
Cornwall Road & Middle Site Driveway	EB	R	--	15	17
Cornwall Road & Southern Site Driveway	WB	R	8	3	4
	SB	L	4	1	1
Norman Drive & Site Driveway	WB	L/T	0	0	0
	NB	L/R	9	7	7

TABLE K-6
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & Rocherty Road	EB	L	70	127	154
	EB	T/R	139	205	210
	WB	L	148	128	132
	WB	T	279	187	197
	WB	R		50	49
	NB	L	17	19	20
	NB	T	228	260	287
	NB	R		39	41
	SB	L	196	165	172
	SB	T/R	191	279	275
Route 72 & Lowe's/ Cedar Crest Square/ Tractor Supply Driveways	EB	L/T/R	24	23	29
	WB	L	89	253	179
	WB	T			76
	WB	R	31	58	
	NB	L	83	43	122
	NB	T	432		258
	NB	R	38	122	213
	SB	L	17	231	309
	SB	T/R	151	137	155
Route 72 & Lowe's/ K-Mart/ Cedar Crest Square Driveways	EB	L	254	291	291
	EB	T/R	53	65	65
	WB	L	64	69	69
	WB	T/R	96	105	105
	NB	L	26	16	20
	NB	T	586	115	141
	NB	R	16		
	SB	L	97	156	168
	SB	T	525	216	238
	SB	R	21		
Route 72 & Isabel Drive	WB	L/R	58	78	82
	NB	T/R	884	196	195
	SB	L	27	25	29
	SB	T	442	187	203

TABLE K-6 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Route 72 & York Street/ Lebanon Plaza Mall Driveway	EB	L	46	60	62
	EB	T/R	74	115	121
	WB	L	111	164	186
	WB	T/R	91	121	125
	NB	L	119	105	137
	NB	T/R	486	218	233
	SB	L	29	31	31
	SB	T	575	289	308
	SB	R	2		
Route 72 & Route 241	EB	L	106	125	129
	EB	R	76	105	131
	NB	L	180	197	228
	NB	T	232	128	143
	SB	T/R	677	361	402
Cornwall Road & Rocherty Road	EB	L	45	53	69
	EB	T	305	235	248
	EB	R		28	30
	WB	L	48	47	51
	WB	T	276	262	276
	WB	R	20	35	41
	NB	L	51	75	75
	NB	T	110	156	173
	NB	R	20	34	34
	SB	L	61	32	38
	SB	T/R	194	58	74
Cornwall Road & Isabel Drive/ Norman Drive	EB	L/T/R	24	76	83
	WB	L/T/R	10	29	30
	NB	L	122	236	36
	NB	T/R			337
	SB	L/T/R	111	220	4
	SB	T/R			498
Cornwall Road & York Street	EB	L/R	106	--	--
	NB	L	140		
	NB	T			
	SB	T/R	133		

TABLE K-6 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Cornwall Road & Wilhelm Avenue	WB	L	112	--	--
	WB	R	16		
	NB	T/R	109		
	SB	L/T	146		
Cornwall Road & York Street/ Wilhelm Avenue	EB	L	--	168	99
	EB	T/R			69
	WB	L		331	234
	WB	T/R			89
	NB	L		21	22
	NB	T		196	277
	NB	R		36	39
	SB	L		27	27
	SB	T/R		318	466
Evergreen Road & Lincoln Avenue	EB	L	28	25	25
	EB	T/R	116	122	141
	WB	L	6	7	6
	WB	T	198	231	262
	WB	R	6	15	14
	NB	L/T/R	23	39	46
	SB	L/T	78	65	69
	SB	R		29	31
Cornwall Road & Township Roadway	EB	L	--	179	346
	EB	T		60	70
	EB	R			
	WB	L		5	5
	WB	T		60	81
	WB	R		23	24
	NB	L		46	144
	NB	T/R		182	167
	SB	L		17	33
	SB	T		297	322
	SB	R		13	38

TABLE K-6 (CONTINUED)
95TH PERCENTILE QUEUE LENGTH SUMMARY (FEET):
TOWNHIP MASTER PLAN GUIDELINES
SATURDAY MIDDAY PEAK HOUR

Intersection	Approach/ Movement		2025 Projected	2035 Projected Phases 1-4	2035 Projected Phases 1-5
Township Road & Eastern Site Driveway(s)	WB	L	--	11	--
	NB	L		73	--
	NB	R			24
	SB	R		--	11
Township Road & Middle Site Driveway(s)	EB	L	--	--	124
	EB	T		--	116
	EB	R		--	53
	WB	L		12	138
	WB	T		--	97
	WB	R		--	35
	NB	L		67	251
	NB	T/R			0
	SB	L		--	217
	SB	L/R		--	0
Township Road & Western Site Driveway(s)	EB	L	--	--	1
	WB	L		0	0
	NB	L/T/R		1	1
	SB	L/T/R		--	2
Rocherty Road & Eastern Site Driveway	EB	L	2	8	7
	EB	T	--	119	126
	WB	T/R	--	272	306
	SB	L/R	3	42	59
Rocherty Road & Western Site Driveway	SB	R	2	1	1
Cornwall Road & Northern Site Driveway	EB	R	--	--	11
Cornwall Road & Middle Site Driveway	EB	R	--	11	13
Cornwall Road & Southern Site Driveway	WB	R	4	2	2
	SB	L	3	1	1
Norman Drive & Site Driveway	WB	L/T	0	0	0
	NB	L/R	0	0	0

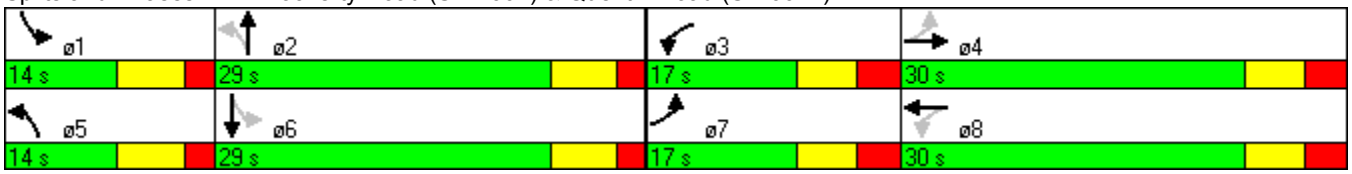
2025 PROJECTED CONDITIONS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	107	308	229	203	18	465	127	336
Lane Group Flow (vph)	147	380	252	364	24	819	140	413
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.5	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.0	21.5	13.5	21.5
Total Split (s)	17.0	30.0	17.0	30.0	14.0	29.0	14.0	29.0
Total Split (%)	18.9%	33.3%	18.9%	33.3%	15.6%	32.2%	15.6%	32.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.47	0.88	0.89	0.79	0.08	0.90	0.66	0.36
Control Delay	21.1	55.0	52.9	42.8	17.2	43.8	42.3	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	55.0	52.9	42.8	17.2	43.8	42.3	24.2
Queue Length 50th (ft)	49	204	92	179	8	214	49	66
Queue Length 95th (ft)	69	#318	#206	#256	20	#305	#131	129
Internal Link Dist (ft)		569		654		721		365
Turn Bay Length (ft)	190		300		80		225	
Base Capacity (vph)	320	449	284	471	317	906	212	1155
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.85	0.89	0.77	0.08	0.90	0.66	0.36

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	308	9	229	203	89	18	465	247	127	336	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	12	12	11	12	12
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.95		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1677	1750		1577	1766		1425	3221		1640	3258	
Flt Permitted	0.31	1.00		0.26	1.00		0.51	1.00		0.14	1.00	
Satd. Flow (perm)	542	1750		435	1766		765	3221		248	3258	
Peak-hour factor, PHF	0.73	0.84	0.70	0.91	0.84	0.73	0.76	0.86	0.89	0.91	0.90	0.78
Adj. Flow (vph)	147	367	13	252	242	122	24	541	278	140	373	40
RTOR Reduction (vph)	0	2	0	0	20	0	0	72	0	0	8	0
Lane Group Flow (vph)	147	378	0	252	344	0	24	747	0	140	405	0
Heavy Vehicles (%)	3%	3%	13%	9%	3%	6%	20%	10%	4%	8%	12%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.8	22.2		32.6	22.6		26.3	23.3		35.3	27.8	
Effective Green, g (s)	31.8	22.2		32.6	22.6		26.3	23.3		35.3	27.8	
Actuated g/C Ratio	0.35	0.25		0.36	0.25		0.29	0.26		0.39	0.31	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	313	432		284	443		246	834		213	1006	
v/s Ratio Prot	0.05	0.22		c0.10	0.19		0.00	c0.23		c0.05	c0.12	
v/s Ratio Perm	0.12			c0.22			0.03			0.20		
v/c Ratio	0.47	0.88		0.89	0.78		0.10	0.90		0.66	0.40	
Uniform Delay, d1	21.2	32.6		23.7	31.3		22.9	32.2		20.6	24.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.44	1.01	
Incremental Delay, d2	1.5	18.2		27.1	8.8		0.2	14.2		7.5	1.1	
Delay (s)	22.8	50.8		50.8	40.1		23.2	46.4		37.3	26.0	
Level of Service	C	D		D	D		C	D		D	C	
Approach Delay (s)		42.9			44.5			45.8			28.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	41.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.5
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

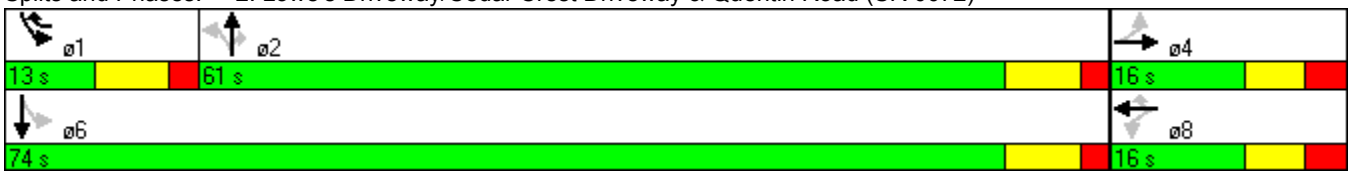
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	6	1	27	2	32	33	584	46	37	436
Lane Group Flow (vph)	0	56	0	38	36	40	649	53	42	502
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	16.0	16.0	16.0	16.0	13.0	61.0	61.0	61.0	13.0	74.0
Total Split (%)	17.8%	17.8%	17.8%	17.8%	14.4%	67.8%	67.8%	67.8%	14.4%	82.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.32		0.38	0.13	0.07	0.54	0.04	0.11	0.37
Control Delay		21.0		49.5	10.4	13.8	21.3	8.3	1.5	1.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		21.0		49.5	10.4	13.8	21.3	8.3	1.5	1.6
Queue Length 50th (ft)		6		21	0	15	340	9	2	19
Queue Length 95th (ft)		0		28	23	m21	m416	m14	m3	23
Internal Link Dist (ft)		216		277			1360			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		184		107	282	554	1208	1186	380	1367
Starvation Cap Reductn		0		0	0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.30		0.36	0.13	0.07	0.54	0.04	0.11	0.37

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1	27	27	2	32	33	584	46	37	436	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1521			1439	1226	1609	1770	1714	1305	1712	
Flt Permitted		0.94			0.71	1.00	0.48	1.00	1.00	0.30	1.00	
Satd. Flow (perm)		1443			1065	1226	812	1770	1714	409	1712	
Peak-hour factor, PHF	0.75	0.25	0.61	0.80	0.50	0.90	0.83	0.90	0.86	0.88	0.89	0.42
Adj. Flow (vph)	8	4	44	34	4	36	40	649	53	42	490	12
RTOR Reduction (vph)	0	41	0	0	0	31	0	0	19	0	1	0
Lane Group Flow (vph)	0	15	0	0	38	5	40	649	34	42	501	0
Heavy Vehicles (%)	17%	0%	4%	25%	50%	33%	15%	10%	3%	33%	14%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		7.0			7.0	11.8	57.2	57.2	57.2	69.0	69.0	
Effective Green, g (s)		7.0			7.0	11.8	57.2	57.2	57.2	69.0	69.0	
Actuated g/C Ratio		0.08			0.08	0.13	0.64	0.64	0.64	0.77	0.77	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		112			83	256	516	1125	1089	361	1313	
v/s Ratio Prot						0.00		c0.37		0.01	c0.29	
v/s Ratio Perm		0.01			c0.04	0.00	0.05		0.02	0.08		
v/c Ratio		0.14			0.46	0.02	0.08	0.58	0.03	0.12	0.38	
Uniform Delay, d1		38.7			39.7	34.1	6.3	9.4	6.1	4.6	3.5	
Progression Factor		1.00			1.00	1.00	1.75	1.94	3.63	0.32	0.25	
Incremental Delay, d2		0.8			5.4	0.1	0.2	1.2	0.0	0.4	0.8	
Delay (s)		39.5			45.1	34.1	11.2	19.5	22.2	1.8	1.6	
Level of Service		D			D	C	B	B	C	A	A	
Approach Delay (s)		39.5			39.7			19.3			1.6	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

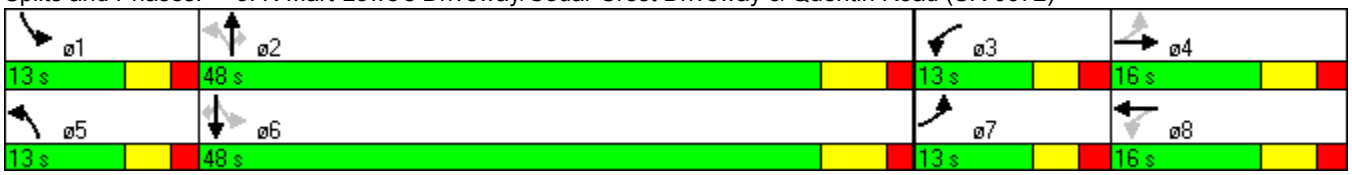
3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	78	7	19	6	35	509	32	63	455	39
Lane Group Flow (vph)	104	40	32	135	48	572	48	89	495	68
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	13.0	16.0	13.0	16.0	13.0	48.0	48.0	13.0	48.0	48.0
Total Split (%)	14.4%	17.8%	14.4%	17.8%	14.4%	53.3%	53.3%	14.4%	53.3%	53.3%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.50	0.22	0.12	0.53	0.10	0.61	0.05	0.19	0.50	0.08
Control Delay	37.2	21.7	27.3	17.4	3.6	8.0	1.9	6.8	14.4	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	21.7	27.3	17.4	3.6	8.0	1.9	6.8	14.4	3.5
Queue Length 50th (ft)	49	6	14	7	1	24	0	15	169	0
Queue Length 95th (ft)	73	17	23	3	12	120	3	27	235	5
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	212	212	277	302	528	932	917	488	988	893
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.19	0.12	0.45	0.09	0.61	0.05	0.18	0.50	0.08

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	7	19	19	6	74	35	509	32	63	455	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1567	1429		1902	1722		1618	1673	1607	1778	1686	1476
Flt Permitted	0.51	1.00		0.73	1.00		0.40	1.00	1.00	0.31	1.00	1.00
Satd. Flow (perm)	833	1429		1464	1722		688	1673	1607	579	1686	1476
Peak-hour factor, PHF	0.75	0.58	0.68	0.59	0.50	0.60	0.73	0.89	0.67	0.71	0.92	0.57
Adj. Flow (vph)	104	12	28	32	12	123	48	572	48	89	495	68
RTOR Reduction (vph)	0	25	0	0	112	0	0	0	23	0	0	31
Lane Group Flow (vph)	104	15	0	32	23	0	48	572	25	89	495	37
Heavy Vehicles (%)	8%	14%	16%	0%	0%	4%	11%	13%	0%	2%	17%	10%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	16.5	10.2		12.9	8.4		51.4	47.1	47.1	54.6	48.7	48.7
Effective Green, g (s)	16.5	10.2		12.9	8.4		51.4	47.1	47.1	54.6	48.7	48.7
Actuated g/C Ratio	0.18	0.11		0.14	0.09		0.57	0.52	0.52	0.61	0.54	0.54
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	204	162		232	161		437	876	841	430	912	799
v/s Ratio Prot	c0.04	0.01		0.01	0.01		0.01	c0.34		c0.01	0.29	
v/s Ratio Perm	c0.06			0.01			0.06		0.02	0.11		0.02
v/c Ratio	0.51	0.09		0.14	0.15		0.11	0.65	0.03	0.21	0.54	0.05
Uniform Delay, d1	32.2	35.8		33.6	37.5		8.9	15.5	10.4	8.8	13.4	9.7
Progression Factor	1.00	1.00		1.00	1.00		0.51	0.32	0.43	0.97	0.90	0.93
Incremental Delay, d2	2.0	0.3		0.3	0.4		0.1	3.3	0.1	0.2	2.1	0.1
Delay (s)	34.2	36.0		33.9	37.9		4.7	8.2	4.5	8.7	14.1	9.1
Level of Service	C	D		C	D		A	A	A	A	B	A
Approach Delay (s)		34.7			37.1			7.7			12.8	
Approach LOS		C			D			A			B	

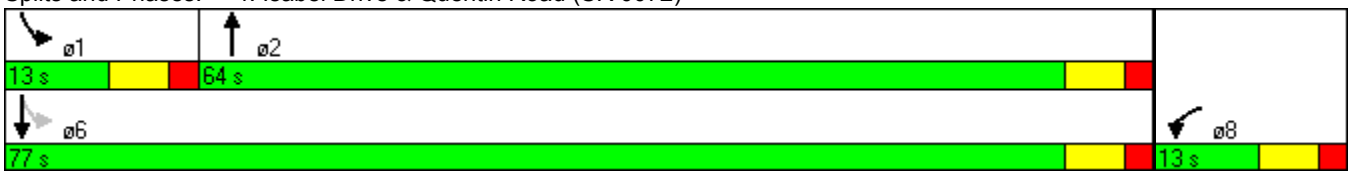
Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	25	536	94	590
Lane Group Flow (vph)	99	704	124	711
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	13.0	64.0	13.0	77.0
Total Split (%)	14.4%	71.1%	14.4%	85.6%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.49	0.65	0.26	0.49
Control Delay	28.0	6.6	3.5	4.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	28.0	6.6	3.5	4.3
Queue Length 50th (ft)	22	82	12	108
Queue Length 95th (ft)	38	125	19	139
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			275	
Base Capacity (vph)	201	1091	474	1457
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.49	0.65	0.26	0.49

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 47 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	25	48	536	55	94	590
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.92		0.98		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1885		1611		1610	1753
Flt Permitted	0.98		1.00		0.28	1.00
Satd. Flow (perm)	1885		1611		471	1753
Peak-hour factor, PHF	0.63	0.81	0.90	0.51	0.76	0.83
Adj. Flow (vph)	40	59	596	108	124	711
RTOR Reduction (vph)	55	0	7	0	0	0
Lane Group Flow (vph)	44	0	697	0	124	711
Heavy Vehicles (%)	4%	4%	10%	10%	10%	10%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	5.6		59.4		72.4	72.4
Effective Green, g (s)	5.6		59.4		72.4	72.4
Actuated g/C Ratio	0.06		0.66		0.80	0.80
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	117		1063		467	1410
v/s Ratio Prot	c0.02		c0.43		0.02	c0.41
v/s Ratio Perm					0.19	
v/c Ratio	0.37		0.66		0.27	0.50
Uniform Delay, d1	40.5		9.2		4.5	2.9
Progression Factor	1.00		0.44		1.00	1.00
Incremental Delay, d2	2.0		2.6		0.3	1.3
Delay (s)	42.5		6.6		4.8	4.2
Level of Service	D		A		A	A
Approach Delay (s)	42.5		6.6			4.3
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

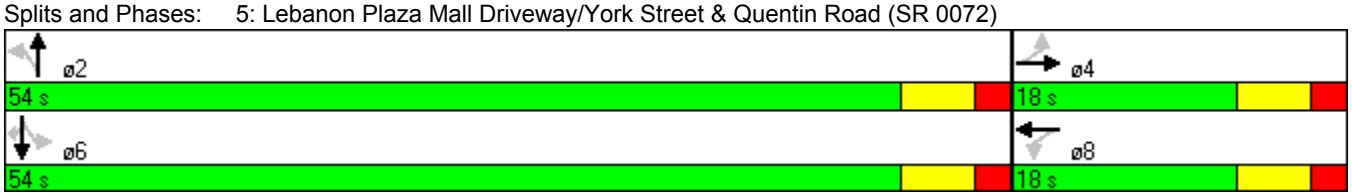
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	4	5	62	10	6	504	32	630	4
Lane Group Flow (vph)	8	20	76	40	20	646	43	692	8
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	18.0	18.0	18.0	18.0	54.0	54.0	54.0	54.0	54.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.05	0.07	0.35	0.13	0.05	0.52	0.09	0.55	0.01
Control Delay	22.5	17.9	28.0	13.1	4.8	7.7	5.2	8.2	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	17.9	28.0	13.1	4.8	7.7	5.2	8.2	2.8
Queue Length 50th (ft)	3	4	26	4	2	112	5	126	0
Queue Length 95th (ft)	7	8	55	23	3	180	14	236	2
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	204	310	252	344	446	1431	530	1449	1323
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.06	0.30	0.12	0.04	0.45	0.08	0.48	0.01

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 62.2
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	5	5	62	10	20	6	504	27	32	630	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.90		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1375	1575		1668	1667		1535	1754		1686	1778	1623
Flt Permitted	0.73	1.00		0.74	1.00		0.34	1.00		0.37	1.00	1.00
Satd. Flow (perm)	1058	1575		1307	1667		548	1754		651	1778	1623
Peak-hour factor, PHF	0.50	0.42	0.63	0.82	0.83	0.71	0.30	0.83	0.69	0.75	0.91	0.50
Adj. Flow (vph)	8	12	8	76	12	28	20	607	39	43	692	8
RTOR Reduction (vph)	0	7	0	0	24	0	0	3	0	0	0	3
Lane Group Flow (vph)	8	13	0	76	16	0	20	643	0	43	692	5
Heavy Vehicles (%)	25%	0%	20%	2%	10%	0%	17%	11%	0%	4%	11%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	8.4	8.4		8.4	8.4		43.1	43.1		43.1	43.1	43.1
Effective Green, g (s)	8.4	8.4		8.4	8.4		43.1	43.1		43.1	43.1	43.1
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.68	0.68		0.68	0.68	0.68
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	140	208		173	221		372	1191		442	1207	1102
v/s Ratio Prot		0.01			0.01			0.37			c0.39	
v/s Ratio Perm	0.01			c0.06			0.04			0.07		0.00
v/c Ratio	0.06	0.06		0.44	0.07		0.05	0.54		0.10	0.57	0.00
Uniform Delay, d1	24.1	24.1		25.4	24.1		3.4	5.2		3.5	5.4	3.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2		2.4	0.2		0.1	0.5		0.1	0.7	0.0
Delay (s)	24.3	24.3		27.8	24.3		3.5	5.6		3.6	6.0	3.3
Level of Service	C	C		C	C		A	A		A	A	A
Approach Delay (s)		24.3			26.6			5.6			5.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	63.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

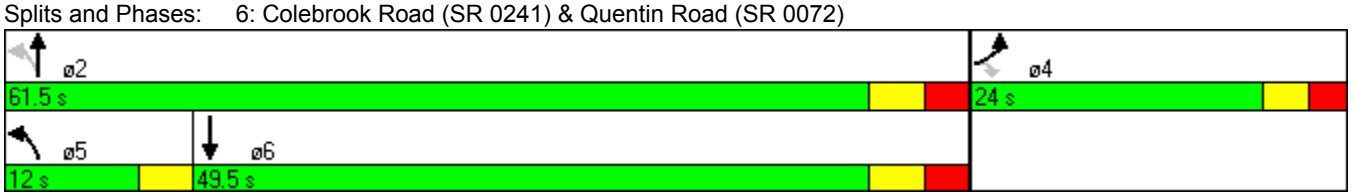
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	161	213	152	471	513
Lane Group Flow (vph)	233	254	173	548	707
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	24.0	24.0	12.0	61.5	49.5
Total Split (%)	28.1%	28.1%	14.0%	71.9%	57.9%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.69	0.51	0.53	0.51	0.88
Control Delay	38.8	8.1	12.9	9.7	31.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	8.1	12.9	9.7	31.4
Queue Length 50th (ft)	92	0	25	118	262
Queue Length 95th (ft)	139	47	66	191	381
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	453	581	332	1420	1186
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.51	0.44	0.52	0.39	0.60

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 69.3
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	161	213	152	471	513	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1627	1428	1625	1769	1826	
Flt Permitted	0.95	1.00	0.14	1.00	1.00	
Satd. Flow (perm)	1627	1428	236	1769	1826	
Peak-hour factor, PHF	0.69	0.84	0.88	0.86	0.84	0.81
Adj. Flow (vph)	233	254	173	548	611	96
RTOR Reduction (vph)	0	200	0	0	7	0
Lane Group Flow (vph)	233	54	173	548	700	0
Heavy Vehicles (%)	3%	5%	9%	9%	13%	12%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	14.5	14.5	42.3	42.3	30.2	
Effective Green, g (s)	14.5	14.5	42.3	42.3	30.2	
Actuated g/C Ratio	0.21	0.21	0.61	0.61	0.44	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	343	301	319	1088	802	
v/s Ratio Prot	c0.14		0.07	c0.31	c0.38	
v/s Ratio Perm		0.04	0.27			
v/c Ratio	0.68	0.18	0.54	0.50	0.87	
Uniform Delay, d1	25.0	22.3	10.4	7.4	17.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	0.3	1.9	1.0	11.6	
Delay (s)	30.3	22.5	12.3	8.4	29.1	
Level of Service	C	C	B	A	C	
Approach Delay (s)	26.2			9.4	29.1	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	18.5
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

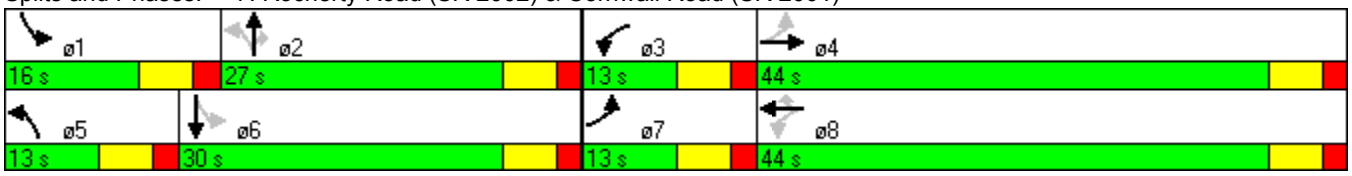
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	96	520	45	409	174	22	251	219	200	122
Lane Group Flow (vph)	133	619	59	445	235	27	330	264	230	207
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	15.0	7.0	15.0	15.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0	21.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	44.0	13.0	44.0	44.0	13.0	27.0	27.0	16.0	30.0
Total Split (%)	13.0%	44.0%	13.0%	44.0%	44.0%	13.0%	27.0%	27.0%	16.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.44	0.91	0.32	0.73	0.34	0.07	0.84	0.49	0.89	0.39
Control Delay	18.3	47.6	17.7	34.2	4.3	21.2	56.8	7.8	61.1	29.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	47.6	17.7	34.2	4.3	21.2	56.8	7.8	61.1	29.4
Queue Length 50th (ft)	43	369	18	233	0	11	203	0	107	101
Queue Length 95th (ft)	60	#594	33	346	21	26	247	47	#218	163
Internal Link Dist (ft)		1052		405			731			260
Turn Bay Length (ft)	225		225		325	150		350	240	
Base Capacity (vph)	303	714	183	705	756	373	424	559	259	533
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.87	0.32	0.63	0.31	0.07	0.78	0.47	0.89	0.39

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 94.9
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	520	31	45	409	174	22	251	219	200	122	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1751		1497	1734	1516	1754	1891	1576	1550	1718	
Flt Permitted	0.28	1.00		0.13	1.00	1.00	0.63	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	482	1751		200	1734	1516	1160	1891	1576	366	1718	
Peak-hour factor, PHF	0.72	0.91	0.65	0.76	0.92	0.74	0.81	0.76	0.83	0.87	0.86	0.86
Adj. Flow (vph)	133	571	48	59	445	235	27	330	264	230	142	65
RTOR Reduction (vph)	0	3	0	0	0	152	0	0	204	0	16	0
Lane Group Flow (vph)	133	616	0	59	445	83	27	330	60	230	191	0
Heavy Vehicles (%)	4%	6%	8%	16%	9%	6%	0%	1%	3%	12%	3%	9%
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	43.9	36.8		40.3	35.0	35.0	26.5	22.5	22.5	38.6	28.6	
Effective Green, g (s)	43.9	36.8		40.3	35.0	35.0	26.5	22.5	22.5	38.6	28.6	
Actuated g/C Ratio	0.44	0.37		0.41	0.35	0.35	0.27	0.23	0.23	0.39	0.29	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	299	653		151	615	538	336	431	359	264	498	
v/s Ratio Prot	c0.03	c0.35		0.02	0.26		0.00	0.17		c0.09	0.11	
v/s Ratio Perm	0.17			0.14		0.05	0.02		0.04	c0.25		
v/c Ratio	0.44	0.94		0.39	0.72	0.15	0.08	0.77	0.17	0.87	0.38	
Uniform Delay, d1	18.2	29.9		21.4	27.7	21.8	26.8	35.6	30.6	24.0	28.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	22.4		1.7	4.5	0.2	0.1	10.9	0.8	25.4	1.7	
Delay (s)	19.3	52.3		23.0	32.1	21.9	26.9	46.6	31.4	49.4	29.8	
Level of Service	B	D		C	C	C	C	D	C	D	C	
Approach Delay (s)		46.4			28.2			39.3			40.1	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	38.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	98.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

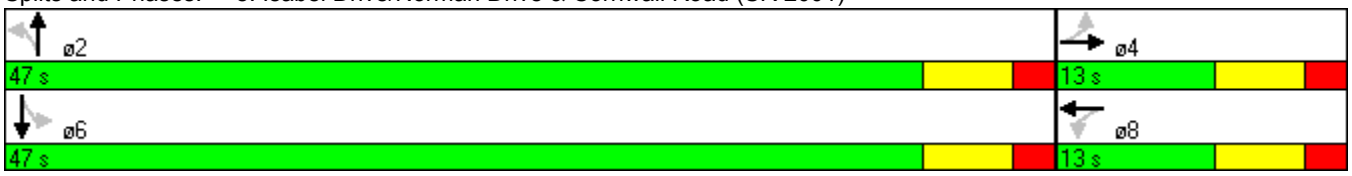
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	6	42	35	15	45	445	159	462
Lane Group Flow (vph)	0	140	0	149	0	659	0	782
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	13.0	13.0	13.0	13.0	47.0	47.0	47.0	47.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	78.3%	78.3%	78.3%	78.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.50		0.50		0.57		0.86
Control Delay		23.0		20.6		7.1		21.7
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		23.0		20.6		7.1		21.7
Queue Length 50th (ft)		28		25		97		196
Queue Length 95th (ft)		50		47		171		#413
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		282		296		1148		911
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.50		0.50		0.57		0.86

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 56
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	42	52	35	15	57	45	445	86	159	462	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.94			0.93			0.98			1.00	
Flt Protected		1.00			0.98			1.00			0.99	
Satd. Flow (prot)		1885			1968			1680			1677	
Flt Permitted		0.96			0.89			0.90			0.72	
Satd. Flow (perm)		1817			1786			1524			1217	
Peak-hour factor, PHF	0.42	0.68	0.81	0.73	0.69	0.72	0.85	0.88	0.86	0.79	0.83	0.50
Adj. Flow (vph)	14	62	64	48	22	79	53	506	100	201	557	24
RTOR Reduction (vph)	0	52	0	0	70	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	88	0	0	79	0	0	649	0	0	780	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.2			5.2			40.2			40.2	
Effective Green, g (s)		5.2			5.2			40.2			40.2	
Actuated g/C Ratio		0.09			0.09			0.70			0.70	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		165			162			1067			852	
v/s Ratio Prot												
v/s Ratio Perm		c0.05			0.04			0.43			c0.64	
v/c Ratio		0.53			0.49			0.61			0.92	
Uniform Delay, d1		24.9			24.8			4.5			7.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.3			2.3			1.0			14.3	
Delay (s)		28.2			27.1			5.5			21.5	
Level of Service		C			C			A			C	
Approach Delay (s)		28.2			27.1			5.5			21.5	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		

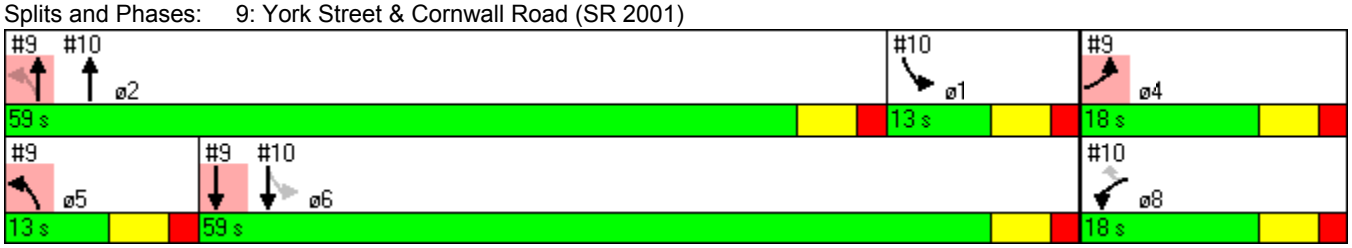
c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	ø1	ø8
Lane Configurations						
Volume (vph)	51	28	460	717		
Lane Group Flow (vph)	106	0	592	946		
Turn Type		pm+pt				
Protected Phases	4	5	2	6	1	8
Permitted Phases		2				
Detector Phase	4	5	2	6		
Switch Phase						
Minimum Initial (s)	7.0	7.0	15.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	21.0	13.0	13.0
Total Split (s)	18.0	13.0	59.0	59.0	13.0	18.0
Total Split (%)	20.0%	14.4%	65.6%	65.6%	14%	20%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lead	Lag	Lag	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	None
v/c Ratio	0.40		0.55	0.74		
Control Delay	28.5		8.2	8.0		
Queue Delay	0.0		0.0	4.8		
Total Delay	28.5		8.2	12.8		
Queue Length 50th (ft)	37		120	127		
Queue Length 95th (ft)	60		172	203		
Internal Link Dist (ft)	1228		849	232		
Turn Bay Length (ft)						
Base Capacity (vph)	282		1080	1275		
Starvation Cap Reductn	0		0	259		
Spillback Cap Reductn	0		0	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.38		0.55	0.93		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77.6
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 9: York Street & Cornwall Road (SR 2001)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	51	25	28	460	717	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.96			1.00	0.99	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1706			1782	1814	
Flt Permitted	0.97			0.86	1.00	
Satd. Flow (perm)	1706			1541	1814	
Peak-hour factor, PHF	0.70	0.75	0.64	0.84	0.84	0.73
Adj. Flow (vph)	73	33	44	548	854	92
RTOR Reduction (vph)	18	0	0	0	3	0
Lane Group Flow (vph)	88	0	0	592	943	0
Heavy Vehicles (%)	0%	10%	9%	6%	3%	7%
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	11.2			54.4	54.4	
Effective Green, g (s)	11.2			54.4	54.4	
Actuated g/C Ratio	0.14			0.70	0.70	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	246			1080	1272	
v/s Ratio Prot	c0.05				c0.52	
v/s Ratio Perm				0.38		
v/c Ratio	0.36			0.55	0.74	
Uniform Delay, d1	30.0			5.6	7.2	
Progression Factor	1.00			1.00	0.68	
Incremental Delay, d2	0.9			0.6	1.5	
Delay (s)	30.8			6.2	6.4	
Level of Service	C			A	A	
Approach Delay (s)	30.8			6.2	6.4	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

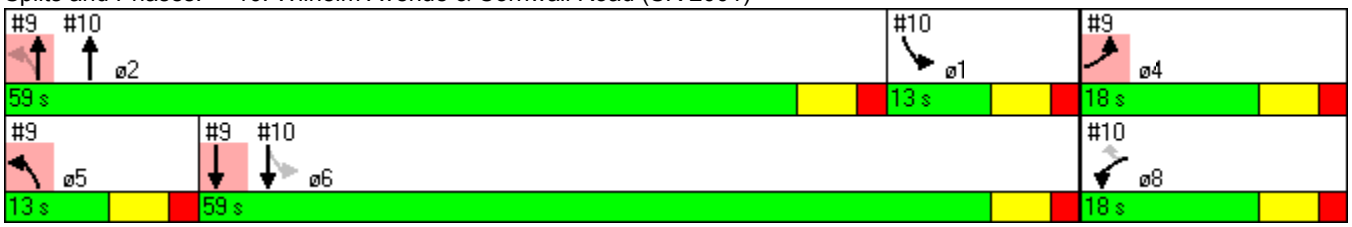
c Critical Lane Group

Lane Group	WBL	WBR	NBT	SBL	SBT	ø4	ø5
Lane Configurations							
Volume (vph)	146	31	331	141	545		
Lane Group Flow (vph)	166	54	524	0	907		
Turn Type		Perm		pm+pt			
Protected Phases	8		2	1	6	4	5
Permitted Phases		8		6			
Detector Phase	8	8	2	1	6		
Switch Phase							
Minimum Initial (s)	7.0	7.0	15.0	7.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	13.0	21.0	13.0	13.0
Total Split (s)	18.0	18.0	59.0	13.0	59.0	18.0	13.0
Total Split (%)	20.0%	20.0%	65.6%	14.4%	65.6%	20%	14%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		
Lead/Lag			Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Recall Mode	None	None	Min	None	Min	None	None
v/c Ratio	0.66	0.21	0.42		0.86		
Control Delay	44.2	11.0	3.1		20.5		
Queue Delay	0.0	0.0	0.3		2.6		
Total Delay	44.2	11.0	3.4		23.2		
Queue Length 50th (ft)	75	0	40		288		
Queue Length 95th (ft)	#134	10	53		335		
Internal Link Dist (ft)	945		232		841		
Turn Bay Length (ft)		100					
Base Capacity (vph)	271	275	1261		1049		
Starvation Cap Reductn	0	0	259		0		
Spillback Cap Reductn	0	0	0		68		
Storage Cap Reductn	0	0	0		0		
Reduced v/c Ratio	0.61	0.20	0.52		0.92		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77.6
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	146	31	331	85	141	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Total Lost time (s)	6.0	6.0	6.0			6.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frt	1.00	0.85	0.97			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	1752	1480	1788			2035
Flt Permitted	0.95	1.00	1.00			0.73
Satd. Flow (perm)	1752	1480	1788			1496
Peak-hour factor, PHF	0.88	0.57	0.81	0.74	0.71	0.77
Adj. Flow (vph)	166	54	409	115	199	708
RTOR Reduction (vph)	0	46	8	0	0	0
Lane Group Flow (vph)	166	8	516	0	0	907
Heavy Vehicles (%)	2%	8%	4%	0%	1%	5%
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	11.2	11.2	54.4			54.4
Effective Green, g (s)	11.2	11.2	54.4			54.4
Actuated g/C Ratio	0.14	0.14	0.70			0.70
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	253	214	1253			1049
v/s Ratio Prot	c0.09		0.29			
v/s Ratio Perm		0.01				c0.61
v/c Ratio	0.66	0.04	0.41			0.86
Uniform Delay, d1	31.4	28.6	4.9			8.8
Progression Factor	1.00	1.00	0.46			1.00
Incremental Delay, d2	6.0	0.1	0.2			7.6
Delay (s)	37.4	28.6	2.4			16.4
Level of Service	D	C	A			B
Approach Delay (s)	35.2		2.4			16.4
Approach LOS	D		A			B

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	329	598	16	540	172	18	22	126	15
Lane Group Flow (vph)	370	731	34	600	253	0	103	0	300
Turn Type	pm+pt		Perm		Perm	Perm		Perm	
Protected Phases	5	2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	5	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	4.0	12.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	18.0	63.0	45.0	45.0	45.0	27.0	27.0	27.0	27.0
Total Split (%)	20.0%	70.0%	50.0%	50.0%	50.0%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?									
Recall Mode	None	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.94	0.69	0.13	0.88	0.33		0.27		0.86
Control Delay	49.6	14.8	16.9	39.3	3.4		20.8		52.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	49.6	14.8	16.9	39.3	3.4		20.8		52.6
Queue Length 50th (ft)	116	242	11	293	0		29		145
Queue Length 95th (ft)	#289	314	15	#488	10		53		128
Internal Link Dist (ft)		619		423			845		1011
Turn Bay Length (ft)	100		80		275				
Base Capacity (vph)	394	1167	313	791	862		416		386
Starvation Cap Reductn	0	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0	0		0		0
Reduced v/c Ratio	0.94	0.63	0.11	0.76	0.29		0.25		0.78

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 83.4
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	329	598	4	16	540	172	18	22	32	126	15	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	12	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.97	
Satd. Flow (prot)	1702	1682		1614	1668	1537		1712			1661	
Flt Permitted	0.17	1.00		0.39	1.00	1.00		0.86			0.81	
Satd. Flow (perm)	302	1682		659	1668	1537		1485			1379	
Peak-hour factor, PHF	0.89	0.83	0.38	0.47	0.90	0.68	0.63	0.72	0.75	0.82	0.57	0.90
Adj. Flow (vph)	370	720	11	34	600	253	29	31	43	154	26	120
RTOR Reduction (vph)	0	1	0	0	0	150	0	29	0	0	27	0
Lane Group Flow (vph)	370	730	0	34	600	103	0	74	0	0	273	0
Heavy Vehicles (%)	2%	8%	33%	7%	9%	4%	7%	0%	8%	4%	0%	6%
Turn Type	pm+pt			Perm		Perm	Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	52.2	52.2		34.0	34.0	34.0		19.5			19.5	
Effective Green, g (s)	52.2	52.2		34.0	34.0	34.0		19.5			19.5	
Actuated g/C Ratio	0.63	0.63		0.41	0.41	0.41		0.23			0.23	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0	6.0		3.0			3.0	
Lane Grp Cap (vph)	395	1055		269	682	628		348			323	
v/s Ratio Prot	c0.14	0.43			0.36							
v/s Ratio Perm	c0.45			0.05		0.07		0.05			c0.20	
v/c Ratio	0.94	0.69		0.13	0.88	0.16		0.21			0.85	
Uniform Delay, d1	17.6	10.2		15.3	22.7	15.6		25.7			30.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	29.4	3.0		0.6	13.9	0.3		0.3			18.1	
Delay (s)	47.0	13.2		15.9	36.6	15.9		26.0			48.5	
Level of Service	D	B		B	D	B		C			D	
Approach Delay (s)		24.5			29.9			26.0			48.5	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	11.5
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	52	866	577	11	6	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997		0.892	
Flt Protected	0.950				0.990	
Satd. Flow (prot)	1676	1825	1894	0	1645	0
Flt Permitted	0.950				0.990	
Satd. Flow (perm)	1676	1825	1894	0	1645	0
Link Speed (mph)		40	40		25	
Link Distance (ft)		480	1348		405	
Travel Time (s)		8.2	23.0		11.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	941	627	12	7	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	57	941	639	0	35	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.03	0.97	0.97	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 55.6%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	52	866	577	11	6	26
Sign Control		Free	Free		Stop	
Grade		4%	-4%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	941	627	12	7	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		965				
pX, platoon unblocked					0.65	
vC, conflicting volume	639				1688	633
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	639				1789	633
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				88	94
cM capacity (veh/h)	945				54	480

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	57	941	639	35
Volume Left	57	0	0	7
Volume Right	0	0	12	28
cSH	945	1700	1700	194
Volume to Capacity	0.06	0.55	0.38	0.18
Queue Length 95th (ft)	5	0	0	16
Control Delay (s)	9.1	0.0	0.0	27.5
Lane LOS	A			D
Approach Delay (s)	0.5		0.0	27.5
Approach LOS				D

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	918	599	4	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1879	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1879	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	998	651	4	0	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	998	655	0	0	17
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	918	599	4	0	16
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	998	651	4	0	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)		485				
pX, platoon unblocked					0.56	
vC, conflicting volume	655				1651	653
vC1, stage 1 conf vol					653	
vC2, stage 2 conf vol					998	
vCu, unblocked vol	655				1768	653
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	96
cM capacity (veh/h)	932				259	467

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	998	655	17
Volume Left	0	0	0
Volume Right	0	4	17
cSH	1700	1700	467
Volume to Capacity	0.59	0.39	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.0	13.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	13.0
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	45	466	45	71	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	150	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1836	1591	1702	1835
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1836	1591	1702	1835
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			2010
Travel Time (s)	4.7		5.2			30.5
Peak Hour Factor	0.92	0.92	0.88	0.92	0.92	0.86
Heavy Vehicles (%)	2%	2%	4%	2%	2%	3%
Adj. Flow (vph)	0	49	530	49	77	430
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	49	530	49	77	430
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 35.1% ICU Level of Service A
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	45	466	45	71	370
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.88	0.92	0.92	0.86
Hourly flow rate (vph)	0	49	530	49	77	430
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			340			
pX, platoon unblocked	0.83	0.83			0.83	
vC, conflicting volume	1114	530			578	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1037	335			394	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	92			92	
cM capacity (veh/h)	196	589			970	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	530	49	77	430
Volume Left	0	0	0	77	0
Volume Right	49	0	49	0	0
cSH	589	1700	1700	970	1700
Volume to Capacity	0.08	0.31	0.03	0.08	0.25
Queue Length 95th (ft)	7	0	0	6	0
Control Delay (s)	11.7	0.0	0.0	9.0	0.0
Lane LOS	B			A	
Approach Delay (s)	11.7	0.0		1.4	
Approach LOS	B				

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	223	64	0	98	9	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.976					
Flt Protected					0.950	
Satd. Flow (prot)	1789	0	0	1900	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1789	0	0	1900	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.68	0.92	0.92	0.69	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	0%	2%	2%
Adj. Flow (vph)	328	70	0	142	10	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	398	0	0	142	10	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 25.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	223	64	0	98	9	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.92	0.92	0.69	0.92	0.92
Hourly flow rate (vph)	328	70	0	142	10	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			398		505	363
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			398		505	363
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1161		527	682

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	398	142	10
Volume Left	0	0	10
Volume Right	70	0	0
cSH	1700	1161	527
Volume to Capacity	0.23	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	12.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	12.0
Approach LOS			B

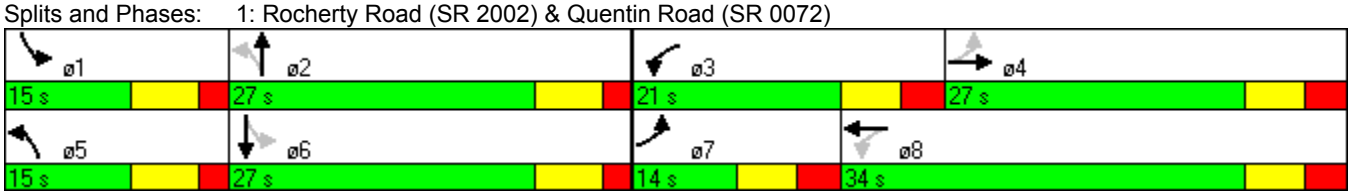
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	96	256	296	268	9	535	187	517
Lane Group Flow (vph)	128	321	340	526	14	717	203	676
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.5	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.0	21.5	13.5	21.5
Total Split (s)	14.0	27.0	21.0	34.0	15.0	27.0	15.0	27.0
Total Split (%)	15.6%	30.0%	23.3%	37.8%	16.7%	30.0%	16.7%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.60	0.83	0.90	0.94	0.05	0.87	0.83	0.54
Control Delay	29.1	53.1	46.5	54.9	17.4	44.5	44.8	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	53.1	46.5	54.9	17.4	44.5	44.8	18.4
Queue Length 50th (ft)	41	172	128	264	5	198	51	97
Queue Length 95th (ft)	62	#284	#249	#464	12	#302	m#191	#272
Internal Link Dist (ft)		569		654		721		365
Turn Bay Length (ft)	190		300		80		225	
Base Capacity (vph)	213	396	379	571	313	825	246	1254
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.81	0.90	0.92	0.04	0.87	0.83	0.54

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 19 (21%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	256	19	296	268	183	9	535	141	187	517	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	12	12	11	12	12
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.93		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1766		1653	1790		1710	3405		1771	3361	
Flt Permitted	0.21	1.00		0.24	1.00		0.36	1.00		0.15	1.00	
Satd. Flow (perm)	369	1766		416	1790		646	3405		271	3361	
Peak-hour factor, PHF	0.75	0.86	0.81	0.87	0.95	0.75	0.66	0.96	0.88	0.92	0.93	0.88
Adj. Flow (vph)	128	298	23	340	282	244	14	557	160	203	556	120
RTOR Reduction (vph)	0	3	0	0	35	0	0	29	0	0	18	0
Lane Group Flow (vph)	128	318	0	340	491	0	14	688	0	203	658	0
Heavy Vehicles (%)	1%	2%	0%	4%	1%	0%	0%	4%	4%	0%	7%	2%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	26.5	19.5		40.5	26.5		22.6	21.0		36.0	27.9	
Effective Green, g (s)	26.5	19.5		40.5	26.5		22.6	21.0		36.0	27.9	
Actuated g/C Ratio	0.29	0.22		0.45	0.29		0.25	0.23		0.40	0.31	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	213	383		380	527		181	795		250	1042	
v/s Ratio Prot	0.05	0.18		c0.14	c0.27		0.00	0.20		c0.08	0.20	
v/s Ratio Perm	0.13			0.26			0.02			c0.25		
v/c Ratio	0.60	0.83		0.89	0.93		0.08	0.87		0.81	0.63	
Uniform Delay, d1	25.2	33.7		19.1	30.9		25.5	33.1		20.8	26.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.97	0.71	
Incremental Delay, d2	5.4	14.4		22.9	23.8		0.2	12.1		16.1	2.4	
Delay (s)	30.6	48.1		42.1	54.7		25.7	45.3		36.1	21.2	
Level of Service	C	D		D	D		C	D		D	C	
Approach Delay (s)		43.1			49.8			44.9			24.7	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	40.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

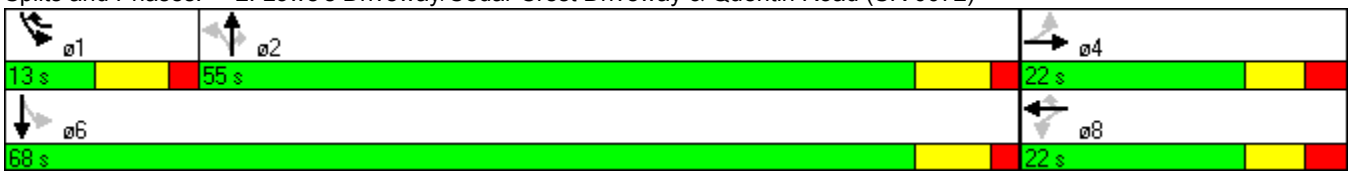
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	10	3	112	3	76	60	739	97	76	651
Lane Group Flow (vph)	0	92	0	173	90	72	778	110	87	697
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0	13.0	55.0	55.0	55.0	13.0	68.0
Total Split (%)	24.4%	24.4%	24.4%	24.4%	14.4%	61.1%	61.1%	61.1%	14.4%	75.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.32		0.77	0.17	0.17	0.75	0.10	0.32	0.54
Control Delay		15.2		59.4	6.0	8.5	17.0	2.8	4.8	2.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.4
Total Delay		15.2		59.4	6.0	8.5	17.0	2.8	4.8	3.1
Queue Length 50th (ft)		10		95	0	21	352	14	4	30
Queue Length 95th (ft)		36		62	28	m26	m433	m16	m9	m67
Internal Link Dist (ft)		216		277			1360			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		295		237	538	431	1038	1054	274	1286
Starvation Cap Reductn		0		0	0	0	0	0	0	199
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.31		0.73	0.17	0.17	0.75	0.10	0.32	0.64

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	3	53	112	3	76	60	739	97	76	651	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1532			1787	1568	1796	1820	1766	1536	1875	
Flt Permitted		0.91			0.76	1.00	0.40	1.00	1.00	0.17	1.00	
Satd. Flow (perm)		1408			1419	1568	756	1820	1766	278	1875	
Peak-hour factor, PHF	0.63	0.75	0.74	0.68	0.38	0.84	0.83	0.95	0.88	0.87	0.95	0.68
Adj. Flow (vph)	16	4	72	165	8	90	72	778	110	87	685	12
RTOR Reduction (vph)	0	61	0	0	0	71	0	0	49	0	1	0
Lane Group Flow (vph)	0	31	0	0	173	19	72	778	61	87	696	0
Heavy Vehicles (%)	0%	0%	6%	1%	33%	4%	3%	7%	0%	13%	4%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		14.3			14.3	19.1	49.9	49.9	49.9	61.7	61.7	
Effective Green, g (s)		14.3			14.3	19.1	49.9	49.9	49.9	61.7	61.7	
Actuated g/C Ratio		0.16			0.16	0.21	0.55	0.55	0.55	0.69	0.69	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		224			225	455	419	1009	979	258	1285	
v/s Ratio Prot						0.00		c0.43		0.02	c0.37	
v/s Ratio Perm		0.02			c0.12	0.01	0.10		0.03	0.21		
v/c Ratio		0.14			0.77	0.04	0.17	0.77	0.06	0.34	0.54	
Uniform Delay, d1		32.6			36.3	28.2	9.9	15.6	9.3	10.8	7.1	
Progression Factor		1.00			1.00	1.00	0.71	0.84	1.21	0.52	0.21	
Incremental Delay, d2		0.4			15.4	0.1	0.5	3.2	0.1	1.5	1.1	
Delay (s)		33.0			51.7	28.3	7.5	16.3	11.3	7.2	2.7	
Level of Service		C			D	C	A	B	B	A	A	
Approach Delay (s)		33.0			43.7			15.1			3.2	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

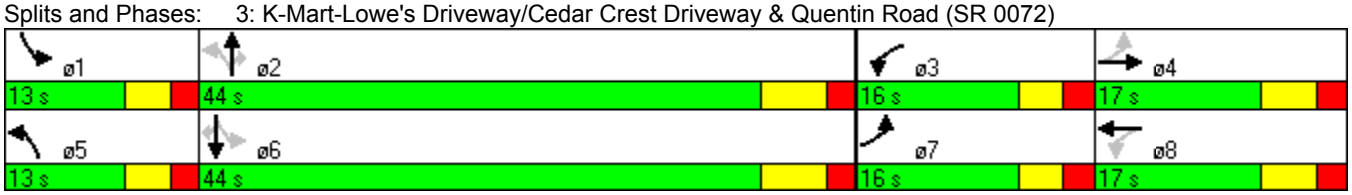
3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	182	19	77	20	49	617	62	142	590	65
Lane Group Flow (vph)	225	96	96	402	56	717	68	167	686	80
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	16.0	17.0	16.0	17.0	13.0	44.0	44.0	13.0	44.0	44.0
Total Split (%)	17.8%	18.9%	17.8%	18.9%	14.4%	48.9%	48.9%	14.4%	48.9%	48.9%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.81	0.30	0.26	0.91	0.21	0.94	0.09	0.67	0.81	0.11
Control Delay	50.3	18.1	25.0	41.2	14.6	44.9	10.7	30.9	28.0	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	18.1	25.0	41.2	14.6	44.9	10.7	30.9	28.0	5.1
Queue Length 50th (ft)	101	16	39	76	17	253	8	55	244	0
Queue Length 95th (ft)	#169	28	67	41	m28	#565	m18	m#117	#514	m20
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	277	317	406	449	297	760	723	252	851	730
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.30	0.24	0.90	0.19	0.94	0.09	0.66	0.81	0.11

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 70 (78%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	19	55	77	20	245	49	617	62	142	590	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1600		1902	1761		1796	1783	1607	1814	1844	1489
Flt Permitted	0.27	1.00		0.69	1.00		0.16	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	482	1600		1392	1761		306	1783	1607	193	1844	1489
Peak-hour factor, PHF	0.81	0.59	0.86	0.80	0.56	0.67	0.88	0.86	0.91	0.85	0.86	0.81
Adj. Flow (vph)	225	32	64	96	36	366	56	717	68	167	686	80
RTOR Reduction (vph)	0	53	0	0	230	0	0	0	39	0	0	45
Lane Group Flow (vph)	225	43	0	96	172	0	56	717	29	167	686	35
Heavy Vehicles (%)	0%	11%	0%	0%	5%	1%	0%	6%	0%	0%	7%	9%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	25.7	14.8		19.1	11.5		43.1	37.4	37.4	47.5	39.6	39.6
Effective Green, g (s)	25.7	14.8		19.1	11.5		43.1	37.4	37.4	47.5	39.6	39.6
Actuated g/C Ratio	0.29	0.16		0.21	0.13		0.48	0.42	0.42	0.53	0.44	0.44
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	284	263		338	225		241	741	668	244	811	655
v/s Ratio Prot	c0.10	0.03		0.02	0.10		0.01	c0.40		c0.06	0.37	
v/s Ratio Perm	c0.13			0.04			0.10		0.02	0.30		0.02
v/c Ratio	0.79	0.16		0.28	0.76		0.23	0.97	0.04	0.68	0.85	0.05
Uniform Delay, d1	27.2	32.3		29.4	37.9		15.6	25.7	15.7	17.5	22.5	14.5
Progression Factor	1.00	1.00		1.00	1.00		1.55	1.04	2.26	1.35	0.90	1.19
Incremental Delay, d2	14.0	0.3		0.5	14.2		0.4	21.3	0.1	6.2	8.6	0.1
Delay (s)	41.2	32.6		29.9	52.1		24.6	48.0	35.5	29.8	29.0	17.4
Level of Service	D	C		C	D		C	D	D	C	C	B
Approach Delay (s)		38.6			47.8			45.4			28.1	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

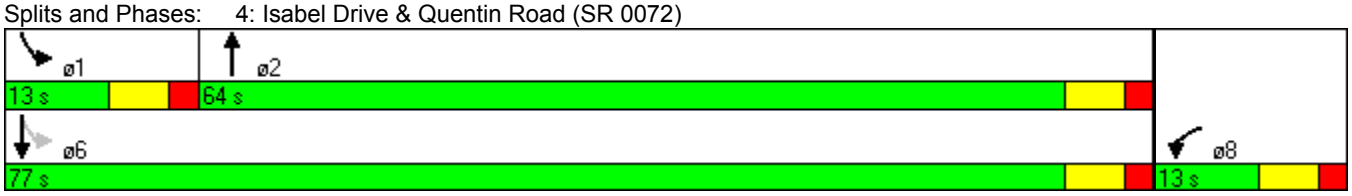
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	39	940	92	848
Lane Group Flow (vph)	206	1066	137	874
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	13.0	64.0	13.0	77.0
Total Split (%)	14.4%	71.1%	14.4%	85.6%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.75	0.94	0.60	0.60
Control Delay	33.1	18.0	21.0	5.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	33.1	18.0	21.0	5.9
Queue Length 50th (ft)	37	238	13	151
Queue Length 95th (ft)	#95	m#297	36	229
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			275	
Base Capacity (vph)	275	1134	229	1449
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.75	0.94	0.60	0.60

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 37 (41%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	39	138	940	68	92	848
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.90		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1890		1754		1687	1837
Flt Permitted	0.99		1.00		0.08	1.00
Satd. Flow (perm)	1890		1754		138	1837
Peak-hour factor, PHF	0.80	0.88	0.96	0.78	0.67	0.97
Adj. Flow (vph)	49	157	979	87	137	874
RTOR Reduction (vph)	128	0	4	0	0	0
Lane Group Flow (vph)	78	0	1062	0	137	874
Heavy Vehicles (%)	2%	2%	2%	2%	5%	5%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	7.0		58.0		71.0	71.0
Effective Green, g (s)	7.0		58.0		71.0	71.0
Actuated g/C Ratio	0.08		0.64		0.79	0.79
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	147		1130		229	1449
v/s Ratio Prot	c0.04		c0.61		0.05	c0.48
v/s Ratio Perm					0.43	
v/c Ratio	0.53		0.94		0.60	0.60
Uniform Delay, d1	39.9		14.4		18.7	3.8
Progression Factor	1.00		0.56		1.00	1.00
Incremental Delay, d2	3.4		7.8		4.2	1.9
Delay (s)	43.3		15.9		22.8	5.7
Level of Service	D		B		C	A
Approach Delay (s)	43.3		15.9			8.0
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

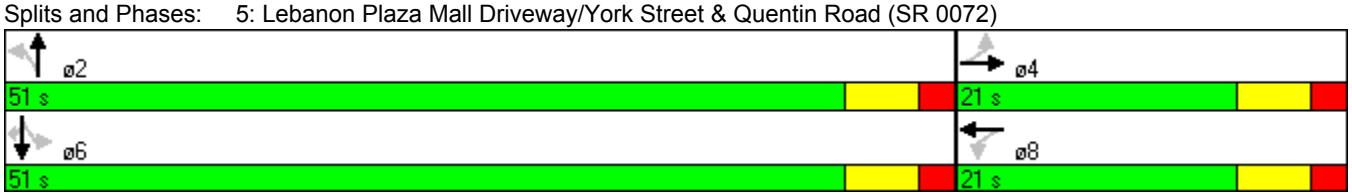
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	52	55	120	94	61	802	36	743	44
Lane Group Flow (vph)	68	152	145	173	72	935	42	790	56
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	21.0	21.0	21.0	21.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.32	0.41	0.66	0.48	0.25	0.79	0.22	0.66	0.05
Control Delay	28.4	16.5	41.1	25.3	8.5	15.9	9.3	11.4	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	16.5	41.1	25.3	8.5	15.9	9.3	11.4	1.8
Queue Length 50th (ft)	23	25	53	51	11	242	6	177	0
Queue Length 95th (ft)	50	63	105	92	31	446	22	312	9
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	255	428	265	432	314	1269	205	1288	1119
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.36	0.55	0.40	0.23	0.74	0.20	0.61	0.05

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 66.6
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	58	120	94	45	61	802	41	36	743	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1653	1627		1685	1816		1744	1864		1754	1897	1623
Flt Permitted	0.65	1.00		0.66	1.00		0.25	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1127	1627		1171	1816		462	1864		303	1897	1623
Peak-hour factor, PHF	0.77	0.81	0.69	0.83	0.78	0.86	0.85	0.92	0.65	0.86	0.94	0.79
Adj. Flow (vph)	68	68	84	145	121	52	72	872	63	42	790	56
RTOR Reduction (vph)	0	63	0	0	22	0	0	4	0	0	0	21
Lane Group Flow (vph)	68	89	0	145	151	0	72	931	0	42	790	35
Heavy Vehicles (%)	4%	2%	2%	1%	0%	3%	3%	4%	0%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	12.5	12.5		12.5	12.5		42.0	42.0		42.0	42.0	42.0
Effective Green, g (s)	12.5	12.5		12.5	12.5		42.0	42.0		42.0	42.0	42.0
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.63	0.63		0.63	0.63	0.63
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	212	306		220	341		292	1177		191	1198	1025
v/s Ratio Prot		0.05			0.08			c0.50			0.42	
v/s Ratio Perm	0.06			c0.12			0.16			0.14		0.02
v/c Ratio	0.32	0.29		0.66	0.44		0.25	0.79		0.22	0.66	0.03
Uniform Delay, d1	23.3	23.2		25.0	23.9		5.3	9.0		5.2	7.7	4.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	0.7		7.7	1.3		0.4	3.7		0.6	1.3	0.0
Delay (s)	24.5	23.9		32.7	25.2		5.8	12.7		5.8	9.1	4.6
Level of Service	C	C		C	C		A	B		A	A	A
Approach Delay (s)		24.1			28.6			12.2			8.6	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	66.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

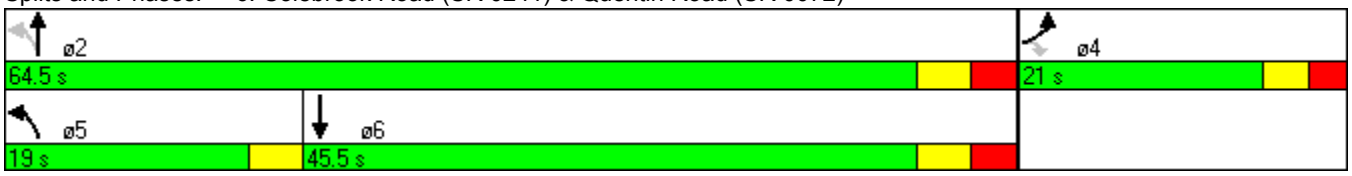
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	185	206	273	760	695
Lane Group Flow (vph)	253	251	374	817	885
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	21.0	21.0	19.0	64.5	45.5
Total Split (%)	24.6%	24.6%	22.2%	75.4%	53.2%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.86	0.54	0.90	0.64	0.98
Control Delay	61.7	9.1	47.5	10.7	49.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	9.1	47.5	10.7	49.3
Queue Length 50th (ft)	133	0	141	217	441
Queue Length 95th (ft)	#174	44	#192	329	#710
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	308	477	416	1299	934
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.82	0.53	0.90	0.63	0.95

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 83.7
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	206	273	760	695	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1470	1736	1872	1985	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1660	1470	177	1872	1985	
Peak-hour factor, PHF	0.73	0.82	0.73	0.93	0.93	0.87
Adj. Flow (vph)	253	251	374	817	747	138
RTOR Reduction (vph)	0	206	0	0	8	0
Lane Group Flow (vph)	253	45	374	817	877	0
Heavy Vehicles (%)	1%	2%	2%	3%	4%	1%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	14.9	14.9	56.8	56.8	37.8	
Effective Green, g (s)	14.9	14.9	56.8	56.8	37.8	
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.45	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	296	262	409	1270	896	
v/s Ratio Prot	c0.15		c0.17	0.44	c0.44	
v/s Ratio Perm		0.03	0.45			
v/c Ratio	0.85	0.17	0.91	0.64	0.98	
Uniform Delay, d1	33.4	29.2	24.9	7.7	22.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	20.7	0.3	24.6	1.8	25.2	
Delay (s)	54.0	29.5	49.5	9.5	47.7	
Level of Service	D	C	D	A	D	
Approach Delay (s)	41.8			22.1	47.7	
Approach LOS	D			C	D	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	15.5
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

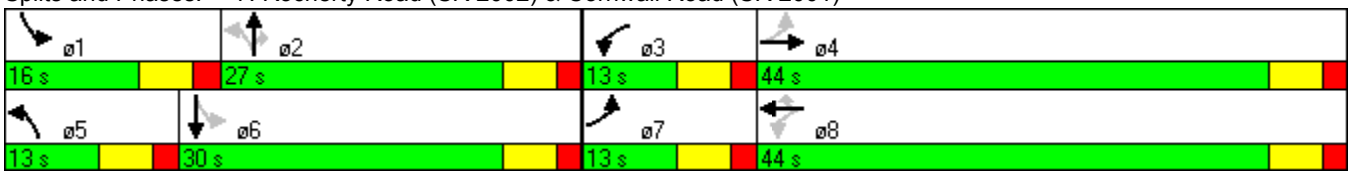
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	75	427	88	549	144	48	182	107	168	226
Lane Group Flow (vph)	96	526	101	646	176	57	219	120	215	395
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	15.0	7.0	15.0	15.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0	21.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	44.0	13.0	44.0	44.0	13.0	27.0	27.0	16.0	30.0
Total Split (%)	13.0%	44.0%	13.0%	44.0%	44.0%	13.0%	27.0%	27.0%	16.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.48	0.77	0.38	0.92	0.25	0.22	0.54	0.27	0.62	0.81
Control Delay	22.1	35.0	17.5	48.3	4.3	23.4	40.3	8.2	31.9	47.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	35.0	17.5	48.3	4.3	23.4	40.3	8.2	31.9	47.5
Queue Length 50th (ft)	30	286	32	386	0	23	126	0	98	230
Queue Length 95th (ft)	50	419	58	#547	31	47	183	44	135	#414
Internal Link Dist (ft)		1052		405			731			260
Turn Bay Length (ft)	225		225		325	150		350	240	
Base Capacity (vph)	198	747	264	773	747	255	436	467	353	487
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.70	0.38	0.84	0.24	0.22	0.50	0.26	0.61	0.81

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 93.4
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	427	46	88	549	144	48	182	107	168	226	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1779		1653	1853	1545	1754	1891	1623	1623	1660	
Flt Permitted	0.11	1.00		0.22	1.00	1.00	0.31	1.00	1.00	0.41	1.00	
Satd. Flow (perm)	196	1779		381	1853	1545	564	1891	1623	698	1660	
Peak-hour factor, PHF	0.78	0.92	0.74	0.87	0.85	0.82	0.84	0.83	0.89	0.78	0.96	0.85
Adj. Flow (vph)	96	464	62	101	646	176	57	219	120	215	235	160
RTOR Reduction (vph)	0	5	0	0	0	111	0	0	93	0	23	0
Lane Group Flow (vph)	96	521	0	101	646	65	57	219	27	215	372	0
Heavy Vehicles (%)	4%	4%	3%	5%	2%	4%	0%	1%	0%	7%	9%	4%
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	40.8	35.6		40.8	35.6	35.6	26.7	21.5	21.5	35.9	26.1	
Effective Green, g (s)	40.8	35.6		40.8	35.6	35.6	26.7	21.5	21.5	35.9	26.1	
Actuated g/C Ratio	0.42	0.37		0.42	0.37	0.37	0.28	0.22	0.22	0.37	0.27	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	162	659		231	686	572	221	423	363	355	451	
v/s Ratio Prot	c0.03	0.29		0.02	c0.35		0.01	0.12		c0.06	c0.22	
v/s Ratio Perm	0.22			0.16		0.04	0.06		0.02	0.16		
v/c Ratio	0.59	0.79		0.44	0.94	0.11	0.26	0.52	0.07	0.61	0.82	
Uniform Delay, d1	21.4	26.9		19.1	29.2	19.9	26.4	32.7	29.4	22.3	32.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.7	6.8		1.3	21.4	0.1	0.6	3.5	0.3	2.9	14.0	
Delay (s)	27.1	33.7		20.4	50.6	20.0	27.0	36.3	29.8	25.2	46.9	
Level of Service	C	C		C	D	C	C	D	C	C	D	
Approach Delay (s)		32.7			41.5			33.0			39.2	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	37.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	96.1	Sum of lost time (s)	24.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

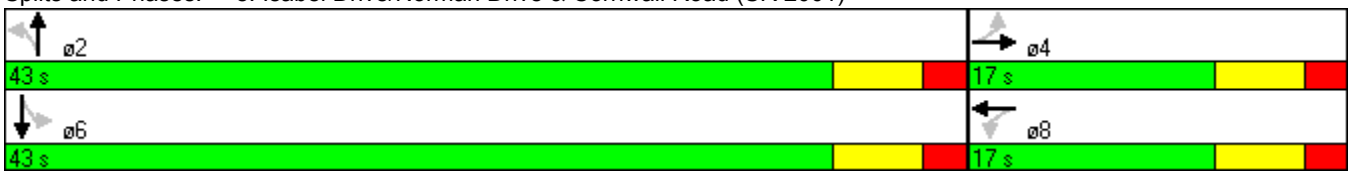
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	34	18	69	33	60	398	58	491
Lane Group Flow (vph)	0	162	0	308	0	552	0	683
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	17.0	17.0	17.0	17.0	43.0	43.0	43.0	43.0
Total Split (%)	28.3%	28.3%	28.3%	28.3%	71.7%	71.7%	71.7%	71.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.41		0.70		0.69		0.88
Control Delay		13.5		24.6		13.0		23.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		13.5		24.6		13.0		23.9
Queue Length 50th (ft)		15		50		99		147
Queue Length 95th (ft)		44		#133		178		249
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		434		488		1220		1189
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.37		0.63		0.45		0.57

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 47.2
Natural Cycle: 60
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	18	76	69	33	156	60	398	39	58	491	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.92			0.99			0.99	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1857			1920			1742			1668	
Flt Permitted		0.80			0.87			0.87			0.89	
Satd. Flow (perm)		1500			1699			1521			1485	
Peak-hour factor, PHF	0.78	0.70	0.83	0.78	0.77	0.88	0.89	0.91	0.81	0.74	0.86	0.61
Adj. Flow (vph)	44	26	92	88	43	177	67	437	48	78	571	34
RTOR Reduction (vph)	0	72	0	0	78	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	90	0	0	230	0	0	545	0	0	679	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		10.1			10.1			24.6			24.6	
Effective Green, g (s)		10.1			10.1			24.6			24.6	
Actuated g/C Ratio		0.22			0.22			0.53			0.53	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		324			367			801			782	
v/s Ratio Prot												
v/s Ratio Perm		0.06			c0.14			0.36			c0.46	
v/c Ratio		0.28			0.63			0.68			0.87	
Uniform Delay, d1		15.3			16.6			8.1			9.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			3.3			2.4			10.1	
Delay (s)		15.7			19.9			10.5			19.7	
Level of Service		B			B			B			B	
Approach Delay (s)		15.7			19.9			10.5			19.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

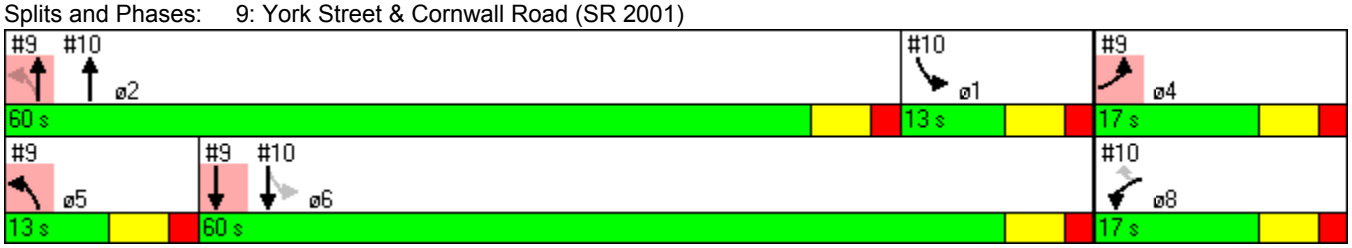
c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	ø1	ø8
Lane Configurations						
Volume (vph)	118	81	654	511		
Lane Group Flow (vph)	217	0	823	752		
Turn Type		pm+pt				
Protected Phases	4	5	2	6	1	8
Permitted Phases		2				
Detector Phase	4	5	2	6		
Switch Phase						
Minimum Initial (s)	7.0	7.0	15.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	21.0	13.0	13.0
Total Split (s)	17.0	13.0	60.0	60.0	13.0	17.0
Total Split (%)	18.9%	14.4%	66.7%	66.7%	14%	19%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lead	Lag	Lag	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	None
v/c Ratio	0.82		0.78	0.61		
Control Delay	55.6		14.6	7.6		
Queue Delay	0.0		0.2	1.4		
Total Delay	55.6		14.8	9.0		
Queue Length 50th (ft)	94		216	133		
Queue Length 95th (ft)	#150		391	m209		
Internal Link Dist (ft)	1228		849	232		
Turn Bay Length (ft)						
Base Capacity (vph)	265		1051	1231		
Starvation Cap Reductn	0		0	280		
Spillback Cap Reductn	0		22	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.82		0.80	0.79		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77
Natural Cycle: 120
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: York Street & Cornwall Road (SR 2001)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	118	36	81	654	511	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.96			1.00	0.97	
Flt Protected	0.97			0.99	1.00	
Satd. Flow (prot)	1751			1852	1742	
Flt Permitted	0.97			0.80	1.00	
Satd. Flow (perm)	1751			1498	1742	
Peak-hour factor, PHF	0.75	0.60	0.84	0.90	0.89	0.90
Adj. Flow (vph)	157	60	96	727	574	178
RTOR Reduction (vph)	15	0	0	0	9	0
Lane Group Flow (vph)	202	0	0	823	743	0
Heavy Vehicles (%)	0%	3%	2%	2%	7%	1%
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	11.0			54.0	54.0	
Effective Green, g (s)	11.0			54.0	54.0	
Actuated g/C Ratio	0.14			0.70	0.70	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	250			1051	1222	
v/s Ratio Prot	c0.12				0.43	
v/s Ratio Perm				c0.55		
v/c Ratio	0.81			0.78	0.61	
Uniform Delay, d1	32.0			7.6	6.0	
Progression Factor	1.00			1.00	0.97	
Incremental Delay, d2	17.3			3.9	0.6	
Delay (s)	49.3			11.5	6.5	
Level of Service	D			B	A	
Approach Delay (s)	49.3			11.5	6.5	
Approach LOS	D			B	A	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		

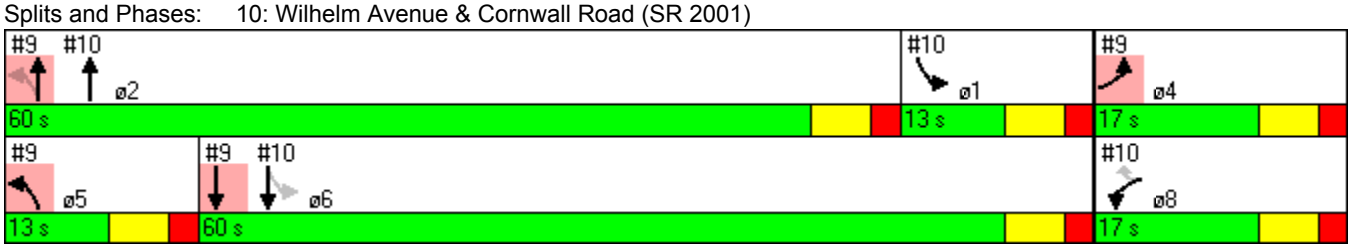
c Critical Lane Group

Lane Group	WBL	WBR	NBT	SBL	SBT	ø4	ø5
Lane Configurations							
Volume (vph)	185	75	515	72	463		
Lane Group Flow (vph)	210	90	874	0	610		
Turn Type		Perm		pm+pt			
Protected Phases	8		2	1	6	4	5
Permitted Phases		8		6			
Detector Phase	8	8	2	1	6		
Switch Phase							
Minimum Initial (s)	7.0	7.0	15.0	7.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	13.0	21.0	13.0	13.0
Total Split (s)	17.0	17.0	60.0	13.0	60.0	17.0	13.0
Total Split (%)	18.9%	18.9%	66.7%	14.4%	66.7%	19%	14%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		
Lead/Lag			Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Recall Mode	None	None	Min	None	Min	None	None
v/c Ratio	0.83	0.29	0.69		0.66		
Control Delay	60.6	10.1	5.5		10.6		
Queue Delay	0.0	0.0	1.6		0.3		
Total Delay	60.6	10.1	7.1		11.0		
Queue Length 50th (ft)	99	0	97		134		
Queue Length 95th (ft)	#205	32	m136		238		
Internal Link Dist (ft)	945		232		841		
Turn Bay Length (ft)		100					
Base Capacity (vph)	253	306	1270		929		
Starvation Cap Reductn	0	0	223		0		
Spillback Cap Reductn	0	0	0		58		
Storage Cap Reductn	0	0	0		0		
Reduced v/c Ratio	0.83	0.29	0.83		0.70		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77
Natural Cycle: 120
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	185	75	515	268	72	463
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Total Lost time (s)	6.0	6.0	6.0			6.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frt	1.00	0.85	0.95			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	1769	1599	1790			2024
Flt Permitted	0.95	1.00	1.00			0.65
Satd. Flow (perm)	1769	1599	1790			1325
Peak-hour factor, PHF	0.88	0.83	0.89	0.91	0.71	0.91
Adj. Flow (vph)	210	90	579	295	101	509
RTOR Reduction (vph)	0	77	15	0	0	0
Lane Group Flow (vph)	210	13	859	0	0	610
Heavy Vehicles (%)	1%	0%	2%	0%	0%	6%
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	11.0	11.0	54.0			54.0
Effective Green, g (s)	11.0	11.0	54.0			54.0
Actuated g/C Ratio	0.14	0.14	0.70			0.70
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	253	228	1255			929
v/s Ratio Prot	c0.12		c0.48			
v/s Ratio Perm		0.01				0.46
v/c Ratio	0.83	0.06	0.68			0.66
Uniform Delay, d1	32.1	28.5	6.6			6.4
Progression Factor	1.00	1.00	0.55			1.00
Incremental Delay, d2	20.0	0.1	0.9			1.7
Delay (s)	52.1	28.6	4.6			8.1
Level of Service	D	C	A			A
Approach Delay (s)	45.1		4.6			8.1
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

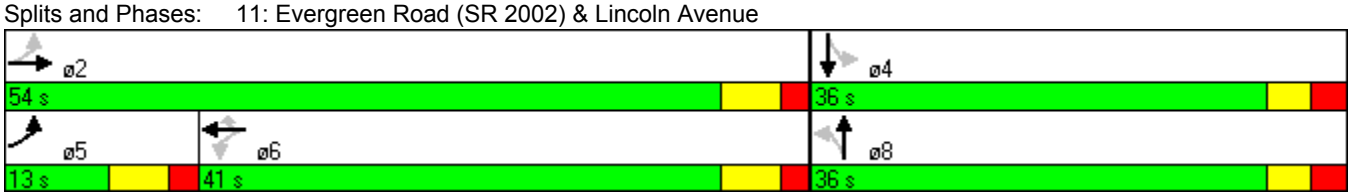
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	172	512	11	427	46	11	16	38	47
Lane Group Flow (vph)	207	605	16	491	58	0	70	0	535
Turn Type	pm+pt		Perm		Perm	Perm		Perm	
Protected Phases	5	2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	5	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	4.0	12.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	13.0	54.0	41.0	41.0	41.0	36.0	36.0	36.0	36.0
Total Split (%)	14.4%	60.0%	45.6%	45.6%	45.6%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?									
Recall Mode	None	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.61	0.66	0.06	0.81	0.10		0.16		0.85
Control Delay	19.8	17.3	17.8	33.8	5.7		18.2		29.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	19.8	17.3	17.8	33.8	5.7		18.2		29.4
Queue Length 50th (ft)	48	188	5	201	0		19		142
Queue Length 95th (ft)	90	349	15	334	18		21		190
Internal Link Dist (ft)		619		423			845		1011
Turn Bay Length (ft)	100		80		275				
Base Capacity (vph)	339	1186	398	877	808		616		813
Starvation Cap Reductn	0	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0	0		0		0
Reduced v/c Ratio	0.61	0.51	0.04	0.56	0.07		0.11		0.66

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 73.4
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	172	512	24	11	427	46	11	16	7	38	47	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	12	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Frt	1.00	0.99		1.00	1.00	0.85		0.98			0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.99	
Satd. Flow (prot)	1702	1720		1727	1748	1552		1735			1639	
Flt Permitted	0.22	1.00		0.44	1.00	1.00		0.79			0.96	
Satd. Flow (perm)	387	1720		792	1748	1552		1391			1583	
Peak-hour factor, PHF	0.83	0.92	0.50	0.70	0.87	0.79	0.56	0.42	0.56	0.71	0.73	0.66
Adj. Flow (vph)	207	557	48	16	491	58	20	38	12	54	64	417
RTOR Reduction (vph)	0	3	0	0	0	37	0	8	0	0	149	0
Lane Group Flow (vph)	207	602	0	16	491	21	0	62	0	0	386	0
Heavy Vehicles (%)	2%	5%	5%	0%	4%	3%	0%	14%	0%	0%	5%	2%
Turn Type	pm+pt			Perm		Perm	Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	39.2	39.2		25.8	25.8	25.8		22.1			22.1	
Effective Green, g (s)	39.2	39.2		25.8	25.8	25.8		22.1			22.1	
Actuated g/C Ratio	0.54	0.54		0.35	0.35	0.35		0.30			0.30	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0	6.0		3.0			3.0	
Lane Grp Cap (vph)	342	926		281	619	550		422			481	
v/s Ratio Prot	0.06	c0.35			c0.28							
v/s Ratio Perm	0.26			0.02		0.01		0.04			c0.24	
v/c Ratio	0.61	0.65		0.06	0.79	0.04		0.15			0.80	
Uniform Delay, d1	11.6	11.9		15.5	21.1	15.4		18.5			23.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	3.0	2.6		0.2	8.4	0.1		0.2			9.4	
Delay (s)	14.6	14.5		15.7	29.5	15.5		18.6			32.7	
Level of Service	B	B		B	C	B		B			C	
Approach Delay (s)		14.5			27.6			18.6			32.7	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	32	656	680	4	13	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1676	1825	1898	0	1649	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1676	1825	1898	0	1649	0
Link Speed (mph)		40	40		25	
Link Distance (ft)		480	1348		405	
Travel Time (s)		8.2	23.0		11.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	713	739	4	14	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	713	743	0	63	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.03	0.97	0.97	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 46.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	32	656	680	4	13	45
Sign Control		Free	Free		Stop	
Grade		4%	-4%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	713	739	4	14	49
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		965				
pX, platoon unblocked					0.74	
vC, conflicting volume	743				1524	741
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	743				1532	741
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				84	88
cM capacity (veh/h)	864				91	416

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	35	713	743	63
Volume Left	35	0	0	14
Volume Right	0	0	4	49
cSH	864	1700	1700	231
Volume to Capacity	0.04	0.42	0.44	0.27
Queue Length 95th (ft)	3	0	0	27
Control Delay (s)	9.3	0.0	0.0	26.3
Lane LOS	A			D
Approach Delay (s)	0.4		0.0	26.3
Approach LOS				D

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	688	722	3	0	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1879	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1879	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	748	785	3	0	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	748	788	0	0	46
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 48.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	688	722	3	0	42
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	748	785	3	0	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)		485				
pX, platoon unblocked					0.66	
vC, conflicting volume	788				1534	786
vC1, stage 1 conf vol					786	
vC2, stage 2 conf vol					748	
vCu, unblocked vol	788				1552	786
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	88
cM capacity (veh/h)	831				324	392

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	748	788	46
Volume Left	0	0	0
Volume Right	0	3	46
cSH	1700	1700	392
Volume to Capacity	0.44	0.46	0.12
Queue Length 95th (ft)	0	0	10
Control Delay (s)	0.0	0.0	15.4
Lane LOS			C
Approach Delay (s)	0.0	0.0	15.4
Approach LOS			C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	63	378	14	49	519
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	150	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			2010
Travel Time (s)	4.7		5.2			30.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	68	411	15	53	564
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	68	411	15	53	564
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 30.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	63	378	14	49	519
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	68	411	15	53	564
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			340			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1082	411			426	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1034	288			305	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	90			95	
cM capacity (veh/h)	220	675			1129	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	68	411	15	53	564
Volume Left	0	0	0	53	0
Volume Right	68	0	15	0	0
cSH	675	1700	1700	1129	1700
Volume to Capacity	0.10	0.24	0.01	0.05	0.33
Queue Length 95th (ft)	8	0	0	4	0
Control Delay (s)	10.9	0.0	0.0	8.3	0.0
Lane LOS	B			A	
Approach Delay (s)	10.9	0.0		0.7	
Approach LOS	B				

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	106	9	0	200	58	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992					
Flt Protected					0.950	
Satd. Flow (prot)	1831	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1831	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.77	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	151	10	0	260	63	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	161	0	0	260	63	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 20.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	106	9	0	200	58	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.77	0.92	0.92
Hourly flow rate (vph)	151	10	0	260	63	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			161		416	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			161		416	156
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		89	100
cM capacity (veh/h)			1418		593	889

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	161	260	63
Volume Left	0	0	63
Volume Right	10	0	0
cSH	1700	1418	593
Volume to Capacity	0.09	0.00	0.11
Queue Length 95th (ft)	0	0	9
Control Delay (s)	0.0	0.0	11.8
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.8
Approach LOS			B

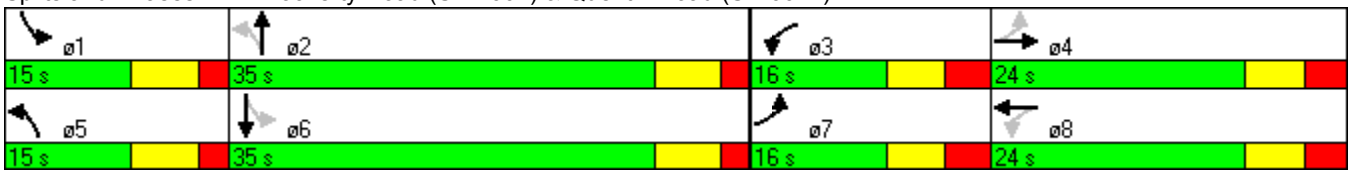
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	87	126	197	136	20	543	228	510
Lane Group Flow (vph)	105	158	224	338	27	699	245	732
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	5.5	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	12.0	21.5	13.5	21.5
Total Split (s)	16.0	24.0	16.0	24.0	15.0	35.0	15.0	35.0
Total Split (%)	17.8%	26.7%	17.8%	26.7%	16.7%	38.9%	16.7%	38.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.42	0.55	0.62	0.86	0.08	0.59	0.77	0.48
Control Delay	25.3	39.3	31.3	53.7	13.2	26.7	30.8	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	39.3	31.3	53.7	13.2	26.7	30.8	14.1
Queue Length 50th (ft)	40	77	92	164	8	169	62	90
Queue Length 95th (ft)	70	139	148	#279	17	228	#196	191
Internal Link Dist (ft)		569		654		721		400
Turn Bay Length (ft)	190		300		80		225	
Base Capacity (vph)	257	318	361	391	338	1194	317	1539
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.50	0.62	0.86	0.08	0.59	0.77	0.48

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 23 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	126	18	197	136	122	20	543	102	228	510	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	13	13	10	12	12	11	12	12
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.92		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	1652		1669	1693		1613	3521		1736	3483	
Flt Permitted	0.30	1.00		0.59	1.00		0.33	1.00		0.22	1.00	
Satd. Flow (perm)	527	1652		1039	1693		555	3521		405	3483	
Peak-hour factor, PHF	0.83	0.93	0.77	0.88	0.82	0.71	0.73	0.93	0.89	0.93	0.89	0.71
Adj. Flow (vph)	105	135	23	224	166	172	27	584	115	245	573	159
RTOR Reduction (vph)	0	7	0	0	40	0	0	18	0	0	26	0
Lane Group Flow (vph)	105	151	0	224	298	0	27	681	0	245	706	0
Heavy Vehicles (%)	4%	9%	0%	3%	6%	5%	6%	1%	4%	2%	2%	1%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	16.8		27.6	18.6		32.0	28.7		42.4	33.9	
Effective Green, g (s)	24.0	16.8		27.6	18.6		32.0	28.7		42.4	33.9	
Actuated g/C Ratio	0.27	0.19		0.31	0.21		0.36	0.32		0.47	0.38	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Lane Grp Cap (vph)	231	308		382	350		236	1123		317	1312	
v/s Ratio Prot	0.04	0.09		c0.06	c0.18		0.00	0.19		c0.07	c0.20	
v/s Ratio Perm	0.08			0.12			0.04			c0.29		
v/c Ratio	0.45	0.49		0.59	0.85		0.11	0.61		0.77	0.54	
Uniform Delay, d1	26.2	32.8		25.1	34.4		19.1	25.9		16.4	21.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.94	0.69	
Incremental Delay, d2	1.9	1.7		2.7	18.2		0.3	2.4		9.8	1.3	
Delay (s)	28.1	34.5		27.8	52.5		19.4	28.3		25.1	16.4	
Level of Service	C	C		C	D		B	C		C	B	
Approach Delay (s)		31.9			42.7			28.0			18.6	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

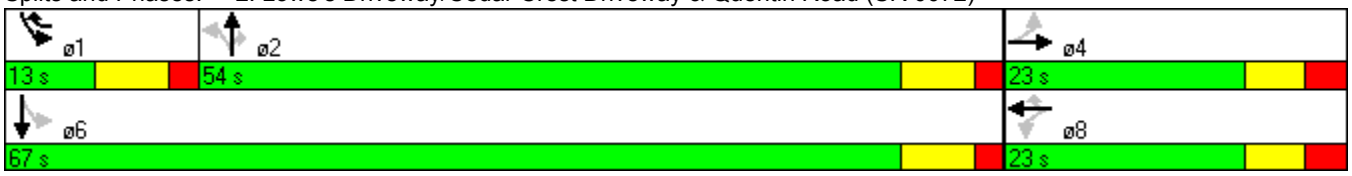
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	13	9	101	10	94	104	641	93	91	726
Lane Group Flow (vph)	0	124	0	139	109	132	704	104	108	797
Turn Type	Perm		Perm		pm+ov	Perm		Perm	pm+pt	
Protected Phases		4		8	1		2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	8	8	1	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	6.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	23.0	23.0	23.0	23.0	13.0	54.0	54.0	54.0	13.0	67.0
Total Split (%)	25.6%	25.6%	25.6%	25.6%	14.4%	60.0%	60.0%	60.0%	14.4%	74.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.42		0.68	0.20	0.36	0.68	0.10	0.32	0.61
Control Delay		17.5		52.6	5.6	14.6	19.0	4.8	5.2	5.5
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay		17.5		52.6	5.6	14.6	19.0	4.8	5.2	5.6
Queue Length 50th (ft)		20		74	0	54	339	16	13	112
Queue Length 95th (ft)		24		89	31	m83	m432	m38	m17	151
Internal Link Dist (ft)		216		277			1326			599
Turn Bay Length (ft)					115	135		230	135	
Base Capacity (vph)		327		234	551	365	1040	1009	336	1317
Starvation Cap Reductn		0		0	0	0	0	0	0	40
Spillback Cap Reductn		0		0	0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0	0
Reduced v/c Ratio		0.38		0.59	0.20	0.36	0.68	0.10	0.32	0.62

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	9	66	101	10	94	104	641	93	91	726	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	14	11	13	13
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.91			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1595			1838	1584	1832	1909	1766	1638	1910	
Flt Permitted		0.90			0.69	1.00	0.35	1.00	1.00	0.21	1.00	
Satd. Flow (perm)		1451			1317	1584	670	1909	1766	363	1910	
Peak-hour factor, PHF	0.54	0.56	0.79	0.82	0.63	0.86	0.79	0.91	0.89	0.84	0.93	0.81
Adj. Flow (vph)	24	16	84	123	16	109	132	704	104	108	781	16
RTOR Reduction (vph)	0	71	0	0	0	85	0	0	47	0	1	0
Lane Group Flow (vph)	0	53	0	0	139	24	132	704	57	108	796	0
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%	1%	2%	0%	6%	2%	0%
Turn Type	Perm			Perm		pm+ov	Perm		Perm	pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		14.0			14.0	20.0	49.0	49.0	49.0	62.0	62.0	
Effective Green, g (s)		14.0			14.0	20.0	49.0	49.0	49.0	62.0	62.0	
Actuated g/C Ratio		0.16			0.16	0.22	0.54	0.54	0.54	0.69	0.69	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0			4.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		226			205	475	365	1039	961	335	1316	
v/s Ratio Prot						0.00		c0.37		0.02	c0.42	
v/s Ratio Perm		0.04			c0.11	0.01	0.20		0.03	0.20		
v/c Ratio		0.23			0.68	0.05	0.36	0.68	0.06	0.32	0.61	
Uniform Delay, d1		33.3			35.9	27.5	11.6	14.8	9.6	9.2	7.5	
Progression Factor		1.00			1.00	1.00	0.93	1.00	1.94	0.63	0.48	
Incremental Delay, d2		0.7			9.3	0.1	2.3	3.0	0.1	1.2	1.5	
Delay (s)		34.0			45.2	27.7	13.1	17.8	18.8	7.0	5.2	
Level of Service		C			D	C	B	B	B	A	A	
Approach Delay (s)		34.0			37.5			17.3			5.4	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

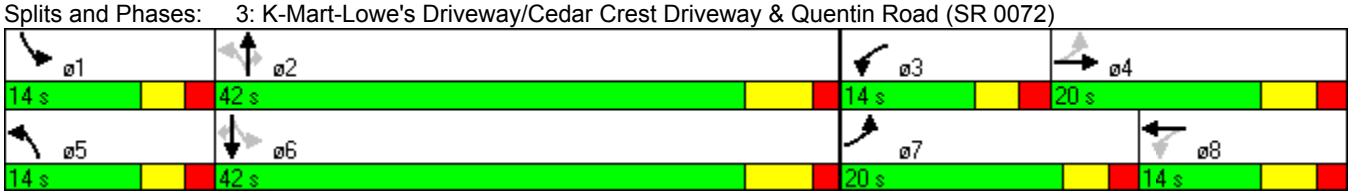
3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	277	37	81	40	56	633	72	192	602	154
Lane Group Flow (vph)	315	163	133	264	68	719	104	204	654	164
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8	5	2		1	6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	15.0	3.0	15.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	21.4	7.9	21.4	21.4
Total Split (s)	20.0	20.0	14.0	14.0	14.0	42.0	42.0	14.0	42.0	42.0
Total Split (%)	22.2%	22.2%	15.6%	15.6%	15.6%	46.7%	46.7%	15.6%	46.7%	46.7%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	6.4	4.9	6.4	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
v/c Ratio	0.87	0.50	0.43	0.82	0.23	0.95	0.15	0.77	0.75	0.20
Control Delay	50.9	23.8	28.0	36.2	10.5	38.6	4.8	29.3	22.0	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	23.8	28.0	36.2	10.5	38.6	4.8	29.3	22.0	3.6
Queue Length 50th (ft)	148	42	55	47	10	140	2	48	319	17
Queue Length 95th (ft)	#254	53	64	#96	m26	#586	16	m97	#525	m21
Internal Link Dist (ft)		199		207		599			1573	
Turn Bay Length (ft)					230		230	235		235
Base Capacity (vph)	364	329	314	325	330	757	702	270	867	811
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.50	0.42	0.81	0.21	0.95	0.15	0.76	0.75	0.20

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 79 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	37	89	81	40	178	56	633	72	192	602	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	13	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	1650		1902	1804		1796	1890	1607	1814	1954	1623
Flt Permitted	0.31	1.00		0.65	1.00		0.19	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	548	1650		1309	1804		353	1890	1607	196	1954	1623
Peak-hour factor, PHF	0.88	0.62	0.86	0.61	0.77	0.84	0.82	0.88	0.69	0.94	0.92	0.94
Adj. Flow (vph)	315	60	103	133	52	212	68	719	104	204	654	164
RTOR Reduction (vph)	0	68	0	0	163	0	0	0	59	0	0	93
Lane Group Flow (vph)	315	95	0	133	101	0	68	719	45	204	654	71
Heavy Vehicles (%)	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	27.9	14.3		16.4	7.9		42.0	36.0	36.0	47.8	38.9	38.9
Effective Green, g (s)	27.9	14.3		16.4	7.9		42.0	36.0	36.0	47.8	38.9	38.9
Actuated g/C Ratio	0.31	0.16		0.18	0.09		0.47	0.40	0.40	0.53	0.43	0.43
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4	6.4	4.9	6.4	6.4
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	359	262		295	158		261	756	643	264	845	701
v/s Ratio Prot	c0.15	0.06		0.04	0.06		0.02	c0.38		c0.08	0.33	
v/s Ratio Perm	c0.13			0.04			0.10		0.03	0.33		0.04
v/c Ratio	0.88	0.36		0.45	0.64		0.26	0.95	0.07	0.77	0.77	0.10
Uniform Delay, d1	26.9	33.8		32.4	39.7		15.7	26.1	16.7	19.0	21.8	15.2
Progression Factor	1.00	1.00		1.00	1.00		0.98	0.62	0.99	0.93	0.76	1.05
Incremental Delay, d2	20.7	0.9		1.1	8.2		0.4	20.1	0.2	8.4	4.3	0.2
Delay (s)	47.5	34.6		33.5	47.8		15.8	36.2	16.7	26.0	21.0	16.1
Level of Service	D	C		C	D		B	D	B	C	C	B
Approach Delay (s)		43.1			43.0			32.3			21.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	91.0%	ICU Level of Service	E
Analysis Period (min)	15		

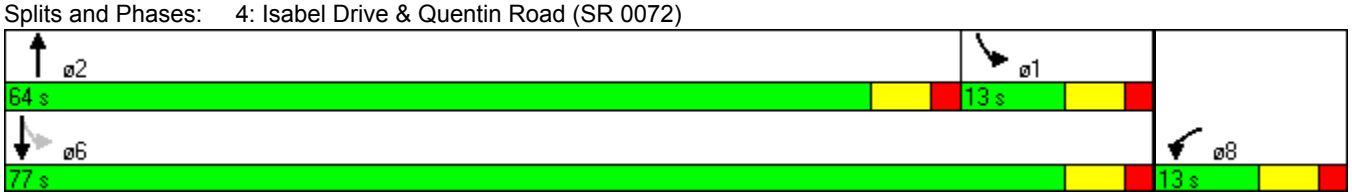
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	31	998	63	1098
Lane Group Flow (vph)	125	1217	85	1168
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	13.0	64.0	13.0	77.0
Total Split (%)	14.4%	71.1%	14.4%	85.6%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.54	1.01	0.39	0.78
Control Delay	25.1	32.9	20.5	9.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	25.1	32.9	20.5	9.8
Queue Length 50th (ft)	22	~747	8	273
Queue Length 95th (ft)	58	m#884	27	442
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			275	
Base Capacity (vph)	230	1210	217	1506
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.54	1.01	0.39	0.78

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 77 (86%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	31	72	998	73	63	1098
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	11	11	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1944		1792		1753	1909
Flt Permitted	0.98		1.00		0.06	1.00
Satd. Flow (perm)	1944		1792		113	1909
Peak-hour factor, PHF	0.78	0.85	0.88	0.88	0.74	0.94
Adj. Flow (vph)	40	85	1134	83	85	1168
RTOR Reduction (vph)	78	0	3	0	0	0
Lane Group Flow (vph)	47	0	1214	0	85	1168
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	7.0		59.4		71.0	71.0
Effective Green, g (s)	7.0		59.4		71.0	71.0
Actuated g/C Ratio	0.08		0.66		0.79	0.79
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	151		1183		191	1506
v/s Ratio Prot	c0.02		c0.68		0.03	c0.61
v/s Ratio Perm					0.32	
v/c Ratio	0.31		1.03		0.45	0.78
Uniform Delay, d1	39.2		15.3		35.9	5.2
Progression Factor	1.00		0.76		1.00	1.00
Incremental Delay, d2	1.2		23.9		1.7	4.0
Delay (s)	40.4		35.5		37.6	9.1
Level of Service	D		D		D	A
Approach Delay (s)	40.4		35.5			11.1
Approach LOS	D		D			B

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

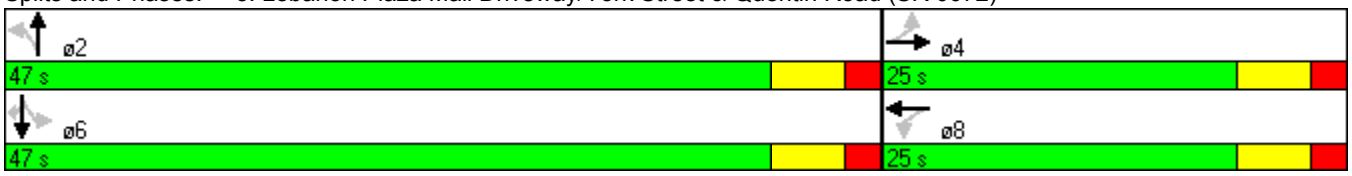
5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	50	64	135	111	96	723	40	868	61
Lane Group Flow (vph)	60	204	167	203	112	924	56	933	115
Turn Type	Perm		Perm		Perm		Perm		Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0
Total Split (%)	34.7%	34.7%	34.7%	34.7%	65.3%	65.3%	65.3%	65.3%	65.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.25	0.46	0.72	0.49	0.69	0.81	0.35	0.80	0.11
Control Delay	24.4	14.1	43.1	24.8	38.8	19.0	15.8	18.3	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	14.1	43.1	24.8	38.8	19.0	15.8	18.3	1.9
Queue Length 50th (ft)	21	31	65	66	28	265	10	266	0
Queue Length 95th (ft)	46	74	111	91	#119	#486	29	#575	2
Internal Link Dist (ft)		346		1228		592		1986	
Turn Bay Length (ft)			70		130		150		320
Base Capacity (vph)	304	539	296	529	162	1139	160	1170	1008
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.38	0.56	0.38	0.69	0.81	0.35	0.80	0.11

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 68
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	64	109	135	111	33	96	723	60	40	868	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	13	13	11	13	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1629		1685	1835		1778	1876		1702	1934	1591
Flt Permitted	0.60	1.00		0.60	1.00		0.14	1.00		0.15	1.00	1.00
Satd. Flow (perm)	1083	1629		1058	1835		267	1876		266	1934	1591
Peak-hour factor, PHF	0.83	0.84	0.85	0.81	0.71	0.70	0.86	0.86	0.72	0.71	0.93	0.53
Adj. Flow (vph)	60	76	128	167	156	47	112	841	83	56	933	115
RTOR Reduction (vph)	0	89	0	0	16	0	0	4	0	0	0	45
Lane Group Flow (vph)	60	115	0	167	187	0	112	920	0	56	933	70
Heavy Vehicles (%)	0%	0%	1%	1%	0%	4%	1%	3%	0%	3%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	14.8	14.8		14.8	14.8		41.1	41.1		41.1	41.1	41.1
Effective Green, g (s)	14.8	14.8		14.8	14.8		41.1	41.1		41.1	41.1	41.1
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.61	0.61		0.61	0.61	0.61
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	236	355		231	400		162	1136		161	1171	963
v/s Ratio Prot		0.07			0.10			c0.49			0.48	
v/s Ratio Perm	0.06			c0.16			0.42			0.21		0.04
v/c Ratio	0.25	0.32		0.72	0.47		0.69	0.81		0.35	0.80	0.07
Uniform Delay, d1	22.0	22.3		24.6	23.1		9.1	10.4		6.7	10.2	5.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.7		11.3	1.2		12.0	4.4		1.3	3.9	0.0
Delay (s)	22.8	23.1		36.0	24.3		21.1	14.7		8.0	14.1	5.6
Level of Service	C	C		D	C		C	B		A	B	A
Approach Delay (s)		23.0			29.6			15.4			12.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.2%	ICU Level of Service	H
Analysis Period (min)	15		

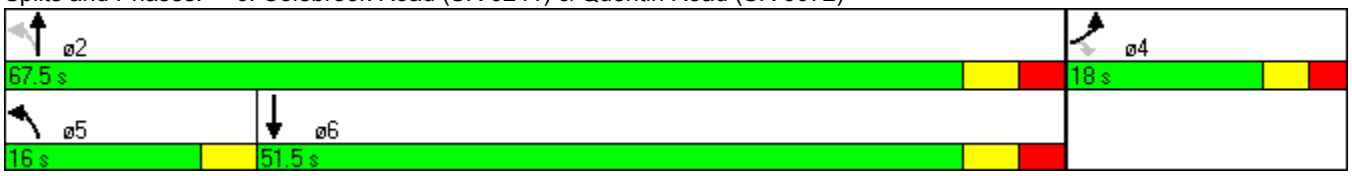
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	101	319	244	703	807
Lane Group Flow (vph)	119	326	271	740	938
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	6.5	16.5	16.5
Total Split (s)	18.0	18.0	16.0	67.5	51.5
Total Split (%)	21.1%	21.1%	18.7%	78.9%	60.2%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	3.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.53	0.67	0.69	0.55	0.93
Control Delay	42.0	11.9	24.9	7.4	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	11.9	24.9	7.4	34.6
Queue Length 50th (ft)	57	0	66	144	396
Queue Length 95th (ft)	106	76	#180	232	#677
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	55		90		
Base Capacity (vph)	284	527	408	1543	1263
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.62	0.66	0.48	0.74

Intersection Summary

Cycle Length: 85.5
Actuated Cycle Length: 75.3
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	101	319	244	703	807	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	16	16
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	3.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1500	1771	1909	2043	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1660	1500	184	1909	2043	
Peak-hour factor, PHF	0.85	0.98	0.90	0.95	0.96	0.61
Adj. Flow (vph)	119	326	271	740	841	97
RTOR Reduction (vph)	0	282	0	0	5	0
Lane Group Flow (vph)	119	44	271	740	933	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	4%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.2	10.2	52.7	52.7	37.0	
Effective Green, g (s)	10.2	10.2	52.7	52.7	37.0	
Actuated g/C Ratio	0.14	0.14	0.70	0.70	0.49	
Clearance Time (s)	5.5	5.5	3.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	226	204	388	1343	1009	
v/s Ratio Prot	c0.07		c0.11	0.39	c0.46	
v/s Ratio Perm		0.03	0.38			
v/c Ratio	0.53	0.22	0.70	0.55	0.92	
Uniform Delay, d1	30.1	28.8	18.8	5.4	17.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.5	5.4	1.1	14.6	
Delay (s)	32.3	29.3	24.3	6.4	32.2	
Level of Service	C	C	C	A	C	
Approach Delay (s)	30.1			11.2	32.2	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	15.5
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

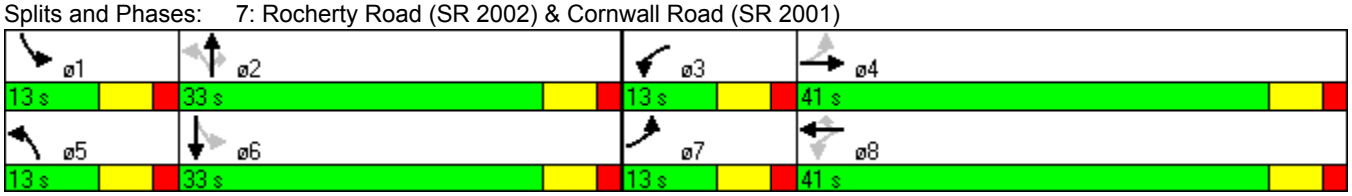
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	66	302	70	335	67	61	115	57	71	143
Lane Group Flow (vph)	93	424	96	381	89	88	144	79	87	255
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	15.0	7.0	15.0	15.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0	21.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	41.0	13.0	41.0	41.0	13.0	33.0	33.0	13.0	33.0
Total Split (%)	13.0%	41.0%	13.0%	41.0%	41.0%	13.0%	33.0%	33.0%	13.0%	33.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.25	0.71	0.29	0.62	0.15	0.24	0.31	0.17	0.20	0.56
Control Delay	14.5	31.3	15.2	28.7	5.7	19.7	30.1	8.0	19.3	31.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	31.3	15.2	28.7	5.7	19.7	30.1	8.0	19.3	31.4
Queue Length 50th (ft)	23	177	24	157	0	28	60	0	27	102
Queue Length 95th (ft)	45	305	48	276	20	51	110	20	61	194
Internal Link Dist (ft)		1052		405			731			260
Turn Bay Length (ft)	225		225		325	150		350	240	
Base Capacity (vph)	365	919	329	949	858	369	732	670	428	703
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.46	0.29	0.40	0.10	0.24	0.20	0.12	0.20	0.36

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 75.1
Natural Cycle: 70
Control Type: Semi Act-Uncoord

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	302	71	70	335	67	61	115	57	71	143	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1727	1800		1702	1872	1607	1754	1872	1591	1702	1755	
Flt Permitted	0.36	1.00		0.30	1.00	1.00	0.48	1.00	1.00	0.67	1.00	
Satd. Flow (perm)	649	1800		536	1872	1607	890	1872	1591	1192	1755	
Peak-hour factor, PHF	0.71	0.87	0.92	0.73	0.88	0.75	0.69	0.80	0.72	0.82	0.87	0.85
Adj. Flow (vph)	93	347	77	96	381	89	88	144	79	87	164	91
RTOR Reduction (vph)	0	8	0	0	0	61	0	0	60	0	21	0
Lane Group Flow (vph)	93	416	0	96	381	28	88	144	19	87	234	0
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	2%	2%	3%	0%
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	29.6	24.5		29.6	24.5	24.5	23.7	18.6	18.6	23.7	18.6	
Effective Green, g (s)	29.6	24.5		29.6	24.5	24.5	23.7	18.6	18.6	23.7	18.6	
Actuated g/C Ratio	0.38	0.32		0.38	0.32	0.32	0.31	0.24	0.24	0.31	0.24	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0	4.0	3.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	320	571		282	593	509	330	450	383	399	422	
v/s Ratio Prot	0.02	c0.23		c0.02	0.20		c0.02	0.08		0.01	c0.13	
v/s Ratio Perm	0.09			0.11		0.02	0.06		0.01	0.05		
v/c Ratio	0.29	0.73		0.34	0.64	0.06	0.27	0.32	0.05	0.22	0.56	
Uniform Delay, d1	16.0	23.4		16.4	22.6	18.4	19.7	24.1	22.6	19.6	25.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	4.9		0.7	2.7	0.1	0.4	1.5	0.2	0.3	4.1	
Delay (s)	16.5	28.4		17.1	25.3	18.4	20.1	25.6	22.7	19.9	29.9	
Level of Service	B	C		B	C	B	C	C	C	B	C	
Approach Delay (s)		26.2			22.8			23.3			27.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

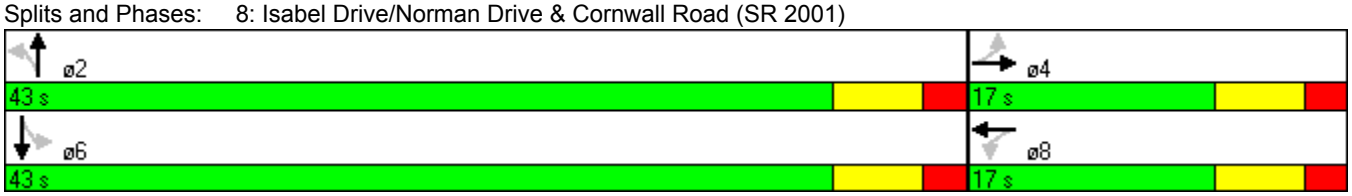
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	32	3	3	6	50	317	6	360
Lane Group Flow (vph)	0	145	0	46	0	423	0	520
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	17.0	17.0	17.0	17.0	43.0	43.0	43.0	43.0
Total Split (%)	28.3%	28.3%	28.3%	28.3%	71.7%	71.7%	71.7%	71.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.35		0.12		0.48		0.54
Control Delay		8.9		9.0		9.3		9.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		8.9		9.0		9.3		9.9
Queue Length 50th (ft)		8		3		52		66
Queue Length 95th (ft)		24		10		122		111
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		565		544		1517		1654
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.26		0.08		0.28		0.31

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 36.6
Natural Cycle: 40
Control Type: Semi Act-Uncoord

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	3	67	3	6	17	50	317	3	6	360	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	10	10	10	10	10	10
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.92			1.00			0.99	
Flt Protected		0.98			0.99			0.99			1.00	
Satd. Flow (prot)		1871			1896			1774			1726	
Flt Permitted		0.87			0.90			0.88			0.99	
Satd. Flow (perm)		1654			1731			1566			1708	
Peak-hour factor, PHF	0.65	0.64	0.74	0.38	0.50	0.66	0.85	0.89	0.38	0.53	0.74	0.70
Adj. Flow (vph)	49	5	91	8	12	26	59	356	8	11	486	23
RTOR Reduction (vph)	0	76	0	0	22	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	69	0	0	24	0	0	422	0	0	517	0
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	0%	0%	0%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.3			6.3			19.4			19.4	
Effective Green, g (s)		6.3			6.3			19.4			19.4	
Actuated g/C Ratio		0.17			0.17			0.51			0.51	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		276			289			806			879	
v/s Ratio Prot												
v/s Ratio Perm		c0.04			0.01			0.27			c0.30	
v/c Ratio		0.25			0.08			0.52			0.59	
Uniform Delay, d1		13.6			13.3			6.1			6.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			0.1			0.6			1.0	
Delay (s)		14.1			13.4			6.7			7.4	
Level of Service		B			B			A			A	
Approach Delay (s)		14.1			13.4			6.7			7.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

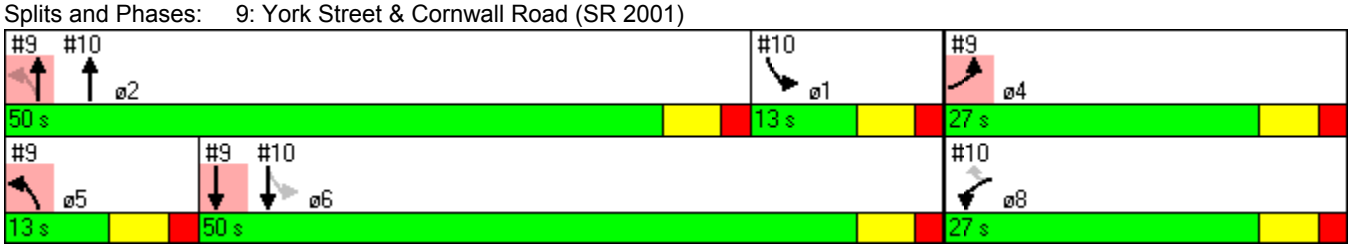
c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	ø1	ø8
Lane Configurations						
Volume (vph)	140	38	318	301		
Lane Group Flow (vph)	199	0	387	568		
Turn Type		pm+pt				
Protected Phases	4	5	2	6	1	8
Permitted Phases		2				
Detector Phase	4	5	2	6		
Switch Phase						
Minimum Initial (s)	7.0	7.0	15.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	21.0	13.0	13.0
Total Split (s)	27.0	13.0	50.0	50.0	13.0	27.0
Total Split (%)	30.0%	14.4%	55.6%	55.6%	14%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0		
Lead/Lag		Lead	Lead	Lag	Lag	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Recall Mode	None	None	Min	Min	None	None
v/c Ratio	0.45		0.48	0.65		
Control Delay	19.7		10.6	10.4		
Queue Delay	0.0		0.0	0.0		
Total Delay	19.7		10.6	10.4		
Queue Length 50th (ft)	40		60	66		
Queue Length 95th (ft)	106		140	133		
Internal Link Dist (ft)	1228		849	232		
Turn Bay Length (ft)						
Base Capacity (vph)	850		1492	1582		
Starvation Cap Reductn	0		0	60		
Spillback Cap Reductn	0		6	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.23		0.26	0.37		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 46.6
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 9: York Street & Cornwall Road (SR 2001)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	25	38	318	301	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.98			1.00	0.95	
Flt Protected	0.96			0.99	1.00	
Satd. Flow (prot)	1772			1856	1749	
Flt Permitted	0.96			0.88	1.00	
Satd. Flow (perm)	1772			1652	1749	
Peak-hour factor, PHF	0.82	0.88	0.78	0.94	0.88	0.87
Adj. Flow (vph)	171	28	49	338	342	226
RTOR Reduction (vph)	7	0	0	0	26	0
Lane Group Flow (vph)	192	0	0	387	542	0
Heavy Vehicles (%)	1%	0%	0%	2%	4%	1%
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	11.4			22.6	22.6	
Effective Green, g (s)	11.4			22.6	22.6	
Actuated g/C Ratio	0.25			0.49	0.49	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	439			812	859	
v/s Ratio Prot	c0.11				c0.31	
v/s Ratio Perm				0.23		
v/c Ratio	0.44			0.48	0.63	
Uniform Delay, d1	14.6			7.8	8.6	
Progression Factor	1.00			1.00	0.78	
Incremental Delay, d2	0.7			0.4	1.5	
Delay (s)	15.3			8.2	8.2	
Level of Service	B			A	A	
Approach Delay (s)	15.3			8.2	8.2	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

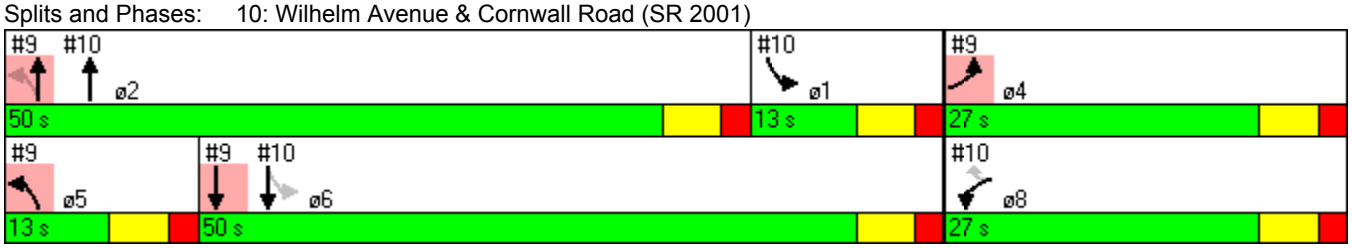
c Critical Lane Group

Lane Group	WBL	WBR	NBT	SBL	SBT	ø4	ø5
Lane Configurations							
Volume (vph)	166	42	237	52	304		
Lane Group Flow (vph)	180	58	499	0	410		
Turn Type		Perm		pm+pt			
Protected Phases	8		2	1	6	4	5
Permitted Phases		8		6			
Detector Phase	8	8	2	1	6		
Switch Phase							
Minimum Initial (s)	7.0	7.0	15.0	7.0	15.0	7.0	7.0
Minimum Split (s)	13.0	13.0	21.0	13.0	21.0	13.0	13.0
Total Split (s)	27.0	27.0	50.0	13.0	50.0	27.0	13.0
Total Split (%)	30.0%	30.0%	55.6%	14.4%	55.6%	30%	14%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		
Lead/Lag			Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Recall Mode	None	None	Min	None	Min	None	None
v/c Ratio	0.42	0.14	0.57		0.49		
Control Delay	20.1	7.0	7.7		10.4		
Queue Delay	0.0	0.0	0.0		0.0		
Total Delay	20.1	7.0	7.8		10.5		
Queue Length 50th (ft)	38	0	50		63		
Queue Length 95th (ft)	112	16	109		146		
Internal Link Dist (ft)	945		232		841		
Turn Bay Length (ft)		100					
Base Capacity (vph)	836	731	1580		1573		
Starvation Cap Reductn	0	0	77		0		
Spillback Cap Reductn	0	0	0		40		
Storage Cap Reductn	0	0	0		0		
Reduced v/c Ratio	0.22	0.08	0.33		0.27		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 46.6
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	166	42	237	198	52	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	16	16
Grade (%)	2%		0%			1%
Total Lost time (s)	6.0	6.0	6.0			6.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frt	1.00	0.85	0.94			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	1752	1467	1743			2040
Flt Permitted	0.95	1.00	1.00			0.85
Satd. Flow (perm)	1752	1467	1743			1743
Peak-hour factor, PHF	0.92	0.73	0.90	0.84	0.72	0.90
Adj. Flow (vph)	180	58	263	236	72	338
RTOR Reduction (vph)	0	44	36	0	0	0
Lane Group Flow (vph)	180	14	463	0	0	410
Heavy Vehicles (%)	2%	9%	3%	1%	0%	5%
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	11.4	11.4	22.6			22.6
Effective Green, g (s)	11.4	11.4	22.6			22.6
Actuated g/C Ratio	0.25	0.25	0.49			0.49
Clearance Time (s)	6.0	6.0	6.0			6.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	434	364	856			856
v/s Ratio Prot	c0.10		c0.27			
v/s Ratio Perm		0.01				0.24
v/c Ratio	0.41	0.04	0.54			0.48
Uniform Delay, d1	14.5	13.1	8.1			7.8
Progression Factor	1.00	1.00	0.68			1.00
Incremental Delay, d2	0.6	0.0	0.7			0.4
Delay (s)	15.1	13.2	6.2			8.2
Level of Service	B	B	A			A
Approach Delay (s)	14.7		6.2			8.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

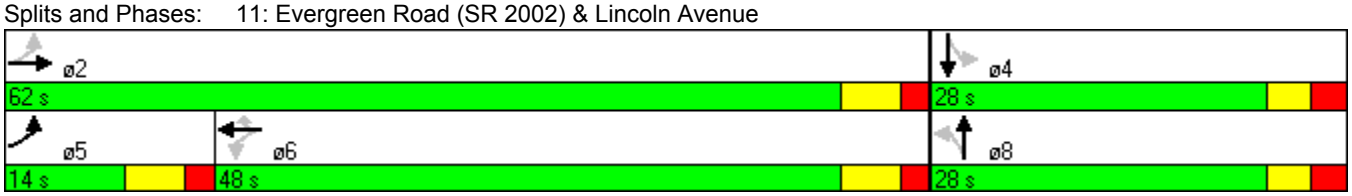
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	75	311	5	340	33	14	14	31	34
Lane Group Flow (vph)	100	398	10	374	59	0	49	0	199
Turn Type	pm+pt		Perm		Perm	Perm		Perm	
Protected Phases	5	2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	5	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	4.0	12.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0
Minimum Split (s)	10.0	18.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5
Total Split (s)	14.0	62.0	48.0	48.0	48.0	28.0	28.0	28.0	28.0
Total Split (%)	15.6%	68.9%	53.3%	53.3%	53.3%	31.1%	31.1%	31.1%	31.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
Lead/Lag	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?									
Recall Mode	None	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.19	0.41	0.03	0.57	0.10		0.15		0.55
Control Delay	6.4	7.9	13.0	19.1	4.6		19.9		21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.4	7.9	13.0	19.1	4.6		19.9		21.4
Queue Length 50th (ft)	12	56	2	99	0		12		38
Queue Length 95th (ft)	28	116	6	198	6		23		78
Internal Link Dist (ft)		619		423			845		1011
Turn Bay Length (ft)	100		80		275				
Base Capacity (vph)	532	1597	765	1396	1239		740		736
Starvation Cap Reductn	0	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0	0		0		0
Reduced v/c Ratio	0.19	0.25	0.01	0.27	0.05		0.07		0.27

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 53.4
Natural Cycle: 50
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	311	15	5	340	33	14	14	1	31	34	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	12	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Frt	1.00	0.99		1.00	1.00	0.85		0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.99	
Satd. Flow (prot)	1702	1695		1727	1748	1537		1880			1717	
Flt Permitted	0.35	1.00		0.53	1.00	1.00		0.86			0.91	
Satd. Flow (perm)	635	1695		959	1748	1537		1655			1576	
Peak-hour factor, PHF	0.75	0.82	0.81	0.50	0.91	0.56	0.75	0.53	0.25	0.69	0.71	0.90
Adj. Flow (vph)	100	379	19	10	374	59	19	26	4	45	48	106
RTOR Reduction (vph)	0	2	0	0	0	37	0	3	0	0	49	0
Lane Group Flow (vph)	100	396	0	10	374	22	0	46	0	0	150	0
Heavy Vehicles (%)	2%	7%	8%	0%	4%	4%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt			Perm		Perm	Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	32.0	32.0		20.1	20.1	20.1		10.7			10.7	
Effective Green, g (s)	32.0	32.0		20.1	20.1	20.1		10.7			10.7	
Actuated g/C Ratio	0.59	0.59		0.37	0.37	0.37		0.20			0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	
Vehicle Extension (s)	3.0	6.0		6.0	6.0	6.0		3.0			3.0	
Lane Grp Cap (vph)	491	1001		356	648	570		327			311	
v/s Ratio Prot	0.02	c0.23			c0.21							
v/s Ratio Perm	0.10			0.01		0.01		0.03			c0.10	
v/c Ratio	0.20	0.40		0.03	0.58	0.04		0.14			0.48	
Uniform Delay, d1	5.7	5.9		10.8	13.6	10.9		18.0			19.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.2	0.7		0.1	2.5	0.1		0.2			1.2	
Delay (s)	5.9	6.7		10.9	16.1	11.0		18.1			20.5	
Level of Service	A	A		B	B	B		B			C	
Approach Delay (s)		6.5			15.3			18.1			20.5	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	54.2	Sum of lost time (s)	17.5
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	24	396	437	3	4	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25			25	25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999		0.892	
Flt Protected	0.950				0.990	
Satd. Flow (prot)	1676	1825	1898	0	1645	0
Flt Permitted	0.950				0.990	
Satd. Flow (perm)	1676	1825	1898	0	1645	0
Link Speed (mph)		40	40		25	
Link Distance (ft)		480	1348		405	
Travel Time (s)		8.2	23.0		11.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	430	475	3	4	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	430	478	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.07	1.03	0.97	0.97	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 33.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	24	396	437	3	4	15
Sign Control		Free	Free		Stop	
Grade		4%	-4%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	430	475	3	4	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		965				
pX, platoon unblocked					0.91	
vC, conflicting volume	478				959	477
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	478				906	477
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	97
cM capacity (veh/h)	1084				272	588

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	26	430	478	21
Volume Left	26	0	0	4
Volume Right	0	0	3	16
cSH	1084	1700	1700	473
Volume to Capacity	0.02	0.25	0.28	0.04
Queue Length 95th (ft)	2	0	0	3
Control Delay (s)	8.4	0.0	0.0	13.0
Lane LOS	A			B
Approach Delay (s)	0.5		0.0	13.0
Approach LOS				B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	420	449	3	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1879	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1879	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	457	488	3	0	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	457	491	0	0	15
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes				
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 33.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	420	449	3	0	14
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	457	488	3	0	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	None			
Median storage veh)		2				
Upstream signal (ft)		485				
pX, platoon unblocked					0.83	
vC, conflicting volume	491				946	490
vC1, stage 1 conf vol					490	
vC2, stage 2 conf vol					457	
vCu, unblocked vol	491				830	490
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	97
cM capacity (veh/h)	1072				506	579

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	457	491	15
Volume Left	0	0	0
Volume Right	0	3	15
cSH	1700	1700	579
Volume to Capacity	0.27	0.29	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	11.4
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.4
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	36	219	15	46	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	150	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1909	1591	1702	1835
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1909	1591	1702	1835
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			2010
Travel Time (s)	4.7		5.2			30.5
Peak Hour Factor	0.92	0.92	0.89	0.92	0.92	0.87
Heavy Vehicles (%)	2%	2%	0%	2%	2%	3%
Adj. Flow (vph)	0	39	246	16	50	318
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	39	246	16	50	318
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 21.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	36	219	15	46	277
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.89	0.92	0.92	0.87
Hourly flow rate (vph)	0	39	246	16	50	318
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			340			
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	664	246			262	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	635	202			219	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			96	
cM capacity (veh/h)	411	810			1305	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	39	246	16	50	318
Volume Left	0	0	0	50	0
Volume Right	39	0	16	0	0
cSH	810	1700	1700	1305	1700
Volume to Capacity	0.05	0.14	0.01	0.04	0.19
Queue Length 95th (ft)	4	0	0	3	0
Control Delay (s)	9.7	0.0	0.0	7.9	0.0
Lane LOS	A			A	
Approach Delay (s)	9.7	0.0		1.1	
Approach LOS	A				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	9	3	0	23	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.976					
Flt Protected					0.950	
Satd. Flow (prot)	1833	0	0	1827	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1833	0	0	1827	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.64	0.92	0.92	0.50	0.92	0.92
Heavy Vehicles (%)	1%	2%	2%	4%	2%	2%
Adj. Flow (vph)	14	3	0	46	3	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	46	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 13.3% ICU Level of Service A
Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	9	3	0	23	3	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.64	0.92	0.92	0.50	0.92	0.92
Hourly flow rate (vph)	14	3	0	46	3	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			17		62	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		62	16
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1600		945	1064

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	46	3
Volume Left	0	0	3
Volume Right	3	0	0
cSH	1700	1600	945
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

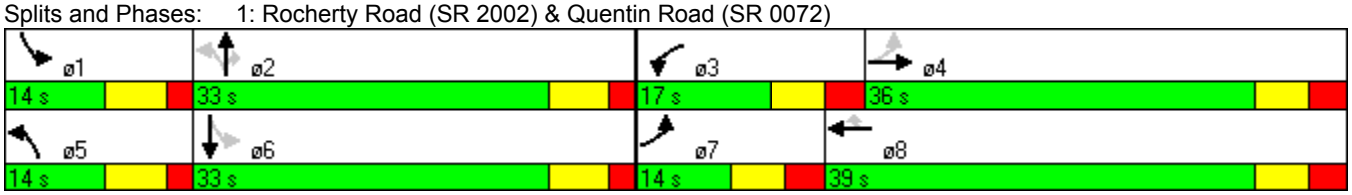
2035 PROJECTED CONDITIONS: PHASES 1-4

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	142	361	259	232	86	20	596	310	111	417
Lane Group Flow (vph)	154	405	282	252	93	22	648	337	121	498
Turn Type	pm+pt		Prot		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	14.0	36.0	17.0	39.0	39.0	14.0	33.0	33.0	14.0	33.0
Total Split (%)	14.0%	36.0%	17.0%	39.0%	39.0%	14.0%	33.0%	33.0%	14.0%	33.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.40	0.86	0.89	0.45	0.17	0.07	0.68	0.49	0.48	0.41
Control Delay	21.3	53.1	55.8	26.3	11.0	18.8	36.5	6.0	22.7	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	53.1	55.8	26.3	11.0	18.8	36.5	6.0	22.7	19.4
Queue Length 50th (ft)	57	237	93	148	24	8	198	0	24	73
Queue Length 95th (ft)	97	#386	m#155	m208	m47	24	263	66	56	205
Internal Link Dist (ft)		569		654			721			1806
Turn Bay Length (ft)	250		225		275	150		275	350	
Base Capacity (vph)	388	509	316	601	576	306	955	692	250	1213
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.80	0.89	0.42	0.16	0.07	0.68	0.49	0.48	0.41

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 34 (34%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	142	361	12	259	232	86	20	596	310	111	417	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	13	14	10	12	12	11	12	12
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1677	1751		3164	1878	1601	1425	3331	1576	1640	3259	
Flt Permitted	0.57	1.00		0.95	1.00	1.00	0.46	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	1008	1751		3164	1878	1601	695	3331	1576	391	3259	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	154	392	13	282	252	93	22	648	337	121	453	45
RTOR Reduction (vph)	0	1	0	0	0	65	0	0	240	0	7	0
Lane Group Flow (vph)	154	404	0	282	252	28	22	648	97	121	491	0
Heavy Vehicles (%)	3%	3%	13%	9%	3%	6%	20%	10%	4%	8%	12%	0%
Turn Type	pm+pt			Prot		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	33.8	26.8		10.0	29.8	29.8	31.7	28.7	28.7	40.7	33.2	
Effective Green, g (s)	33.8	26.8		10.0	29.8	29.8	31.7	28.7	28.7	40.7	33.2	
Actuated g/C Ratio	0.34	0.27		0.10	0.30	0.30	0.32	0.29	0.29	0.41	0.33	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	388	469		316	560	477	242	956	452	253	1082	
v/s Ratio Prot	0.03	c0.23		c0.09	c0.13		0.00	c0.19		c0.04	c0.15	
v/s Ratio Perm	0.11					0.02	0.03		0.06	0.16		
v/c Ratio	0.40	0.86		0.89	0.45	0.06	0.09	0.68	0.21	0.48	0.45	
Uniform Delay, d1	24.1	34.8		44.5	28.5	25.1	23.7	31.6	27.1	20.3	26.3	
Progression Factor	1.00	1.00		0.64	0.86	1.95	1.00	1.00	1.00	0.83	0.73	
Incremental Delay, d2	0.9	15.3		22.0	0.6	0.1	0.2	3.9	1.1	1.9	1.4	
Delay (s)	25.1	50.1		50.4	25.1	48.9	23.9	35.4	28.2	18.7	20.5	
Level of Service	C	D		D	C	D	C	D	C	B	C	
Approach Delay (s)		43.2			40.0			32.7			20.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	40.5
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

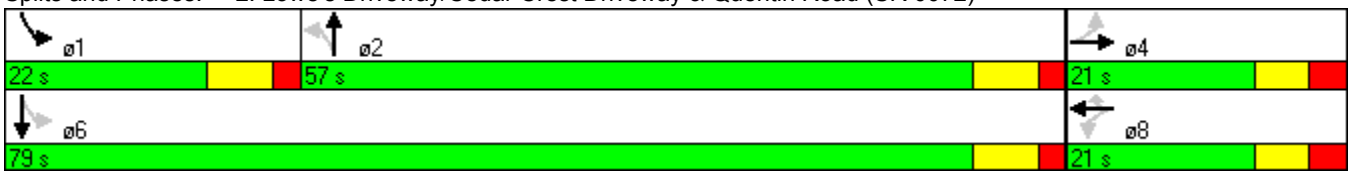
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	6	1	40	2	50	33	650	110	491
Lane Group Flow (vph)	0	56	0	45	54	40	823	120	546
Turn Type	Perm		Perm		Perm	Perm		pm+pt	
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	13.0	22.0
Total Split (s)	21.0	21.0	21.0	21.0	21.0	57.0	57.0	22.0	79.0
Total Split (%)	21.0%	21.0%	21.0%	21.0%	21.0%	57.0%	57.0%	22.0%	79.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio		0.30		0.34	0.26	0.09	0.40	0.23	0.22
Control Delay		20.8		43.5	11.7	5.5	8.6	4.4	2.5
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		20.8		43.5	11.7	5.5	8.6	4.4	2.5
Queue Length 50th (ft)		7		27	1	6	215	11	30
Queue Length 95th (ft)		0		61	34	m20	273	23	40
Internal Link Dist (ft)		216		637			1806		599
Turn Bay Length (ft)					115	225		350	
Base Capacity (vph)		239		183	270	465	2050	571	2526
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.23		0.25	0.20	0.09	0.40	0.21	0.22

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 5 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1	27	40	2	50	33	650	107	110	491	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.89			1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1521			1796	1599	1609	3327		1702	3149	
Flt Permitted		0.94			0.69	1.00	0.45	1.00		0.28	1.00	
Satd. Flow (perm)		1441			1307	1599	759	3327		496	3149	
Peak-hour factor, PHF	0.75	0.25	0.61	0.92	0.92	0.92	0.83	0.92	0.92	0.92	0.92	0.42
Adj. Flow (vph)	8	4	44	43	2	54	40	707	116	120	534	12
RTOR Reduction (vph)	0	40	0	0	0	49	0	10	0	0	1	0
Lane Group Flow (vph)	0	16	0	0	45	5	40	813	0	120	545	0
Heavy Vehicles (%)	17%	0%	4%	2%	2%	2%	15%	10%	2%	2%	14%	0%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		8.7			8.7	8.7	59.9	59.9		77.3	77.3	
Effective Green, g (s)		8.7			8.7	8.7	59.9	59.9		77.3	77.3	
Actuated g/C Ratio		0.09			0.09	0.09	0.60	0.60		0.77	0.77	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)		4.0			4.0	4.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		125			114	139	455	1993		509	2434	
v/s Ratio Prot								c0.24		0.02	c0.17	
v/s Ratio Perm		0.01			c0.03	0.00	0.05			0.16		
v/c Ratio		0.13			0.39	0.03	0.09	0.41		0.24	0.22	
Uniform Delay, d1		42.1			43.2	41.8	8.5	10.6		3.8	3.1	
Progression Factor		1.00			0.89	0.76	0.49	0.73		0.99	0.69	
Incremental Delay, d2		0.6			3.1	0.1	0.3	0.5		0.6	0.2	
Delay (s)		42.8			41.4	32.0	4.4	8.3		4.4	2.4	
Level of Service		D			D	C	A	A		A	A	
Approach Delay (s)		42.8			36.3			8.1			2.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

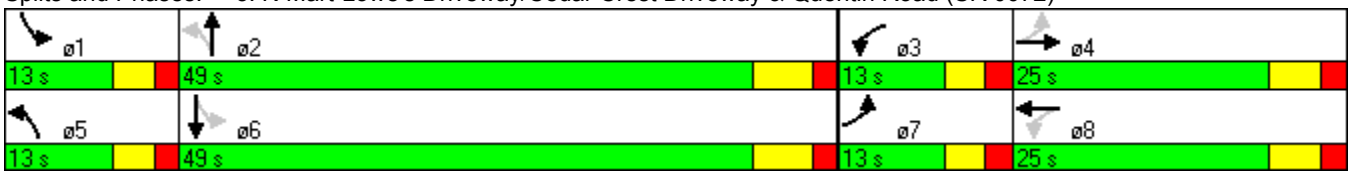
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	78	7	19	6	35	605	63	583
Lane Group Flow (vph)	104	40	32	135	48	706	89	702
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	3.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	7.9	21.4
Total Split (s)	13.0	25.0	13.0	25.0	13.0	49.0	13.0	49.0
Total Split (%)	13.0%	25.0%	13.0%	25.0%	13.0%	49.0%	13.0%	49.0%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	3.0	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	4.9	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.56	0.23	0.13	0.55	0.10	0.37	0.17	0.37
Control Delay	45.1	23.9	31.6	18.6	1.7	2.4	6.1	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	23.9	31.6	18.6	1.7	2.4	6.1	9.8
Queue Length 50th (ft)	57	7	17	7	2	15	16	80
Queue Length 95th (ft)	81	18	25	1	4	25	26	102
Internal Link Dist (ft)		199		207		599		1573
Turn Bay Length (ft)					200		325	
Base Capacity (vph)	189	296	256	428	502	1897	531	1920
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.14	0.13	0.32	0.10	0.37	0.17	0.37

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	7	19	19	6	74	35	605	32	63	583	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	12	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1567	1429		1902	1722		1618	3171		1778	3074	
Flt Permitted	0.47	1.00		0.73	1.00		0.37	1.00		0.34	1.00	
Satd. Flow (perm)	770	1429		1464	1722		623	3171		638	3074	
Peak-hour factor, PHF	0.75	0.58	0.68	0.59	0.50	0.60	0.73	0.92	0.67	0.71	0.92	0.57
Adj. Flow (vph)	104	12	28	32	12	123	48	658	48	89	634	68
RTOR Reduction (vph)	0	25	0	0	112	0	0	4	0	0	6	0
Lane Group Flow (vph)	104	15	0	32	23	0	48	702	0	89	696	0
Heavy Vehicles (%)	8%	14%	16%	0%	0%	4%	11%	13%	0%	2%	17%	10%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.8	10.5		13.4	8.8		61.0	56.7		64.2	58.3	
Effective Green, g (s)	16.8	10.5		13.4	8.8		61.0	56.7		64.2	58.3	
Actuated g/C Ratio	0.17	0.10		0.13	0.09		0.61	0.57		0.64	0.58	
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0		3.0	6.0	
Lane Grp Cap (vph)	180	150		216	152		423	1798		477	1792	
v/s Ratio Prot	c0.04	0.01		0.01	0.01		0.00	0.22		c0.01	c0.23	
v/s Ratio Perm	c0.06			0.01			0.06			0.11		
v/c Ratio	0.58	0.10		0.15	0.15		0.11	0.39		0.19	0.39	
Uniform Delay, d1	37.1	40.5		38.1	42.1		7.9	12.0		7.0	11.2	
Progression Factor	1.00	1.00		1.00	1.00		0.22	0.15		0.93	0.82	
Incremental Delay, d2	4.4	0.3		0.3	0.5		0.1	0.6		0.2	0.6	
Delay (s)	41.6	40.8		38.5	42.6		1.8	2.5		6.7	9.9	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		41.3			41.8			2.4			9.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

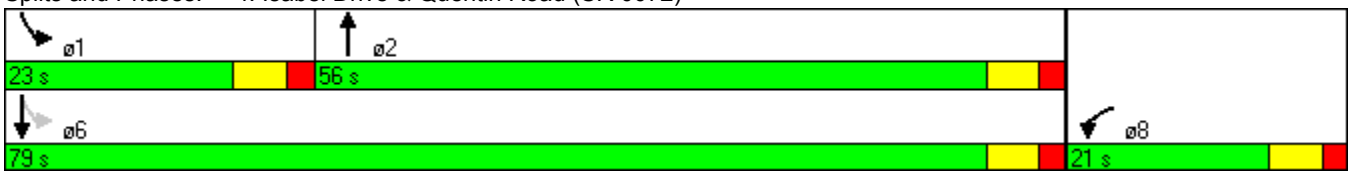
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	28	632	138	718
Lane Group Flow (vph)	88	754	150	780
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	21.0	56.0	23.0	79.0
Total Split (%)	21.0%	56.0%	23.0%	79.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.43	0.34	0.28	0.28
Control Delay	27.1	3.8	3.6	2.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	27.1	3.8	3.6	2.7
Queue Length 50th (ft)	25	57	15	48
Queue Length 95th (ft)	m51	66	34	82
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			250	
Base Capacity (vph)	330	2195	628	2787
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.27	0.34	0.24	0.28

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 64 (64%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	28	53	632	62	138	718
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	12	12	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1873		3190		1610	3331
Flt Permitted	0.98		1.00		0.32	1.00
Satd. Flow (perm)	1873		3190		542	3331
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	58	687	67	150	780
RTOR Reduction (vph)	54	0	5	0	0	0
Lane Group Flow (vph)	34	0	749	0	150	780
Heavy Vehicles (%)	4%	4%	10%	10%	10%	10%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	6.7		67.5		81.3	81.3
Effective Green, g (s)	6.7		67.5		81.3	81.3
Actuated g/C Ratio	0.07		0.68		0.81	0.81
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	125		2153		524	2708
v/s Ratio Prot	c0.02		c0.23		0.02	c0.23
v/s Ratio Perm					0.21	
v/c Ratio	0.27		0.35		0.29	0.29
Uniform Delay, d1	44.3		6.9		2.5	2.3
Progression Factor	1.19		0.47		1.00	1.00
Incremental Delay, d2	0.9		0.4		0.3	0.3
Delay (s)	53.5		3.7		2.8	2.6
Level of Service	D		A		A	A
Approach Delay (s)	53.5		3.7			2.6
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

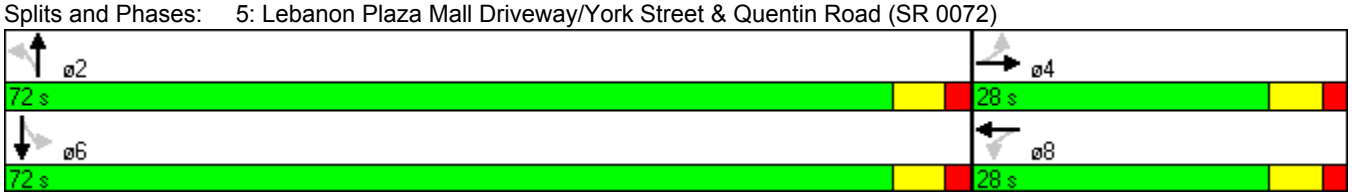
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	4	5	68	10	6	604	36	799
Lane Group Flow (vph)	8	20	74	36	20	685	39	876
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0
Total Split (s)	28.0	28.0	28.0	28.0	72.0	72.0	72.0	72.0
Total Split (%)	28.0%	28.0%	28.0%	28.0%	72.0%	72.0%	72.0%	72.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.05	0.07	0.34	0.12	0.05	0.30	0.08	0.38
Control Delay	22.5	18.0	27.9	13.8	4.8	4.9	4.9	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	18.0	27.9	13.8	4.8	4.9	4.9	5.5
Queue Length 50th (ft)	3	4	25	4	2	50	5	70
Queue Length 95th (ft)	7	8	60	22	3	79	15	108
Internal Link Dist (ft)		346		1245		592		1986
Turn Bay Length (ft)			175		225		175	
Base Capacity (vph)	376	563	462	607	512	3230	694	3268
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.16	0.06	0.04	0.21	0.06	0.27

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 62.1
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	5	5	68	10	22	6	604	26	36	799	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.90		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1375	1575		1668	1671		1535	3229		1686	3267	
Flt Permitted	0.73	1.00		0.74	1.00		0.32	1.00		0.39	1.00	
Satd. Flow (perm)	1062	1575		1307	1671		512	3229		694	3267	
Peak-hour factor, PHF	0.50	0.42	0.63	0.92	0.83	0.92	0.30	0.92	0.92	0.92	0.92	0.50
Adj. Flow (vph)	8	12	8	74	12	24	20	657	28	39	868	8
RTOR Reduction (vph)	0	7	0	0	21	0	0	3	0	0	1	0
Lane Group Flow (vph)	8	13	0	74	15	0	20	682	0	39	875	0
Heavy Vehicles (%)	25%	0%	20%	2%	10%	0%	17%	11%	0%	4%	11%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.3	8.3		8.3	8.3		43.1	43.1		43.1	43.1	
Effective Green, g (s)	8.3	8.3		8.3	8.3		43.1	43.1		43.1	43.1	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.68	0.68		0.68	0.68	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	139	206		171	219		348	2195		472	2221	
v/s Ratio Prot		0.01			0.01			0.21			c0.27	
v/s Ratio Perm	0.01			c0.06			0.04			0.06		
v/c Ratio	0.06	0.06		0.43	0.07		0.06	0.31		0.08	0.39	
Uniform Delay, d1	24.1	24.1		25.4	24.2		3.4	4.1		3.4	4.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		2.4	0.2		0.1	0.1		0.1	0.1	
Delay (s)	24.4	24.3		27.8	24.3		3.5	4.2		3.5	4.6	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		24.3			26.6			4.2			4.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	63.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

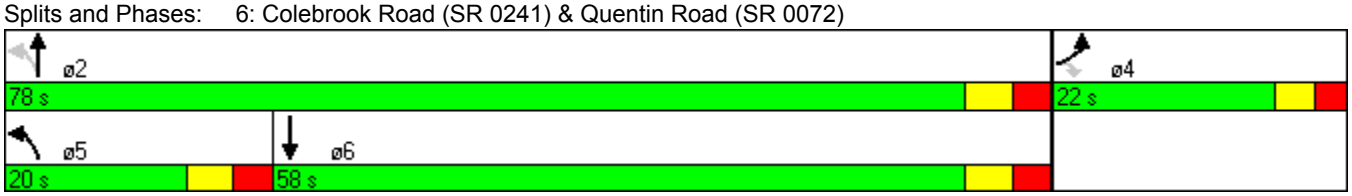
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	181	254	174	568	666
Lane Group Flow (vph)	197	276	189	617	819
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	9.5	16.5	16.5
Total Split (s)	22.0	22.0	20.0	78.0	58.0
Total Split (%)	22.0%	22.0%	20.0%	78.0%	58.0%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.61	0.55	0.45	0.30	0.78
Control Delay	34.6	8.3	9.2	6.5	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	8.3	9.2	6.5	25.4
Queue Length 50th (ft)	78	0	29	54	154
Queue Length 95th (ft)	154	60	59	87	233
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	250		350		
Base Capacity (vph)	414	569	465	3293	2424
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.48	0.49	0.41	0.19	0.34

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 66.4
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	181	254	174	568	666	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	12	12
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1627	1428	1625	3362	3064	
Flt Permitted	0.95	1.00	0.18	1.00	1.00	
Satd. Flow (perm)	1627	1428	311	3362	3064	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	276	189	617	724	95
RTOR Reduction (vph)	0	221	0	0	14	0
Lane Group Flow (vph)	197	55	189	617	805	0
Heavy Vehicles (%)	3%	5%	9%	9%	13%	12%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	13.2	13.2	41.0	41.0	22.7	
Effective Green, g (s)	13.2	13.2	41.0	41.0	22.7	
Actuated g/C Ratio	0.20	0.20	0.62	0.62	0.34	
Clearance Time (s)	5.5	5.5	6.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	324	285	427	2082	1051	
v/s Ratio Prot	c0.12		c0.08	0.18	c0.26	
v/s Ratio Perm		0.04	0.20			
v/c Ratio	0.61	0.19	0.44	0.30	0.77	
Uniform Delay, d1	24.1	22.1	7.5	5.9	19.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.2	0.3	0.7	0.2	4.4	
Delay (s)	27.4	22.4	8.3	6.1	23.8	
Level of Service	C	C	A	A	C	
Approach Delay (s)	24.5			6.6	23.8	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	66.2	Sum of lost time (s)	18.5
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

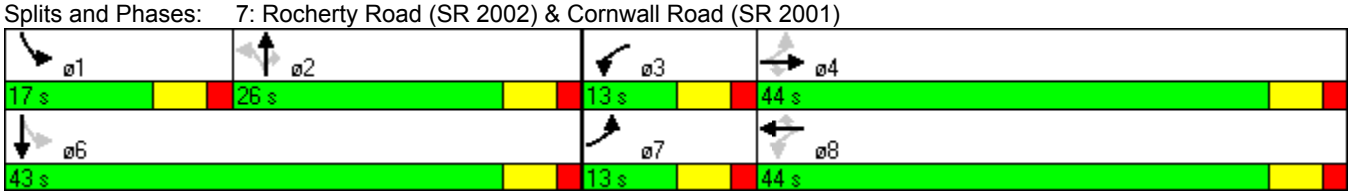
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	113	605	34	50	442	205	24	296	258	225	142
Lane Group Flow (vph)	123	658	37	54	480	223	26	322	280	245	232
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt	
Protected Phases	7	4		3	8			2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	7	4	4	3	8	8	2	2	2	1	6
Switch Phase											
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	21.0	13.0	21.0	21.0	21.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	44.0	44.0	13.0	44.0	44.0	26.0	26.0	26.0	17.0	43.0
Total Split (%)	13.0%	44.0%	44.0%	13.0%	44.0%	44.0%	26.0%	26.0%	26.0%	17.0%	43.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio	0.44	0.97	0.06	0.33	0.78	0.33	0.10	0.75	0.51	0.91	0.33
Control Delay	15.4	48.3	7.4	18.2	38.4	4.3	34.2	50.2	10.8	53.0	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	48.3	7.4	18.2	38.4	4.3	34.2	50.2	10.8	53.0	10.1
Queue Length 50th (ft)	28	205	2	17	258	0	14	200	19	132	109
Queue Length 95th (ft)	m56	#627	m10	37	381	46	37	#347	95	#229	105
Internal Link Dist (ft)		1052			405			731			260
Turn Bay Length (ft)	225		175	225		325	175		350	240	
Base Capacity (vph)	278	675	579	166	659	714	256	427	545	269	695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.97	0.06	0.33	0.73	0.31	0.10	0.75	0.51	0.91	0.33

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 42 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	605	34	50	442	205	24	296	258	225	142	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1775	1480	1497	1734	1516	1754	1891	1576	1550	1709	
Flt Permitted	0.25	1.00	1.00	0.11	1.00	1.00	0.61	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	440	1775	1480	172	1734	1516	1133	1891	1576	346	1709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	658	37	54	480	223	26	322	280	245	154	78
RTOR Reduction (vph)	0	0	16	0	0	141	0	0	191	0	18	0
Lane Group Flow (vph)	123	658	21	54	480	82	26	322	89	245	214	0
Heavy Vehicles (%)	4%	6%	8%	16%	9%	6%	0%	1%	3%	12%	3%	9%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	45.0	38.0	38.0	42.2	36.6	36.6	21.4	21.4	21.4	38.4	38.4	
Effective Green, g (s)	45.0	38.0	38.0	42.2	36.6	36.6	21.4	21.4	21.4	38.4	38.4	
Actuated g/C Ratio	0.45	0.38	0.38	0.42	0.37	0.37	0.21	0.21	0.21	0.38	0.38	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	7.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	283	675	562	147	635	555	242	405	337	265	656	
v/s Ratio Prot	c0.03	c0.37		0.02	0.28			0.17		c0.10	0.13	
v/s Ratio Perm	0.16		0.01	0.13		0.05	0.02		0.06	c0.25		
v/c Ratio	0.43	0.97	0.04	0.37	0.76	0.15	0.11	0.80	0.26	0.92	0.33	
Uniform Delay, d1	18.3	30.5	19.5	21.6	27.8	21.2	31.6	37.2	32.7	25.2	21.7	
Progression Factor	0.82	0.69	0.72	1.00	1.00	1.00	1.00	1.00	1.00	0.57	0.45	
Incremental Delay, d2	0.8	24.4	0.0	1.6	5.4	0.2	0.9	14.9	1.9	34.1	1.2	
Delay (s)	15.9	45.4	14.1	23.2	33.2	21.4	32.5	52.1	34.6	48.6	11.0	
Level of Service	B	D	B	C	C	C	C	D	C	D	B	
Approach Delay (s)		39.5			29.0			43.5			30.3	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	7	39	35	14	51	543	159	735
Lane Group Flow (vph)	0	154	0	113	0	738	0	986
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	17.0	17.0	17.0	17.0	83.0	83.0	83.0	83.0
Total Split (%)	17.0%	17.0%	17.0%	17.0%	83.0%	83.0%	83.0%	83.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio		0.62		0.71		0.59		0.91
Control Delay		30.7		51.1		5.8		22.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		30.7		51.1		5.8		22.8
Queue Length 50th (ft)		39		41		58		399
Queue Length 95th (ft)		94		#117		111		#844
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		271		175		1249		1089
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.57		0.65		0.59		0.91

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	39	96	35	14	55	51	543	86	159	735	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	12	12	11	12	12
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.91			0.93			0.98			1.00	
Flt Protected		1.00			0.98			1.00			0.99	
Satd. Flow (prot)		1830			1966			1807			1808	
Flt Permitted		0.97			0.61			0.87			0.76	
Satd. Flow (perm)		1787			1219			1587			1389	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	42	104	38	15	60	55	590	93	173	799	14
RTOR Reduction (vph)	0	76	0	0	42	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	78	0	0	71	0	0	733	0	0	986	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.6			9.6			78.4			78.4	
Effective Green, g (s)		9.6			9.6			78.4			78.4	
Actuated g/C Ratio		0.10			0.10			0.78			0.78	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		172			117			1244			1089	
v/s Ratio Prot												
v/s Ratio Perm		0.04			c0.06			0.46			c0.71	
v/c Ratio		0.45			0.61			0.59			0.91	
Uniform Delay, d1		42.7			43.4			4.3			8.0	
Progression Factor		0.95			1.00			0.88			1.00	
Incremental Delay, d2		1.9			9.1			1.7			12.2	
Delay (s)		42.4			52.5			5.5			20.3	
Level of Service		D			D			A			C	
Approach Delay (s)		42.4			52.5			5.5			20.3	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.9%	ICU Level of Service	H
Analysis Period (min)	15		

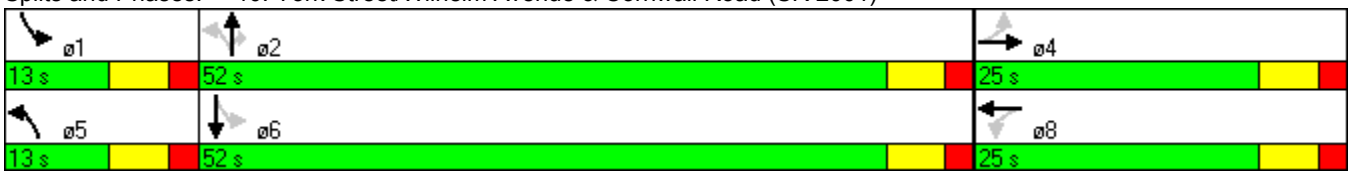
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	46	10	203	16	32	461	96	158	709
Lane Group Flow (vph)	0	91	0	275	35	501	104	172	834
Turn Type	Perm		Perm		pm+pt		Perm	pm+pt	
Protected Phases		4		8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	8	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	25.0	25.0	25.0	25.0	13.0	52.0	52.0	13.0	52.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	14.4%	57.8%	57.8%	14.4%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.26		0.83	0.15	0.65	0.15	0.40	0.90
Control Delay		24.4		54.2	7.3	21.0	3.1	9.4	33.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		24.4		54.2	7.3	21.0	3.1	9.4	33.4
Queue Length 50th (ft)		31		151	6	184	0	33	408
Queue Length 95th (ft)		74		#306	16	277	24	57	#672
Internal Link Dist (ft)		1245		1105		839			1040
Turn Bay Length (ft)					225		400	175	
Base Capacity (vph)		366		346	235	1091	968	435	1092
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.25		0.79	0.15	0.46	0.11	0.40	0.76

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 78.5
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: York Street/Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	46	10	28	203	16	34	32	461	96	158	709	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.96			0.98		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.97			0.96		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1707			1744		1656	1792	1524	1787	1789	
Flt Permitted		0.79			0.74		0.11	1.00	1.00	0.31	1.00	
Satd. Flow (perm)		1382			1351		189	1792	1524	575	1789	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	11	30	221	17	37	35	501	104	172	771	63
RTOR Reduction (vph)	0	19	0	0	6	0	0	0	57	0	4	0
Lane Group Flow (vph)	0	72	0	0	269	0	35	501	47	172	830	0
Heavy Vehicles (%)	0%	2%	10%	2%	2%	8%	9%	6%	6%	1%	5%	5%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		18.9			18.9		40.5	36.8	36.8	47.7	40.4	
Effective Green, g (s)		18.9			18.9		40.5	36.8	36.8	47.7	40.4	
Actuated g/C Ratio		0.23			0.23		0.50	0.45	0.45	0.59	0.50	
Clearance Time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		322			315		162	814	692	448	892	
v/s Ratio Prot							0.01	0.28		c0.03	c0.46	
v/s Ratio Perm		0.05			c0.20		0.10		0.03	0.19		
v/c Ratio		0.22			0.85		0.22	0.62	0.07	0.38	0.93	
Uniform Delay, d1		25.1			29.7		14.6	16.7	12.4	9.2	19.0	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.4			19.5		0.7	1.4	0.0	0.5	16.0	
Delay (s)		25.5			49.3		15.3	18.1	12.5	9.8	35.0	
Level of Service		C			D		B	B	B	A	C	
Approach Delay (s)		25.5			49.3			17.1			30.7	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	369	680	18	640	193	21	22	141	17	121
Lane Group Flow (vph)	401	744	20	696	210	0	86	0	171	132
Turn Type	pm+pt		Perm		Perm	Perm		Perm		pm+ov
Protected Phases	5	2		6			8		4	5
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	6	6	6	8	8	4	4	5
Switch Phase										
Minimum Initial (s)	4.0	12.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0	4.0
Minimum Split (s)	10.0	18.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5	10.0
Total Split (s)	20.0	71.0	51.0	51.0	51.0	19.0	19.0	19.0	19.0	20.0
Total Split (%)	22.2%	78.9%	56.7%	56.7%	56.7%	21.1%	21.1%	21.1%	21.1%	22.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	6.0
Lead/Lag	Lead		Lag	Lag	Lag					Lead
Lead-Lag Optimize?										
Recall Mode	None	Min	Min	Min	Min	None	None	None	None	None
v/c Ratio	0.93	0.62	0.07	0.90	0.25		0.32		0.80	0.20
Control Delay	47.3	9.2	12.6	37.0	2.7		24.7		64.7	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	47.3	9.2	12.6	37.0	2.7		24.7		64.7	4.5
Queue Length 50th (ft)	129	176	6	324	0		23		93	0
Queue Length 95th (ft)	#315	270	18	#545	34		67		#207	36
Internal Link Dist (ft)		619		423			845		1011	
Turn Bay Length (ft)	450		80		275					325
Base Capacity (vph)	431	1328	355	908	933		277		223	671
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.93	0.56	0.06	0.77	0.23		0.31		0.77	0.20

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 83.5
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	369	680	5	18	640	193	21	22	36	141	17	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	12	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1702	1688		1614	1668	1537		1702			1738	1508
Flt Permitted	0.15	1.00		0.38	1.00	1.00		0.87			0.75	1.00
Satd. Flow (perm)	267	1688		651	1668	1537		1493			1367	1508
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	739	5	20	696	210	23	24	39	153	18	132
RTOR Reduction (vph)	0	0	0	0	0	112	0	33	0	0	0	89
Lane Group Flow (vph)	401	744	0	20	696	98	0	53	0	0	171	43
Heavy Vehicles (%)	2%	8%	33%	7%	9%	4%	7%	0%	8%	4%	0%	6%
Turn Type	pm+pt			Perm		Perm	Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	58.9	58.9		38.8	38.8	38.8		13.0			13.0	27.1
Effective Green, g (s)	58.9	58.9		38.8	38.8	38.8		13.0			13.0	27.1
Actuated g/C Ratio	0.71	0.71		0.47	0.47	0.47		0.16			0.16	0.32
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Vehicle Extension (s)	3.0	6.0		6.0	6.0	6.0		3.0			3.0	3.0
Lane Grp Cap (vph)	431	1192		303	776	715		233			213	490
v/s Ratio Prot	c0.16	0.44			0.42							0.01
v/s Ratio Perm	c0.50			0.03		0.06		0.04			c0.13	0.01
v/c Ratio	0.93	0.62		0.07	0.90	0.14		0.23			0.80	0.09
Uniform Delay, d1	19.9	6.4		12.3	20.5	12.7		30.8			34.0	19.6
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	26.7	1.7		0.3	14.3	0.2		0.5			19.2	0.1
Delay (s)	46.7	8.2		12.6	34.8	13.0		31.3			53.2	19.6
Level of Service	D	A		B	C	B		C			D	B
Approach Delay (s)		21.7			29.4			31.3			38.6	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	83.4	Sum of lost time (s)	11.5
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

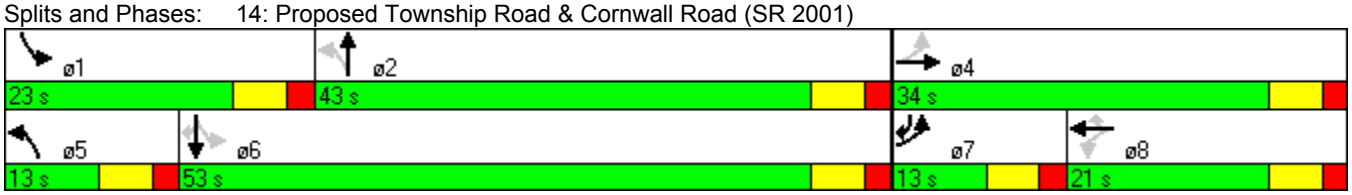
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	38	125	3	50	54	26	525	269	438	42
Lane Group Flow (vph)	41	145	3	54	59	28	596	292	476	46
Turn Type	pm+pt		Perm		Perm	pm+pt		pm+pt		pm+ov
Protected Phases	7	4		8		5	2	1	6	7
Permitted Phases	4		8		8	2		6		6
Detector Phase	7	4	8	8	8	5	2	1	6	7
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	21.0	21.0	13.0	21.0	13.0	21.0	13.0
Total Split (s)	13.0	34.0	21.0	21.0	21.0	13.0	43.0	23.0	53.0	13.0
Total Split (%)	13.0%	34.0%	21.0%	21.0%	21.0%	13.0%	43.0%	23.0%	53.0%	13.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
v/c Ratio	0.19	0.41	0.03	0.33	0.31	0.05	0.69	0.62	0.42	0.04
Control Delay	29.3	33.9	41.0	47.9	15.6	6.8	29.4	12.3	17.1	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	33.9	41.0	47.9	15.6	6.8	29.4	12.3	17.1	3.1
Queue Length 50th (ft)	24	87	2	33	0	5	347	90	229	2
Queue Length 95th (ft)	52	145	11	70	38	m9	#555	m106	m280	m4
Internal Link Dist (ft)		240		318			830		570	
Turn Bay Length (ft)	180		100		100	225		400		275
Base Capacity (vph)	214	519	180	279	288	531	864	504	1136	1183
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.28	0.02	0.19	0.20	0.05	0.69	0.58	0.42	0.04

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Proposed Township Road & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	125	8	3	50	54	26	525	23	269	438	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1845		1711	1863	1583	1702	1842		1711	1863	1583
Flt Permitted	0.43	1.00		0.66	1.00	1.00	0.49	1.00		0.21	1.00	1.00
Satd. Flow (perm)	773	1845		1197	1863	1583	880	1842		380	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	136	9	3	54	59	28	571	25	292	476	46
RTOR Reduction (vph)	0	2	0	0	0	54	0	2	0	0	0	17
Lane Group Flow (vph)	41	143	0	3	54	5	28	594	0	292	476	29
Turn Type	pm+pt			Perm		Perm	pm+pt			pm+pt		pm+ov
Protected Phases	7	4			8		5	2		1	6	7
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	20.4	20.4		8.8	8.8	8.8	49.9	45.7		67.6	57.4	63.0
Effective Green, g (s)	20.4	20.4		8.8	8.8	8.8	49.9	45.7		67.6	57.4	63.0
Actuated g/C Ratio	0.20	0.20		0.09	0.09	0.09	0.50	0.46		0.68	0.57	0.63
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	210	376		105	164	139	474	842		469	1069	1092
v/s Ratio Prot	0.01	c0.08			0.03		0.00	c0.32		c0.10	0.26	0.00
v/s Ratio Perm	0.03			0.00		0.00	0.03			0.32		0.02
v/c Ratio	0.20	0.38		0.03	0.33	0.04	0.06	0.71		0.62	0.45	0.03
Uniform Delay, d1	32.6	34.3		41.7	42.8	41.7	12.8	21.8		12.1	12.2	7.0
Progression Factor	0.88	0.92		1.00	1.00	1.00	0.83	1.05		1.21	1.28	1.51
Incremental Delay, d2	0.5	0.6		0.1	1.2	0.1	0.0	4.2		1.3	0.7	0.0
Delay (s)	29.2	32.1		41.8	44.0	41.8	10.6	27.0		15.9	16.2	10.5
Level of Service	C	C		D	D	D	B	C		B	B	B
Approach Delay (s)		31.5			42.8			26.3			15.8	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	140	13	36	70	12	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989				0.910	
Flt Protected			0.950		0.984	
Satd. Flow (prot)	1842	0	1770	1863	1668	0
Flt Permitted			0.950		0.984	
Satd. Flow (perm)	1842	0	1770	1863	1668	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	525			320	264	
Travel Time (s)	14.3			7.3	7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	14	39	76	13	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	166	0	39	76	39	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 24.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	140	13	36	70	12	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	152	14	39	76	13	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				320		
pX, platoon unblocked						
vC, conflicting volume			166		314	159
vC1, stage 1 conf vol					159	
vC2, stage 2 conf vol					154	
vCu, unblocked vol			166		314	159
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	97
cM capacity (veh/h)			1412		774	886

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	166	39	76	39
Volume Left	0	39	0	13
Volume Right	14	0	0	26
cSH	1700	1412	1700	845
Volume to Capacity	0.10	0.03	0.04	0.05
Queue Length 95th (ft)	0	2	0	4
Control Delay (s)	0.0	7.6	0.0	9.5
Lane LOS		A		A
Approach Delay (s)	0.0	2.6		9.5
Approach LOS				A

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	128	31	36	46	12	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		175	75		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.909	
Flt Protected			0.950		0.984	
Satd. Flow (prot)	1863	1583	1770	1863	1666	0
Flt Permitted			0.950		0.984	
Satd. Flow (perm)	1863	1583	1770	1863	1666	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	356			525	240	
Travel Time (s)	9.7			11.9	6.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	139	34	39	50	13	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	139	34	39	50	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 23.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	128	31	36	46	12	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	34	39	50	13	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1073			845		
pX, platoon unblocked						
vC, conflicting volume			173		267	139
vC1, stage 1 conf vol					139	
vC2, stage 2 conf vol					128	
vCu, unblocked vol			173		267	139
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	97
cM capacity (veh/h)			1404		801	909

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	139	34	39	50	40
Volume Left	0	0	39	0	13
Volume Right	0	34	0	0	27
cSH	1700	1700	1404	1700	871
Volume to Capacity	0.08	0.02	0.03	0.03	0.05
Queue Length 95th (ft)	0	0	2	0	4
Control Delay (s)	0.0	0.0	7.6	0.0	9.3
Lane LOS			A		A
Approach Delay (s)	0.0		3.4		9.3
Approach LOS					A

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	159	2	1	57	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998					
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1859	0	1770	1863	1770	0
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1859	0	1770	1863	1770	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	717			356	195	
Travel Time (s)	19.6			9.7	5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	173	2	1	62	1	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	0	1	62	1	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 18.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	159	2	1	57	1	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	173	2	1	62	1	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	717			1201		
pX, platoon unblocked						
vC, conflicting volume			175		238	174
vC1, stage 1 conf vol					174	
vC2, stage 2 conf vol					64	
vCu, unblocked vol			175		238	174
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1401		821	870

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	175	1	62	1
Volume Left	0	1	0	1
Volume Right	2	0	0	0
cSH	1700	1401	1700	821
Volume to Capacity	0.10	0.00	0.04	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	7.6	0.0	9.4
Lane LOS		A		A
Approach Delay (s)	0.0	0.1		9.4
Approach LOS				A

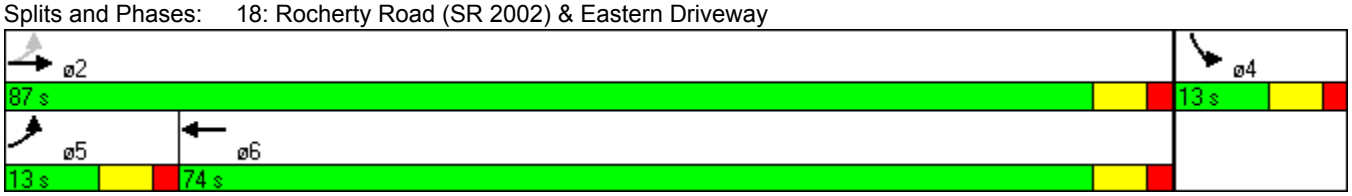
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	18.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Volume (vph)	91	975	651	13
Lane Group Flow (vph)	99	1060	756	39
Turn Type	pm+pt			
Protected Phases	5	2	6	4
Permitted Phases	2			
Detector Phase	5	2	6	4
Switch Phase				
Minimum Initial (s)	7.0	15.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	13.0
Total Split (s)	13.0	87.0	74.0	13.0
Total Split (%)	13.0%	87.0%	74.0%	13.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	None	None	None
v/c Ratio	0.20	0.65	0.62	0.13
Control Delay	2.8	5.8	11.4	19.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.8	5.8	11.4	19.6
Queue Length 50th (ft)	0	0	113	4
Queue Length 95th (ft)	19	375	340	37
Internal Link Dist (ft)		400	1268	325
Turn Bay Length (ft)	225			
Base Capacity (vph)	491	1807	1808	305
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.59	0.42	0.13

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 52
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 18: Rocherty Road (SR 2002) & Eastern Driveway



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	91	975	651	44	13	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.91	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1676	1825	1884		1672	
Flt Permitted	0.19	1.00	1.00		0.98	
Satd. Flow (perm)	336	1825	1884		1672	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	1060	708	48	14	25
RTOR Reduction (vph)	0	0	4	0	24	0
Lane Group Flow (vph)	99	1060	752	0	15	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	42.2	42.2	30.8		1.9	
Effective Green, g (s)	42.2	42.2	30.8		1.9	
Actuated g/C Ratio	0.75	0.75	0.55		0.03	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	382	1373	1034		57	
v/s Ratio Prot	0.02	c0.58	0.40		c0.01	
v/s Ratio Perm	0.17					
v/c Ratio	0.26	0.77	0.73		0.26	
Uniform Delay, d1	5.3	4.1	9.5		26.4	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.4	2.8	2.6		2.4	
Delay (s)	5.7	6.9	12.1		28.8	
Level of Service	A	A	B		C	
Approach Delay (s)		6.8	12.1		28.8	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	1066	672	2	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1881	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1881	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1159	730	2	0	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1159	732	0	0	11
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1066	672	2	0	10
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1159	730	2	0	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485	480			
pX, platoon unblocked	0.68				0.70	0.68
vC, conflicting volume	733				1890	732
vC1, stage 1 conf vol					732	
vC2, stage 2 conf vol					1159	
vCu, unblocked vol	364				1014	362
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	807				216	461

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1159	733	11
Volume Left	0	0	0
Volume Right	0	2	11
cSH	1700	1700	461
Volume to Capacity	0.68	0.43	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	13.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	13.0
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	6	568	34	15	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	125	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			450
Travel Time (s)	4.7		5.2			6.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Adj. Flow (vph)	0	7	617	37	16	448
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	617	37	16	448
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			Yes
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	6	568	34	15	430
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Hourly flow rate (vph)	0	7	617	37	16	448
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			340			
pX, platoon unblocked	0.80	0.80			0.80	
vC, conflicting volume	1098	617			654	
vC1, stage 1 conf vol	617					
vC2, stage 2 conf vol	481					
vCu, unblocked vol	1000	403			449	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			98	
cM capacity (veh/h)	442	521			894	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	617	37	16	448
Volume Left	0	0	0	16	0
Volume Right	7	0	37	0	0
cSH	521	1700	1700	894	1700
Volume to Capacity	0.01	0.36	0.02	0.02	0.26
Queue Length 95th (ft)	1	0	0	1	0
Control Delay (s)	12.0	0.0	0.0	9.1	0.0
Lane LOS	B			A	
Approach Delay (s)	12.0	0.0		0.3	
Approach LOS	B				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	11	0	574	434	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			150
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	1863	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	1583
Link Speed (mph)	25			45	45	
Link Distance (ft)	247			450	910	
Travel Time (s)	6.7			6.8	13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	12	0	624	472	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	12	0	624	472	16
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			11	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 33.5% ICU Level of Service A
Analysis Period (min) 15

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	11	0	574	434	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	0	624	472	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				790	910	
pX, platoon unblocked	0.91	0.85	0.85			
vC, conflicting volume	1096	472	488			
vC1, stage 1 conf vol	472					
vC2, stage 2 conf vol	624					
vCu, unblocked vol	685	293	312			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	495	636	1063			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	12	624	472	16
Volume Left	0	0	0	0
Volume Right	12	0	0	16
cSH	636	1700	1700	1700
Volume to Capacity	0.02	0.37	0.28	0.01
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	10.8	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.8	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	223	61	0	98	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.977					
Flt Protected					0.950	
Satd. Flow (prot)	1805	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1805	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	319	66	0	132	7	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	385	0	0	132	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 25.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	223	61	0	98	6	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Hourly flow rate (vph)	319	66	0	132	7	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			385		484	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			385		484	352
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1174		542	692

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	385	132	7
Volume Left	0	0	7
Volume Right	66	0	0
cSH	1700	1174	542
Volume to Capacity	0.23	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	11.7
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.7
Approach LOS			B

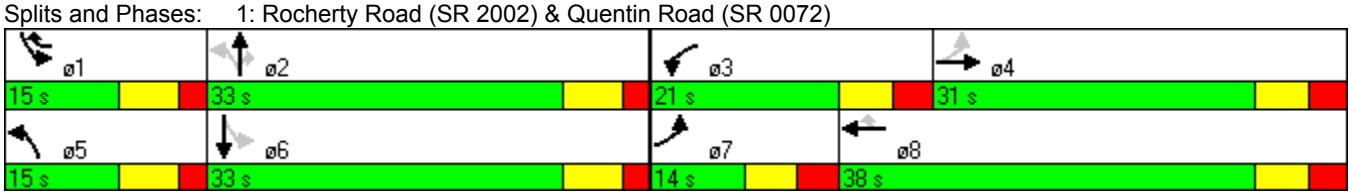
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	135	295	341	322	171	12	654	167	181	646
Lane Group Flow (vph)	147	344	371	339	186	13	681	182	197	859
Turn Type	pm+pt		Prot		pm+ov	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8	1	5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	1	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.5	12.0	21.5	21.5	13.5	21.5
Total Split (s)	14.0	31.0	21.0	38.0	15.0	15.0	33.0	33.0	15.0	33.0
Total Split (%)	14.0%	31.0%	21.0%	38.0%	15.0%	15.0%	33.0%	33.0%	15.0%	33.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.46	0.86	0.81	0.60	0.23	0.05	0.69	0.32	0.74	0.63
Control Delay	23.9	57.7	56.4	34.9	7.3	18.1	36.9	6.1	35.0	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	57.7	56.4	34.9	7.3	18.1	36.9	6.1	35.0	25.2
Queue Length 50th (ft)	55	206	119	180	25	5	208	0	76	222
Queue Length 95th (ft)	95	#348	#187	272	65	16	274	51	m#165	#394
Internal Link Dist (ft)		569		654			721			1806
Turn Bay Length (ft)	250		225		275	150		275	350	
Base Capacity (vph)	322	426	464	594	826	261	987	572	268	1362
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.81	0.80	0.57	0.23	0.05	0.69	0.32	0.74	0.63

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 60 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	295	21	341	322	171	12	654	167	181	646	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	13	14	10	12	12	11	12	12
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1710	1767		3317	1915	1697	1710	3523	1576	1771	3356	
Flt Permitted	0.50	1.00		0.95	1.00	1.00	0.23	1.00	1.00	0.19	1.00	
Satd. Flow (perm)	893	1767		3317	1915	1697	415	3523	1576	352	3356	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.96	0.92	0.92	0.93	0.92
Adj. Flow (vph)	147	321	23	371	339	186	13	681	182	197	695	164
RTOR Reduction (vph)	0	2	0	0	0	70	0	0	131	0	18	0
Lane Group Flow (vph)	147	342	0	371	339	116	13	681	51	197	841	0
Heavy Vehicles (%)	1%	2%	0%	4%	1%	0%	0%	4%	4%	0%	7%	2%
Turn Type	pm+pt			Prot		pm+ov	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	29.6	22.6		13.9	29.5	38.0	29.6	28.0	28.0	43.0	34.9	
Effective Green, g (s)	29.6	22.6		13.9	29.5	38.0	29.6	28.0	28.0	43.0	34.9	
Actuated g/C Ratio	0.30	0.23		0.14	0.30	0.38	0.30	0.28	0.28	0.43	0.35	
Clearance Time (s)	7.0	7.0		7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	322	399		461	565	645	144	986	441	272	1171	
v/s Ratio Prot	0.03	c0.19		c0.11	c0.18	0.02	0.00	0.19		c0.06	c0.25	
v/s Ratio Perm	0.10					0.05	0.03		0.03	c0.25		
v/c Ratio	0.46	0.86		0.80	0.60	0.18	0.09	0.69	0.12	0.72	0.72	
Uniform Delay, d1	27.1	37.1		41.7	30.2	20.6	25.3	32.1	26.8	20.5	28.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.91	
Incremental Delay, d2	1.4	16.9		10.4	2.1	0.2	0.4	4.0	0.5	9.2	3.6	
Delay (s)	28.5	54.0		52.1	32.3	20.8	25.7	36.1	27.3	27.0	29.2	
Level of Service	C	D		D	C	C	C	D	C	C	C	
Approach Delay (s)		46.4			38.1			34.1			28.8	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	35.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	34.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

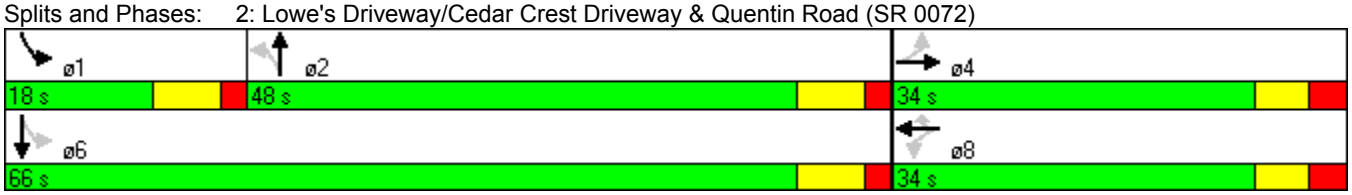
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	10	3	230	3	229	60	754	182	671
Lane Group Flow (vph)	0	92	0	253	249	72	1017	198	718
Turn Type	Perm		Perm		Perm	Perm		pm+pt	
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	13.0	22.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	48.0	48.0	18.0	66.0
Total Split (%)	34.0%	34.0%	34.0%	34.0%	34.0%	48.0%	48.0%	18.0%	66.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio		0.24		0.80	0.44	0.22	0.66	0.60	0.33
Control Delay		11.5		54.1	6.4	10.4	11.5	34.8	8.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		11.5		54.1	6.4	10.4	11.5	34.8	8.1
Queue Length 50th (ft)		10		148	0	11	73	86	64
Queue Length 95th (ft)		33		#237	58	m21	113	163	121
Internal Link Dist (ft)		216		637			1806		599
Turn Bay Length (ft)					115	225		350	
Base Capacity (vph)		434		367	614	321	1535	330	2158
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.21		0.69	0.41	0.22	0.66	0.60	0.33

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 65
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	3	53	230	3	229	60	754	205	182	671	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.89			1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1532			1793	1599	1796	3379		1702	3447	
Flt Permitted		0.91			0.72	1.00	0.38	1.00		0.15	1.00	
Satd. Flow (perm)		1414			1360	1599	716	3379		276	3447	
Peak-hour factor, PHF	0.63	0.75	0.74	0.92	0.92	0.92	0.83	0.95	0.92	0.92	0.95	0.67
Adj. Flow (vph)	16	4	72	250	3	249	72	794	223	198	706	12
RTOR Reduction (vph)	0	55	0	0	0	191	0	24	0	0	1	0
Lane Group Flow (vph)	0	37	0	0	253	58	72	993	0	198	717	0
Heavy Vehicles (%)	0%	0%	6%	2%	2%	2%	3%	7%	2%	2%	4%	0%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		23.4			23.4	23.4	44.7	44.7		62.6	62.6	
Effective Green, g (s)		23.4			23.4	23.4	44.7	44.7		62.6	62.6	
Actuated g/C Ratio		0.23			0.23	0.23	0.45	0.45		0.63	0.63	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)		4.0			4.0	4.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		331			318	374	320	1510		328	2158	
v/s Ratio Prot								c0.29		c0.07	0.21	
v/s Ratio Perm		0.03			c0.19	0.04	0.10			0.31		
v/c Ratio		0.11			0.80	0.16	0.22	0.66		0.60	0.33	
Uniform Delay, d1		30.1			36.0	30.4	17.0	21.7		12.4	8.8	
Progression Factor		1.00			1.00	1.00	0.46	0.44		2.80	0.82	
Incremental Delay, d2		0.2			13.6	0.3	1.4	1.9		4.8	0.4	
Delay (s)		30.3			49.6	30.7	9.2	11.4		39.6	7.6	
Level of Service		C			D	C	A	B		D	A	
Approach Delay (s)		30.3			40.2			11.3			14.6	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

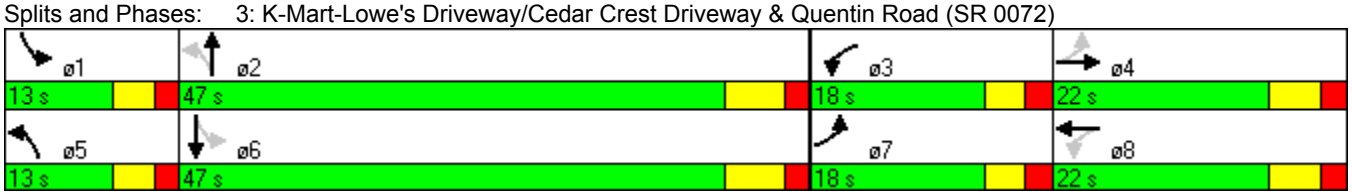
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	182	19	77	20	49	775	142	723
Lane Group Flow (vph)	225	96	96	402	56	910	167	866
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	3.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	7.9	21.4
Total Split (s)	18.0	22.0	18.0	22.0	13.0	47.0	13.0	47.0
Total Split (%)	18.0%	22.0%	18.0%	22.0%	13.0%	47.0%	13.0%	47.0%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	3.0	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	4.9	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.80	0.26	0.25	0.90	0.17	0.63	0.54	0.57
Control Delay	47.5	16.7	24.9	42.6	5.2	9.9	21.3	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	16.7	24.9	42.6	5.2	9.9	21.3	19.2
Queue Length 50th (ft)	106	17	42	111	5	63	49	143
Queue Length 95th (ft)	#172	28	69	63	m11	84	98	174
Internal Link Dist (ft)		199		207		599		1573
Turn Bay Length (ft)					200		325	
Base Capacity (vph)	283	375	456	474	349	1441	314	1532
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.26	0.21	0.85	0.16	0.63	0.53	0.57

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	19	55	77	20	245	49	775	62	142	723	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	12	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1600		1902	1761		1796	3365		1814	3338	
Flt Permitted	0.20	1.00		0.69	1.00		0.24	1.00		0.19	1.00	
Satd. Flow (perm)	353	1600		1392	1761		461	3365		367	3338	
Peak-hour factor, PHF	0.81	0.59	0.86	0.80	0.56	0.67	0.88	0.92	0.91	0.85	0.92	0.81
Adj. Flow (vph)	225	32	64	96	36	366	56	842	68	167	786	80
RTOR Reduction (vph)	0	51	0	0	192	0	0	6	0	0	7	0
Lane Group Flow (vph)	225	45	0	96	210	0	56	904	0	167	859	0
Heavy Vehicles (%)	0%	11%	0%	0%	5%	1%	0%	6%	0%	0%	7%	9%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.1	20.2		23.3	15.3		47.4	41.6		51.6	43.7	
Effective Green, g (s)	33.1	20.2		23.3	15.3		47.4	41.6		51.6	43.7	
Actuated g/C Ratio	0.33	0.20		0.23	0.15		0.47	0.42		0.52	0.44	
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0		3.0	6.0	
Lane Grp Cap (vph)	290	323		365	269		296	1400		304	1459	
v/s Ratio Prot	c0.10	0.03		0.02	0.12		0.01	c0.27		c0.04	0.26	
v/s Ratio Perm	c0.16			0.04			0.08			0.24		
v/c Ratio	0.78	0.14		0.26	0.78		0.19	0.65		0.55	0.59	
Uniform Delay, d1	27.3	32.8		31.0	40.7		14.9	23.3		14.9	21.3	
Progression Factor	1.00	1.00		1.00	1.00		0.40	0.35		1.36	0.84	
Incremental Delay, d2	12.2	0.2		0.4	13.3		0.3	1.9		1.9	1.6	
Delay (s)	39.5	33.0		31.4	54.0		6.2	10.1		22.2	19.5	
Level of Service	D	C		C	D		A	B		C	B	
Approach Delay (s)		37.6			49.7			9.9			19.9	
Approach LOS		D			D			A			B	

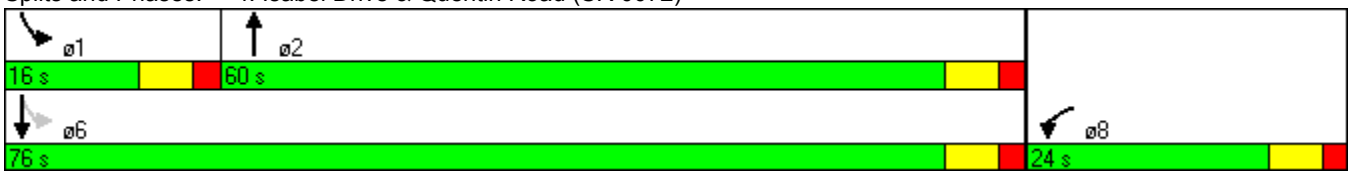
Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	44	1132	114	988
Lane Group Flow (vph)	250	1262	124	1019
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	24.0	60.0	16.0	76.0
Total Split (%)	24.0%	60.0%	16.0%	76.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.69	0.57	0.39	0.38
Control Delay	23.0	7.9	6.7	4.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.0	7.9	6.7	4.3
Queue Length 50th (ft)	40	157	14	80
Queue Length 95th (ft)	111	202	37	148
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			250	
Base Capacity (vph)	490	2212	354	2712
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.51	0.57	0.35	0.38

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 74 (74%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	44	186	1132	76	114	988
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	12	12	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.89		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1882		3452		1687	3490
Flt Permitted	0.99		1.00		0.15	1.00
Satd. Flow (perm)	1882		3452		274	3490
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.97
Adj. Flow (vph)	48	202	1179	83	124	1019
RTOR Reduction (vph)	166	0	4	0	0	0
Lane Group Flow (vph)	84	0	1258	0	124	1019
Heavy Vehicles (%)	2%	2%	2%	2%	5%	5%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	10.3		64.0		77.7	77.7
Effective Green, g (s)	10.3		64.0		77.7	77.7
Actuated g/C Ratio	0.10		0.64		0.78	0.78
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	194		2209		322	2712
v/s Ratio Prot	c0.04		c0.36		0.03	c0.29
v/s Ratio Perm					0.27	
v/c Ratio	0.43		0.57		0.39	0.38
Uniform Delay, d1	42.1		10.2		5.9	3.5
Progression Factor	1.00		0.65		1.00	1.00
Incremental Delay, d2	1.6		0.7		0.8	0.4
Delay (s)	43.7		7.3		6.7	3.9
Level of Service	D		A		A	A
Approach Delay (s)	43.7		7.3			4.2
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

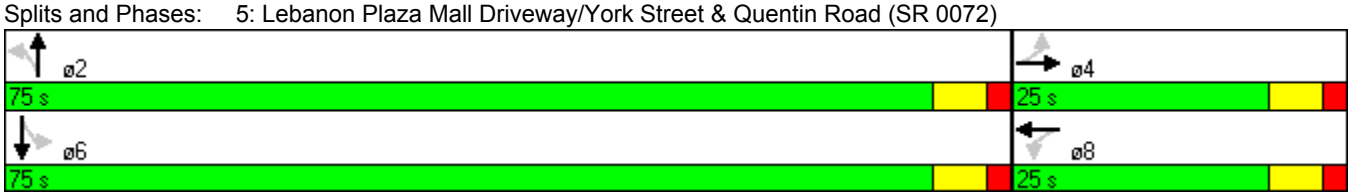
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	52	55	133	94	61	1001	41	892
Lane Group Flow (vph)	68	152	145	175	72	1134	45	1005
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0
Total Split (s)	25.0	25.0	25.0	25.0	75.0	75.0	75.0	75.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.28	0.39	0.58	0.43	0.26	0.55	0.20	0.48
Control Delay	24.6	17.3	32.9	23.1	10.3	9.5	9.7	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	17.3	32.9	23.1	10.3	9.5	9.7	8.7
Queue Length 50th (ft)	23	33	53	54	12	124	7	103
Queue Length 95th (ft)	46	67	105	87	37	207	28	173
Internal Link Dist (ft)		346		1245		592		1986
Turn Bay Length (ft)			175		225		175	
Base Capacity (vph)	323	505	335	534	456	3419	380	3449
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.30	0.43	0.33	0.16	0.33	0.12	0.29

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 66.4
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	58	133	94	50	61	1001	42	41	892	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1653	1627		1685	1813		1744	3438		1754	3467	
Flt Permitted	0.65	1.00		0.66	1.00		0.25	1.00		0.21	1.00	
Satd. Flow (perm)	1125	1627		1171	1813		459	3438		382	3467	
Peak-hour factor, PHF	0.77	0.81	0.69	0.92	0.78	0.92	0.85	0.92	0.92	0.92	0.94	0.79
Adj. Flow (vph)	68	68	84	145	121	54	72	1088	46	45	949	56
RTOR Reduction (vph)	0	43	0	0	16	0	0	4	0	0	6	0
Lane Group Flow (vph)	68	109	0	145	159	0	72	1130	0	45	999	0
Heavy Vehicles (%)	4%	2%	2%	1%	0%	3%	3%	4%	0%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.3	14.3		14.3	14.3		40.1	40.1		40.1	40.1	
Effective Green, g (s)	14.3	14.3		14.3	14.3		40.1	40.1		40.1	40.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.60	0.60		0.60	0.60	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	242	350		252	390		277	2076		231	2094	
v/s Ratio Prot		0.07			0.09			c0.33			0.29	
v/s Ratio Perm	0.06			c0.12			0.16			0.12		
v/c Ratio	0.28	0.31		0.58	0.41		0.26	0.54		0.19	0.48	
Uniform Delay, d1	21.8	21.9		23.3	22.4		6.2	7.8		5.9	7.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7		3.8	1.0		0.5	0.3		0.4	0.2	
Delay (s)	22.6	22.6		27.1	23.4		6.7	8.1		6.3	7.5	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		22.6			25.1			8.0			7.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

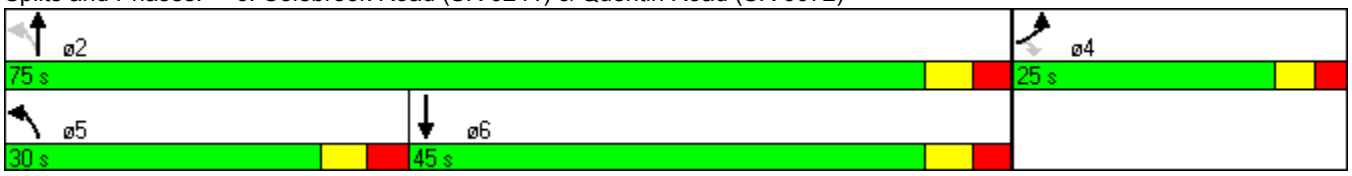
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	207	242	323	941	833
Lane Group Flow (vph)	225	263	351	1012	1043
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	9.5	16.5	16.5
Total Split (s)	25.0	25.0	30.0	75.0	45.0
Total Split (%)	25.0%	25.0%	30.0%	75.0%	45.0%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.74	0.54	0.71	0.42	0.87
Control Delay	50.2	9.2	27.1	7.2	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	9.2	27.1	7.2	34.5
Queue Length 50th (ft)	121	0	121	120	287
Queue Length 95th (ft)	#232	68	242	167	386
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	250		350		
Base Capacity (vph)	393	548	571	2876	1565
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.57	0.48	0.61	0.35	0.67

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 85.4
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	207	242	323	941	833	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	12	12
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1470	1736	3557	3326	
Flt Permitted	0.95	1.00	0.11	1.00	1.00	
Satd. Flow (perm)	1660	1470	197	3557	3326	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.92
Adj. Flow (vph)	225	263	351	1012	896	147
RTOR Reduction (vph)	0	214	0	0	13	0
Lane Group Flow (vph)	225	49	351	1012	1030	0
Heavy Vehicles (%)	1%	2%	2%	3%	4%	1%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	15.7	15.7	57.2	57.2	30.7	
Effective Green, g (s)	15.7	15.7	57.2	57.2	30.7	
Actuated g/C Ratio	0.18	0.18	0.67	0.67	0.36	
Clearance Time (s)	5.5	5.5	6.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	307	272	495	2396	1203	
v/s Ratio Prot	c0.14		c0.17	0.28	c0.31	
v/s Ratio Perm		0.03	0.31			
v/c Ratio	0.73	0.18	0.71	0.42	0.86	
Uniform Delay, d1	32.6	29.2	19.3	6.3	25.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.7	0.3	4.6	0.3	7.1	
Delay (s)	41.4	29.5	23.9	6.7	32.1	
Level of Service	D	C	C	A	C	
Approach Delay (s)	35.0			11.1	32.1	
Approach LOS	C			B	C	

Intersection Summary			
HCM Average Control Delay	22.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	84.9	Sum of lost time (s)	18.5
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

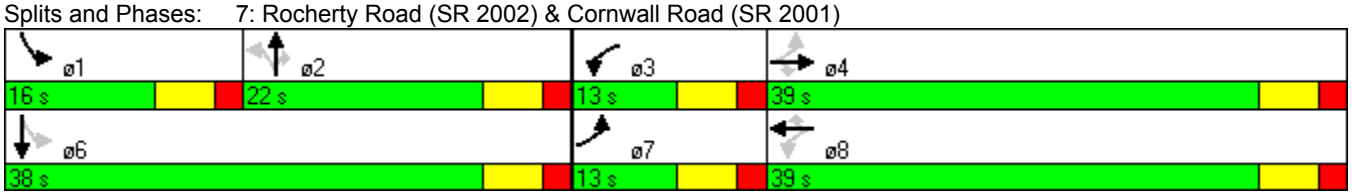
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	96	456	49	105	592	186	52	222	120	221	279
Lane Group Flow (vph)	104	496	53	114	643	202	57	241	130	240	514
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt	
Protected Phases	7	4		3	8			2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	7	4	4	3	8	8	2	2	2	1	6
Switch Phase											
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	21.0	13.0	21.0	21.0	21.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	39.0	39.0	13.0	39.0	39.0	22.0	22.0	22.0	16.0	38.0
Total Split (%)	14.4%	43.3%	43.3%	14.4%	43.3%	43.3%	24.4%	24.4%	24.4%	17.8%	42.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio	0.51	0.75	0.09	0.41	0.95	0.29	0.32	0.61	0.29	0.73	0.77
Control Delay	22.1	33.6	6.0	16.8	54.2	4.2	38.6	41.7	8.1	22.3	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	33.6	6.0	16.8	54.2	4.2	38.6	41.7	8.1	22.3	15.0
Queue Length 50th (ft)	29	242	0	32	349	0	29	130	0	26	64
Queue Length 95th (ft)	59	364	23	61	#569	43	67	#233	47	m66	m#370
Internal Link Dist (ft)		1052			405			731			260
Turn Bay Length (ft)	225		175	225		325	175		350	240	
Base Capacity (vph)	203	663	603	280	679	694	178	396	442	331	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.75	0.09	0.41	0.95	0.29	0.32	0.61	0.29	0.73	0.77

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 45 (50%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	456	49	105	592	186	52	222	120	221	279	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1809	1552	1653	1853	1545	1754	1891	1623	1623	1654	
Flt Permitted	0.12	1.00	1.00	0.25	1.00	1.00	0.46	1.00	1.00	0.32	1.00	
Satd. Flow (perm)	213	1809	1552	436	1853	1545	848	1891	1623	547	1654	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	104	496	53	114	643	202	57	241	130	240	291	223
RTOR Reduction (vph)	0	0	34	0	0	128	0	0	105	0	30	0
Lane Group Flow (vph)	104	496	19	114	643	74	57	241	25	240	484	0
Heavy Vehicles (%)	4%	4%	3%	5%	2%	4%	0%	1%	0%	7%	9%	4%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	38.4	32.8	32.8	38.4	32.8	32.8	17.6	17.6	17.6	33.6	33.6	
Effective Green, g (s)	38.4	32.8	32.8	38.4	32.8	32.8	17.6	17.6	17.6	33.6	33.6	
Actuated g/C Ratio	0.43	0.36	0.36	0.43	0.36	0.36	0.20	0.20	0.20	0.37	0.37	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	7.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	181	659	566	262	675	563	166	370	317	324	617	
v/s Ratio Prot	c0.04	0.27		0.03	c0.35			0.13		0.08	c0.29	
v/s Ratio Perm	0.21		0.01	0.16		0.05	0.07		0.02	0.19		
v/c Ratio	0.57	0.75	0.03	0.44	0.95	0.13	0.34	0.65	0.08	0.74	0.78	
Uniform Delay, d1	19.9	25.0	18.4	17.5	27.8	19.1	31.2	33.4	29.6	21.6	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.44	0.30	
Incremental Delay, d2	4.4	5.2	0.0	1.2	23.6	0.1	5.6	8.6	0.5	7.0	7.7	
Delay (s)	24.3	30.2	18.4	18.6	51.5	19.2	36.8	42.0	30.1	16.5	15.1	
Level of Service	C	C	B	B	D	B	D	D	C	B	B	
Approach Delay (s)		28.3			40.8			37.7			15.5	
Approach LOS		C			D			D			B	

Intersection Summary			
HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	38	18	69	28	106	715	57	692
Lane Group Flow (vph)	0	165	0	268	0	934	0	840
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	23.0	23.0	23.0	23.0	67.0	67.0	67.0	67.0
Total Split (%)	25.6%	25.6%	25.6%	25.6%	74.4%	74.4%	74.4%	74.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio		0.57		0.83		0.87		0.76
Control Delay		25.3		48.1		19.9		14.8
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		25.3		48.1		19.9		14.8
Queue Length 50th (ft)		40		104		220		284
Queue Length 95th (ft)		104		#220		#711		466
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		319		356		1078		1112
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.52		0.75		0.87		0.76

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 79 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	18	96	69	28	150	106	715	39	57	692	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	12	12	11	12	12
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.91			0.92			0.99			1.00	
Flt Protected		0.99			0.99			0.99			1.00	
Satd. Flow (prot)		1842			1911			1877			1795	
Flt Permitted		0.71			0.80			0.81			0.88	
Satd. Flow (perm)		1326			1552			1536			1585	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	20	104	75	30	163	115	777	42	62	752	26
RTOR Reduction (vph)	0	70	0	0	64	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	95	0	0	204	0	0	932	0	0	839	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	5%	5%	5%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.9			14.9			63.1			63.1	
Effective Green, g (s)		14.9			14.9			63.1			63.1	
Actuated g/C Ratio		0.17			0.17			0.70			0.70	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		220			257			1077			1111	
v/s Ratio Prot												
v/s Ratio Perm		0.07			c0.13			c0.61			0.53	
v/c Ratio		0.43			0.79			0.87			0.75	
Uniform Delay, d1		33.7			36.1			10.2			8.5	
Progression Factor		1.00			1.00			0.91			1.00	
Incremental Delay, d2		1.4			15.3			8.2			4.8	
Delay (s)		35.1			51.4			17.5			13.3	
Level of Service		D			D			B			B	
Approach Delay (s)		35.1			51.4			17.5			13.3	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

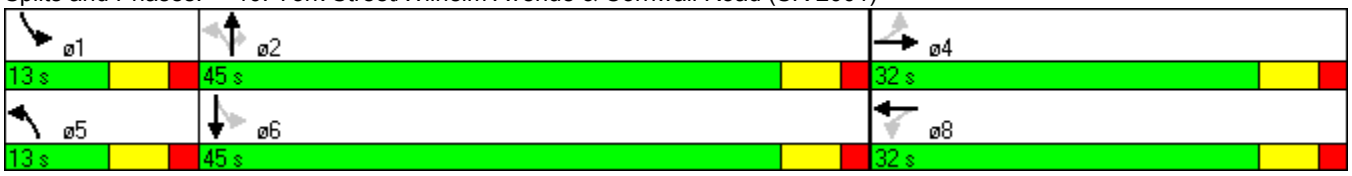
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	88	42	191	49	91	599	323	80	496
Lane Group Flow (vph)	0	187	0	352	99	651	351	87	678
Turn Type	Perm		Perm		pm+pt		Perm	pm+pt	
Protected Phases		4		8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	8	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	32.0	32.0	32.0	32.0	13.0	45.0	45.0	13.0	45.0
Total Split (%)	35.6%	35.6%	35.6%	35.6%	14.4%	50.0%	50.0%	14.4%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.48		0.86	0.37	0.82	0.40	0.30	0.90
Control Delay		28.4		50.9	13.1	31.5	3.4	11.6	39.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		28.4		50.9	13.1	31.5	3.4	11.6	39.2
Queue Length 50th (ft)		79		181	23	313	0	20	337
Queue Length 95th (ft)		145		#346	45	#480	48	41	#561
Internal Link Dist (ft)		1245		1105		839			1040
Turn Bay Length (ft)					225		400	175	
Base Capacity (vph)		441		459	268	947	977	292	892
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.42		0.77	0.37	0.69	0.36	0.30	0.76

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 81.3
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: York Street/Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	42	41	191	49	84	91	599	323	80	496	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.97			0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected		0.97			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1771			1765		1770	1863	1583	1805	1737	
Flt Permitted		0.70			0.72		0.14	1.00	1.00	0.17	1.00	
Satd. Flow (perm)		1269			1314		265	1863	1583	318	1737	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	46	45	208	53	91	99	651	351	87	539	139
RTOR Reduction (vph)	0	13	0	0	14	0	0	0	202	0	10	0
Lane Group Flow (vph)	0	174	0	0	338	0	99	651	149	87	668	0
Heavy Vehicles (%)	0%	2%	3%	1%	2%	0%	2%	2%	2%	0%	6%	6%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		24.3			24.3		39.9	34.8	34.8	39.9	34.8	
Effective Green, g (s)		24.3			24.3		39.9	34.8	34.8	39.9	34.8	
Actuated g/C Ratio		0.30			0.30		0.49	0.42	0.42	0.49	0.42	
Clearance Time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		375			388		222	789	670	247	735	
v/s Ratio Prot							c0.03	0.35		0.02	c0.38	
v/s Ratio Perm		0.14			c0.26		0.19		0.09	0.15		
v/c Ratio		0.46			0.87		0.45	0.83	0.22	0.35	0.91	
Uniform Delay, d1		23.6			27.5		15.1	21.0	15.1	14.4	22.2	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.9			18.7		1.4	7.0	0.2	0.9	15.0	
Delay (s)		24.6			46.2		16.5	28.0	15.3	15.3	37.2	
Level of Service		C			D		B	C	B	B	D	
Approach Delay (s)		24.6			46.2			22.9			34.7	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	82.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

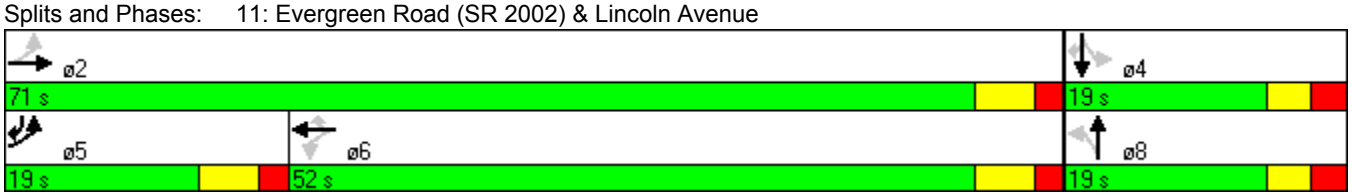
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	193	626	11	510	51	15	18	42	53	309
Lane Group Flow (vph)	210	712	12	554	55	0	45	0	104	336
Turn Type	pm+pt		Perm		Perm	Perm		Perm		pm+ov
Protected Phases	5	2		6			8		4	5
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	6	6	6	8	8	4	4	5
Switch Phase										
Minimum Initial (s)	4.0	12.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0	4.0
Minimum Split (s)	10.0	18.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5	10.0
Total Split (s)	19.0	71.0	52.0	52.0	52.0	19.0	19.0	19.0	19.0	19.0
Total Split (%)	21.1%	78.9%	57.8%	57.8%	57.8%	21.1%	21.1%	21.1%	21.1%	21.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	6.0
Lead/Lag	Lead		Lag	Lag	Lag					Lead
Lead-Lag Optimize?										
Recall Mode	None	Min	Min	Min	Min	None	None	None	None	None
v/c Ratio	0.40	0.55	0.04	0.76	0.08		0.18		0.42	0.45
Control Delay	6.4	7.6	12.4	24.3	4.1		25.9		34.4	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	6.4	7.6	12.4	24.3	4.1		25.9		34.4	6.5
Queue Length 50th (ft)	26	128	3	185	0		13		39	17
Queue Length 95th (ft)	54	244	12	327	18		47		101	85
Internal Link Dist (ft)		619		423			845		1011	
Turn Bay Length (ft)	450		80		275					325
Base Capacity (vph)	595	1602	527	1286	1156		371		374	816
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.35	0.44	0.02	0.43	0.05		0.12		0.28	0.41

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 62.4
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	193	626	29	11	510	51	15	18	8	42	53	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	12	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.98	1.00
Satd. Flow (prot)	1702	1729		1727	1748	1552		1744			1790	1567
Flt Permitted	0.23	1.00		0.39	1.00	1.00		0.84			0.84	1.00
Satd. Flow (perm)	415	1729		717	1748	1552		1491			1530	1567
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	680	32	12	554	55	16	20	9	46	58	336
RTOR Reduction (vph)	0	2	0	0	0	32	0	8	0	0	0	186
Lane Group Flow (vph)	210	710	0	12	554	23	0	37	0	0	104	150
Heavy Vehicles (%)	2%	5%	5%	0%	4%	3%	0%	14%	0%	0%	5%	2%
Turn Type	pm+pt			Perm		Perm	Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	44.0	44.0		26.8	26.8	26.8		7.7			7.7	18.9
Effective Green, g (s)	44.0	44.0		26.8	26.8	26.8		7.7			7.7	18.9
Actuated g/C Ratio	0.70	0.70		0.42	0.42	0.42		0.12			0.12	0.30
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Vehicle Extension (s)	3.0	6.0		6.0	6.0	6.0		3.0			3.0	3.0
Lane Grp Cap (vph)	517	1204		304	741	658		182			186	469
v/s Ratio Prot	0.07	c0.41			c0.32							0.06
v/s Ratio Perm	0.21			0.02		0.02		0.02			c0.07	0.04
v/c Ratio	0.41	0.59		0.04	0.75	0.04		0.20			0.56	0.32
Uniform Delay, d1	6.1	4.9		10.7	15.3	10.6		25.0			26.2	17.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.5	1.4		0.2	5.5	0.1		0.6			3.6	0.4
Delay (s)	6.6	6.4		10.8	20.9	10.7		25.5			29.8	17.6
Level of Service	A	A		B	C	B		C			C	B
Approach Delay (s)		6.4			19.8			25.5			20.4	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	17.5
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

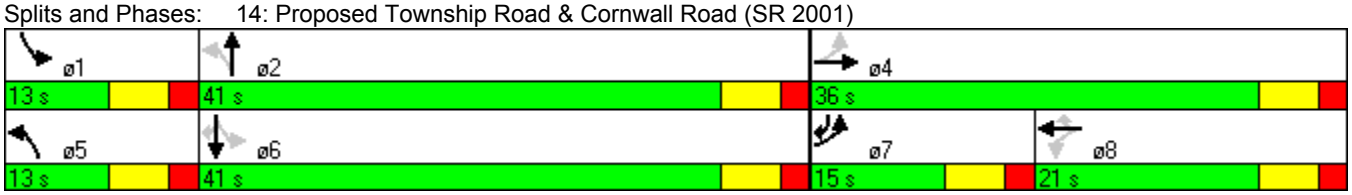
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	186	60	25	159	201	89	416	53	607	128
Lane Group Flow (vph)	202	116	27	173	218	97	454	58	660	139
Turn Type	pm+pt		Perm		Perm	pm+pt		pm+pt		pm+ov
Protected Phases	7	4		8		5	2	1	6	7
Permitted Phases	4		8		8	2		6		6
Detector Phase	7	4	8	8	8	5	2	1	6	7
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	21.0	21.0	13.0	21.0	13.0	21.0	13.0
Total Split (s)	15.0	36.0	21.0	21.0	21.0	13.0	41.0	13.0	41.0	15.0
Total Split (%)	16.7%	40.0%	23.3%	23.3%	23.3%	14.4%	45.6%	14.4%	45.6%	16.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
v/c Ratio	0.66	0.20	0.16	0.66	0.53	0.38	0.55	0.14	0.80	0.14
Control Delay	35.3	14.5	34.9	48.5	10.1	10.0	21.0	12.1	29.2	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	14.5	34.9	48.5	10.1	10.0	21.0	12.1	29.2	1.8
Queue Length 50th (ft)	88	28	14	93	0	11	239	14	247	0
Queue Length 95th (ft)	145	65	37	157	61	m24	339	m24	#562	m10
Internal Link Dist (ft)		240		318			830		570	
Turn Bay Length (ft)	180		100		100	225		400		275
Base Capacity (vph)	307	611	205	311	446	256	821	406	822	1017
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.19	0.13	0.56	0.49	0.38	0.55	0.14	0.80	0.14

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Proposed Township Road & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	186	60	47	25	159	201	89	416	2	53	607	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1740		1711	1863	1583	1702	1852		1711	1863	1583
Flt Permitted	0.36	1.00		0.68	1.00	1.00	0.16	1.00		0.36	1.00	1.00
Satd. Flow (perm)	654	1740		1229	1863	1583	281	1852		642	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	65	51	27	173	218	97	452	2	58	660	139
RTOR Reduction (vph)	0	33	0	0	0	187	0	0	0	0	0	66
Lane Group Flow (vph)	202	83	0	27	173	31	97	454	0	58	660	73
Turn Type	pm+pt			Perm		Perm	pm+pt			pm+pt		pm+ov
Protected Phases	7	4			8		5	2		1	6	7
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	27.7	27.7		12.7	12.7	12.7	44.5	38.7		44.1	38.5	47.5
Effective Green, g (s)	27.7	27.7		12.7	12.7	12.7	44.5	38.7		44.1	38.5	47.5
Actuated g/C Ratio	0.31	0.31		0.14	0.14	0.14	0.49	0.43		0.49	0.43	0.53
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	307	536		173	263	223	231	796		381	797	941
v/s Ratio Prot	c0.07	0.05			0.09		c0.03	0.25		0.01	c0.35	0.01
v/s Ratio Perm	c0.14			0.02		0.02	0.18			0.07		0.04
v/c Ratio	0.66	0.16		0.16	0.66	0.14	0.42	0.57		0.15	0.83	0.08
Uniform Delay, d1	24.9	22.6		33.9	36.6	33.9	15.9	19.4		12.8	22.8	10.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.58	0.89		1.14	0.93	0.88
Incremental Delay, d2	5.0	0.1		0.4	5.8	0.3	1.1	2.7		0.1	6.7	0.0
Delay (s)	29.9	22.8		34.4	42.4	34.1	10.4	19.9		14.7	28.0	9.2
Level of Service	C	C		C	D	C	B	B		B	C	A
Approach Delay (s)		27.3			37.6			18.3			24.0	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	170	65	117	233	111	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963				0.931	
Flt Protected			0.950		0.976	
Satd. Flow (prot)	1794	0	1770	1863	1693	0
Flt Permitted			0.950		0.976	
Satd. Flow (perm)	1794	0	1770	1863	1693	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	525			320	264	
Travel Time (s)	14.3			7.3	7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	71	127	253	121	125
Shared Lane Traffic (%)						
Lane Group Flow (vph)	256	0	127	253	246	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 42.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	170	65	117	233	111	115
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	185	71	127	253	121	125
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				320		
pX, platoon unblocked					0.97	
vC, conflicting volume			255		728	220
vC1, stage 1 conf vol					220	
vC2, stage 2 conf vol					508	
vCu, unblocked vol			255		701	220
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			90		76	85
cM capacity (veh/h)			1310		513	820

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	255	127	253	246
Volume Left	0	127	0	121
Volume Right	71	0	0	125
cSH	1700	1310	1700	634
Volume to Capacity	0.15	0.10	0.15	0.39
Queue Length 95th (ft)	0	8	0	46
Control Delay (s)	0.0	8.0	0.0	14.2
Lane LOS		A		B
Approach Delay (s)	0.0	2.7		14.2
Approach LOS				B

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	123	151	116	228	112	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		175	75		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.932	
Flt Protected			0.950		0.976	
Satd. Flow (prot)	1863	1583	1770	1863	1694	0
Flt Permitted			0.950		0.976	
Satd. Flow (perm)	1863	1583	1770	1863	1694	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	356			525	240	
Travel Time (s)	9.7			11.9	6.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	134	164	126	248	122	122
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	164	126	248	244	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 36.0%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	123	151	116	228	112	112
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	134	164	126	248	122	122
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1073			845		
pX, platoon unblocked						
vC, conflicting volume			298		634	134
vC1, stage 1 conf vol					134	
vC2, stage 2 conf vol					500	
vCu, unblocked vol			298		634	134
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			90		77	87
cM capacity (veh/h)			1263		526	915

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	134	164	126	248	243
Volume Left	0	0	126	0	122
Volume Right	0	164	0	0	122
cSH	1700	1700	1263	1700	668
Volume to Capacity	0.08	0.10	0.10	0.15	0.36
Queue Length 95th (ft)	0	0	8	0	42
Control Delay (s)	0.0	0.0	8.2	0.0	13.4
Lane LOS			A		B
Approach Delay (s)	0.0		2.8		13.4
Approach LOS					B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	273	12	1	339	3	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994				0.966	
Flt Protected			0.950		0.964	
Satd. Flow (prot)	1852	0	1770	1863	1735	0
Flt Permitted			0.950		0.964	
Satd. Flow (perm)	1852	0	1770	1863	1735	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	717			356	195	
Travel Time (s)	19.6			9.7	5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	297	13	1	368	3	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	310	0	1	368	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 27.8% ICU Level of Service A
Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	273	12	1	339	3	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	297	13	1	368	3	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	717			1201		
pX, platoon unblocked						
vC, conflicting volume			310		674	303
vC1, stage 1 conf vol					303	
vC2, stage 2 conf vol					371	
vCu, unblocked vol			310		674	303
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1251		605	736

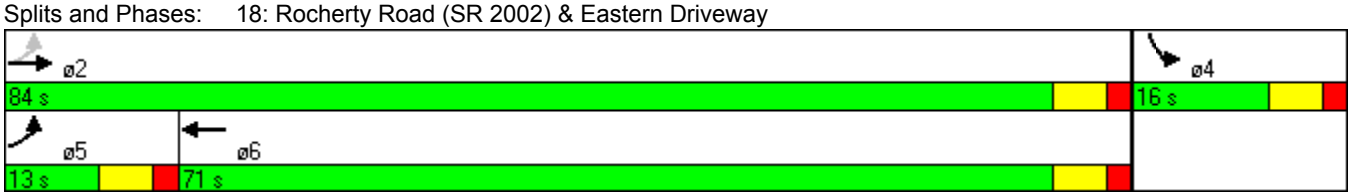
Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	310	1	368	4
Volume Left	0	1	0	3
Volume Right	13	0	0	1
cSH	1700	1251	1700	634
Volume to Capacity	0.18	0.00	0.22	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	7.9	0.0	10.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.0		10.7
Approach LOS				B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Volume (vph)	29	751	774	53
Lane Group Flow (vph)	32	816	871	105
Turn Type	pm+pt			
Protected Phases	5	2	6	4
Permitted Phases	2			
Detector Phase	5	2	6	4
Switch Phase				
Minimum Initial (s)	7.0	15.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	13.0
Total Split (s)	13.0	84.0	71.0	16.0
Total Split (%)	13.0%	84.0%	71.0%	16.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	None	None	None
v/c Ratio	0.08	0.60	0.67	0.33
Control Delay	3.4	7.4	12.9	27.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.4	7.4	12.9	27.8
Queue Length 50th (ft)	3	149	162	24
Queue Length 95th (ft)	9	242	475	96
Internal Link Dist (ft)		400	1268	325
Turn Bay Length (ft)	225			
Base Capacity (vph)	398	1737	1688	402
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.08	0.47	0.52	0.26

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 60.2
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 18: Rocherty Road (SR 2002) & Eastern Driveway



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	29	751	774	28	53	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	1.00		0.94	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1676	1825	1891		1703	
Flt Permitted	0.15	1.00	1.00		0.97	
Satd. Flow (perm)	261	1825	1891		1703	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	816	841	30	58	47
RTOR Reduction (vph)	0	0	2	0	29	0
Lane Group Flow (vph)	32	816	869	0	76	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	45.6	45.6	37.7		6.4	
Effective Green, g (s)	45.6	45.6	37.7		6.4	
Actuated g/C Ratio	0.71	0.71	0.59		0.10	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	228	1300	1114		170	
v/s Ratio Prot	0.00	c0.45	c0.46		c0.04	
v/s Ratio Perm	0.10					
v/c Ratio	0.14	0.63	0.78		0.45	
Uniform Delay, d1	7.7	4.8	10.0		27.1	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	1.0	3.6		1.9	
Delay (s)	8.0	5.7	13.6		29.0	
Level of Service	A	A	B		C	
Approach Delay (s)		5.8	13.6		29.0	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	780	815	2	0	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1881	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1881	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	848	886	2	0	55
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	848	888	0	0	55
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 53.0%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	780	815	2	0	51
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	848	886	2	0	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485	480			
pX, platoon unblocked	0.60				0.77	0.60
vC, conflicting volume	888				1735	887
vC1, stage 1 conf vol					887	
vC2, stage 2 conf vol					848	
vCu, unblocked vol	486				822	484
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	84
cM capacity (veh/h)	650				336	352

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	848	888	55
Volume Left	0	0	0
Volume Right	0	2	55
cSH	1700	1700	352
Volume to Capacity	0.50	0.52	0.16
Queue Length 95th (ft)	0	0	14
Control Delay (s)	0.0	0.0	17.1
Lane LOS			C
Approach Delay (s)	0.0	0.0	17.1
Approach LOS			C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	24	483	12	16	692
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	125	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			450
Travel Time (s)	4.7		5.2			6.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Adj. Flow (vph)	0	26	525	13	17	721
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	525	13	17	721
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			Yes
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	24	483	12	16	692
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Hourly flow rate (vph)	0	26	525	13	17	721
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			340			
pX, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	1281	525			538	
vC1, stage 1 conf vol	525					
vC2, stage 2 conf vol	756					
vCu, unblocked vol	1244	361			376	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			98	
cM capacity (veh/h)	385	585			1012	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	26	525	13	17	721
Volume Left	0	0	0	17	0
Volume Right	26	0	13	0	0
cSH	585	1700	1700	1012	1700
Volume to Capacity	0.04	0.31	0.01	0.02	0.42
Queue Length 95th (ft)	3	0	0	1	0
Control Delay (s)	11.4	0.0	0.0	8.6	0.0
Lane LOS	B			A	
Approach Delay (s)	11.4	0.0		0.2	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	78	0	507	630	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			150
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	1863	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	1583
Link Speed (mph)	25			45	45	
Link Distance (ft)	247			450	910	
Travel Time (s)	6.7			6.8	13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	85	0	551	685	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	85	0	551	685	53
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			11	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 44.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	78	0	507	630	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	0	551	685	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				790	910	
pX, platoon unblocked	0.73	0.68	0.68			
vC, conflicting volume	1236	685	738			
vC1, stage 1 conf vol	685					
vC2, stage 2 conf vol	551					
vCu, unblocked vol	799	295	374			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	83	100			
cM capacity (veh/h)	436	504	802			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	85	551	685	53
Volume Left	0	0	0	0
Volume Right	85	0	0	53
cSH	504	1700	1700	1700
Volume to Capacity	0.17	0.32	0.40	0.03
Queue Length 95th (ft)	15	0	0	0
Control Delay (s)	13.6	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	13.6	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	106	8	0	200	47	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992					
Flt Protected					0.950	
Satd. Flow (prot)	1831	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1831	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	151	9	0	270	51	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	0	0	270	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 20.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	106	8	0	200	47	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Hourly flow rate (vph)	151	9	0	270	51	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			160		426	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			160		426	156
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1419		585	890

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	160	270	51
Volume Left	0	0	51
Volume Right	9	0	0
cSH	1700	1419	585
Volume to Capacity	0.09	0.00	0.09
Queue Length 95th (ft)	0	0	7
Control Delay (s)	0.0	0.0	11.7
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.7
Approach LOS			B

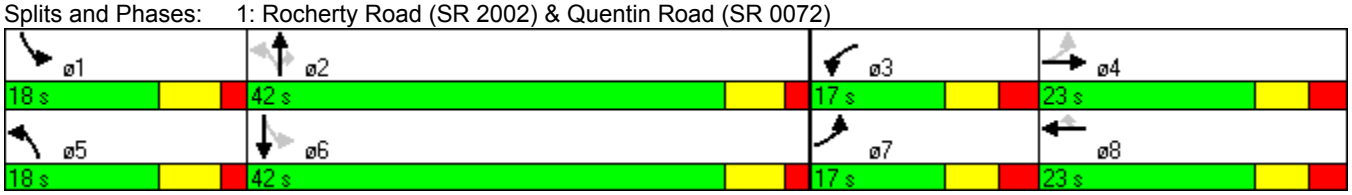
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	145	153	222	172	115	22	692	126	230	646
Lane Group Flow (vph)	158	188	241	187	125	24	744	137	247	874
Turn Type	pm+pt		Prot		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	17.0	23.0	17.0	23.0	23.0	18.0	42.0	42.0	18.0	42.0
Total Split (%)	17.0%	23.0%	17.0%	23.0%	23.0%	18.0%	42.0%	42.0%	18.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.53	0.75	0.72	0.68	0.36	0.08	0.56	0.20	0.68	0.51
Control Delay	32.9	58.2	56.8	53.4	10.0	12.2	27.4	4.8	24.9	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.9	58.2	56.8	53.4	10.0	12.2	27.4	4.8	24.9	16.7
Queue Length 50th (ft)	74	111	77	113	0	7	200	0	104	162
Queue Length 95th (ft)	127	#205	#128	187	50	19	260	39	m#165	279
Internal Link Dist (ft)		569		654			721			1806
Turn Bay Length (ft)	250		225		275	150		275	350	
Base Capacity (vph)	302	270	335	292	364	365	1340	669	368	1721
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.70	0.72	0.64	0.34	0.07	0.56	0.20	0.67	0.51

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 76 (76%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	153	21	222	172	115	22	692	126	230	646	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	13	14	10	12	12	11	12	12
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1654		3349	1824	1616	1613	3628	1576	1736	3493	
Flt Permitted	0.52	1.00		0.95	1.00	1.00	0.29	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	912	1654		3349	1824	1616	485	3628	1576	402	3493	
Peak-hour factor, PHF	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.93	0.92	0.92
Adj. Flow (vph)	158	165	23	241	187	125	24	744	137	247	702	172
RTOR Reduction (vph)	0	5	0	0	0	106	0	0	86	0	18	0
Lane Group Flow (vph)	158	183	0	241	187	19	24	744	51	247	856	0
Heavy Vehicles (%)	4%	9%	0%	3%	6%	5%	6%	1%	4%	2%	2%	1%
Turn Type	pm+pt			Prot		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	24.8	14.9		10.0	15.0	15.0	40.1	36.9	36.9	54.6	44.9	
Effective Green, g (s)	24.8	14.9		10.0	15.0	15.0	40.1	36.9	36.9	54.6	44.9	
Actuated g/C Ratio	0.25	0.15		0.10	0.15	0.15	0.40	0.37	0.37	0.55	0.45	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	300	246		335	274	242	231	1339	582	369	1568	
v/s Ratio Prot	0.05	c0.11		c0.07	0.10		0.00	0.21		c0.07	0.25	
v/s Ratio Perm	0.08					0.01	0.04		0.03	c0.29		
v/c Ratio	0.53	0.74		0.72	0.68	0.08	0.10	0.56	0.09	0.67	0.55	
Uniform Delay, d1	31.3	40.7		43.6	40.2	36.5	18.3	25.0	20.6	14.4	20.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.20	0.85	
Incremental Delay, d2	2.2	12.2		7.7	7.4	0.2	0.3	1.7	0.3	4.6	1.2	
Delay (s)	33.5	52.9		51.4	47.7	36.7	18.6	26.7	20.9	21.9	18.3	
Level of Service	C	D		D	D	D	B	C	C	C	B	
Approach Delay (s)		44.0			46.8			25.6			19.1	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

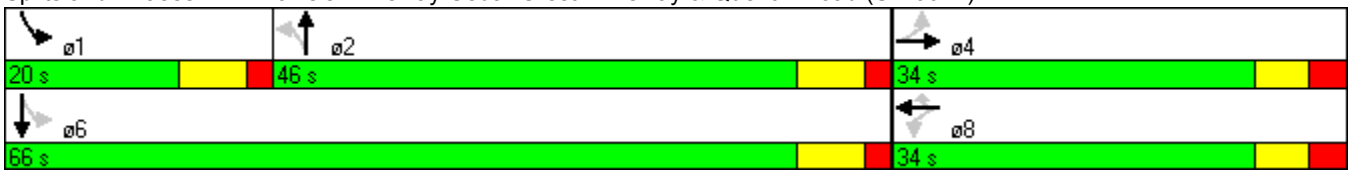
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	13	9	215	10	234	104	656	238	763
Lane Group Flow (vph)	0	124	0	245	254	132	988	259	836
Turn Type	Perm		Perm		Perm	Perm		pm+pt	
Protected Phases		4		8			2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	22.0	22.0	13.0	22.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	46.0	46.0	20.0	66.0
Total Split (%)	34.0%	34.0%	34.0%	34.0%	34.0%	46.0%	46.0%	20.0%	66.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag						Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio		0.30		0.82	0.44	0.48	0.65	0.73	0.38
Control Delay		13.3		57.6	6.4	17.9	12.9	40.3	8.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.3		57.6	6.4	17.9	12.9	40.3	8.1
Queue Length 50th (ft)		19		143	0	27	93	122	80
Queue Length 95th (ft)		23		#253	58	43	122	#231	137
Internal Link Dist (ft)		216		637			1806		599
Turn Bay Length (ft)					115	225		350	
Base Capacity (vph)		452		339	617	276	1510	356	2184
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.27		0.72	0.41	0.48	0.65	0.73	0.38

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 99 (99%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	9	66	215	10	234	104	656	253	238	763	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.91			1.00	0.85	1.00	0.96		1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1595			1796	1599	1832	3476		1702	3513	
Flt Permitted		0.90			0.67	1.00	0.34	1.00		0.15	1.00	
Satd. Flow (perm)		1446			1254	1599	650	3476		273	3513	
Peak-hour factor, PHF	0.54	0.56	0.79	0.92	0.92	0.92	0.79	0.92	0.92	0.92	0.93	0.81
Adj. Flow (vph)	24	16	84	234	11	254	132	713	275	259	820	16
RTOR Reduction (vph)	0	64	0	0	0	194	0	38	0	0	1	0
Lane Group Flow (vph)	0	60	0	0	245	60	132	950	0	259	835	0
Heavy Vehicles (%)	0%	0%	3%	2%	2%	2%	1%	2%	2%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		23.8			23.8	23.8	42.4	42.4		62.2	62.2	
Effective Green, g (s)		23.8			23.8	23.8	42.4	42.4		62.2	62.2	
Actuated g/C Ratio		0.24			0.24	0.24	0.42	0.42		0.62	0.62	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)		4.0			4.0	4.0	6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		344			298	381	276	1474		353	2185	
v/s Ratio Prot								0.27		c0.09	0.24	
v/s Ratio Perm		0.04			c0.20	0.04	0.20			c0.36		
v/c Ratio		0.17			0.82	0.16	0.48	0.64		0.73	0.38	
Uniform Delay, d1		30.3			36.1	30.2	20.8	22.8		13.9	9.4	
Progression Factor		1.00			1.00	1.00	0.53	0.49		2.36	0.77	
Incremental Delay, d2		0.3			17.2	0.3	5.2	1.9		8.7	0.4	
Delay (s)		30.6			53.3	30.4	16.2	13.1		41.6	7.6	
Level of Service		C			D	C	B	B		D	A	
Approach Delay (s)		30.6			41.7			13.5			15.6	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

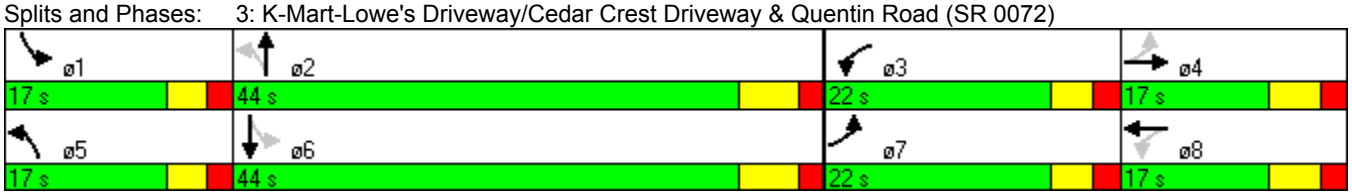
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	277	37	81	40	56	788	192	786
Lane Group Flow (vph)	315	163	133	264	68	961	204	1018
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	3.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	7.9	21.4
Total Split (s)	22.0	17.0	22.0	17.0	17.0	44.0	17.0	44.0
Total Split (%)	22.0%	17.0%	22.0%	17.0%	17.0%	44.0%	17.0%	44.0%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	3.0	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	4.9	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.88	0.51	0.39	0.81	0.24	0.67	0.62	0.63
Control Delay	55.0	28.4	28.1	37.0	7.0	12.3	27.4	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	28.4	28.1	37.0	7.0	12.3	27.4	20.1
Queue Length 50th (ft)	162	53	60	60	8	84	65	183
Queue Length 95th (ft)	#291	65	69	105	m16	115	156	216
Internal Link Dist (ft)		199		207		599		1573
Turn Bay Length (ft)					200		325	
Base Capacity (vph)	358	320	460	347	371	1440	354	1623
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.51	0.29	0.76	0.18	0.67	0.58	0.63

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	37	89	81	40	178	56	788	72	192	786	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	12	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.88		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1650		1902	1804		1796	3534		1814	3511	
Flt Permitted	0.27	1.00		0.65	1.00		0.19	1.00		0.16	1.00	
Satd. Flow (perm)	478	1650		1309	1804		365	3534		300	3511	
Peak-hour factor, PHF	0.88	0.62	0.86	0.61	0.77	0.84	0.82	0.92	0.69	0.94	0.92	0.94
Adj. Flow (vph)	315	60	103	133	52	212	68	857	104	204	854	164
RTOR Reduction (vph)	0	59	0	0	149	0	0	9	0	0	14	0
Lane Group Flow (vph)	315	104	0	133	115	0	68	952	0	204	1004	0
Heavy Vehicles (%)	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.8	15.8		20.7	9.8		46.7	40.5		55.3	44.8	
Effective Green, g (s)	31.8	15.8		20.7	9.8		46.7	40.5		55.3	44.8	
Actuated g/C Ratio	0.32	0.16		0.21	0.10		0.47	0.40		0.55	0.45	
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0		3.0	6.0	
Lane Grp Cap (vph)	357	261		336	177		259	1431		325	1573	
v/s Ratio Prot	c0.15	0.06		0.04	0.06		0.02	0.27		c0.07	c0.29	
v/s Ratio Perm	c0.13			0.04			0.11			0.28		
v/c Ratio	0.88	0.40		0.40	0.65		0.26	0.67		0.63	0.64	
Uniform Delay, d1	29.3	37.8		33.8	43.5		15.7	24.2		14.7	21.3	
Progression Factor	1.00	1.00		1.00	1.00		0.50	0.41		1.68	0.86	
Incremental Delay, d2	21.7	1.0		0.8	8.3		0.5	2.1		3.4	1.8	
Delay (s)	51.0	38.8		34.6	51.7		8.4	12.0		28.2	20.0	
Level of Service	D	D		C	D		A	B		C	C	
Approach Delay (s)		46.8			46.0			11.8			21.4	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.9
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

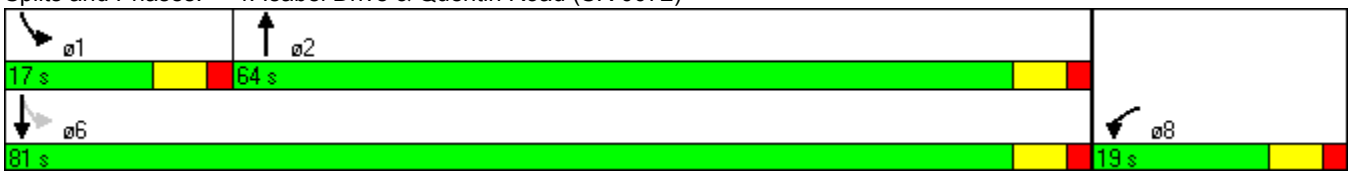
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	34	1184	89	1303
Lane Group Flow (vph)	142	1376	97	1386
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	19.0	64.0	17.0	81.0
Total Split (%)	19.0%	64.0%	17.0%	81.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.54	0.57	0.31	0.48
Control Delay	22.1	6.8	5.2	4.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.1	6.8	5.2	4.3
Queue Length 50th (ft)	23	160	10	110
Queue Length 95th (ft)	78	m196	25	187
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			250	
Base Capacity (vph)	343	2423	367	2880
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.41	0.57	0.26	0.48

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 71 (71%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	34	97	1184	82	89	1303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	12	12	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.90		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1933		3521		1753	3628
Flt Permitted	0.99		1.00		0.14	1.00
Satd. Flow (perm)	1933		3521		255	3628
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.94
Adj. Flow (vph)	37	105	1287	89	97	1386
RTOR Reduction (vph)	96	0	4	0	0	0
Lane Group Flow (vph)	46	0	1372	0	97	1386
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	8.6		67.6		79.4	79.4
Effective Green, g (s)	8.6		67.6		79.4	79.4
Actuated g/C Ratio	0.09		0.68		0.79	0.79
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	166		2380		289	2881
v/s Ratio Prot	c0.02		c0.39		0.02	c0.38
v/s Ratio Perm					0.25	
v/c Ratio	0.28		0.58		0.34	0.48
Uniform Delay, d1	42.8		8.6		5.5	3.4
Progression Factor	1.00		0.68		1.00	1.00
Incremental Delay, d2	0.9		0.7		0.7	0.6
Delay (s)	43.7		6.5		6.2	4.0
Level of Service	D		A		A	A
Approach Delay (s)	43.7		6.5			4.2
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		

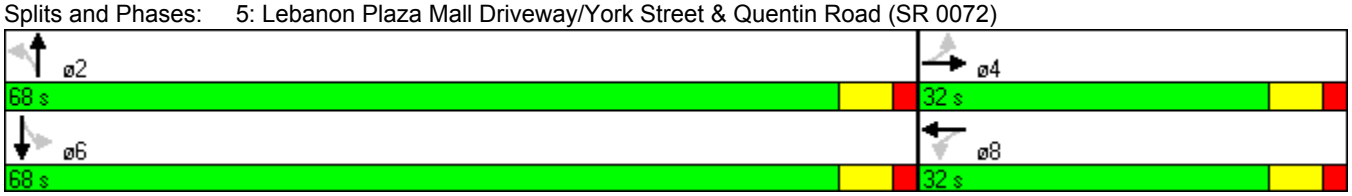
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	50	64	150	111	96	899	45	1078
Lane Group Flow (vph)	60	204	163	196	112	1042	49	1274
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0
Total Split (s)	32.0	32.0	32.0	32.0	68.0	68.0	68.0	68.0
Total Split (%)	32.0%	32.0%	32.0%	32.0%	68.0%	68.0%	68.0%	68.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.25	0.47	0.70	0.46	0.60	0.49	0.19	0.59
Control Delay	28.0	19.6	45.0	28.1	27.1	9.5	9.9	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	19.6	45.0	28.1	27.1	9.5	9.9	10.7
Queue Length 50th (ft)	20	42	62	65	27	119	9	160
Queue Length 95th (ft)	60	115	164	121	105	218	31	289
Internal Link Dist (ft)		346		1245		592		1986
Turn Bay Length (ft)			175		225		175	
Base Capacity (vph)	384	634	367	666	261	2949	358	2988
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.32	0.44	0.29	0.43	0.35	0.14	0.43

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 75.1
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	64	109	150	111	37	96	899	60	45	1078	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1629		1685	1845		1778	3461		1702	3509	
Flt Permitted	0.60	1.00		0.58	1.00		0.16	1.00		0.23	1.00	
Satd. Flow (perm)	1077	1629		1027	1845		308	3461		420	3509	
Peak-hour factor, PHF	0.83	0.84	0.85	0.92	0.71	0.92	0.86	0.92	0.92	0.92	0.93	0.53
Adj. Flow (vph)	60	76	128	163	156	40	112	977	65	49	1159	115
RTOR Reduction (vph)	0	63	0	0	9	0	0	5	0	0	8	0
Lane Group Flow (vph)	60	141	0	163	187	0	112	1037	0	49	1266	0
Heavy Vehicles (%)	0%	0%	1%	1%	0%	4%	1%	3%	0%	3%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		45.7	45.7		45.7	45.7	
Effective Green, g (s)	17.0	17.0		17.0	17.0		45.7	45.7		45.7	45.7	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.61	0.61		0.61	0.61	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	245	371		234	420		188	2117		257	2147	
v/s Ratio Prot		0.09			0.10			0.30			0.36	
v/s Ratio Perm	0.06			c0.16			c0.36			0.12		
v/c Ratio	0.24	0.38		0.70	0.44		0.60	0.49		0.19	0.59	
Uniform Delay, d1	23.6	24.4		26.5	24.8		8.9	8.0		6.4	8.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.9		9.4	1.0		5.0	0.2		0.4	0.4	
Delay (s)	24.3	25.3		35.8	25.8		13.9	8.2		6.7	9.2	
Level of Service	C	C		D	C		B	A		A	A	
Approach Delay (s)		25.1			30.4			8.8			9.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	74.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		

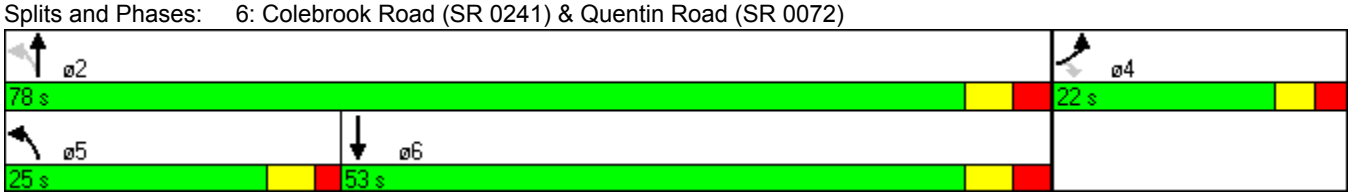
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	113	375	288	865	1000
Lane Group Flow (vph)	123	383	313	911	1114
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	8.5	16.5	16.5
Total Split (s)	22.0	22.0	25.0	78.0	53.0
Total Split (%)	22.0%	22.0%	25.0%	78.0%	53.0%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.51	0.73	0.65	0.36	0.80
Control Delay	40.8	14.3	21.3	5.4	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	14.3	21.3	5.4	25.7
Queue Length 50th (ft)	53	9	73	75	243
Queue Length 95th (ft)	125	105	197	128	361
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	250		350		
Base Capacity (vph)	373	617	561	3295	2186
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.62	0.56	0.28	0.51

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 76
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	113	375	288	865	1000	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	12	12
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	5.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1500	1771	3628	3445	
Flt Permitted	0.95	1.00	0.11	1.00	1.00	
Satd. Flow (perm)	1660	1500	206	3628	3445	
Peak-hour factor, PHF	0.92	0.98	0.92	0.95	0.96	0.92
Adj. Flow (vph)	123	383	313	911	1042	72
RTOR Reduction (vph)	0	308	0	0	5	0
Lane Group Flow (vph)	123	75	313	911	1109	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	4%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.0	11.0	52.6	52.6	30.7	
Effective Green, g (s)	11.0	11.0	52.6	52.6	30.7	
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.41	
Clearance Time (s)	5.5	5.5	5.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	242	218	483	2524	1399	
v/s Ratio Prot	c0.07		c0.14	0.25	c0.32	
v/s Ratio Perm		0.05	0.31			
v/c Ratio	0.51	0.35	0.65	0.36	0.79	
Uniform Delay, d1	29.8	29.1	15.3	4.7	19.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	1.0	3.0	0.2	3.9	
Delay (s)	31.5	30.0	18.3	4.9	23.5	
Level of Service	C	C	B	A	C	
Approach Delay (s)	30.4			8.3	23.5	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	75.6	Sum of lost time (s)	17.5
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

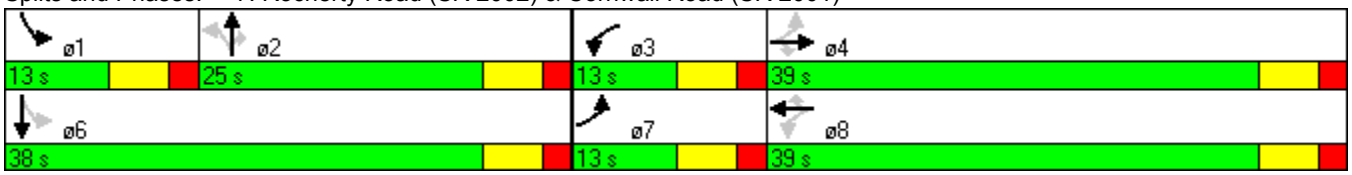
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	89	318	75	77	352	117	66	168	65	117	199
Lane Group Flow (vph)	97	346	82	84	383	127	72	183	71	127	343
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt	
Protected Phases	7	4		3	8			2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	7	4	4	3	8	8	2	2	2	1	6
Switch Phase											
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	21.0	13.0	21.0	21.0	21.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	39.0	39.0	13.0	39.0	39.0	25.0	25.0	25.0	13.0	38.0
Total Split (%)	14.4%	43.3%	43.3%	14.4%	43.3%	43.3%	27.8%	27.8%	27.8%	14.4%	42.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio	0.36	0.67	0.16	0.29	0.74	0.24	0.21	0.30	0.12	0.26	0.40
Control Delay	18.6	35.0	5.7	17.1	37.7	5.1	29.0	27.7	8.0	8.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.6	35.0	5.7	17.1	37.7	5.1	29.0	27.7	8.0	8.2	6.8
Queue Length 50th (ft)	33	173	0	28	196	0	31	81	0	16	30
Queue Length 95th (ft)	53	235	28	47	262	35	75	156	34	32	58
Internal Link Dist (ft)		1052			405			731			260
Turn Bay Length (ft)	225		175	225		325	175		350	240	
Base Capacity (vph)	271	676	638	294	686	670	337	615	570	495	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.51	0.13	0.29	0.56	0.19	0.21	0.30	0.12	0.26	0.40

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 39 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	318	75	77	352	117	66	168	65	117	199	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1727	1844	1599	1702	1872	1607	1754	1872	1591	1702	1746	
Flt Permitted	0.29	1.00	1.00	0.34	1.00	1.00	0.55	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	522	1844	1599	616	1872	1607	1024	1872	1591	917	1746	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	97	346	82	84	383	127	72	183	71	127	207	136
RTOR Reduction (vph)	0	0	59	0	0	92	0	0	49	0	22	0
Lane Group Flow (vph)	97	346	23	84	383	35	72	183	22	127	321	0
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	2%	2%	3%	0%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	30.6	25.0	25.0	30.6	25.0	25.0	28.4	28.4	28.4	41.4	41.4	
Effective Green, g (s)	30.6	25.0	25.0	30.6	25.0	25.0	28.4	28.4	28.4	41.4	41.4	
Actuated g/C Ratio	0.34	0.28	0.28	0.34	0.28	0.28	0.32	0.32	0.32	0.46	0.46	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	7.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	252	512	444	277	520	446	323	591	502	483	803	
v/s Ratio Prot	c0.02	0.19		0.02	c0.20			0.10		0.02	c0.18	
v/s Ratio Perm	0.11		0.01	0.08		0.02	0.07		0.01	0.10		
v/c Ratio	0.38	0.68	0.05	0.30	0.74	0.08	0.22	0.31	0.04	0.26	0.40	
Uniform Delay, d1	21.6	28.9	23.8	21.2	29.5	24.0	22.7	23.4	21.4	14.5	16.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.41	0.33	
Incremental Delay, d2	1.0	3.8	0.1	0.6	5.7	0.1	1.6	1.4	0.2	0.3	1.4	
Delay (s)	22.6	32.7	23.9	21.8	35.3	24.1	24.3	24.7	21.5	6.3	6.7	
Level of Service	C	C	C	C	D	C	C	C	C	A	A	
Approach Delay (s)		29.5			31.0			23.9			6.6	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

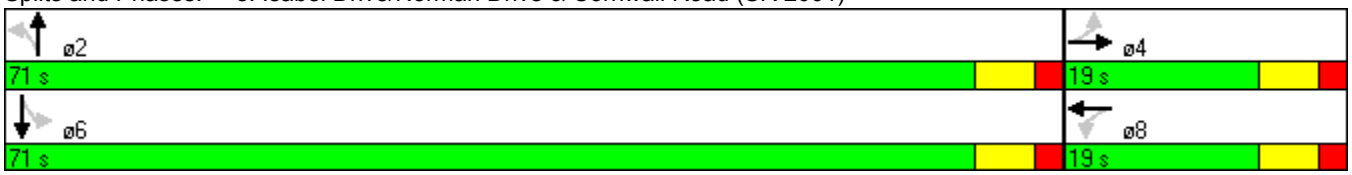
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	36	3	3	6	72	546	7	618
Lane Group Flow (vph)	0	144	0	28	0	674	0	700
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	15.0	15.0	15.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	21.0	21.0	21.0	21.0
Total Split (s)	19.0	19.0	19.0	19.0	71.0	71.0	71.0	71.0
Total Split (%)	21.1%	21.1%	21.1%	21.1%	78.9%	78.9%	78.9%	78.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio		0.55		0.14		0.53		0.50
Control Delay		21.9		22.1		5.0		5.7
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		21.9		22.1		5.0		5.7
Queue Length 50th (ft)		23		5		35		108
Queue Length 95th (ft)		76		29		236		220
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)								
Base Capacity (vph)		331		273		1264		1414
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.44		0.10		0.53		0.50

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 60 (67%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	3	94	3	6	17	72	546	3	7	618	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	11	12	12	11	12	12
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.90			0.91			1.00			1.00	
Flt Protected		0.99			0.99			0.99			1.00	
Satd. Flow (prot)		1855			1881			1907			1855	
Flt Permitted		0.90			0.94			0.86			0.99	
Satd. Flow (perm)		1689			1783			1648			1843	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	3	102	3	7	18	78	593	3	8	672	20
RTOR Reduction (vph)	0	92	0	0	16	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	52	0	0	12	0	0	674	0	0	699	0
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	0%	0%	0%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.0			9.0			69.0			69.0	
Effective Green, g (s)		9.0			9.0			69.0			69.0	
Actuated g/C Ratio		0.10			0.10			0.77			0.77	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		169			178			1263			1413	
v/s Ratio Prot												
v/s Ratio Perm		c0.03			0.01			c0.41			0.38	
v/c Ratio		0.31			0.07			0.53			0.49	
Uniform Delay, d1		37.6			36.7			4.1			3.9	
Progression Factor		1.00			1.00			0.73			1.00	
Incremental Delay, d2		1.0			0.2			1.5			1.2	
Delay (s)		38.7			36.9			4.5			5.2	
Level of Service		D			D			A			A	
Approach Delay (s)		38.7			36.9			4.5			5.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		

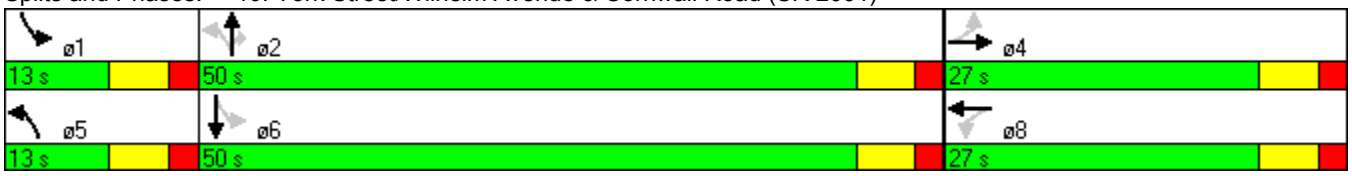
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	96	60	168	71	42	337	209	58	351
Lane Group Flow (vph)	0	199	0	311	46	366	227	63	544
Turn Type	Perm		Perm		pm+pt		Perm	pm+pt	
Protected Phases		4		8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	8	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	27.0	27.0	27.0	27.0	13.0	50.0	50.0	13.0	50.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	14.4%	55.6%	55.6%	14.4%	55.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.46		0.71	0.13	0.51	0.30	0.13	0.79
Control Delay		26.9		36.1	8.3	18.8	3.3	8.3	26.9
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		26.9		36.1	8.3	18.8	3.3	8.3	26.9
Queue Length 50th (ft)		72		127	9	127	0	12	205
Queue Length 95th (ft)		168		#331	21	196	36	27	318
Internal Link Dist (ft)		1245		1105		839			1040
Turn Bay Length (ft)					225		400	175	
Base Capacity (vph)		432		438	342	1285	1162	469	1202
Starvation Cap Reductn		0		0	0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0	0
Reduced v/c Ratio		0.46		0.71	0.13	0.28	0.20	0.13	0.45

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 67.6
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: York Street/Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	60	28	168	71	47	42	337	209	58	351	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.98			0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected		0.97			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1793			1750		1805	1863	1583	1805	1729	
Flt Permitted		0.70			0.73		0.23	1.00	1.00	0.43	1.00	
Satd. Flow (perm)		1293			1311		439	1863	1583	826	1729	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	65	30	183	77	51	46	366	227	63	382	162
RTOR Reduction (vph)	0	6	0	0	7	0	0	0	142	0	21	0
Lane Group Flow (vph)	0	193	0	0	304	0	46	366	85	63	523	0
Heavy Vehicles (%)	1%	2%	0%	2%	2%	9%	0%	2%	2%	0%	5%	5%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		22.2			22.2		29.6	26.0	26.0	29.6	26.0	
Effective Green, g (s)		22.2			22.2		29.6	26.0	26.0	29.6	26.0	
Actuated g/C Ratio		0.32			0.32		0.42	0.37	0.37	0.42	0.37	
Clearance Time (s)		6.0			6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		411			417		257	694	590	401	644	
v/s Ratio Prot							c0.01	0.20		0.01	c0.30	
v/s Ratio Perm		0.15			c0.23		0.07		0.05	0.06		
v/c Ratio		0.47			0.73		0.18	0.53	0.14	0.16	0.81	
Uniform Delay, d1		19.1			21.1		13.2	17.1	14.5	12.2	19.7	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.8			6.3		0.3	0.7	0.1	0.2	7.7	
Delay (s)		19.9			27.4		13.5	17.8	14.6	12.4	27.4	
Level of Service		B			C		B	B	B	B	C	
Approach Delay (s)		19.9			27.4			16.4			25.9	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

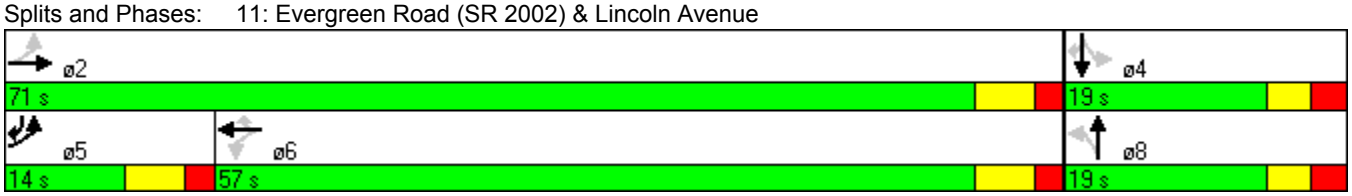
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	84	397	5	435	37	21	16	34	38	107
Lane Group Flow (vph)	91	456	5	473	40	0	41	0	78	116
Turn Type	pm+pt		Perm		Perm	Perm		Perm		pm+ov
Protected Phases	5	2		6			8		4	5
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	6	6	6	8	8	4	4	5
Switch Phase										
Minimum Initial (s)	4.0	12.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0	4.0
Minimum Split (s)	10.0	18.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5	10.0
Total Split (s)	14.0	71.0	57.0	57.0	57.0	19.0	19.0	19.0	19.0	14.0
Total Split (%)	15.6%	78.9%	63.3%	63.3%	63.3%	21.1%	21.1%	21.1%	21.1%	15.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	6.0
Lead/Lag	Lead		Lag	Lag	Lag					Lead
Lead-Lag Optimize?										
Recall Mode	None	Min	Min	Min	Min	None	None	None	None	None
v/c Ratio	0.15	0.34	0.01	0.50	0.05		0.16		0.29	0.21
Control Delay	4.3	4.9	10.4	14.4	4.3		23.7		25.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	4.3	4.9	10.4	14.4	4.3		23.7		25.4	4.4
Queue Length 50th (ft)	9	58	1	124	0		11		23	0
Queue Length 95th (ft)	25	122	7	231	15		39		65	29
Internal Link Dist (ft)		619		423			845		1011	
Turn Bay Length (ft)	450		80		275					325
Base Capacity (vph)	623	1679	824	1584	1396		444		456	592
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.15	0.27	0.01	0.30	0.03		0.09		0.17	0.20

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 50.2
Natural Cycle: 45
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	397	22	5	435	37	21	16	1	34	38	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	12	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1702	1694		1727	1748	1537		1879			1837	1583
Flt Permitted	0.34	1.00		0.50	1.00	1.00		0.78			0.83	1.00
Satd. Flow (perm)	601	1694		909	1748	1537		1512			1558	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	432	24	5	473	40	23	17	1	37	41	116
RTOR Reduction (vph)	0	2	0	0	0	21	0	1	0	0	0	93
Lane Group Flow (vph)	91	454	0	5	473	19	0	40	0	0	78	23
Heavy Vehicles (%)	2%	7%	8%	0%	4%	4%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt			Perm		Perm	Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	37.4	37.4		25.5	25.5	25.5		4.8			4.8	10.7
Effective Green, g (s)	37.4	37.4		25.5	25.5	25.5		4.8			4.8	10.7
Actuated g/C Ratio	0.70	0.70		0.47	0.47	0.47		0.09			0.09	0.20
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Vehicle Extension (s)	3.0	6.0		6.0	6.0	6.0		3.0			3.0	3.0
Lane Grp Cap (vph)	540	1180		432	830	730		135			139	315
v/s Ratio Prot	0.02	c0.27			c0.27							0.01
v/s Ratio Perm	0.10			0.01		0.01		0.03			c0.05	0.01
v/c Ratio	0.17	0.38		0.01	0.57	0.03		0.30			0.56	0.07
Uniform Delay, d1	3.7	3.4		7.4	10.2	7.5		22.9			23.4	17.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	0.6		0.0	1.9	0.0		1.2			5.1	0.1
Delay (s)	3.8	4.0		7.5	12.0	7.5		24.1			28.5	17.6
Level of Service	A	A		A	B	A		C			C	B
Approach Delay (s)		3.9			11.6			24.1			22.0	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	17.5
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

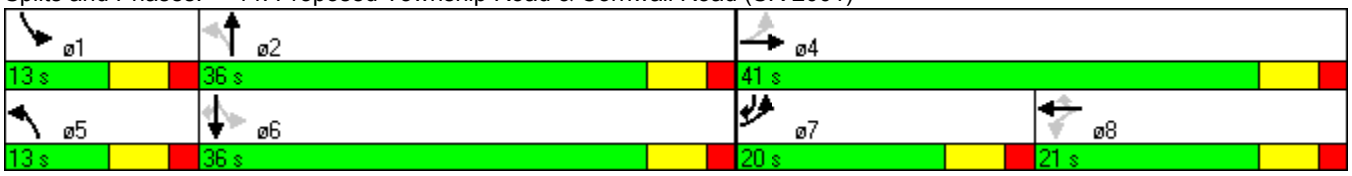
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	232	53	1	45	23	119	236	37	369	187
Lane Group Flow (vph)	252	115	1	49	25	129	258	40	401	203
Turn Type	pm+pt		Perm		Perm	pm+pt		pm+pt		pm+ov
Protected Phases	7	4		8		5	2	1	6	7
Permitted Phases	4		8		8	2		6		6
Detector Phase	7	4	8	8	8	5	2	1	6	7
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	21.0	21.0	13.0	21.0	13.0	21.0	13.0
Total Split (s)	20.0	41.0	21.0	21.0	21.0	13.0	36.0	13.0	36.0	20.0
Total Split (%)	22.2%	45.6%	23.3%	23.3%	23.3%	14.4%	40.0%	14.4%	40.0%	22.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
v/c Ratio	0.73	0.22	0.01	0.29	0.15	0.28	0.28	0.07	0.51	0.19
Control Delay	39.0	13.1	36.0	42.2	16.9	8.8	15.8	9.5	20.7	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	13.1	36.0	42.2	16.9	8.8	15.8	9.5	20.7	1.2
Queue Length 50th (ft)	116	24	1	27	0	41	106	8	176	8
Queue Length 95th (ft)	179	60	5	60	23	46	182	m17	297	13
Internal Link Dist (ft)		240		318			830		570	
Turn Bay Length (ft)	180		100		100	225		400		275
Base Capacity (vph)	355	706	205	311	285	460	924	590	784	1090
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.16	0.00	0.16	0.09	0.28	0.28	0.07	0.51	0.19

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 70
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Proposed Township Road & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	232	53	52	1	45	23	119	236	1	37	369	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1724		1711	1863	1583	1702	1852		1711	1863	1583
Flt Permitted	0.39	1.00		0.68	1.00	1.00	0.35	1.00		0.60	1.00	1.00
Satd. Flow (perm)	694	1724		1230	1863	1583	624	1852		1080	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	58	57	1	49	25	129	257	1	40	401	203
RTOR Reduction (vph)	0	40	0	0	0	23	0	0	0	0	0	90
Lane Group Flow (vph)	252	75	0	1	49	2	129	258	0	40	401	113
Turn Type	pm+pt			Perm		Perm	pm+pt			pm+pt		pm+ov
Protected Phases	7	4			8		5	2		1	6	7
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	26.4	26.4		6.8	6.8	6.8	50.2	41.2		41.0	36.6	50.2
Effective Green, g (s)	26.4	26.4		6.8	6.8	6.8	50.2	41.2		41.0	36.6	50.2
Actuated g/C Ratio	0.29	0.29		0.08	0.08	0.08	0.56	0.46		0.46	0.41	0.56
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	357	506		93	141	120	456	848		523	758	988
v/s Ratio Prot	c0.11	0.04			0.03		c0.03	c0.14		0.00	c0.22	0.02
v/s Ratio Perm	c0.10			0.00		0.00	0.13			0.03		0.05
v/c Ratio	0.71	0.15		0.01	0.35	0.02	0.28	0.30		0.08	0.53	0.11
Uniform Delay, d1	26.6	23.5		38.5	39.5	38.5	10.8	15.4		13.7	20.2	9.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.73	0.90		0.90	0.85	0.58
Incremental Delay, d2	6.2	0.1		0.0	1.5	0.1	0.3	0.9		0.1	2.3	0.0
Delay (s)	32.8	23.6		38.5	41.0	38.6	8.2	14.7		12.4	19.4	5.5
Level of Service	C	C		D	D	D	A	B		B	B	A
Approach Delay (s)		30.0			40.1			12.5			14.6	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	194	93	150	197	140	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.956				0.933	
Flt Protected			0.950		0.975	
Satd. Flow (prot)	1781	0	1770	1863	1694	0
Flt Permitted			0.950		0.975	
Satd. Flow (perm)	1781	0	1770	1863	1694	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	525			320	264	
Travel Time (s)	14.3			7.3	7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	211	101	163	214	152	149
Shared Lane Traffic (%)						
Lane Group Flow (vph)	312	0	163	214	301	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 50.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	194	93	150	197	140	137
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	211	101	163	214	152	149
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)				320		
pX, platoon unblocked						
vC, conflicting volume			312		802	261
vC1, stage 1 conf vol					261	
vC2, stage 2 conf vol					540	
vCu, unblocked vol			312		802	261
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			87		68	81
cM capacity (veh/h)			1248		474	777

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	312	163	214	301
Volume Left	0	163	0	152
Volume Right	101	0	0	149
cSH	1700	1248	1700	587
Volume to Capacity	0.18	0.13	0.13	0.51
Queue Length 95th (ft)	0	11	0	73
Control Delay (s)	0.0	8.3	0.0	17.4
Lane LOS		A		C
Approach Delay (s)	0.0	3.6		17.4
Approach LOS				C

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	148	220	151	186	141	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		175	75		0	0
Storage Lanes		1	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.933	
Flt Protected			0.950		0.975	
Satd. Flow (prot)	1863	1583	1770	1863	1694	0
Flt Permitted			0.950		0.975	
Satd. Flow (perm)	1863	1583	1770	1863	1694	0
Link Speed (mph)	25			30	25	
Link Distance (ft)	356			525	240	
Travel Time (s)	9.7			11.9	6.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	161	239	164	202	153	151
Shared Lane Traffic (%)						
Lane Group Flow (vph)	161	239	164	202	304	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 42.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	148	220	151	186	141	139
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	161	239	164	202	153	151
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1073			845		
pX, platoon unblocked						
vC, conflicting volume			400		691	161
vC1, stage 1 conf vol					161	
vC2, stage 2 conf vol					530	
vCu, unblocked vol			400		691	161
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			86		68	83
cM capacity (veh/h)			1159		485	884

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	161	239	164	202	304
Volume Left	0	0	164	0	153
Volume Right	0	239	0	0	151
cSH	1700	1700	1159	1700	625
Volume to Capacity	0.09	0.14	0.14	0.12	0.49
Queue Length 95th (ft)	0	0	12	0	67
Control Delay (s)	0.0	0.0	8.6	0.0	16.1
Lane LOS			A		C
Approach Delay (s)	0.0		3.9		16.1
Approach LOS					C

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	366	16	2	325	4	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	75		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994				0.955	
Flt Protected			0.950		0.968	
Satd. Flow (prot)	1852	0	1770	1863	1722	0
Flt Permitted			0.950		0.968	
Satd. Flow (perm)	1852	0	1770	1863	1722	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	717			356	195	
Travel Time (s)	19.6			9.7	5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	17	2	353	4	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	415	0	2	353	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 30.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	366	16	2	325	4	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	398	17	2	353	4	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	717			1201		
pX, platoon unblocked						
vC, conflicting volume			415		764	407
vC1, stage 1 conf vol					407	
vC2, stage 2 conf vol					358	
vCu, unblocked vol			415		764	407
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1144		569	644

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	415	2	353	7
Volume Left	0	2	0	4
Volume Right	17	0	0	2
cSH	1700	1144	1700	592
Volume to Capacity	0.24	0.00	0.21	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	8.2	0.0	11.2
Lane LOS		A		B
Approach Delay (s)	0.0	0.0		11.2
Approach LOS				B

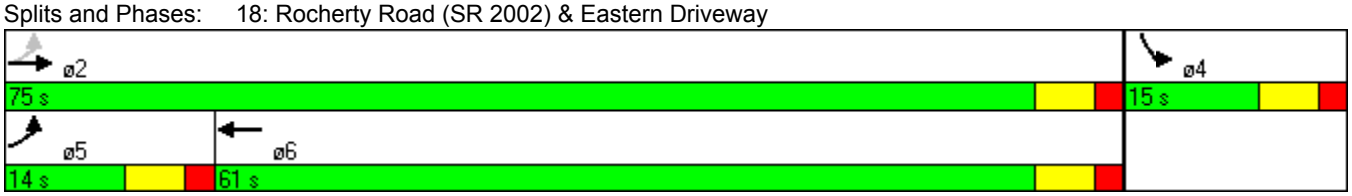
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	30.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Volume (vph)	20	469	518	33
Lane Group Flow (vph)	22	510	600	49
Turn Type	pm+pt			
Protected Phases	5	2	6	4
Permitted Phases	2			
Detector Phase	5	2	6	4
Switch Phase				
Minimum Initial (s)	7.0	15.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	13.0
Total Split (s)	14.0	75.0	61.0	15.0
Total Split (%)	15.6%	83.3%	67.8%	16.7%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	None	None	None
v/c Ratio	0.03	0.33	0.39	0.11
Control Delay	3.3	3.6	6.6	16.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.3	3.6	6.6	16.4
Queue Length 50th (ft)	1	0	0	2
Queue Length 95th (ft)	8	119	272	42
Internal Link Dist (ft)		400	1268	325
Turn Bay Length (ft)	225			
Base Capacity (vph)	673	1825	1812	558
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.03	0.28	0.33	0.09

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 35.7
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Splits and Phases: 18: Rocherty Road (SR 2002) & Eastern Driveway



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	469	518	34	33	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.96	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1676	1825	1884		1732	
Flt Permitted	0.28	1.00	1.00		0.96	
Satd. Flow (perm)	495	1825	1884		1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	510	563	37	36	13
RTOR Reduction (vph)	0	0	3	0	12	0
Lane Group Flow (vph)	22	510	597	0	37	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	29.9	29.9	23.1		2.1	
Effective Green, g (s)	29.9	29.9	23.1		2.1	
Actuated g/C Ratio	0.68	0.68	0.52		0.05	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	358	1240	989		83	
v/s Ratio Prot	0.00	c0.28	c0.32		c0.02	
v/s Ratio Perm	0.04					
v/c Ratio	0.06	0.41	0.60		0.44	
Uniform Delay, d1	3.6	3.1	7.3		20.4	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.2	1.0		3.7	
Delay (s)	3.6	3.4	8.3		24.1	
Level of Service	A	A	A		C	
Approach Delay (s)		3.4	8.3		24.1	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	489	528	2	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1881	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1881	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	532	574	2	0	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	532	576	0	0	9
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 37.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	489	528	2	0	8
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	532	574	2	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485	480			
pX, platoon unblocked	0.77				0.86	0.77
vC, conflicting volume	576				1107	575
vC1, stage 1 conf vol					575	
vC2, stage 2 conf vol					532	
vCu, unblocked vol	299				553	298
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	971				524	571

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	532	576	9
Volume Left	0	0	0
Volume Right	0	2	9
cSH	1700	1700	571
Volume to Capacity	0.31	0.34	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	11.4
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.4
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	13	343	11	16	421
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	125	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			450
Travel Time (s)	4.7		5.2			6.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Adj. Flow (vph)	0	14	373	12	17	439
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	14	373	12	17	439
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			Yes
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 28.1%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	13	343	11	16	421
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Hourly flow rate (vph)	0	14	373	12	17	439
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			340			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	846	373			385	
vC1, stage 1 conf vol	373					
vC2, stage 2 conf vol	473					
vCu, unblocked vol	776	252			266	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	533	710			1173	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	14	373	12	17	439
Volume Left	0	0	0	17	0
Volume Right	14	0	12	0	0
cSH	710	1700	1700	1173	1700
Volume to Capacity	0.02	0.22	0.01	0.01	0.26
Queue Length 95th (ft)	2	0	0	1	0
Control Delay (s)	10.2	0.0	0.0	8.1	0.0
Lane LOS	B			A	
Approach Delay (s)	10.2	0.0		0.3	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	88	0	356	349	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			150
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	1863	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	1583
Link Speed (mph)	25			45	45	
Link Distance (ft)	247			450	910	
Travel Time (s)	6.7			6.8	13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	96	0	387	379	79
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	96	0	387	379	79
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			11	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 30.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	88	0	356	349	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	96	0	387	379	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				790	910	
pX, platoon unblocked	0.89	0.86	0.86			
vC, conflicting volume	766	379	459			
vC1, stage 1 conf vol	379					
vC2, stage 2 conf vol	387					
vCu, unblocked vol	539	200	292			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	605	725	1094			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	96	387	379	79
Volume Left	0	0	0	0
Volume Right	96	0	0	79
cSH	725	1700	1700	1700
Volume to Capacity	0.13	0.23	0.22	0.05
Queue Length 95th (ft)	11	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.7	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	9	4	0	23	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.968					
Flt Protected					0.950	
Satd. Flow (prot)	1790	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1790	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	13	4	0	31	3	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	31	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 13.3% ICU Level of Service A
Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	9	4	0	23	3	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Hourly flow rate (vph)	13	4	0	31	3	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			17		46	15
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		46	15
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1600		964	1065

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	31	3
Volume Left	0	0	3
Volume Right	4	0	0
cSH	1700	1600	964
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

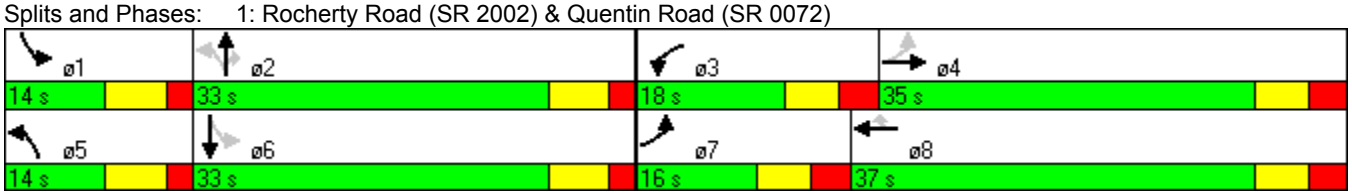
2035 PROJECTED CONDITIONS: PHASES 1-5

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	151	363	261	233	86	20	608	313	111	424
Lane Group Flow (vph)	164	408	284	253	93	22	661	340	121	512
Turn Type	pm+pt		Prot		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	16.0	35.0	18.0	37.0	37.0	14.0	33.0	33.0	14.0	33.0
Total Split (%)	16.0%	35.0%	18.0%	37.0%	37.0%	14.0%	33.0%	33.0%	14.0%	33.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.41	0.88	0.82	0.47	0.18	0.08	0.71	0.49	0.50	0.43
Control Delay	20.7	56.3	44.6	28.5	11.5	18.9	37.6	6.0	23.2	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	56.3	44.6	28.5	11.5	18.9	37.6	6.0	23.2	18.4
Queue Length 50th (ft)	61	243	91	151	24	8	203	0	26	72
Queue Length 95th (ft)	103	#401	m#145	m214	m47	24	270	67	61	212
Internal Link Dist (ft)		569		654			721			1806
Turn Bay Length (ft)	325		225		275	150		425	350	
Base Capacity (vph)	403	492	348	563	545	296	937	688	241	1197
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.83	0.82	0.45	0.17	0.07	0.71	0.49	0.50	0.43

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	151	363	12	261	233	86	20	608	313	111	424	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	13	14	10	12	12	11	12	12
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1677	1751		3164	1878	1601	1425	3331	1576	1640	3257	
Flt Permitted	0.54	1.00		0.95	1.00	1.00	0.45	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	954	1751		3164	1878	1601	673	3331	1576	368	3257	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	164	395	13	284	253	93	22	661	340	121	461	51
RTOR Reduction (vph)	0	1	0	0	0	67	0	0	244	0	7	0
Lane Group Flow (vph)	164	407	0	284	253	26	22	661	96	121	505	0
Heavy Vehicles (%)	3%	3%	13%	9%	3%	6%	20%	10%	4%	8%	12%	0%
Turn Type	pm+pt			Prot		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	35.4	26.4		11.0	28.4	28.4	31.1	28.1	28.1	40.1	32.6	
Effective Green, g (s)	35.4	26.4		11.0	28.4	28.4	31.1	28.1	28.1	40.1	32.6	
Actuated g/C Ratio	0.35	0.26		0.11	0.28	0.28	0.31	0.28	0.28	0.40	0.33	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	403	462		348	533	455	232	936	443	243	1062	
v/s Ratio Prot	0.04	c0.23		c0.09	0.13		0.00	c0.20		c0.04	c0.15	
v/s Ratio Perm	0.11					0.02	0.03		0.06	0.16		
v/c Ratio	0.41	0.88		0.82	0.47	0.06	0.09	0.71	0.22	0.50	0.48	
Uniform Delay, d1	23.2	35.3		43.5	29.6	26.1	24.1	32.2	27.5	20.8	26.9	
Progression Factor	1.00	1.00		0.63	0.88	1.90	1.00	1.00	1.00	0.81	0.67	
Incremental Delay, d2	0.9	17.6		11.8	0.7	0.1	0.2	4.5	1.1	2.1	1.5	
Delay (s)	24.1	52.9		39.4	26.8	49.6	24.4	36.7	28.6	18.9	19.6	
Level of Service	C	D		D	C	D	C	D	C	B	B	
Approach Delay (s)		44.6			35.8			33.8			19.4	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	33.5
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

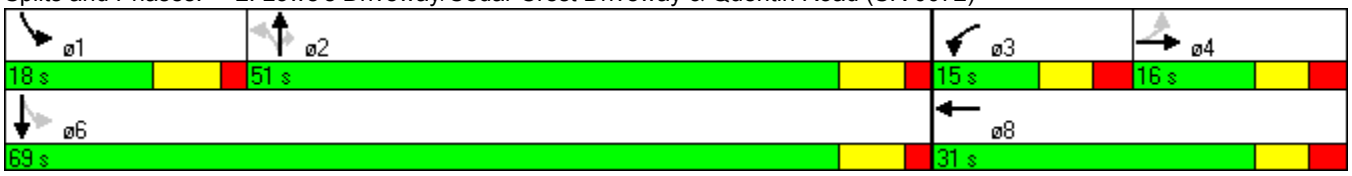
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	6	1	53	2	33	650	128	128	491
Lane Group Flow (vph)	0	56	58	69	40	707	139	139	546
Turn Type	Perm		Prot		Perm		Perm	pm+pt	
Protected Phases		4	3	8		2		1	6
Permitted Phases	4				2		2	6	
Detector Phase	4	4	3	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	4.0	7.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	11.0	14.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	16.0	16.0	15.0	31.0	51.0	51.0	51.0	18.0	69.0
Total Split (%)	16.0%	16.0%	15.0%	31.0%	51.0%	51.0%	51.0%	18.0%	69.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.37	0.24	0.19	0.10	0.40	0.15	0.28	0.24
Control Delay		24.7	46.2	9.5	8.0	10.8	3.9	9.1	5.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		24.7	46.2	9.5	8.0	10.8	3.9	9.1	5.6
Queue Length 50th (ft)		7	18	1	11	196	25	24	50
Queue Length 95th (ft)		0	38	35	m20	249	m42	52	61
Internal Link Dist (ft)		216		637		1806			599
Turn Bay Length (ft)			200		225		425	350	
Base Capacity (vph)		169	277	437	395	1748	910	494	2234
Starvation Cap Reductn		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.33	0.21	0.16	0.10	0.40	0.15	0.28	0.24

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 95 (95%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1	27	53	2	62	33	650	128	128	491	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.89		1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1521		3467	1607		1609	3364	1623	1702	3149	
Flt Permitted		0.94		0.95	1.00		0.45	1.00	1.00	0.29	1.00	
Satd. Flow (perm)		1433		3467	1607		759	3364	1623	524	3149	
Peak-hour factor, PHF	0.75	0.25	0.61	0.92	0.92	0.92	0.83	0.92	0.92	0.92	0.92	0.42
Adj. Flow (vph)	8	4	44	58	2	67	40	707	139	139	534	12
RTOR Reduction (vph)	0	41	0	0	54	0	0	0	71	0	1	0
Lane Group Flow (vph)	0	15	0	58	15	0	40	707	68	139	545	0
Heavy Vehicles (%)	17%	0%	4%	2%	2%	2%	15%	10%	2%	2%	14%	0%
Turn Type	Perm			Prot			Perm		Perm	pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4						2		2	6		
Actuated Green, G (s)		6.5		5.8	19.3		49.2	49.2	49.2	66.7	66.7	
Effective Green, g (s)		6.5		5.8	19.3		49.2	49.2	49.2	66.7	66.7	
Actuated g/C Ratio		0.06		0.06	0.19		0.49	0.49	0.49	0.67	0.67	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0		3.0	4.0		6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		93		201	310		373	1655	799	473	2100	
v/s Ratio Prot				c0.02	0.01			c0.21		0.03	c0.17	
v/s Ratio Perm		c0.01					0.05		0.04	0.16		
v/c Ratio		0.16		0.29	0.05		0.11	0.43	0.09	0.29	0.26	
Uniform Delay, d1		44.2		45.1	32.9		13.6	16.3	13.5	7.1	6.7	
Progression Factor		1.00		1.00	1.00		0.45	0.60	1.18	1.09	0.74	
Incremental Delay, d2		1.1		0.8	0.1		0.5	0.7	0.2	0.9	0.3	
Delay (s)		45.3		45.9	33.0		6.7	10.5	16.0	8.7	5.3	
Level of Service		D		D	C		A	B	B	A	A	
Approach Delay (s)		45.3			38.9			11.2			6.0	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

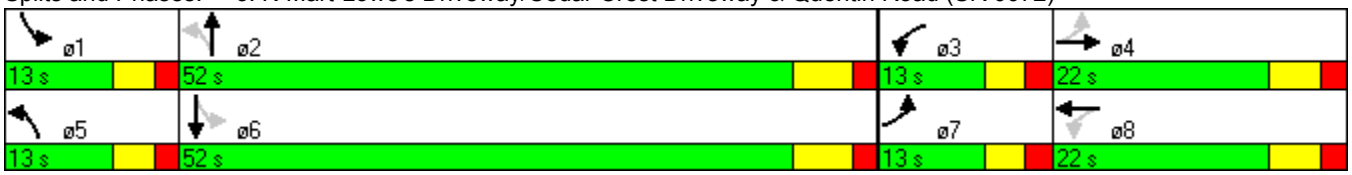
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	78	7	19	6	35	617	63	601
Lane Group Flow (vph)	104	40	32	135	48	719	89	721
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	3.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	7.9	21.4
Total Split (s)	13.0	22.0	13.0	22.0	13.0	52.0	13.0	52.0
Total Split (%)	13.0%	22.0%	13.0%	22.0%	13.0%	52.0%	13.0%	52.0%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	3.0	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	4.9	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.56	0.23	0.13	0.55	0.10	0.38	0.17	0.38
Control Delay	45.1	23.8	31.6	18.6	1.5	1.9	6.2	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	23.8	31.6	18.6	1.5	1.9	6.2	9.9
Queue Length 50th (ft)	57	7	17	7	1	8	16	85
Queue Length 95th (ft)	81	18	25	1	4	21	27	107
Internal Link Dist (ft)		199		207		599		1573
Turn Bay Length (ft)					200		325	
Base Capacity (vph)	189	261	256	380	493	1897	524	1922
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.15	0.13	0.36	0.10	0.38	0.17	0.38

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 7 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	7	19	19	6	74	35	617	32	63	601	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	12	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1567	1429		1902	1722		1618	3171		1778	3074	
Flt Permitted	0.47	1.00		0.73	1.00		0.36	1.00		0.33	1.00	
Satd. Flow (perm)	770	1429		1464	1722		608	3171		627	3074	
Peak-hour factor, PHF	0.75	0.58	0.68	0.59	0.50	0.60	0.73	0.92	0.67	0.71	0.92	0.57
Adj. Flow (vph)	104	12	28	32	12	123	48	671	48	89	653	68
RTOR Reduction (vph)	0	25	0	0	112	0	0	4	0	0	6	0
Lane Group Flow (vph)	104	15	0	32	23	0	48	715	0	89	715	0
Heavy Vehicles (%)	8%	14%	16%	0%	0%	4%	11%	13%	0%	2%	17%	10%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.8	10.5		13.4	8.8		61.0	56.7		64.2	58.3	
Effective Green, g (s)	16.8	10.5		13.4	8.8		61.0	56.7		64.2	58.3	
Actuated g/C Ratio	0.17	0.10		0.13	0.09		0.61	0.57		0.64	0.58	
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0		3.0	6.0	
Lane Grp Cap (vph)	180	150		216	152		414	1798		470	1792	
v/s Ratio Prot	c0.04	0.01		0.01	0.01		0.00	0.23		c0.01	c0.23	
v/s Ratio Perm	c0.06			0.01			0.07			0.11		
v/c Ratio	0.58	0.10		0.15	0.15		0.12	0.40		0.19	0.40	
Uniform Delay, d1	37.1	40.5		38.1	42.1		7.9	12.1		7.0	11.3	
Progression Factor	1.00	1.00		1.00	1.00		0.18	0.11		0.94	0.83	
Incremental Delay, d2	4.4	0.3		0.3	0.5		0.1	0.6		0.2	0.6	
Delay (s)	41.6	40.8		38.5	42.6		1.6	1.9		6.8	10.0	
Level of Service	D	D		D	D		A	A		A	B	
Approach Delay (s)		41.3			41.8			1.9			9.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

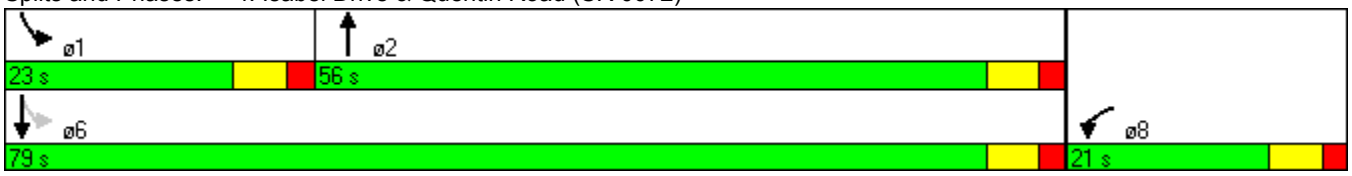
c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	28	644	143	736
Lane Group Flow (vph)	91	767	155	800
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	21.0	56.0	23.0	79.0
Total Split (%)	21.0%	56.0%	23.0%	79.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.44	0.35	0.30	0.29
Control Delay	26.1	3.7	3.8	2.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.1	3.7	3.8	2.8
Queue Length 50th (ft)	23	57	16	50
Queue Length 95th (ft)	m53	68	35	85
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			250	
Base Capacity (vph)	333	2191	622	2786
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.27	0.35	0.25	0.29

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 64 (64%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	28	56	644	62	143	736
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	12	12	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1871		3190		1610	3331
Flt Permitted	0.98		1.00		0.31	1.00
Satd. Flow (perm)	1871		3190		533	3331
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	61	700	67	155	800
RTOR Reduction (vph)	57	0	5	0	0	0
Lane Group Flow (vph)	34	0	762	0	155	800
Heavy Vehicles (%)	4%	4%	10%	10%	10%	10%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	6.8		67.3		81.2	81.2
Effective Green, g (s)	6.8		67.3		81.2	81.2
Actuated g/C Ratio	0.07		0.67		0.81	0.81
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	127		2147		518	2705
v/s Ratio Prot	c0.02		c0.24		0.02	c0.24
v/s Ratio Perm					0.22	
v/c Ratio	0.27		0.36		0.30	0.30
Uniform Delay, d1	44.2		7.0		2.6	2.3
Progression Factor	1.10		0.45		1.00	1.00
Incremental Delay, d2	1.1		0.4		0.3	0.3
Delay (s)	49.7		3.6		2.9	2.6
Level of Service	D		A		A	A
Approach Delay (s)	49.7		3.6			2.6
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

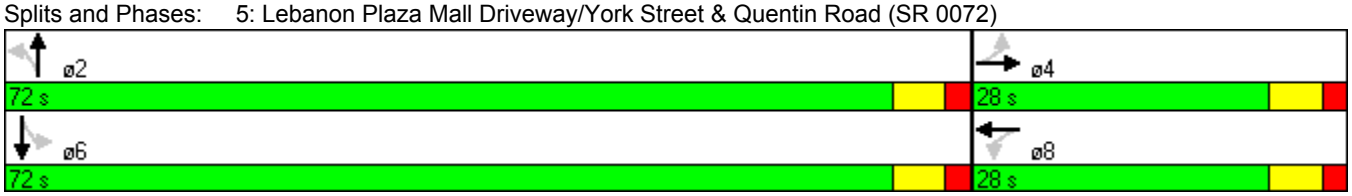
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	4	5	68	10	6	619	36	822
Lane Group Flow (vph)	8	20	74	36	20	701	39	901
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0
Total Split (s)	28.0	28.0	28.0	28.0	72.0	72.0	72.0	72.0
Total Split (%)	28.0%	28.0%	28.0%	28.0%	72.0%	72.0%	72.0%	72.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.05	0.07	0.34	0.12	0.06	0.30	0.08	0.39
Control Delay	22.5	18.0	27.9	13.8	4.8	5.0	4.9	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	18.0	27.9	13.8	4.8	5.0	4.9	5.5
Queue Length 50th (ft)	3	4	25	4	2	51	5	72
Queue Length 95th (ft)	7	8	60	22	3	82	15	112
Internal Link Dist (ft)		346		1237		592		1986
Turn Bay Length (ft)			200		225		175	
Base Capacity (vph)	376	563	462	607	496	3229	683	3268
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.16	0.06	0.04	0.22	0.06	0.28

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 62.1
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	5	5	68	10	22	6	619	26	36	822	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.90		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1375	1575		1668	1671		1535	3229		1686	3267	
Flt Permitted	0.73	1.00		0.74	1.00		0.31	1.00		0.39	1.00	
Satd. Flow (perm)	1062	1575		1307	1671		496	3229		683	3267	
Peak-hour factor, PHF	0.50	0.42	0.63	0.92	0.83	0.92	0.30	0.92	0.92	0.92	0.92	0.50
Adj. Flow (vph)	8	12	8	74	12	24	20	673	28	39	893	8
RTOR Reduction (vph)	0	7	0	0	21	0	0	3	0	0	1	0
Lane Group Flow (vph)	8	13	0	74	15	0	20	698	0	39	900	0
Heavy Vehicles (%)	25%	0%	20%	2%	10%	0%	17%	11%	0%	4%	11%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.3	8.3		8.3	8.3		43.1	43.1		43.1	43.1	
Effective Green, g (s)	8.3	8.3		8.3	8.3		43.1	43.1		43.1	43.1	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.68	0.68		0.68	0.68	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	139	206		171	219		337	2195		464	2221	
v/s Ratio Prot		0.01			0.01			0.22			c0.28	
v/s Ratio Perm	0.01			c0.06			0.04			0.06		
v/c Ratio	0.06	0.06		0.43	0.07		0.06	0.32		0.08	0.41	
Uniform Delay, d1	24.1	24.1		25.4	24.2		3.4	4.1		3.4	4.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		2.4	0.2		0.1	0.1		0.1	0.1	
Delay (s)	24.4	24.3		27.8	24.3		3.5	4.2		3.5	4.6	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		24.3			26.6			4.2			4.6	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	63.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

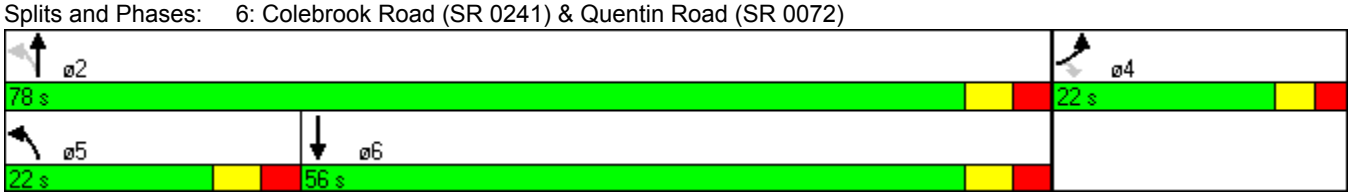
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	181	257	176	581	686
Lane Group Flow (vph)	197	279	191	632	841
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	9.5	16.5	16.5
Total Split (s)	22.0	22.0	22.0	78.0	56.0
Total Split (%)	22.0%	22.0%	22.0%	78.0%	56.0%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.62	0.55	0.44	0.30	0.80
Control Delay	36.0	8.5	9.5	6.5	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	8.5	9.5	6.5	27.0
Queue Length 50th (ft)	78	0	30	55	162
Queue Length 95th (ft)	160	63	64	88	251
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	250		375		
Base Capacity (vph)	406	565	495	3243	2297
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.49	0.39	0.19	0.37

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 68
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	181	257	176	581	686	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	12	12
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1627	1428	1625	3362	3065	
Flt Permitted	0.95	1.00	0.17	1.00	1.00	
Satd. Flow (perm)	1627	1428	294	3362	3065	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	279	191	632	746	95
RTOR Reduction (vph)	0	224	0	0	12	0
Lane Group Flow (vph)	197	55	191	632	829	0
Heavy Vehicles (%)	3%	5%	9%	9%	13%	12%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	13.3	13.3	42.3	42.3	23.2	
Effective Green, g (s)	13.3	13.3	42.3	42.3	23.2	
Actuated g/C Ratio	0.20	0.20	0.63	0.63	0.34	
Clearance Time (s)	5.5	5.5	6.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	320	281	432	2104	1052	
v/s Ratio Prot	c0.12		c0.08	0.19	c0.27	
v/s Ratio Perm		0.04	0.19			
v/c Ratio	0.62	0.20	0.44	0.30	0.79	
Uniform Delay, d1	24.8	22.7	7.7	5.8	20.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.5	0.3	0.7	0.2	4.9	
Delay (s)	28.3	23.0	8.4	6.1	24.9	
Level of Service	C	C	A	A	C	
Approach Delay (s)	25.2			6.6	24.9	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	18.5
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

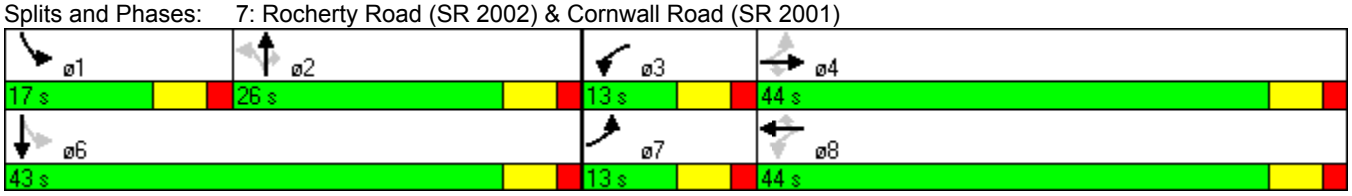
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	118	605	34	50	442	212	24	301	258	230	145
Lane Group Flow (vph)	128	658	37	54	480	230	26	327	280	250	240
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt	
Protected Phases	7	4		3	8			2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	7	4	4	3	8	8	2	2	2	1	6
Switch Phase											
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	21.0	13.0	21.0	21.0	21.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	44.0	44.0	13.0	44.0	44.0	26.0	26.0	26.0	17.0	43.0
Total Split (%)	13.0%	44.0%	44.0%	13.0%	44.0%	44.0%	26.0%	26.0%	26.0%	17.0%	43.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio	0.46	0.97	0.06	0.33	0.78	0.34	0.10	0.77	0.52	0.94	0.35
Control Delay	15.6	47.8	7.3	18.2	38.4	4.3	34.2	51.0	11.0	61.5	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	47.8	7.3	18.2	38.4	4.3	34.2	51.0	11.0	61.5	9.5
Queue Length 50th (ft)	29	202	2	17	258	0	14	203	21	122	88
Queue Length 95th (ft)	m56	m#611	m9	37	381	47	37	#355	97	#241	101
Internal Link Dist (ft)		1052			405			731			260
Turn Bay Length (ft)	250		175	225		325	175		400	240	
Base Capacity (vph)	278	675	579	166	659	719	254	427	543	266	695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.97	0.06	0.33	0.73	0.32	0.10	0.77	0.52	0.94	0.35

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 42 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	605	34	50	442	212	24	301	258	230	145	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1775	1480	1497	1734	1516	1754	1891	1576	1550	1707	
Flt Permitted	0.25	1.00	1.00	0.11	1.00	1.00	0.61	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	440	1775	1480	172	1734	1516	1125	1891	1576	334	1707	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	658	37	54	480	230	26	327	280	250	158	82
RTOR Reduction (vph)	0	0	16	0	0	146	0	0	189	0	18	0
Lane Group Flow (vph)	128	658	21	54	480	84	26	327	91	250	222	0
Heavy Vehicles (%)	4%	6%	8%	16%	9%	6%	0%	1%	3%	12%	3%	9%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	45.0	38.0	38.0	42.2	36.6	36.6	21.4	21.4	21.4	38.4	38.4	
Effective Green, g (s)	45.0	38.0	38.0	42.2	36.6	36.6	21.4	21.4	21.4	38.4	38.4	
Actuated g/C Ratio	0.45	0.38	0.38	0.42	0.37	0.37	0.21	0.21	0.21	0.38	0.38	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	7.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	283	675	562	147	635	555	241	405	337	262	655	
v/s Ratio Prot	c0.03	c0.37		0.02	0.28			0.17		c0.10	0.13	
v/s Ratio Perm	0.17		0.01	0.13		0.06	0.02		0.06	c0.26		
v/c Ratio	0.45	0.97	0.04	0.37	0.76	0.15	0.11	0.81	0.27	0.95	0.34	
Uniform Delay, d1	18.4	30.5	19.5	21.6	27.8	21.3	31.6	37.3	32.8	25.8	21.8	
Progression Factor	0.81	0.68	0.71	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.41	
Incremental Delay, d2	0.9	24.0	0.0	1.6	5.4	0.2	0.9	15.8	2.0	41.3	1.3	
Delay (s)	15.8	44.8	13.9	23.2	33.2	21.5	32.5	53.1	34.7	58.6	10.4	
Level of Service	B	D	B	C	C	C	C	D	C	E	B	
Approach Delay (s)		38.9			29.0			44.1			35.0	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

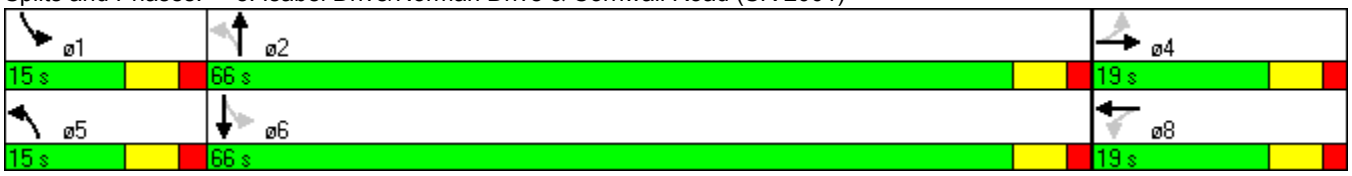
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	7	39	35	14	54	568	159	773
Lane Group Flow (vph)	0	160	0	113	59	710	173	854
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	21.0	13.0	21.0
Total Split (s)	19.0	19.0	19.0	19.0	15.0	66.0	15.0	66.0
Total Split (%)	19.0%	19.0%	19.0%	19.0%	15.0%	66.0%	15.0%	66.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio		0.60		0.68	0.15	0.61	0.37	0.70
Control Delay		30.9		46.4	2.9	7.2	5.5	15.5
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		30.9		46.4	2.9	7.2	5.5	15.5
Queue Length 50th (ft)		44		41	5	77	22	327
Queue Length 95th (ft)		110		98	m10	116	43	528
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)					225		275	
Base Capacity (vph)		312		198	422	1158	486	1228
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.51		0.57	0.14	0.61	0.36	0.70

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	39	101	35	14	55	54	568	86	159	773	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	12	12	12	12	12	12
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.91			0.93		1.00	0.98		1.00	1.00	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1827			1966		1753	1809		1736	1822	
Flt Permitted		0.98			0.60		0.22	1.00		0.28	1.00	
Satd. Flow (perm)		1792			1207		415	1809		505	1822	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	42	110	38	15	60	59	617	93	173	840	14
RTOR Reduction (vph)	0	82	0	0	42	0	0	5	0	0	1	0
Lane Group Flow (vph)	0	78	0	0	71	0	59	705	0	173	853	0
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	4%	4%	4%	4%	4%	4%
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		10.2			10.2		69.5	63.8		74.1	66.1	
Effective Green, g (s)		10.2			10.2		69.5	63.8		74.1	66.1	
Actuated g/C Ratio		0.10			0.10		0.70	0.64		0.74	0.66	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		183			123		365	1154		473	1204	
v/s Ratio Prot							0.01	0.39		c0.03	c0.47	
v/s Ratio Perm		0.04			c0.06		0.10			0.24		
v/c Ratio		0.43			0.58		0.16	0.61		0.37	0.71	
Uniform Delay, d1		42.2			42.8		7.6	10.7		6.3	10.8	
Progression Factor		1.10			1.00		0.66	0.44		1.00	1.00	
Incremental Delay, d2		1.6			6.4		0.2	2.1		0.5	3.5	
Delay (s)		47.9			49.2		5.1	6.8		6.8	14.4	
Level of Service		D			D		A	A		A	B	
Approach Delay (s)		47.9			49.2			6.7			13.1	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

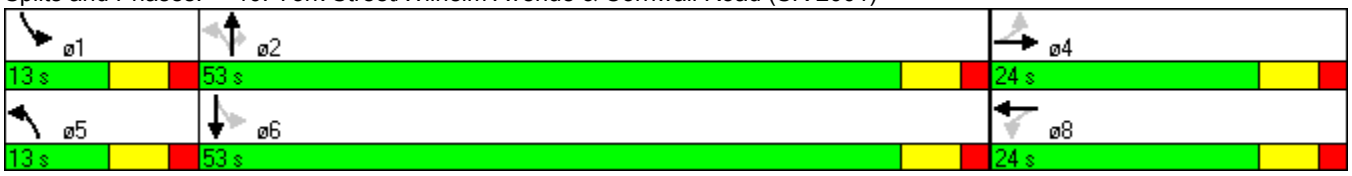
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	46	10	212	17	32	479	103	158	738
Lane Group Flow (vph)	50	41	230	55	35	521	112	172	864
Turn Type	Perm		Perm		pm+pt		Perm	pm+pt	
Protected Phases		4		8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	8	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	24.0	24.0	24.0	24.0	13.0	53.0	53.0	13.0	53.0
Total Split (%)	26.7%	26.7%	26.7%	26.7%	14.4%	58.9%	58.9%	14.4%	58.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.17	0.11	0.78	0.15	0.15	0.65	0.15	0.39	0.90
Control Delay	30.8	15.5	52.2	15.9	6.8	20.2	2.9	8.7	32.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	15.5	52.2	15.9	6.8	20.2	2.9	8.7	32.4
Queue Length 50th (ft)	24	5	127	8	6	189	0	32	426
Queue Length 95th (ft)	56	32	#255	40	15	283	24	55	#700
Internal Link Dist (ft)		1237		1131		837			1311
Turn Bay Length (ft)	150		250		225		425	250	
Base Capacity (vph)	334	405	332	421	241	1141	1011	443	1142
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.10	0.69	0.13	0.15	0.46	0.11	0.39	0.76

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77.6
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: York Street/Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	46	10	28	212	17	34	32	479	103	158	738	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.89		1.00	0.90		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1568		1770	1611		1656	1792	1524	1787	1790	
Flt Permitted	0.72	1.00		0.73	1.00		0.11	1.00	1.00	0.30	1.00	
Satd. Flow (perm)	1370	1568		1360	1611		188	1792	1524	564	1790	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	11	30	230	18	37	35	521	112	172	802	62
RTOR Reduction (vph)	0	24	0	0	29	0	0	0	59	0	3	0
Lane Group Flow (vph)	50	17	0	230	26	0	35	521	53	172	861	0
Heavy Vehicles (%)	0%	2%	10%	2%	2%	8%	9%	6%	6%	1%	5%	5%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	16.9	16.9		16.9	16.9		41.2	37.6	37.6	48.8	41.4	
Effective Green, g (s)	16.9	16.9		16.9	16.9		41.2	37.6	37.6	48.8	41.4	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.52	0.47	0.47	0.61	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	290	332		288	341		163	843	717	458	927	
v/s Ratio Prot		0.01			0.02		0.01	0.29		c0.03	c0.48	
v/s Ratio Perm	0.04			c0.17			0.10		0.03	0.19		
v/c Ratio	0.17	0.05		0.80	0.08		0.21	0.62	0.07	0.38	0.93	
Uniform Delay, d1	25.8	25.1		29.9	25.2		14.0	15.8	11.6	8.5	17.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.1		14.3	0.1		0.7	1.4	0.0	0.5	15.0	
Delay (s)	26.1	25.2		44.1	25.3		14.6	17.1	11.6	9.0	32.9	
Level of Service	C	C		D	C		B	B	B	A	C	
Approach Delay (s)		25.7			40.5			16.1			29.0	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	79.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	369	687	18	650	193	22	22	141	17	121
Lane Group Flow (vph)	401	754	20	707	210	0	87	0	171	132
Turn Type	pm+pt		Perm		Perm	Perm		Perm		pm+ov
Protected Phases	5	2		6			8		4	5
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	6	6	6	8	8	4	4	5
Switch Phase										
Minimum Initial (s)	4.0	12.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0	4.0
Minimum Split (s)	10.0	18.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5	10.0
Total Split (s)	20.0	70.0	50.0	50.0	50.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	22.2%	77.8%	55.6%	55.6%	55.6%	22.2%	22.2%	22.2%	22.2%	22.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	6.0
Lead/Lag	Lead		Lag	Lag	Lag					Lead
Lead-Lag Optimize?										
Recall Mode	None	Min	Min	Min	Min	None	None	None	None	None
v/c Ratio	0.95	0.64	0.07	0.91	0.25		0.32		0.78	0.20
Control Delay	54.0	9.8	13.0	39.2	2.8		24.2		61.6	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	54.0	9.8	13.0	39.2	2.8		24.2		61.6	4.4
Queue Length 50th (ft)	140	189	6	342	0		24		94	0
Queue Length 95th (ft)	#328	292	18	#572	35		67		#199	35
Internal Link Dist (ft)		619		423			845		1011	
Turn Bay Length (ft)	450		80		275					325
Base Capacity (vph)	420	1314	337	873	905		291		234	673
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.95	0.57	0.06	0.81	0.23		0.30		0.73	0.20

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 84.8
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	369	687	6	18	650	193	22	22	36	141	17	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	12	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1702	1686		1614	1668	1537		1702			1738	1508
Flt Permitted	0.14	1.00		0.38	1.00	1.00		0.87			0.75	1.00
Satd. Flow (perm)	254	1686		645	1668	1537		1501			1355	1508
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	747	7	20	707	210	24	24	39	153	18	132
RTOR Reduction (vph)	0	0	0	0	0	112	0	33	0	0	0	89
Lane Group Flow (vph)	401	754	0	20	707	98	0	54	0	0	171	43
Heavy Vehicles (%)	2%	8%	33%	7%	9%	4%	7%	0%	8%	4%	0%	6%
Turn Type	pm+pt			Perm		Perm	Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	59.6	59.6		39.5	39.5	39.5		13.6			13.6	27.7
Effective Green, g (s)	59.6	59.6		39.5	39.5	39.5		13.6			13.6	27.7
Actuated g/C Ratio	0.70	0.70		0.47	0.47	0.47		0.16			0.16	0.33
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Vehicle Extension (s)	3.0	6.0		6.0	6.0	6.0		3.0			3.0	3.0
Lane Grp Cap (vph)	420	1186		301	778	717		241			218	493
v/s Ratio Prot	c0.16	0.45			0.42							0.01
v/s Ratio Perm	c0.51			0.03		0.06		0.04			c0.13	0.01
v/c Ratio	0.95	0.64		0.07	0.91	0.14		0.23			0.78	0.09
Uniform Delay, d1	21.3	6.7		12.4	20.9	12.9		31.0			34.1	19.7
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	32.2	1.9		0.3	15.7	0.2		0.5			16.7	0.1
Delay (s)	53.5	8.6		12.7	36.6	13.1		31.4			50.9	19.8
Level of Service	D	A		B	D	B		C			D	B
Approach Delay (s)		24.2			30.8			31.4			37.3	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	84.7	Sum of lost time (s)	11.5
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

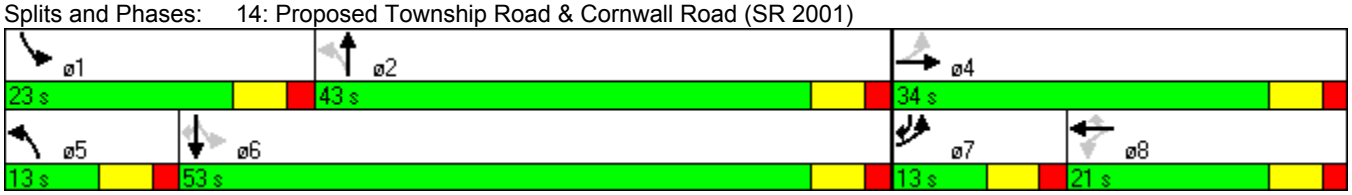
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	66	127	3	54	54	43	525	270	442	55
Lane Group Flow (vph)	72	154	3	59	59	47	596	293	480	60
Turn Type	pm+pt		Perm		Perm	pm+pt		pm+pt		pm+ov
Protected Phases	7	4		8		5	2	1	6	7
Permitted Phases	4		8		8	2		6		6
Detector Phase	7	4	8	8	8	5	2	1	6	7
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	21.0	21.0	13.0	21.0	13.0	21.0	13.0
Total Split (s)	13.0	34.0	21.0	21.0	21.0	13.0	43.0	23.0	53.0	13.0
Total Split (%)	13.0%	34.0%	21.0%	21.0%	21.0%	13.0%	43.0%	23.0%	53.0%	13.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
v/c Ratio	0.33	0.43	0.03	0.35	0.30	0.09	0.69	0.62	0.43	0.05
Control Delay	35.8	36.2	40.7	48.0	15.3	6.7	29.6	20.9	18.1	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	36.2	40.7	48.0	15.3	6.7	29.6	20.9	18.1	3.5
Queue Length 50th (ft)	38	81	2	36	0	8	346	115	186	0
Queue Length 95th (ft)	74	135	11	75	38	m12	#555	206	311	m13
Internal Link Dist (ft)		240		318			830		570	
Turn Bay Length (ft)	500		100		100	325		400		350
Base Capacity (vph)	217	518	178	279	288	529	859	500	1128	1180
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.30	0.02	0.21	0.20	0.09	0.69	0.59	0.43	0.05

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Proposed Township Road & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	127	15	3	54	54	43	525	23	270	442	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1834		1711	1863	1583	1702	1842		1711	1863	1583
Flt Permitted	0.43	1.00		0.66	1.00	1.00	0.49	1.00		0.21	1.00	1.00
Satd. Flow (perm)	780	1834		1187	1863	1583	876	1842		375	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	138	16	3	59	59	47	571	25	293	480	60
RTOR Reduction (vph)	0	5	0	0	0	54	0	2	0	0	0	22
Lane Group Flow (vph)	72	149	0	3	59	5	47	594	0	293	480	38
Turn Type	pm+pt			Perm		Perm	pm+pt			pm+pt		pm+ov
Protected Phases	7	4			8		5	2		1	6	7
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	20.7	20.7		9.1	9.1	9.1	49.7	45.4		67.3	57.0	62.6
Effective Green, g (s)	20.7	20.7		9.1	9.1	9.1	49.7	45.4		67.3	57.0	62.6
Actuated g/C Ratio	0.21	0.21		0.09	0.09	0.09	0.50	0.45		0.67	0.57	0.63
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	214	380		108	170	144	471	836		465	1062	1086
v/s Ratio Prot	0.02	c0.08			0.03		0.00	c0.32		c0.10	0.26	0.00
v/s Ratio Perm	0.05			0.00		0.00	0.05			0.32		0.02
v/c Ratio	0.34	0.39		0.03	0.35	0.04	0.10	0.71		0.63	0.45	0.03
Uniform Delay, d1	33.0	34.2		41.4	42.7	41.5	13.0	22.0		12.3	12.5	7.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.80	1.04		2.03	1.29	1.75
Incremental Delay, d2	0.9	0.7		0.1	1.2	0.1	0.1	4.3		2.1	1.0	0.0
Delay (s)	33.9	34.9		41.5	43.9	41.6	10.4	27.3		26.9	17.1	12.6
Level of Service	C	C		D	D	D	B	C		C	B	B
Approach Delay (s)		34.6			42.7			26.1			20.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	184	13	0	124	28	0	0	24	0	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	0		150	0		0	0		0
Storage Lanes	0		1	0		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.865			0.865
Flt Protected												
Satd. Flow (prot)	0	1863	1583	0	1863	1583	0	0	1611	0	0	1611
Flt Permitted												
Satd. Flow (perm)	0	1863	1583	0	1863	1583	0	0	1611	0	0	1611
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		525			320			264			247	
Travel Time (s)		10.2			6.2			7.2			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	200	14	0	135	30	0	0	26	0	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	200	14	0	135	30	0	0	26	0	0	8
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 19.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	184	13	0	124	28	0	0	24	0	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	200	14	0	135	30	0	0	26	0	0	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		525			320							
pX, platoon unblocked	0.99						0.99	0.99		0.99	0.99	0.99
vC, conflicting volume	165			214			342	365	200	361	349	135
vC1, stage 1 conf vol							200	200		135	135	
vC2, stage 2 conf vol							142	165		226	214	
vCu, unblocked vol	154			214			333	356	200	351	339	124
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	97	100	100	99
cM capacity (veh/h)	1414			1356			736	671	841	704	675	920

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	200	14	135	30	26	8
Volume Left	0	0	0	0	0	0
Volume Right	0	14	0	30	26	8
cSH	1700	1700	1700	1700	841	920
Volume to Capacity	0.12	0.01	0.08	0.02	0.03	0.01
Queue Length 95th (ft)	0	0	0	0	2	1
Control Delay (s)	0.0	0.0	0.0	0.0	9.4	8.9
Lane LOS					A	A
Approach Delay (s)	0.0		0.0		9.4	8.9
Approach LOS					A	A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	19.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	196	2	1	81	1	1	0	0	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	75		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.998						0.932	
Flt Protected	0.950			0.950				0.950			0.976	
Satd. Flow (prot)	1770	1861	0	1770	1859	0	0	1770	0	0	1694	0
Flt Permitted	0.950			0.950				0.950			0.976	
Satd. Flow (perm)	1770	1861	0	1770	1859	0	0	1770	0	0	1694	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		717			356			195			278	
Travel Time (s)		14.0			6.9			5.3			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	213	2	1	88	1	1	0	0	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	215	0	1	89	0	0	1	0	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 20.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	196	2	1	81	1	1	0	0	1	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	213	2	1	88	1	1	0	0	1	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)		717			356							
pX, platoon unblocked												
vC, conflicting volume	89			215			310	310	214	308	310	89
vC1, stage 1 conf vol							218	218		91	91	
vC2, stage 2 conf vol							91	91		217	220	
vCu, unblocked vol	89			215			310	310	214	308	310	89
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1506			1355			743	685	826	744	684	970

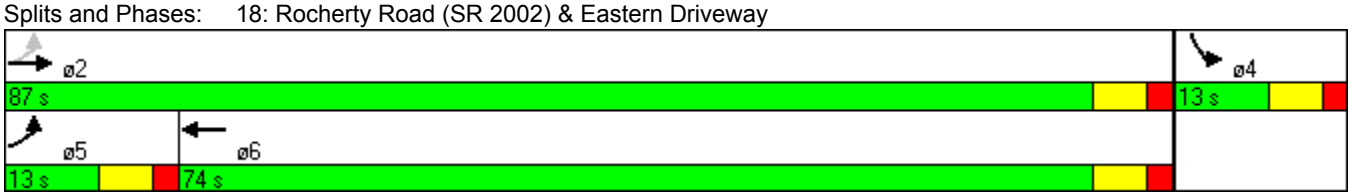
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	2	215	1	89	1	2
Volume Left	2	0	1	0	1	1
Volume Right	0	2	0	1	0	1
cSH	1506	1700	1355	1700	743	842
Volume to Capacity	0.00	0.13	0.00	0.05	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	7.4	0.0	7.7	0.0	9.9	9.3
Lane LOS	A		A		A	A
Approach Delay (s)	0.1		0.1		9.9	9.3
Approach LOS					A	A

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Volume (vph)	91	980	658	16
Lane Group Flow (vph)	99	1065	767	42
Turn Type	pm+pt			
Protected Phases	5	2	6	4
Permitted Phases	2			
Detector Phase	5	2	6	4
Switch Phase				
Minimum Initial (s)	7.0	15.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	13.0
Total Split (s)	13.0	87.0	74.0	13.0
Total Split (%)	13.0%	87.0%	74.0%	13.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	None	None	None
v/c Ratio	0.20	0.65	0.62	0.14
Control Delay	2.8	5.8	11.5	20.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.8	5.8	11.5	20.4
Queue Length 50th (ft)	0	0	115	4
Queue Length 95th (ft)	19	379	347	40
Internal Link Dist (ft)		400	1268	325
Turn Bay Length (ft)	225			
Base Capacity (vph)	485	1804	1805	304
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.59	0.42	0.14

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 52.5
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 18: Rocherty Road (SR 2002) & Eastern Driveway



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	91	980	658	48	16	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.92	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1676	1825	1883		1679	
Flt Permitted	0.19	1.00	1.00		0.98	
Satd. Flow (perm)	328	1825	1883		1679	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	1065	715	52	17	25
RTOR Reduction (vph)	0	0	4	0	24	0
Lane Group Flow (vph)	99	1065	763	0	18	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	42.7	42.7	31.3		1.9	
Effective Green, g (s)	42.7	42.7	31.3		1.9	
Actuated g/C Ratio	0.75	0.75	0.55		0.03	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	376	1377	1041		56	
v/s Ratio Prot	0.03	c0.58	0.41		c0.01	
v/s Ratio Perm	0.17					
v/c Ratio	0.26	0.77	0.73		0.32	
Uniform Delay, d1	5.5	4.1	9.5		26.7	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.4	2.8	2.7		3.3	
Delay (s)	5.9	6.9	12.2		30.0	
Level of Service	A	A	B		C	
Approach Delay (s)		6.8	12.2		30.0	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	56.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	1071	679	2	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1881	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1881	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1164	738	2	0	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1164	740	0	0	11
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 59.7%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1071	679	2	0	10
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1164	738	2	0	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485	480			
pX, platoon unblocked	0.67				0.70	0.67
vC, conflicting volume	740				1903	739
vC1, stage 1 conf vol					739	
vC2, stage 2 conf vol					1164	
vCu, unblocked vol	367				1017	365
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	799				213	456

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1164	740	11
Volume Left	0	0	0
Volume Right	0	2	11
cSH	1700	1700	456
Volume to Capacity	0.68	0.44	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	13.1
Lane LOS			B
Approach Delay (s)	0.0	0.0	13.1
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	6	585	34	15	441
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	125	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			450
Travel Time (s)	4.7		5.2			6.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Adj. Flow (vph)	0	7	636	37	16	459
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	7	636	37	16	459
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			Yes
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 40.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	6	585	34	15	441
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Hourly flow rate (vph)	0	7	636	37	16	459
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			340			
pX, platoon unblocked	0.80	0.80			0.80	
vC, conflicting volume	1128	636			673	
vC1, stage 1 conf vol	636					
vC2, stage 2 conf vol	492					
vCu, unblocked vol	1034	418			464	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			98	
cM capacity (veh/h)	431	507			876	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	636	37	16	459
Volume Left	0	0	0	16	0
Volume Right	7	0	37	0	0
cSH	507	1700	1700	876	1700
Volume to Capacity	0.01	0.37	0.02	0.02	0.27
Queue Length 95th (ft)	1	0	0	1	0
Control Delay (s)	12.2	0.0	0.0	9.2	0.0
Lane LOS	B			A	
Approach Delay (s)	12.2	0.0		0.3	
Approach LOS	B				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

21: Middle Right-In/Right-Out Driveway & Cornwall Road (SR 2001)

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	11	0	591	445	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			175
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	1863	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	1583
Link Speed (mph)	25			45	45	
Link Distance (ft)	247			450	910	
Travel Time (s)	6.7			6.8	13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	12	0	642	484	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	12	0	642	484	16
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			11	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 34.4% ICU Level of Service A
Analysis Period (min) 15

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	11	0	591	445	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	0	642	484	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				790	910	
pX, platoon unblocked	0.90	0.85	0.85			
vC, conflicting volume	1126	484	500			
vC1, stage 1 conf vol	484					
vC2, stage 2 conf vol	642					
vCu, unblocked vol	705	302	321			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	483	626	1051			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	12	642	484	16
Volume Left	0	0	0	0
Volume Right	12	0	0	16
cSH	626	1700	1700	1700
Volume to Capacity	0.02	0.38	0.28	0.01
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	10.9	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.9	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	5	0	735	890	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			-3%	3%	
Storage Length (ft)	0	0	0			225
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1891	1835	1560
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1891	1835	1560
Link Speed (mph)	30			45	45	
Link Distance (ft)	247			650	678	
Travel Time (s)	5.6			9.8	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	5	0	799	967	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	5	0	799	967	33
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	0.98	0.98	1.02	1.02
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	5	0	735	890	30
Sign Control	Stop			Free	Free	
Grade	0%			-3%	3%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	799	967	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				650	678	
pX, platoon unblocked	0.81	0.68	0.68			
vC, conflicting volume	1766	967	1000			
vC1, stage 1 conf vol	967					
vC2, stage 2 conf vol	799					
vCu, unblocked vol	1061	712	761			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	300	292	576			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	5	799	967	33
Volume Left	0	0	0	0
Volume Right	5	0	0	33
cSH	292	1700	1700	1700
Volume to Capacity	0.02	0.47	0.57	0.02
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	17.6	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	17.6	0.0	0.0	
Approach LOS	C			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	223	61	0	98	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.977					
Flt Protected					0.950	
Satd. Flow (prot)	1805	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1805	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	319	66	0	132	7	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	385	0	0	132	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 25.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	223	61	0	98	6	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Hourly flow rate (vph)	319	66	0	132	7	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			385		484	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			385		484	352
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1174		542	692

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	385	132	7
Volume Left	0	0	7
Volume Right	66	0	0
cSH	1700	1174	542
Volume to Capacity	0.23	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	11.7
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.7
Approach LOS			B

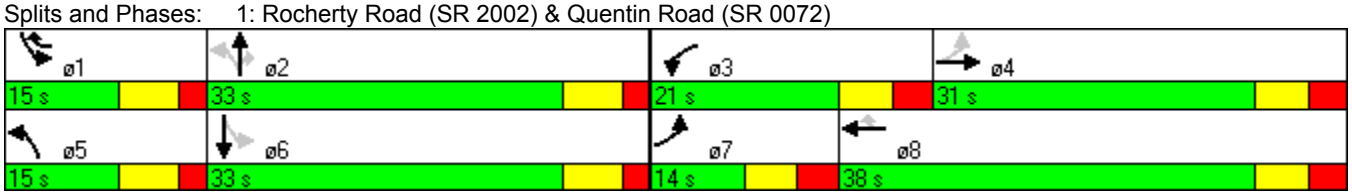
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	158	301	353	332	171	12	684	174	181	675
Lane Group Flow (vph)	172	350	384	349	186	13	712	189	197	915
Turn Type	pm+pt		Prot		pm+ov	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8	1	5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	1	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	13.5	12.0	21.5	21.5	13.5	21.5
Total Split (s)	14.0	31.0	21.0	38.0	15.0	15.0	33.0	33.0	15.0	33.0
Total Split (%)	14.0%	31.0%	21.0%	38.0%	15.0%	15.0%	33.0%	33.0%	15.0%	33.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.54	0.86	0.83	0.61	0.23	0.06	0.73	0.33	0.77	0.68
Control Delay	26.9	58.6	58.3	35.2	8.7	18.2	38.2	6.1	37.7	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	58.6	58.3	35.2	8.7	18.2	38.2	6.1	37.7	22.2
Queue Length 50th (ft)	65	210	124	187	32	5	220	0	62	207
Queue Length 95th (ft)	110	#359	#197	280	73	16	288	52	m#171	#444
Internal Link Dist (ft)		569		654			721			1806
Turn Bay Length (ft)	325		225		275	150		425	350	
Base Capacity (vph)	317	426	464	594	819	242	978	574	255	1355
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.82	0.83	0.59	0.23	0.05	0.73	0.33	0.77	0.68

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 60 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	301	21	353	332	171	12	684	174	181	675	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	13	14	10	12	12	11	12	12
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1710	1767		3317	1915	1697	1710	3523	1576	1771	3351	
Flt Permitted	0.48	1.00		0.95	1.00	1.00	0.19	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	868	1767		3317	1915	1697	349	3523	1576	315	3351	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.96	0.92	0.92	0.93	0.92
Adj. Flow (vph)	172	327	23	384	349	186	13	712	189	197	726	189
RTOR Reduction (vph)	0	2	0	0	0	58	0	0	137	0	21	0
Lane Group Flow (vph)	172	348	0	384	349	128	13	712	52	197	894	0
Heavy Vehicles (%)	1%	2%	0%	4%	1%	0%	0%	4%	4%	0%	7%	2%
Turn Type	pm+pt			Prot		pm+ov	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	29.8	22.8		14.0	29.8	38.3	29.3	27.7	27.7	42.7	34.6	
Effective Green, g (s)	29.8	22.8		14.0	29.8	38.3	29.3	27.7	27.7	42.7	34.6	
Actuated g/C Ratio	0.30	0.23		0.14	0.30	0.38	0.29	0.28	0.28	0.43	0.35	
Clearance Time (s)	7.0	7.0		7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	318	403		464	571	650	124	976	437	258	1159	
v/s Ratio Prot	0.04	c0.20		c0.12	c0.18	0.02	0.00	0.20		c0.06	c0.27	
v/s Ratio Perm	0.12					0.06	0.03		0.03	0.26		
v/c Ratio	0.54	0.86		0.83	0.61	0.20	0.10	0.73	0.12	0.76	0.77	
Uniform Delay, d1	27.7	37.1		41.8	30.1	20.6	25.7	32.8	27.0	21.0	29.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.83	0.73	
Incremental Delay, d2	2.3	17.6		12.1	2.2	0.2	0.5	4.8	0.6	12.1	4.5	
Delay (s)	30.1	54.7		53.9	32.3	20.8	26.3	37.5	27.6	29.5	25.8	
Level of Service	C	D		D	C	C	C	D	C	C	C	
Approach Delay (s)		46.6			39.0			35.3			26.5	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	34.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

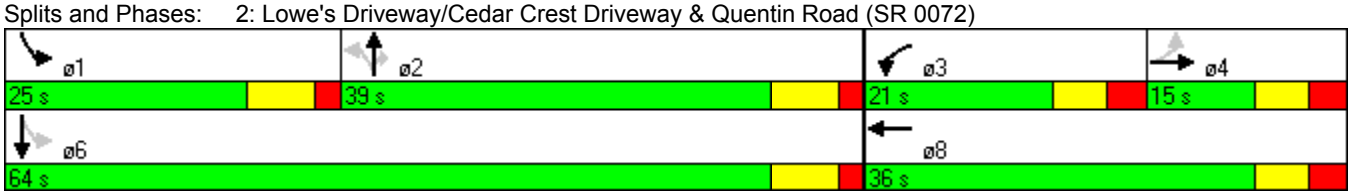
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	10	3	328	3	60	702	310	274	625
Lane Group Flow (vph)	0	92	357	366	72	739	337	298	670
Turn Type	Perm		Prot		Perm		Perm	pm+pt	
Protected Phases		4	3	8		2		1	6
Permitted Phases	4				2		2	6	
Detector Phase	4	4	3	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	4.0	7.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	11.0	14.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	15.0	15.0	21.0	36.0	39.0	39.0	39.0	25.0	64.0
Total Split (%)	15.0%	15.0%	21.0%	36.0%	39.0%	39.0%	39.0%	25.0%	64.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.55	0.76	0.54	0.26	0.57	0.41	0.66	0.32
Control Delay		28.7	53.3	6.4	15.8	16.8	2.2	36.9	9.4
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		28.7	53.3	6.4	15.8	16.8	2.2	36.9	9.4
Queue Length 50th (ft)		12	113	1	17	205	0	137	65
Queue Length 95th (ft)		43	#164	68	m34	277	m2	228	126
Internal Link Dist (ft)		216		637		1806			599
Turn Bay Length (ft)			200		225		425	350	
Base Capacity (vph)		171	485	722	282	1300	821	475	2094
Starvation Cap Reductn		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.54	0.74	0.51	0.26	0.57	0.41	0.63	0.32

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	3	53	328	3	334	60	702	310	274	625	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.89		1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1532		3467	1601		1796	3458	1623	1702	3447	
Flt Permitted		0.85		0.95	1.00		0.40	1.00	1.00	0.22	1.00	
Satd. Flow (perm)		1314		3467	1601		751	3458	1623	394	3447	
Peak-hour factor, PHF	0.63	0.75	0.74	0.92	0.92	0.92	0.83	0.95	0.92	0.92	0.95	0.67
Adj. Flow (vph)	16	4	72	357	3	363	72	739	337	298	658	12
RTOR Reduction (vph)	0	68	0	0	266	0	0	0	215	0	1	0
Lane Group Flow (vph)	0	24	0	357	100	0	72	739	122	298	669	0
Heavy Vehicles (%)	0%	0%	6%	2%	2%	2%	3%	7%	2%	2%	4%	0%
Turn Type	Perm			Prot			Perm		Perm	pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4						2		2	6		
Actuated Green, G (s)		6.2		13.5	26.7		36.2	36.2	36.2	59.3	59.3	
Effective Green, g (s)		6.2		13.5	26.7		36.2	36.2	36.2	59.3	59.3	
Actuated g/C Ratio		0.06		0.14	0.27		0.36	0.36	0.36	0.59	0.59	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0		3.0	4.0		6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		81		468	427		272	1252	588	444	2044	
v/s Ratio Prot				c0.10	c0.06			0.21		c0.11	0.19	
v/s Ratio Perm		0.02					0.10		0.08	c0.29		
v/c Ratio		0.30		0.76	0.23		0.26	0.59	0.21	0.67	0.33	
Uniform Delay, d1		44.8		41.7	28.7		22.5	25.9	22.0	12.8	10.3	
Progression Factor		1.00		1.00	1.00		0.54	0.57	0.30	2.67	0.86	
Incremental Delay, d2		2.9		7.2	0.4		2.0	1.7	0.7	5.2	0.4	
Delay (s)		47.7		48.9	29.0		14.1	16.4	7.3	39.6	9.3	
Level of Service		D		D	C		B	B	A	D	A	
Approach Delay (s)		47.7			38.9			13.6			18.6	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

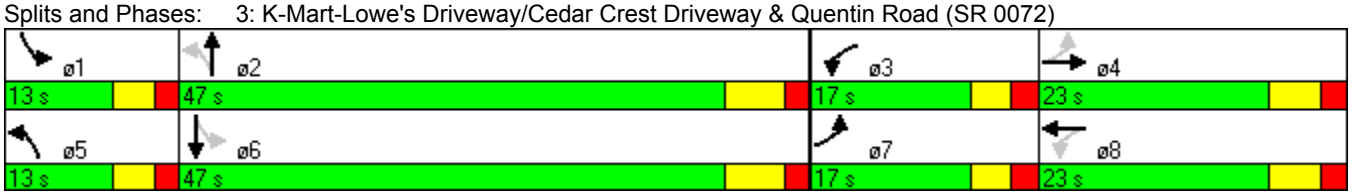
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	182	19	77	20	49	828	142	769
Lane Group Flow (vph)	225	96	96	402	56	968	167	916
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	3.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	7.9	21.4
Total Split (s)	17.0	23.0	17.0	23.0	13.0	47.0	13.0	47.0
Total Split (%)	17.0%	23.0%	17.0%	23.0%	13.0%	47.0%	13.0%	47.0%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	3.0	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	4.9	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.84	0.26	0.24	0.90	0.18	0.67	0.57	0.59
Control Delay	54.5	16.7	24.8	42.7	6.0	10.6	24.5	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.5	16.7	24.8	42.7	6.0	10.6	24.5	19.5
Queue Length 50th (ft)	106	17	42	117	6	79	49	152
Queue Length 95th (ft)	#181	28	69	69	m14	109	106	184
Internal Link Dist (ft)		199		207		599		1573
Turn Bay Length (ft)					200		325	
Base Capacity (vph)	267	372	447	480	332	1448	297	1541
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.26	0.21	0.84	0.17	0.67	0.56	0.59

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 8 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	19	55	77	20	245	49	828	62	142	769	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	12	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.90		1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1600		1902	1761		1796	3366		1814	3341	
Flt Permitted	0.20	1.00		0.69	1.00		0.22	1.00		0.17	1.00	
Satd. Flow (perm)	356	1600		1392	1761		420	3366		326	3341	
Peak-hour factor, PHF	0.81	0.59	0.86	0.80	0.56	0.67	0.88	0.92	0.91	0.85	0.92	0.81
Adj. Flow (vph)	225	32	64	96	36	366	56	900	68	167	836	80
RTOR Reduction (vph)	0	51	0	0	181	0	0	5	0	0	7	0
Lane Group Flow (vph)	225	45	0	96	221	0	56	963	0	167	909	0
Heavy Vehicles (%)	0%	11%	0%	0%	5%	1%	0%	6%	0%	0%	7%	9%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.9	20.0		23.9	16.0		47.7	41.9		51.9	44.0	
Effective Green, g (s)	31.9	20.0		23.9	16.0		47.7	41.9		51.9	44.0	
Actuated g/C Ratio	0.32	0.20		0.24	0.16		0.48	0.42		0.52	0.44	
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0		3.0	6.0	
Lane Grp Cap (vph)	273	320		373	282		280	1410		287	1470	
v/s Ratio Prot	c0.10	0.03		0.02	0.13		0.01	c0.29		c0.05	0.27	
v/s Ratio Perm	c0.16			0.04			0.08			0.26		
v/c Ratio	0.82	0.14		0.26	0.78		0.20	0.68		0.58	0.62	
Uniform Delay, d1	28.2	32.9		30.5	40.3		14.9	23.6		15.2	21.5	
Progression Factor	1.00	1.00		1.00	1.00		0.46	0.36		1.54	0.83	
Incremental Delay, d2	17.9	0.2		0.4	13.2		0.3	2.3		2.8	1.8	
Delay (s)	46.1	33.1		30.9	53.5		7.1	10.8		26.2	19.8	
Level of Service	D	C		C	D		A	B		C	B	
Approach Delay (s)		42.3			49.1			10.6			20.7	
Approach LOS		D			D			B			C	

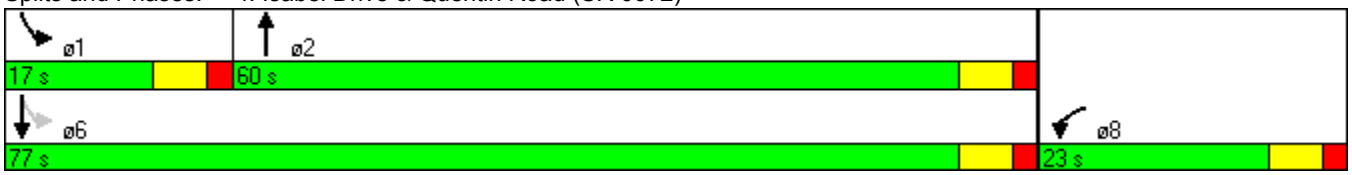
Intersection Summary			
HCM Average Control Delay	24.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	44	1185	126	1034
Lane Group Flow (vph)	264	1317	137	1066
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	23.0	60.0	17.0	77.0
Total Split (%)	23.0%	60.0%	17.0%	77.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.71	0.60	0.44	0.39
Control Delay	23.3	8.2	7.8	4.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.3	8.2	7.8	4.5
Queue Length 50th (ft)	42	161	16	86
Queue Length 95th (ft)	116	211	41	161
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			250	
Base Capacity (vph)	482	2192	351	2705
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.55	0.60	0.39	0.39

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 74 (74%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	44	199	1185	76	126	1034
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	12	12	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.89		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1880		3453		1687	3490
Flt Permitted	0.99		1.00		0.14	1.00
Satd. Flow (perm)	1880		3453		248	3490
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.97
Adj. Flow (vph)	48	216	1234	83	137	1066
RTOR Reduction (vph)	175	0	4	0	0	0
Lane Group Flow (vph)	89	0	1313	0	137	1066
Heavy Vehicles (%)	2%	2%	2%	2%	5%	5%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	10.5		63.3		77.5	77.5
Effective Green, g (s)	10.5		63.3		77.5	77.5
Actuated g/C Ratio	0.10		0.63		0.78	0.78
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	197		2186		310	2705
v/s Ratio Prot	c0.05		c0.38		0.04	c0.31
v/s Ratio Perm					0.31	
v/c Ratio	0.45		0.60		0.44	0.39
Uniform Delay, d1	42.1		10.9		6.9	3.6
Progression Factor	1.00		0.62		1.00	1.00
Incremental Delay, d2	1.7		0.8		1.0	0.4
Delay (s)	43.7		7.6		8.0	4.1
Level of Service	D		A		A	A
Approach Delay (s)	43.7		7.6			4.5
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

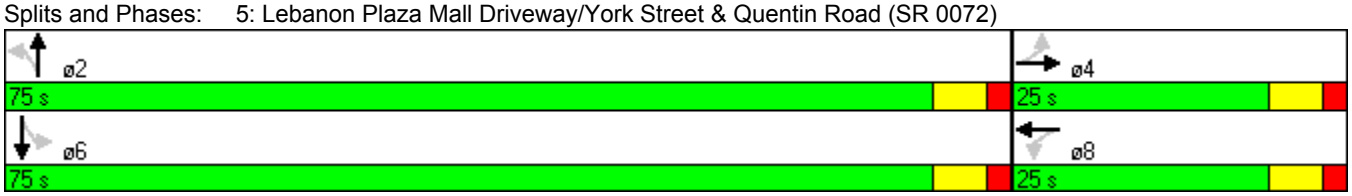
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	52	55	133	94	61	1067	41	950
Lane Group Flow (vph)	68	152	145	175	72	1206	45	1067
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0
Total Split (s)	25.0	25.0	25.0	25.0	75.0	75.0	75.0	75.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.28	0.39	0.58	0.43	0.29	0.58	0.22	0.51
Control Delay	24.6	17.3	32.9	23.1	11.2	9.9	10.5	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	17.3	32.9	23.1	11.2	9.9	10.5	9.0
Queue Length 50th (ft)	23	33	53	54	12	136	7	112
Queue Length 95th (ft)	46	67	105	87	39	227	29	188
Internal Link Dist (ft)		346		1237		592		1986
Turn Bay Length (ft)			200		225		175	
Base Capacity (vph)	323	505	335	534	416	3419	339	3449
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.30	0.43	0.33	0.17	0.35	0.13	0.31

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 66.4
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	55	58	133	94	50	61	1067	42	41	950	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1653	1627		1685	1813		1744	3439		1754	3468	
Flt Permitted	0.65	1.00		0.66	1.00		0.23	1.00		0.18	1.00	
Satd. Flow (perm)	1125	1627		1171	1813		419	3439		341	3468	
Peak-hour factor, PHF	0.77	0.81	0.69	0.92	0.78	0.92	0.85	0.92	0.92	0.92	0.94	0.79
Adj. Flow (vph)	68	68	84	145	121	54	72	1160	46	45	1011	56
RTOR Reduction (vph)	0	43	0	0	16	0	0	4	0	0	5	0
Lane Group Flow (vph)	68	109	0	145	159	0	72	1202	0	45	1062	0
Heavy Vehicles (%)	4%	2%	2%	1%	0%	3%	3%	4%	0%	0%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.3	14.3		14.3	14.3		40.1	40.1		40.1	40.1	
Effective Green, g (s)	14.3	14.3		14.3	14.3		40.1	40.1		40.1	40.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.60	0.60		0.60	0.60	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	242	350		252	390		253	2077		206	2094	
v/s Ratio Prot		0.07			0.09			c0.35			0.31	
v/s Ratio Perm	0.06			c0.12			0.17			0.13		
v/c Ratio	0.28	0.31		0.58	0.41		0.28	0.58		0.22	0.51	
Uniform Delay, d1	21.8	21.9		23.3	22.4		6.3	8.0		6.0	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7		3.8	1.0		0.6	0.4		0.5	0.2	
Delay (s)	22.6	22.6		27.1	23.4		6.9	8.4		6.5	7.7	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		22.6			25.1			8.3			7.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

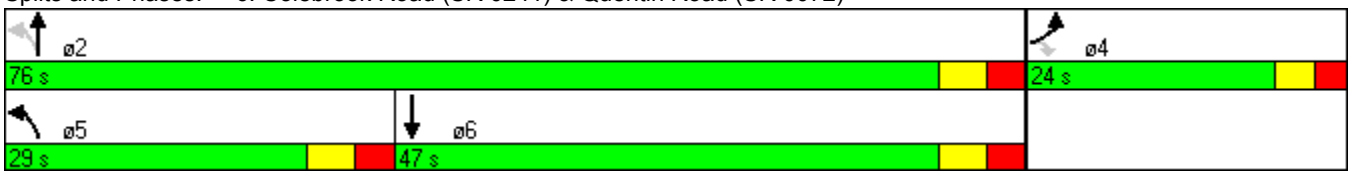
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	207	250	332	998	883
Lane Group Flow (vph)	225	272	361	1073	1096
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	9.5	16.5	16.5
Total Split (s)	24.0	24.0	29.0	76.0	47.0
Total Split (%)	24.0%	24.0%	29.0%	76.0%	47.0%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.75	0.56	0.75	0.44	0.87
Control Delay	52.6	9.4	30.8	7.2	34.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	9.4	30.8	7.2	34.3
Queue Length 50th (ft)	126	0	139	135	311
Queue Length 95th (ft)	#243	71	#280	173	399
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	250		375		
Base Capacity (vph)	361	533	537	2854	1598
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.62	0.51	0.67	0.38	0.69

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 87.4
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	207	250	332	998	883	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	12	12
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1470	1736	3557	3329	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1660	1470	186	3557	3329	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.92
Adj. Flow (vph)	225	272	361	1073	949	147
RTOR Reduction (vph)	0	223	0	0	13	0
Lane Group Flow (vph)	225	49	361	1073	1083	0
Heavy Vehicles (%)	1%	2%	2%	3%	4%	1%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	15.8	15.8	59.3	59.3	32.8	
Effective Green, g (s)	15.8	15.8	59.3	59.3	32.8	
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.38	
Clearance Time (s)	5.5	5.5	6.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	301	267	483	2422	1254	
v/s Ratio Prot	c0.14		c0.17	0.30	c0.33	
v/s Ratio Perm		0.03	0.34			
v/c Ratio	0.75	0.18	0.75	0.44	0.86	
Uniform Delay, d1	33.8	30.2	21.1	6.4	25.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.7	0.3	6.2	0.4	7.2	
Delay (s)	43.5	30.5	27.3	6.7	32.3	
Level of Service	D	C	C	A	C	
Approach Delay (s)	36.4			11.9	32.3	
Approach LOS	D			B	C	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	87.1	Sum of lost time (s)	18.5
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

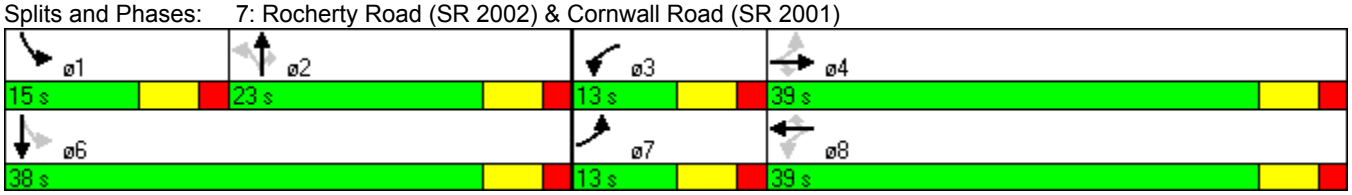
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	109	456	49	105	592	204	52	235	120	241	294
Lane Group Flow (vph)	118	496	53	114	643	222	57	255	130	262	553
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt	
Protected Phases	7	4		3	8			2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	7	4	4	3	8	8	2	2	2	1	6
Switch Phase											
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	21.0	13.0	21.0	21.0	21.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	39.0	39.0	13.0	39.0	39.0	23.0	23.0	23.0	15.0	38.0
Total Split (%)	14.4%	43.3%	43.3%	14.4%	43.3%	43.3%	25.6%	25.6%	25.6%	16.7%	42.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio	0.58	0.70	0.08	0.36	0.95	0.32	0.52	0.71	0.31	0.94	0.89
Control Delay	26.1	30.3	6.0	15.3	54.2	4.2	52.2	46.2	8.2	47.8	22.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	30.3	6.0	15.3	54.2	4.2	52.2	46.2	8.2	47.8	22.8
Queue Length 50th (ft)	34	242	0	32	349	0	29	137	0	46	84
Queue Length 95th (ft)	#83	364	23	61	#569	45	#81	#240	46	m#109	m170
Internal Link Dist (ft)		1052			405			731			260
Turn Bay Length (ft)	250		175	225		325	175		400	240	
Base Capacity (vph)	204	711	643	314	679	707	109	361	415	280	623
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.70	0.08	0.36	0.95	0.31	0.52	0.71	0.31	0.94	0.89

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 44 (49%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	456	49	105	592	204	52	235	120	241	294	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1809	1552	1653	1853	1545	1754	1891	1623	1623	1652	
Flt Permitted	0.11	1.00	1.00	0.29	1.00	1.00	0.31	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	198	1809	1552	509	1853	1545	572	1891	1623	457	1652	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	118	496	53	114	643	222	57	255	130	262	306	247
RTOR Reduction (vph)	0	0	32	0	0	138	0	0	107	0	33	0
Lane Group Flow (vph)	118	496	21	114	643	84	57	255	23	262	520	0
Heavy Vehicles (%)	4%	4%	3%	5%	2%	4%	0%	1%	0%	7%	9%	4%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	42.4	35.4	35.4	39.6	34.0	34.0	16.0	16.0	16.0	31.0	31.0	
Effective Green, g (s)	42.4	35.4	35.4	39.6	34.0	34.0	16.0	16.0	16.0	31.0	31.0	
Actuated g/C Ratio	0.47	0.39	0.39	0.44	0.38	0.38	0.18	0.18	0.18	0.34	0.34	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	7.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	207	712	610	295	700	584	102	336	289	274	569	
v/s Ratio Prot	c0.04	0.27		0.02	c0.35			0.13		0.10	c0.31	
v/s Ratio Perm	0.22		0.01	0.15		0.05	0.10		0.01	c0.23		
v/c Ratio	0.57	0.70	0.03	0.39	0.92	0.14	0.56	0.76	0.08	0.96	0.91	
Uniform Delay, d1	18.1	22.8	16.8	16.3	26.7	18.4	33.8	35.2	30.9	26.5	28.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.52	0.33	
Incremental Delay, d2	3.8	3.2	0.0	0.8	17.2	0.2	20.3	14.8	0.5	32.9	15.9	
Delay (s)	21.9	26.0	16.8	17.1	43.9	18.6	54.1	50.0	31.4	46.7	25.2	
Level of Service	C	C	B	B	D	B	D	D	C	D	C	
Approach Delay (s)		24.6			35.1			45.1			32.1	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

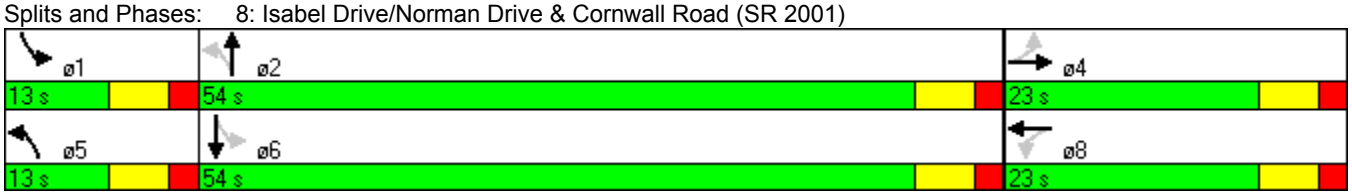
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	38	18	69	28	119	826	57	789
Lane Group Flow (vph)	0	178	0	268	129	940	62	884
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	21.0	13.0	21.0
Total Split (s)	23.0	23.0	23.0	23.0	13.0	54.0	13.0	54.0
Total Split (%)	25.6%	25.6%	25.6%	25.6%	14.4%	60.0%	14.4%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio		0.58		0.85	0.49	0.85	0.27	0.88
Control Delay		24.5		50.0	11.9	22.7	8.1	30.7
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		24.5		50.0	11.9	22.7	8.1	30.7
Queue Length 50th (ft)		41		104	12	534	10	433
Queue Length 95th (ft)		107		#225	m28	m#712	22	#711
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)					225		275	
Base Capacity (vph)		333		348	264	1104	232	1002
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.53		0.77	0.49	0.85	0.27	0.88

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 42 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	18	108	69	28	150	119	826	39	57	789	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	12	12	12	12	12	12
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.91			0.92		1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1836			1911		1805	1887		1719	1802	
Flt Permitted		0.73			0.78		0.11	1.00		0.10	1.00	
Satd. Flow (perm)		1353			1510		216	1887		175	1802	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	20	117	75	30	163	129	898	42	62	858	26
RTOR Reduction (vph)	0	79	0	0	64	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	99	0	0	204	0	129	938	0	62	883	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	1%	1%	1%	5%	5%	5%
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.0			15.0		58.4	51.4		55.6	50.0	
Effective Green, g (s)		15.0			15.0		58.4	51.4		55.6	50.0	
Actuated g/C Ratio		0.17			0.17		0.65	0.57		0.62	0.56	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		226			252		264	1078		204	1001	
v/s Ratio Prot							c0.04	c0.50		0.02	0.49	
v/s Ratio Perm		0.07			c0.13		0.28			0.17		
v/c Ratio		0.44			0.81		0.49	0.87		0.30	0.88	
Uniform Delay, d1		33.7			36.1		14.0	16.5		14.4	17.4	
Progression Factor		1.00			1.00		0.95	0.84		1.00	1.00	
Incremental Delay, d2		1.4			17.1		1.1	7.5		0.8	11.1	
Delay (s)		35.1			53.3		14.5	21.3		15.2	28.5	
Level of Service		D			D		B	C		B	C	
Approach Delay (s)		35.1			53.3			20.4			27.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

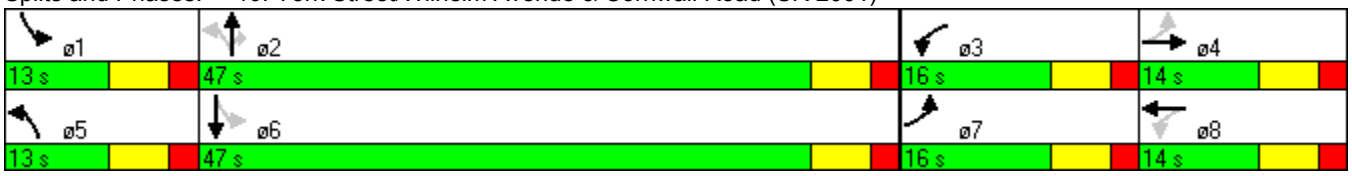
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	89	41	217	49	91	749	354	80	567
Lane Group Flow (vph)	97	90	236	144	99	814	385	87	755
Turn Type	pm+pt		pm+pt		pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	16.0	14.0	16.0	14.0	13.0	47.0	47.0	13.0	47.0
Total Split (%)	17.8%	15.6%	17.8%	15.6%	14.4%	52.2%	52.2%	14.4%	52.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.33	0.43	0.82	0.56	0.38	0.91	0.40	0.34	0.90
Control Delay	29.3	29.9	53.7	30.8	12.4	39.2	3.1	12.0	37.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	29.9	53.7	30.8	12.4	39.2	3.1	12.0	37.3
Queue Length 50th (ft)	43	25	113	38	22	430	0	19	386
Queue Length 95th (ft)	83	72	#217	#116	43	#688	48	38	#638
Internal Link Dist (ft)		1237		1131		837			1311
Turn Bay Length (ft)	150		250		225		425	250	
Base Capacity (vph)	332	221	298	258	264	1009	1034	255	951
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.41	0.79	0.56	0.38	0.81	0.37	0.34	0.79

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 81.1
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: York Street/Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	41	41	217	49	84	91	749	354	80	567	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.92		1.00	0.91		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	1715		1787	1707		1770	1863	1583	1805	1743	
Flt Permitted	0.71	1.00		0.44	1.00		0.12	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1357	1715		827	1707		224	1863	1583	196	1743	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	45	45	236	53	91	99	814	385	87	616	139
RTOR Reduction (vph)	0	41	0	0	67	0	0	0	207	0	9	0
Lane Group Flow (vph)	97	49	0	236	77	0	99	814	178	87	746	0
Heavy Vehicles (%)	0%	2%	3%	1%	2%	0%	2%	2%	2%	0%	6%	6%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.3	5.6		19.3	9.1		43.8	38.7	38.7	43.8	38.7	
Effective Green, g (s)	12.3	5.6		19.3	9.1		43.8	38.7	38.7	43.8	38.7	
Actuated g/C Ratio	0.15	0.07		0.23	0.11		0.52	0.46	0.46	0.52	0.46	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	236	115		308	186		212	862	733	201	807	
v/s Ratio Prot	0.03	0.03		c0.09	0.05		c0.03	c0.44		0.03	0.43	
v/s Ratio Perm	0.03			c0.08			0.22		0.11	0.20		
v/c Ratio	0.41	0.43		0.77	0.41		0.47	0.94	0.24	0.43	0.92	
Uniform Delay, d1	32.1	37.5		28.6	34.8		14.9	21.4	13.6	16.3	21.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	2.5		10.8	1.5		1.6	18.4	0.2	1.5	16.1	
Delay (s)	33.3	40.0		39.4	36.3		16.5	39.9	13.8	17.8	37.2	
Level of Service	C	D		D	D		B	D	B	B	D	
Approach Delay (s)		36.5			38.2			30.3			35.2	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	33.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	24.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

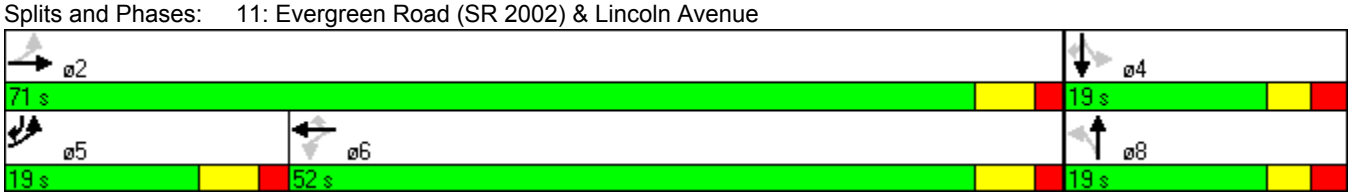
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	193	656	11	537	51	18	18	42	53	309
Lane Group Flow (vph)	210	748	12	584	55	0	49	0	104	336
Turn Type	pm+pt		Perm		Perm	Perm		Perm		pm+ov
Protected Phases	5	2		6			8		4	5
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	6	6	6	8	8	4	4	5
Switch Phase										
Minimum Initial (s)	4.0	12.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0	4.0
Minimum Split (s)	10.0	18.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5	10.0
Total Split (s)	19.0	71.0	52.0	52.0	52.0	19.0	19.0	19.0	19.0	19.0
Total Split (%)	21.1%	78.9%	57.8%	57.8%	57.8%	21.1%	21.1%	21.1%	21.1%	21.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	6.0
Lead/Lag	Lead		Lag	Lag	Lag					Lead
Lead-Lag Optimize?										
Recall Mode	None	Min	Min	Min	Min	None	None	None	None	None
v/c Ratio	0.41	0.58	0.04	0.78	0.08		0.21		0.43	0.47
Control Delay	6.5	7.8	12.1	24.8	3.9		27.4		35.7	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	6.5	7.8	12.1	24.8	3.9		27.4		35.7	7.8
Queue Length 50th (ft)	26	140	3	199	0		15		40	23
Queue Length 95th (ft)	53	265	12	350	18		52		104	101
Internal Link Dist (ft)		619		423			845		1011	
Turn Bay Length (ft)	450		80		275					325
Base Capacity (vph)	580	1577	501	1263	1136		358		366	794
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.36	0.47	0.02	0.46	0.05		0.14		0.28	0.42

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 64
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	193	656	32	11	537	51	18	18	8	42	53	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	12	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.98	1.00
Satd. Flow (prot)	1702	1728		1727	1748	1552		1752			1790	1567
Flt Permitted	0.22	1.00		0.38	1.00	1.00		0.82			0.83	1.00
Satd. Flow (perm)	390	1728		694	1748	1552		1467			1527	1567
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	713	35	12	584	55	20	20	9	46	58	336
RTOR Reduction (vph)	0	2	0	0	0	31	0	8	0	0	0	174
Lane Group Flow (vph)	210	746	0	12	584	24	0	41	0	0	104	162
Heavy Vehicles (%)	2%	5%	5%	0%	4%	3%	0%	14%	0%	0%	5%	2%
Turn Type	pm+pt			Perm		Perm	Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	45.5	45.5		28.3	28.3	28.3		7.7			7.7	18.9
Effective Green, g (s)	45.5	45.5		28.3	28.3	28.3		7.7			7.7	18.9
Actuated g/C Ratio	0.70	0.70		0.44	0.44	0.44		0.12			0.12	0.29
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Vehicle Extension (s)	3.0	6.0		6.0	6.0	6.0		3.0			3.0	3.0
Lane Grp Cap (vph)	501	1215		304	765	679		175			182	458
v/s Ratio Prot	0.07	c0.43			c0.33							0.06
v/s Ratio Perm	0.22			0.02		0.02		0.03			c0.07	0.04
v/c Ratio	0.42	0.61		0.04	0.76	0.04		0.23			0.57	0.35
Uniform Delay, d1	6.5	5.0		10.4	15.4	10.4		25.8			26.9	18.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.6	1.6		0.2	5.8	0.1		0.7			4.3	0.5
Delay (s)	7.0	6.6		10.6	21.2	10.5		26.5			31.2	18.5
Level of Service	A	A		B	C	B		C			C	B
Approach Delay (s)		6.7			20.1			26.5			21.5	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	64.7	Sum of lost time (s)	17.5
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

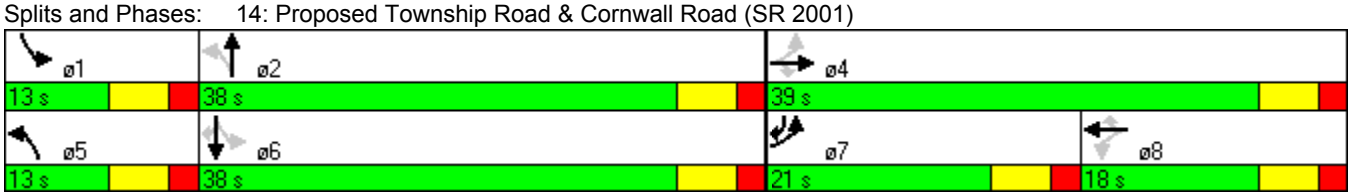
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	333	68	100	25	171	201	156	393	58	611	171
Lane Group Flow (vph)	362	74	109	27	186	218	170	429	63	664	186
Turn Type	pm+pt		Perm	Perm		Perm	pm+pt		pm+pt		pm+ov
Protected Phases	7	4			8		5	2	1	6	7
Permitted Phases	4		4	8		8	2		6		6
Detector Phase	7	4	4	8	8	8	5	2	1	6	7
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0	7.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	21.0	13.0	21.0	13.0
Total Split (s)	21.0	39.0	39.0	18.0	18.0	18.0	13.0	38.0	13.0	38.0	21.0
Total Split (%)	23.3%	43.3%	43.3%	20.0%	20.0%	20.0%	14.4%	42.2%	14.4%	42.2%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max	None
v/c Ratio	0.92	0.11	0.17	0.17	0.78	0.55	0.81	0.60	0.17	0.99	0.18
Control Delay	55.5	19.5	4.7	37.4	61.2	11.2	38.8	23.5	6.9	50.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	19.5	4.7	37.4	61.2	11.2	38.8	23.5	6.9	50.0	4.2
Queue Length 50th (ft)	163	27	0	14	103	0	41	231	10	~384	24
Queue Length 95th (ft)	#296	57	33	39	#204	63	m#132	317	m14	m#533	m30
Internal Link Dist (ft)		240			318			830		570	
Turn Bay Length (ft)	100			100		100	325		400		350
Base Capacity (vph)	393	683	649	170	248	400	211	721	362	672	1011
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.11	0.17	0.16	0.75	0.55	0.81	0.60	0.17	0.99	0.18

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Proposed Township Road & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	333	68	100	25	171	201	156	393	2	58	611	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1863	1583	1711	1863	1583	1702	1852		1711	1863	1583
Flt Permitted	0.31	1.00	1.00	0.71	1.00	1.00	0.12	1.00		0.35	1.00	1.00
Satd. Flow (perm)	557	1863	1583	1276	1863	1583	211	1852		635	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	362	74	109	27	186	218	170	427	2	63	664	186
RTOR Reduction (vph)	0	0	70	0	0	190	0	0	0	0	0	82
Lane Group Flow (vph)	362	74	39	27	186	28	170	429	0	63	664	104
Turn Type	pm+pt		Perm	Perm		Perm	pm+pt			pm+pt		pm+ov
Protected Phases	7	4			8		5	2		1	6	7
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	32.5	32.5	32.5	11.5	11.5	11.5	40.9	33.9		38.1	32.5	47.5
Effective Green, g (s)	32.5	32.5	32.5	11.5	11.5	11.5	40.9	33.9		38.1	32.5	47.5
Actuated g/C Ratio	0.36	0.36	0.36	0.13	0.13	0.13	0.45	0.38		0.42	0.36	0.53
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	393	673	572	163	238	202	212	698		336	673	941
v/s Ratio Prot	c0.15	0.04			0.10		c0.06	0.23		0.01	c0.36	0.02
v/s Ratio Perm	c0.18		0.02	0.02		0.02	0.30			0.07		0.05
v/c Ratio	0.92	0.11	0.07	0.17	0.78	0.14	0.80	0.61		0.19	0.99	0.11
Uniform Delay, d1	24.2	19.1	18.8	35.0	38.0	34.8	20.2	22.8		16.2	28.5	10.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.66	0.85		0.52	0.81	2.34
Incremental Delay, d2	26.6	0.1	0.1	0.5	15.3	0.3	17.1	3.5		0.2	23.9	0.0
Delay (s)	50.8	19.2	18.9	35.5	53.3	35.2	30.4	23.0		8.5	46.9	25.0
Level of Service	D	B	B	D	D	D	C	C		A	D	C
Approach Delay (s)		40.2			43.0			25.1			39.8	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	386	65	0	401	97	0	0	115	0	0	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	0		150	0		0	0		0
Storage Lanes	0		1	0		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.865			0.865
Flt Protected												
Satd. Flow (prot)	0	1863	1583	0	1863	1583	0	0	1611	0	0	1611
Flt Permitted												
Satd. Flow (perm)	0	1863	1583	0	1863	1583	0	0	1611	0	0	1611
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		525			320			264			247	
Travel Time (s)		10.2			6.2			7.2			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	420	71	0	436	105	0	0	125	0	0	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	420	71	0	436	105	0	0	125	0	0	63
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 34.1%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	386	65	0	401	97	0	0	115	0	0	58
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	420	71	0	436	105	0	0	125	0	0	63
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		525			320							
pX, platoon unblocked	0.88			0.93			0.91	0.91	0.93	0.91	0.91	0.88
vC, conflicting volume	541			490			918	961	420	980	926	436
vC1, stage 1 conf vol							420	420		436	436	
vC2, stage 2 conf vol							499	541		545	490	
vCu, unblocked vol	406			410			682	728	334	750	690	285
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	81	100	100	90
cM capacity (veh/h)	1010			1064			464	464	656	396	480	660

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	420	71	436	105	125	63
Volume Left	0	0	0	0	0	0
Volume Right	0	71	0	105	125	63
cSH	1700	1700	1700	1700	656	660
Volume to Capacity	0.25	0.04	0.26	0.06	0.19	0.10
Queue Length 95th (ft)	0	0	0	0	17	8
Control Delay (s)	0.0	0.0	0.0	0.0	11.8	11.0
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		11.8	11.0
Approach LOS					B	B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	460	12	1	532	1	3	0	1	1	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	75		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996						0.966			0.876	
Flt Protected	0.950			0.950				0.964			0.996	
Satd. Flow (prot)	1770	1855	0	1770	1863	0	0	1735	0	0	1625	0
Flt Permitted	0.950			0.950				0.964			0.996	
Satd. Flow (perm)	1770	1855	0	1770	1863	0	0	1735	0	0	1625	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		717			356			195			278	
Travel Time (s)		14.0			6.9			5.3			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	500	13	1	578	1	3	0	1	1	0	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	513	0	1	579	0	0	4	0	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 38.1%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	460	12	1	532	1	3	0	1	1	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	500	13	1	578	1	3	0	1	1	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)		717			356							
pX, platoon unblocked	0.82			0.96			0.84	0.84	0.96	0.84	0.84	0.82
vC, conflicting volume	579			513			1120	1110	507	1104	1116	579
vC1, stage 1 conf vol							528	528		581	581	
vC2, stage 2 conf vol							591	582		523	535	
vCu, unblocked vol	376			476			948	936	469	929	943	375
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	100	100	100	98
cM capacity (veh/h)	969			1047			398	401	573	412	403	550

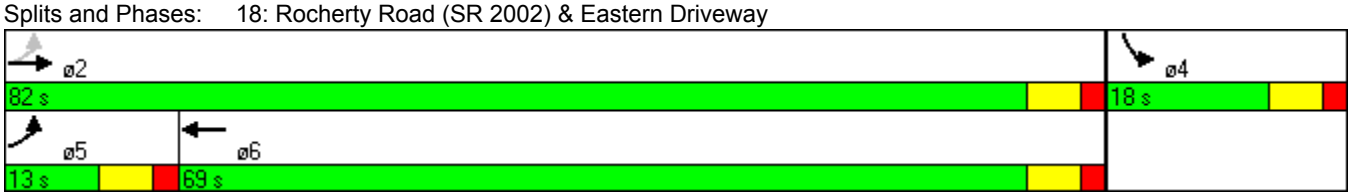
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	513	1	579	4	12
Volume Left	11	0	1	0	3	1
Volume Right	0	13	0	1	1	11
cSH	969	1700	1047	1700	431	533
Volume to Capacity	0.01	0.30	0.00	0.34	0.01	0.02
Queue Length 95th (ft)	1	0	0	0	1	2
Control Delay (s)	8.8	0.0	8.4	0.0	13.4	11.9
Lane LOS	A		A		B	B
Approach Delay (s)	0.2		0.0		13.4	11.9
Approach LOS					B	B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Volume (vph)	29	771	792	66
Lane Group Flow (vph)	32	838	904	119
Turn Type	pm+pt			
Protected Phases	5	2	6	4
Permitted Phases	2			
Detector Phase	5	2	6	4
Switch Phase				
Minimum Initial (s)	7.0	15.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	13.0
Total Split (s)	13.0	82.0	69.0	18.0
Total Split (%)	13.0%	82.0%	69.0%	18.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	None	None	None
v/c Ratio	0.09	0.62	0.69	0.38
Control Delay	3.7	8.0	13.9	31.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.7	8.0	13.9	31.3
Queue Length 50th (ft)	4	169	187	33
Queue Length 95th (ft)	10	284	542	113
Internal Link Dist (ft)		400	1268	325
Turn Bay Length (ft)	225			
Base Capacity (vph)	371	1682	1627	434
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.09	0.50	0.56	0.27

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 64.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 18: Rocherty Road (SR 2002) & Eastern Driveway



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	29	771	792	40	66	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1676	1825	1888		1712	
Flt Permitted	0.14	1.00	1.00		0.97	
Satd. Flow (perm)	244	1825	1888		1712	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	838	861	43	72	47
RTOR Reduction (vph)	0	0	2	0	24	0
Lane Group Flow (vph)	32	838	902	0	95	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	49.2	49.2	41.3		7.3	
Effective Green, g (s)	49.2	49.2	41.3		7.3	
Actuated g/C Ratio	0.72	0.72	0.60		0.11	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	215	1311	1138		182	
v/s Ratio Prot	0.00	c0.46	c0.48		c0.06	
v/s Ratio Perm	0.10					
v/c Ratio	0.15	0.64	0.79		0.52	
Uniform Delay, d1	8.6	5.0	10.3		28.9	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	1.0	3.9		2.7	
Delay (s)	8.9	6.1	14.2		31.6	
Level of Service	A	A	B		C	
Approach Delay (s)		6.2	14.2		31.6	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	68.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	800	833	2	0	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1881	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1881	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	870	905	2	0	55
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	870	907	0	0	55
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 54.0%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	800	833	2	0	51
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	870	905	2	0	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485	480			
pX, platoon unblocked	0.59				0.76	0.59
vC, conflicting volume	908				1776	907
vC1, stage 1 conf vol					907	
vC2, stage 2 conf vol					870	
vCu, unblocked vol	497				846	496
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	84
cM capacity (veh/h)	630				324	339

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	870	908	55
Volume Left	0	0	0
Volume Right	0	2	55
cSH	1700	1700	339
Volume to Capacity	0.51	0.53	0.16
Queue Length 95th (ft)	0	0	14
Control Delay (s)	0.0	0.0	17.7
Lane LOS			C
Approach Delay (s)	0.0	0.0	17.7
Approach LOS			C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	24	527	12	16	749
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	125	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			450
Travel Time (s)	4.7		5.2			6.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Adj. Flow (vph)	0	26	573	13	17	780
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	573	13	17	780
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			Yes
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 42.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	24	527	12	16	749
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Hourly flow rate (vph)	0	26	573	13	17	780
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			340			
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	1388	573			586	
vC1, stage 1 conf vol	573					
vC2, stage 2 conf vol	815					
vCu, unblocked vol	1366	396			411	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			98	
cM capacity (veh/h)	356	549			964	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	26	573	13	17	780
Volume Left	0	0	0	17	0
Volume Right	26	0	13	0	0
cSH	549	1700	1700	964	1700
Volume to Capacity	0.05	0.34	0.01	0.02	0.46
Queue Length 95th (ft)	4	0	0	1	0
Control Delay (s)	11.9	0.0	0.0	8.8	0.0
Lane LOS	B			A	
Approach Delay (s)	11.9	0.0		0.2	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	78	0	551	687	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			175
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	1863	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	1583
Link Speed (mph)	25			45	45	
Link Distance (ft)	247			450	910	
Travel Time (s)	6.7			6.8	13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	85	0	599	747	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	85	0	599	747	53
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			11	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 47.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	78	0	551	687	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	85	0	599	747	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				790	910	
pX, platoon unblocked	0.72	0.66	0.66			
vC, conflicting volume	1346	747	800			
vC1, stage 1 conf vol	747					
vC2, stage 2 conf vol	599					
vCu, unblocked vol	885	356	437			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	81	100			
cM capacity (veh/h)	400	453	739			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	85	599	747	53
Volume Left	0	0	0	0
Volume Right	85	0	0	53
cSH	453	1700	1700	1700
Volume to Capacity	0.19	0.35	0.44	0.03
Queue Length 95th (ft)	17	0	0	0
Control Delay (s)	14.8	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	14.8	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	41	0	997	890	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			-3%	3%	
Storage Length (ft)	0	0	0			225
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1891	1835	1560
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1891	1835	1560
Link Speed (mph)	30			45	45	
Link Distance (ft)	247			650	678	
Travel Time (s)	5.6			9.8	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	45	0	1084	967	107
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	45	0	1084	967	107
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	0.98	0.98	1.02	1.02
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 56.8%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	41	0	997	890	98
Sign Control	Stop			Free	Free	
Grade	0%			-3%	3%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	45	0	1084	967	107
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				650	678	
pX, platoon unblocked	0.74	0.56	0.56			
vC, conflicting volume	2051	967	1074			
vC1, stage 1 conf vol	967					
vC2, stage 2 conf vol	1084					
vCu, unblocked vol	1156	553	742			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	85	100			
cM capacity (veh/h)	240	300	486			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	45	1084	967	107
Volume Left	0	0	0	0
Volume Right	45	0	0	107
cSH	300	1700	1700	1700
Volume to Capacity	0.15	0.64	0.57	0.06
Queue Length 95th (ft)	13	0	0	0
Control Delay (s)	19.1	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	19.1	0.0	0.0	
Approach LOS	C			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	106	8	0	200	47	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992					
Flt Protected					0.950	
Satd. Flow (prot)	1831	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1831	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	151	9	0	270	51	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	0	0	270	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 20.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	106	8	0	200	47	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Hourly flow rate (vph)	151	9	0	270	51	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			160		426	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			160		426	156
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1419		585	890

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	160	270	51
Volume Left	0	0	51
Volume Right	9	0	0
cSH	1700	1419	585
Volume to Capacity	0.09	0.00	0.09
Queue Length 95th (ft)	0	0	7
Control Delay (s)	0.0	0.0	11.7
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.7
Approach LOS			B

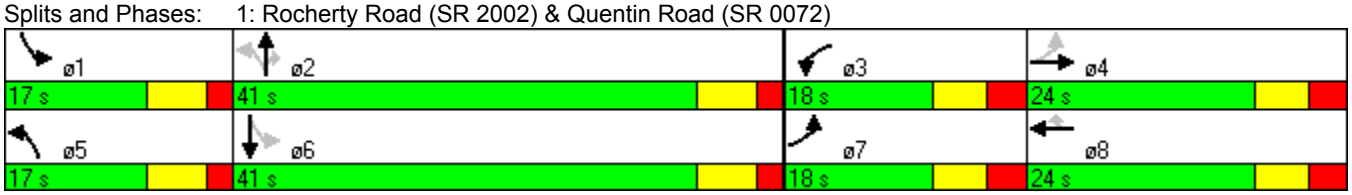
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Volume (vph)	185	163	239	185	115	22	742	139	230	686
Lane Group Flow (vph)	201	198	260	201	125	24	798	151	247	951
Turn Type	pm+pt		Prot		Perm	pm+pt		Perm	pm+pt	
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases	4				8	2		2	6	
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	5.5	15.0	15.0	7.0	15.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	12.0	21.5	21.5	13.5	21.5
Total Split (s)	18.0	24.0	18.0	24.0	24.0	17.0	41.0	41.0	17.0	41.0
Total Split (%)	18.0%	24.0%	18.0%	24.0%	24.0%	17.0%	41.0%	41.0%	17.0%	41.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max
v/c Ratio	0.64	0.75	0.71	0.71	0.35	0.09	0.61	0.23	0.76	0.57
Control Delay	35.8	57.0	54.7	53.8	9.7	13.2	29.1	4.8	32.1	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	57.0	54.7	53.8	9.7	13.2	29.1	4.8	32.1	12.8
Queue Length 50th (ft)	94	116	83	121	0	7	222	0	61	80
Queue Length 95th (ft)	154	#210	#132	197	49	20	287	41	m#172	275
Internal Link Dist (ft)		569		654			721			1806
Turn Bay Length (ft)	325		225		275	150		425	350	
Base Capacity (vph)	315	287	368	310	378	312	1304	663	324	1661
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.69	0.71	0.65	0.33	0.08	0.61	0.23	0.76	0.57

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 50 (50%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rocherty Road (SR 2002) & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	163	21	239	185	115	22	742	139	230	686	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	13	14	10	12	12	11	12	12
Grade (%)		2%			3%			-3%			-3%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1661	1655		3349	1824	1616	1613	3628	1576	1736	3484	
Flt Permitted	0.49	1.00		0.95	1.00	1.00	0.23	1.00	1.00	0.19	1.00	
Satd. Flow (perm)	849	1655		3349	1824	1616	395	3628	1576	347	3484	
Peak-hour factor, PHF	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.93	0.92	0.92
Adj. Flow (vph)	201	175	23	260	201	125	24	798	151	247	746	205
RTOR Reduction (vph)	0	5	0	0	0	106	0	0	97	0	22	0
Lane Group Flow (vph)	201	193	0	260	201	20	24	798	54	247	929	0
Heavy Vehicles (%)	4%	9%	0%	3%	6%	5%	6%	1%	4%	2%	2%	1%
Turn Type	pm+pt			Prot		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4					8	2		2	6		
Actuated Green, G (s)	26.5	15.6		10.9	15.6	15.6	39.3	36.0	36.0	53.0	43.2	
Effective Green, g (s)	26.5	15.6		10.9	15.6	15.6	39.3	36.0	36.0	53.0	43.2	
Actuated g/C Ratio	0.26	0.16		0.11	0.16	0.16	0.39	0.36	0.36	0.53	0.43	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	313	258		365	285	252	195	1306	567	330	1505	
v/s Ratio Prot	0.07	c0.12		c0.08	0.11		0.00	0.22		c0.08	0.27	
v/s Ratio Perm	0.10					0.01	0.04		0.03	c0.32		
v/c Ratio	0.64	0.75		0.71	0.71	0.08	0.12	0.61	0.10	0.75	0.62	
Uniform Delay, d1	30.8	40.3		43.0	40.0	36.1	19.1	26.3	21.2	16.0	22.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.18	0.57	
Incremental Delay, d2	5.0	11.9		6.9	8.3	0.2	0.4	2.1	0.3	8.3	1.7	
Delay (s)	35.8	52.2		49.9	48.3	36.2	19.4	28.4	21.5	27.2	14.1	
Level of Service	D	D		D	D	D	B	C	C	C	B	
Approach Delay (s)		43.9			46.4			27.1			16.8	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	13	9	340	10	104	595	404	372	709
Lane Group Flow (vph)	0	124	370	409	132	647	439	404	778
Turn Type	Perm		Prot		Perm		Perm	pm+pt	
Protected Phases		4	3	8		2		1	6
Permitted Phases	4				2		2	6	
Detector Phase	4	4	3	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	4.0	7.0	15.0	15.0	15.0	6.0	15.0
Minimum Split (s)	14.0	14.0	11.0	14.0	22.0	22.0	22.0	13.0	22.0
Total Split (s)	16.0	16.0	21.0	37.0	39.0	39.0	39.0	24.0	63.0
Total Split (%)	16.0%	16.0%	21.0%	37.0%	39.0%	39.0%	39.0%	24.0%	63.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio		0.67	0.79	0.55	0.58	0.54	0.53	0.86	0.39
Control Delay		35.7	54.6	6.3	32.5	22.9	10.6	48.1	10.7
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		35.7	54.6	6.3	32.5	22.9	10.6	48.1	10.7
Queue Length 50th (ft)		25	118	5	76	193	137	196	80
Queue Length 95th (ft)		29	#179	76	122	258	213	#309	155
Internal Link Dist (ft)		216		637		1806			599
Turn Bay Length (ft)			200		225		425	350	
Base Capacity (vph)		195	485	761	228	1203	832	468	2009
Starvation Cap Reductn		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.64	0.76	0.54	0.58	0.54	0.53	0.86	0.39

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	9	66	340	10	366	104	595	404	372	709	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			-5%			1%	
Total Lost time (s)		7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.91		1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1595		3467	1607		1832	3628	1623	1702	3512	
Flt Permitted		0.82		0.95	1.00		0.36	1.00	1.00	0.25	1.00	
Satd. Flow (perm)		1328		3467	1607		688	3628	1623	444	3512	
Peak-hour factor, PHF	0.54	0.56	0.79	0.92	0.92	0.92	0.79	0.92	0.92	0.92	0.93	0.81
Adj. Flow (vph)	24	16	84	370	11	398	132	647	439	404	762	16
RTOR Reduction (vph)	0	76	0	0	283	0	0	0	294	0	1	0
Lane Group Flow (vph)	0	48	0	370	126	0	132	647	145	404	777	0
Heavy Vehicles (%)	0%	0%	3%	2%	2%	2%	1%	2%	2%	2%	2%	0%
Turn Type	Perm			Prot			Perm		Perm	pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4						2		2	6		
Actuated Green, G (s)		8.3		13.6	28.9		33.1	33.1	33.1	57.1	57.1	
Effective Green, g (s)		8.3		13.6	28.9		33.1	33.1	33.1	57.1	57.1	
Actuated g/C Ratio		0.08		0.14	0.29		0.33	0.33	0.33	0.57	0.57	
Clearance Time (s)		7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		4.0		3.0	4.0		6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)		110		472	464		228	1201	537	467	2005	
v/s Ratio Prot				c0.11	0.08			0.18		c0.15	0.22	
v/s Ratio Perm		c0.04					0.19		0.09	c0.35		
v/c Ratio		0.44		0.78	0.27		0.58	0.54	0.27	0.87	0.39	
Uniform Delay, d1		43.6		41.8	27.4		27.7	27.2	24.6	14.8	11.8	
Progression Factor		1.00		1.00	1.00		0.79	0.77	3.16	2.43	0.85	
Incremental Delay, d2		3.7		8.3	0.4		8.8	1.5	1.1	14.1	0.4	
Delay (s)		47.4		50.1	27.9		30.7	22.5	78.8	50.1	10.4	
Level of Service		D		D	C		C	C	E	D	B	
Approach Delay (s)		47.4			38.4			43.7			24.0	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	35.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

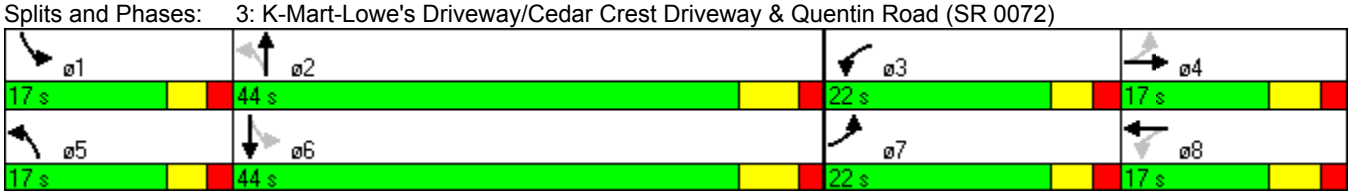
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	277	37	81	40	56	859	192	866
Lane Group Flow (vph)	315	163	133	264	68	1038	204	1105
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	15.0	3.0	15.0
Minimum Split (s)	8.1	8.9	8.1	8.9	7.9	21.4	7.9	21.4
Total Split (s)	22.0	17.0	22.0	17.0	17.0	44.0	17.0	44.0
Total Split (%)	22.0%	17.0%	22.0%	17.0%	17.0%	44.0%	17.0%	44.0%
Yellow Time (s)	3.0	3.8	3.0	3.8	3.0	4.5	3.0	4.5
All-Red Time (s)	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.9	5.1	5.9	4.9	6.4	4.9	6.4
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.88	0.51	0.39	0.81	0.26	0.72	0.67	0.68
Control Delay	55.0	28.4	28.1	37.0	8.1	13.3	33.2	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	28.4	28.1	37.0	8.1	13.3	33.2	21.2
Queue Length 50th (ft)	162	53	60	60	8	101	0	203
Queue Length 95th (ft)	#291	65	69	105	m20	141	168	238
Internal Link Dist (ft)		199		207		599		1573
Turn Bay Length (ft)					200		325	
Base Capacity (vph)	358	320	460	347	343	1439	329	1624
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.51	0.29	0.76	0.20	0.72	0.62	0.68

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: K-Mart-Lowe's Driveway/Cedar Crest Driveway & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	37	89	81	40	178	56	859	72	192	866	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	13	14	14	12	12	12	12	12	12
Grade (%)		6%			-4%			1%			-1%	
Total Lost time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.88		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1692	1650		1902	1804		1796	3538		1814	3517	
Flt Permitted	0.27	1.00		0.65	1.00		0.16	1.00		0.13	1.00	
Satd. Flow (perm)	478	1650		1309	1804		300	3538		245	3517	
Peak-hour factor, PHF	0.88	0.62	0.86	0.61	0.77	0.84	0.82	0.92	0.69	0.94	0.92	0.94
Adj. Flow (vph)	315	60	103	133	52	212	68	934	104	204	941	164
RTOR Reduction (vph)	0	59	0	0	149	0	0	8	0	0	13	0
Lane Group Flow (vph)	315	104	0	133	115	0	68	1030	0	204	1092	0
Heavy Vehicles (%)	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.8	15.8		20.7	9.8		46.6	40.4		55.4	44.8	
Effective Green, g (s)	31.8	15.8		20.7	9.8		46.6	40.4		55.4	44.8	
Actuated g/C Ratio	0.32	0.16		0.21	0.10		0.47	0.40		0.55	0.45	
Clearance Time (s)	5.1	5.9		5.1	5.9		4.9	6.4		4.9	6.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	6.0		3.0	6.0	
Lane Grp Cap (vph)	357	261		336	177		233	1429		302	1576	
v/s Ratio Prot	c0.15	0.06		0.04	0.06		0.02	0.29		c0.07	c0.31	
v/s Ratio Perm	c0.13			0.04			0.12			0.30		
v/c Ratio	0.88	0.40		0.40	0.65		0.29	0.72		0.68	0.69	
Uniform Delay, d1	29.3	37.8		33.8	43.5		16.2	25.1		15.9	22.1	
Progression Factor	1.00	1.00		1.00	1.00		0.56	0.41		1.69	0.85	
Incremental Delay, d2	21.7	1.0		0.8	8.3		0.6	2.7		5.1	2.2	
Delay (s)	51.0	38.8		34.6	51.7		9.7	13.0		32.0	21.1	
Level of Service	D	D		C	D		A	B		C	C	
Approach Delay (s)		46.8			46.0			12.8			22.8	
Approach LOS		D			D			B			C	

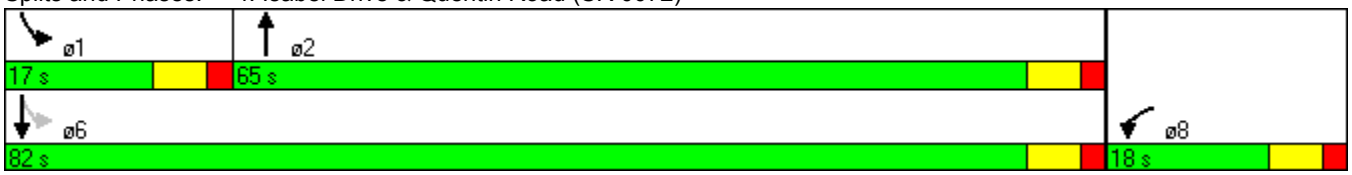
Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.9
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	34	1255	109	1383
Lane Group Flow (vph)	162	1453	118	1471
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phase	8	2	1	6
Switch Phase				
Minimum Initial (s)	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	13.0	21.0
Total Split (s)	18.0	65.0	17.0	82.0
Total Split (%)	18.0%	65.0%	17.0%	82.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	None	C-Max	None	C-Max
v/c Ratio	0.58	0.63	0.41	0.51
Control Delay	21.5	7.6	6.7	4.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.5	7.6	6.7	4.5
Queue Length 50th (ft)	23	162	12	121
Queue Length 95th (ft)	82	195	29	203
Internal Link Dist (ft)	328	1573		473
Turn Bay Length (ft)			250	
Base Capacity (vph)	341	2322	342	2881
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.48	0.63	0.35	0.51

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 73 (73%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: Isabel Drive & Quentin Road (SR 0072)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	34	115	1255	82	109	1383
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	16	16	12	12	11	12
Grade (%)	-2%		3%			-3%
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frt	0.90		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1926		3523		1753	3628
Flt Permitted	0.99		1.00		0.12	1.00
Satd. Flow (perm)	1926		3523		218	3628
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.94
Adj. Flow (vph)	37	125	1364	89	118	1471
RTOR Reduction (vph)	114	0	4	0	0	0
Lane Group Flow (vph)	48	0	1449	0	118	1471
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Turn Type					pm+pt	
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	8.6		65.8		79.4	79.4
Effective Green, g (s)	8.6		65.8		79.4	79.4
Actuated g/C Ratio	0.09		0.66		0.79	0.79
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	166		2318		290	2881
v/s Ratio Prot	c0.02		c0.41		0.03	c0.41
v/s Ratio Perm					0.29	
v/c Ratio	0.29		0.63		0.41	0.51
Uniform Delay, d1	42.8		9.9		7.2	3.6
Progression Factor	1.00		0.64		1.00	1.00
Incremental Delay, d2	1.0		0.8		0.9	0.6
Delay (s)	43.8		7.2		8.1	4.2
Level of Service	D		A		A	A
Approach Delay (s)	43.8		7.2			4.5
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

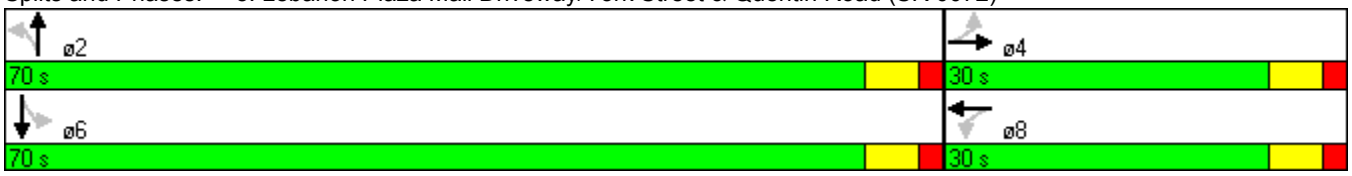
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	50	64	150	111	96	988	45	1178
Lane Group Flow (vph)	60	204	163	196	112	1139	49	1382
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	40.0	40.0	40.0	40.0
Minimum Split (s)	16.0	16.0	16.0	16.0	46.0	46.0	46.0	46.0
Total Split (s)	30.0	30.0	30.0	30.0	70.0	70.0	70.0	70.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	70.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.26	0.48	0.73	0.47	0.70	0.53	0.22	0.63
Control Delay	30.9	21.8	50.4	30.4	38.3	9.8	10.3	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	21.8	50.4	30.4	38.3	9.8	10.3	11.2
Queue Length 50th (ft)	20	44	62	65	32	145	9	193
Queue Length 95th (ft)	62	121	#186	125	#137	233	31	308
Internal Link Dist (ft)		346		1237		592		1986
Turn Bay Length (ft)			200		225		175	
Base Capacity (vph)	333	568	317	591	217	2895	307	2940
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.36	0.51	0.33	0.52	0.39	0.16	0.47

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 79.2
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Lebanon Plaza Mall Driveway/York Street & Quentin Road (SR 0072)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	64	109	150	111	37	96	988	60	45	1178	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	10	12	12	12	12	12	11	12	12
Grade (%)		3%			-2%			1%			-1%	
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1629		1685	1845		1778	3463		1702	3513	
Flt Permitted	0.58	1.00		0.57	1.00		0.14	1.00		0.20	1.00	
Satd. Flow (perm)	1054	1629		1004	1845		260	3463		367	3513	
Peak-hour factor, PHF	0.83	0.84	0.85	0.92	0.71	0.92	0.86	0.92	0.92	0.92	0.93	0.53
Adj. Flow (vph)	60	76	128	163	156	40	112	1074	65	49	1267	115
RTOR Reduction (vph)	0	60	0	0	9	0	0	5	0	0	7	0
Lane Group Flow (vph)	60	144	0	163	187	0	112	1134	0	49	1375	0
Heavy Vehicles (%)	0%	0%	1%	1%	0%	4%	1%	3%	0%	3%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.7	17.7		17.7	17.7		49.0	49.0		49.0	49.0	
Effective Green, g (s)	17.7	17.7		17.7	17.7		49.0	49.0		49.0	49.0	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.62	0.62		0.62	0.62	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	237	366		226	415		162	2156		229	2187	
v/s Ratio Prot		0.09			0.10			0.33			0.39	
v/s Ratio Perm	0.06			c0.16			c0.43			0.13		
v/c Ratio	0.25	0.39		0.72	0.45		0.69	0.53		0.21	0.63	
Uniform Delay, d1	25.1	25.9		28.2	26.3		9.8	8.3		6.5	9.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.9		11.5	1.1		12.0	0.2		0.5	0.6	
Delay (s)	25.8	26.9		39.7	27.4		21.8	8.6		6.9	9.8	
Level of Service	C	C		D	C		C	A		A	A	
Approach Delay (s)		26.6			33.0			9.8			9.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	78.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.2%	ICU Level of Service	G
Analysis Period (min)	15		

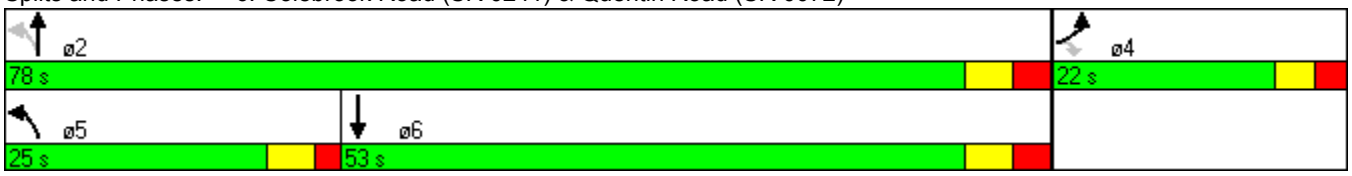
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	113	389	300	942	1086
Lane Group Flow (vph)	123	397	326	992	1203
Turn Type		Perm	pm+pt		
Protected Phases	4		5	2	6
Permitted Phases		4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	3.0	3.0	3.0	10.0	10.0
Minimum Split (s)	8.5	8.5	8.5	16.5	16.5
Total Split (s)	22.0	22.0	25.0	78.0	53.0
Total Split (%)	22.0%	22.0%	25.0%	78.0%	53.0%
Yellow Time (s)	3.0	3.0	3.5	3.5	3.5
All-Red Time (s)	2.5	2.5	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	6.5	6.5
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.51	0.77	0.68	0.39	0.84
Control Delay	42.5	17.7	24.9	5.5	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	17.7	24.9	5.5	27.6
Queue Length 50th (ft)	58	21	90	87	284
Queue Length 95th (ft)	129	131	#228	143	402
Internal Link Dist (ft)	376			184	208
Turn Bay Length (ft)	250		375		
Base Capacity (vph)	355	597	536	3182	2083
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.66	0.61	0.31	0.58

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 79.9
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Colebrook Road (SR 0241) & Quentin Road (SR 0072)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	113	389	300	942	1086	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	11	12	12	12
Grade (%)	1%			-3%	5%	
Total Lost time (s)	5.5	5.5	5.5	6.5	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1660	1500	1771	3628	3447	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1660	1500	192	3628	3447	
Peak-hour factor, PHF	0.92	0.98	0.92	0.95	0.96	0.92
Adj. Flow (vph)	123	397	326	992	1131	72
RTOR Reduction (vph)	0	300	0	0	5	0
Lane Group Flow (vph)	123	97	326	992	1198	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	4%
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.5	11.5	56.0	56.0	33.3	
Effective Green, g (s)	11.5	11.5	56.0	56.0	33.3	
Actuated g/C Ratio	0.14	0.14	0.70	0.70	0.42	
Clearance Time (s)	5.5	5.5	5.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	
Lane Grp Cap (vph)	240	217	477	2556	1444	
v/s Ratio Prot	c0.07		c0.15	0.27	c0.35	
v/s Ratio Perm		0.06	0.33			
v/c Ratio	0.51	0.45	0.68	0.39	0.83	
Uniform Delay, d1	31.4	31.1	17.7	4.8	20.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	1.5	4.0	0.3	4.8	
Delay (s)	33.3	32.5	21.8	5.1	25.4	
Level of Service	C	C	C	A	C	
Approach Delay (s)	32.7			9.2	25.4	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	17.5
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

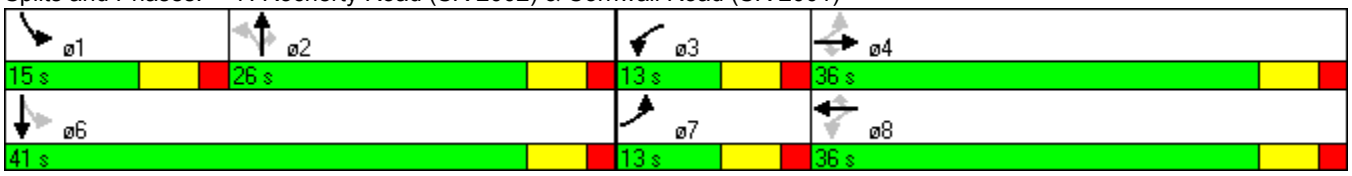
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	112	318	75	77	352	147	66	191	65	143	219
Lane Group Flow (vph)	122	346	82	84	383	160	72	208	71	155	396
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt	
Protected Phases	7	4		3	8			2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	7	4	4	3	8	8	2	2	2	1	6
Switch Phase											
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	15.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	21.0	21.0	13.0	21.0	21.0	21.0	21.0	21.0	13.0	21.0
Total Split (s)	13.0	36.0	36.0	13.0	36.0	36.0	26.0	26.0	26.0	15.0	41.0
Total Split (%)	14.4%	40.0%	40.0%	14.4%	40.0%	40.0%	28.9%	28.9%	28.9%	16.7%	45.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
v/c Ratio	0.44	0.63	0.15	0.26	0.76	0.29	0.25	0.38	0.14	0.34	0.49
Control Delay	20.7	33.0	5.9	17.1	39.7	5.3	30.5	30.0	8.1	9.2	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	33.0	5.9	17.1	39.7	5.3	30.5	30.0	8.1	9.2	7.9
Queue Length 50th (ft)	42	174	0	28	197	0	32	96	0	20	35
Queue Length 95th (ft)	69	248	30	51	276	41	75	173	34	m38	74
Internal Link Dist (ft)		1052			405			731			260
Turn Bay Length (ft)	250		175	225		325	175		400	240	
Base Capacity (vph)	279	615	588	320	624	642	283	543	512	457	812
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.56	0.14	0.26	0.61	0.25	0.25	0.38	0.14	0.34	0.49

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Rocherty Road (SR 2002) & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	112	318	75	77	352	147	66	191	65	143	219	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		2%			1%			-1%			1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1727	1844	1599	1702	1872	1607	1754	1872	1591	1702	1740	
Flt Permitted	0.28	1.00	1.00	0.39	1.00	1.00	0.53	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	508	1844	1599	695	1872	1607	975	1872	1591	815	1740	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	122	346	82	84	383	160	72	208	71	155	228	168
RTOR Reduction (vph)	0	0	57	0	0	115	0	0	51	0	27	0
Lane Group Flow (vph)	122	346	25	84	383	45	72	208	20	155	369	0
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	2%	2%	2%	3%	0%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	33.9	26.9	26.9	31.1	25.5	25.5	24.9	24.9	24.9	39.5	39.5	
Effective Green, g (s)	33.9	26.9	26.9	31.1	25.5	25.5	24.9	24.9	24.9	39.5	39.5	
Actuated g/C Ratio	0.38	0.30	0.30	0.35	0.28	0.28	0.28	0.28	0.28	0.44	0.44	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	7.0	7.0	7.0	3.0	7.0	
Lane Grp Cap (vph)	286	551	478	303	530	455	270	518	440	442	764	
v/s Ratio Prot	c0.03	0.19		0.02	c0.20			0.11		0.03	c0.21	
v/s Ratio Perm	0.13		0.02	0.08		0.03	0.07		0.01	0.12		
v/c Ratio	0.43	0.63	0.05	0.28	0.72	0.10	0.27	0.40	0.04	0.35	0.48	
Uniform Delay, d1	19.9	27.2	22.5	20.6	29.1	23.8	25.4	26.5	23.8	16.1	18.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.44	0.36	
Incremental Delay, d2	1.0	2.5	0.1	0.5	5.2	0.1	2.4	2.3	0.2	0.4	2.0	
Delay (s)	20.9	29.8	22.5	21.1	34.2	23.9	27.8	28.8	24.0	7.5	8.5	
Level of Service	C	C	C	C	C	C	C	C	C	A	A	
Approach Delay (s)		26.7			29.8			27.6			8.2	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

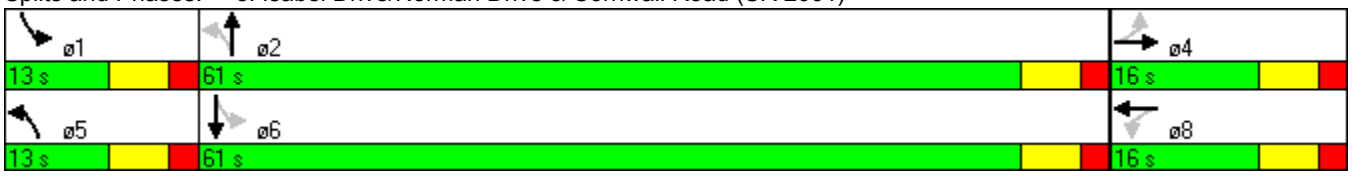
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	36	3	3	6	90	695	7	785
Lane Group Flow (vph)	0	166	0	28	98	758	8	873
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	21.0	13.0	21.0
Total Split (s)	16.0	16.0	16.0	16.0	13.0	61.0	13.0	61.0
Total Split (%)	17.8%	17.8%	17.8%	17.8%	14.4%	67.8%	14.4%	67.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio		0.61		0.16	0.26	0.53	0.02	0.71
Control Delay		22.7		23.5	7.1	14.3	2.9	15.5
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		22.7		23.5	7.1	14.3	2.9	15.5
Queue Length 50th (ft)		23		5	23	263	1	306
Queue Length 95th (ft)		83		30	m36	m337	4	498
Internal Link Dist (ft)		124		614		598		2141
Turn Bay Length (ft)					225		275	
Base Capacity (vph)		299		205	384	1428	512	1223
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.56		0.14	0.26	0.53	0.02	0.71

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Isabel Drive/Norman Drive & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	3	114	3	6	17	90	695	3	7	785	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	12	12	12	12	12	12
Grade (%)		5%			0%			-2%			0%	
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.90			0.91		1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1847			1881		1823	1918		1770	1856	
Flt Permitted		0.91			0.90		0.18	1.00		0.31	1.00	
Satd. Flow (perm)		1702			1698		355	1918		582	1856	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	3	124	3	7	18	98	755	3	8	853	20
RTOR Reduction (vph)	0	112	0	0	16	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	54	0	0	12	0	98	758	0	8	872	0
Heavy Vehicles (%)	1%	1%	1%	4%	4%	4%	0%	0%	0%	2%	2%	2%
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.4			8.4		67.8	62.2		59.4	58.0	
Effective Green, g (s)		8.4			8.4		67.8	62.2		59.4	58.0	
Actuated g/C Ratio		0.09			0.09		0.75	0.69		0.66	0.64	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		159			158		359	1326		403	1196	
v/s Ratio Prot							c0.02	c0.40		0.00	c0.47	
v/s Ratio Perm		c0.03			0.01		0.19			0.01		
v/c Ratio		0.34			0.07		0.27	0.57		0.02	0.73	
Uniform Delay, d1		38.2			37.2		8.1	7.1		5.8	10.7	
Progression Factor		1.00			1.00		2.07	2.08		1.00	1.00	
Incremental Delay, d2		1.3			0.2		0.3	1.5		0.0	3.9	
Delay (s)		39.5			37.4		17.2	16.2		5.8	14.7	
Level of Service		D			D		B	B		A	B	
Approach Delay (s)		39.5			37.4			16.3			14.6	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

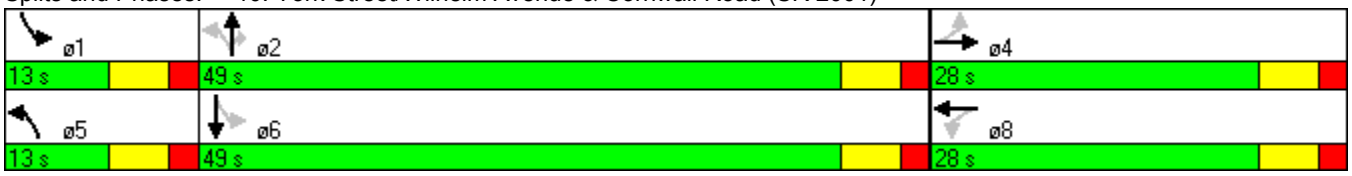
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	99	57	215	69	42	443	252	58	471
Lane Group Flow (vph)	108	92	234	126	46	482	274	63	676
Turn Type	Perm		Perm		pm+pt		Perm	pm+pt	
Protected Phases		4		8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	8	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	15.0	15.0	7.0	15.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	21.0	21.0	13.0	21.0
Total Split (s)	28.0	28.0	28.0	28.0	13.0	49.0	49.0	13.0	49.0
Total Split (%)	31.1%	31.1%	31.1%	31.1%	14.4%	54.4%	54.4%	14.4%	54.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min
v/c Ratio	0.33	0.19	0.70	0.27	0.13	0.56	0.31	0.13	0.83
Control Delay	29.5	20.6	41.2	21.2	7.8	18.0	2.9	7.6	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	20.6	41.2	21.2	7.8	18.0	2.9	7.6	27.7
Queue Length 50th (ft)	46	27	112	37	9	179	0	12	291
Queue Length 95th (ft)	99	69	#234	89	22	277	39	27	#466
Internal Link Dist (ft)		1237		1131		837			1311
Turn Bay Length (ft)	150		250		225		425	250	
Base Capacity (vph)	456	655	465	633	343	1247	1150	475	1176
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.14	0.50	0.20	0.13	0.39	0.24	0.13	0.57

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 69.9
Natural Cycle: 70
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: York Street/Wilhelm Avenue & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	57	28	215	69	47	42	443	252	58	471	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1787	1783		1770	1702		1805	1863	1583	1805	1744	
Flt Permitted	0.68	1.00		0.70	1.00		0.18	1.00	1.00	0.36	1.00	
Satd. Flow (perm)	1272	1783		1299	1702		349	1863	1583	686	1744	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	62	30	234	75	51	46	482	274	63	512	164
RTOR Reduction (vph)	0	19	0	0	27	0	0	0	151	0	14	0
Lane Group Flow (vph)	108	73	0	234	99	0	46	482	123	63	662	0
Heavy Vehicles (%)	1%	2%	0%	2%	2%	9%	0%	2%	2%	0%	5%	5%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	17.9	17.9		17.9	17.9		35.5	32.1	32.1	35.5	32.1	
Effective Green, g (s)	17.9	17.9		17.9	17.9		35.5	32.1	32.1	35.5	32.1	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.50	0.45	0.45	0.50	0.45	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	319	447		326	427		243	838	712	394	784	
v/s Ratio Prot		0.04			0.06		c0.01	0.26		0.01	c0.38	
v/s Ratio Perm	0.08			c0.18			0.09		0.08	0.07		
v/c Ratio	0.34	0.16		0.72	0.23		0.19	0.58	0.17	0.16	0.84	
Uniform Delay, d1	21.9	20.9		24.4	21.3		11.6	14.6	11.7	9.9	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.2		7.4	0.3		0.4	1.0	0.1	0.2	8.3	
Delay (s)	22.5	21.1		31.8	21.6		12.0	15.5	11.8	10.1	25.7	
Level of Service	C	C		C	C		B	B	B	B	C	
Approach Delay (s)		21.9			28.2			14.1			24.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	71.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

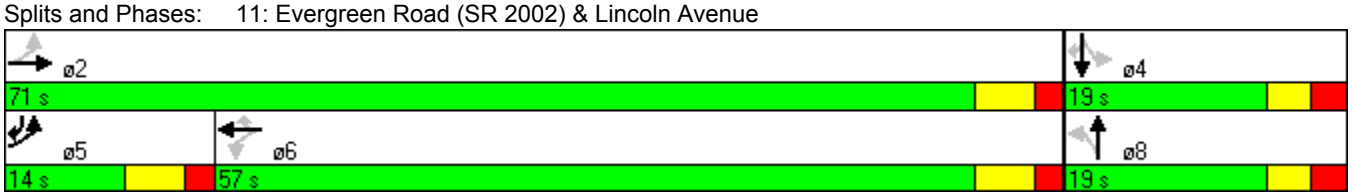
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	84	437	5	480	37	26	16	34	38	107
Lane Group Flow (vph)	91	503	5	522	40	0	46	0	78	116
Turn Type	pm+pt		Perm		Perm	Perm		Perm		pm+ov
Protected Phases	5	2		6			8		4	5
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	6	6	6	8	8	4	4	5
Switch Phase										
Minimum Initial (s)	4.0	12.0	12.0	12.0	12.0	3.0	3.0	3.0	3.0	4.0
Minimum Split (s)	10.0	18.0	18.0	18.0	18.0	8.5	8.5	8.5	8.5	10.0
Total Split (s)	14.0	71.0	57.0	57.0	57.0	19.0	19.0	19.0	19.0	14.0
Total Split (%)	15.6%	78.9%	63.3%	63.3%	63.3%	21.1%	21.1%	21.1%	21.1%	15.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	6.0
Lead/Lag	Lead		Lag	Lag	Lag					Lead
Lead-Lag Optimize?										
Recall Mode	None	Min	Min	Min	Min	None	None	None	None	None
v/c Ratio	0.16	0.37	0.01	0.53	0.05		0.19		0.30	0.21
Control Delay	4.3	5.0	10.0	14.6	4.0		25.6		27.2	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	4.3	5.0	10.0	14.6	4.0		25.6		27.2	4.8
Queue Length 50th (ft)	9	68	1	144	0		14		24	0
Queue Length 95th (ft)	25	141	6	262	14		46		69	31
Internal Link Dist (ft)		619		423			845		1011	
Turn Bay Length (ft)	450		80		275					325
Base Capacity (vph)	596	1656	767	1540	1359		421		439	576
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.15	0.30	0.01	0.34	0.03		0.11		0.18	0.20

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 52.6
Natural Cycle: 50
Control Type: Semi Act-Uncoord

Splits and Phases: 11: Evergreen Road (SR 2002) & Lincoln Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	437	26	5	480	37	26	16	1	34	38	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	12	12	12	12	12	12	12
Grade (%)		1%			2%			-4%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1702	1693		1727	1748	1537		1875			1837	1583
Flt Permitted	0.31	1.00		0.48	1.00	1.00		0.77			0.83	1.00
Satd. Flow (perm)	553	1693		871	1748	1537		1485			1553	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	475	28	5	522	40	28	17	1	37	41	116
RTOR Reduction (vph)	0	2	0	0	0	20	0	1	0	0	0	93
Lane Group Flow (vph)	91	501	0	5	522	20	0	45	0	0	78	23
Heavy Vehicles (%)	2%	7%	8%	0%	4%	4%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt			Perm		Perm	Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	39.6	39.6		27.7	27.7	27.7		5.0			5.0	10.9
Effective Green, g (s)	39.6	39.6		27.7	27.7	27.7		5.0			5.0	10.9
Actuated g/C Ratio	0.71	0.71		0.49	0.49	0.49		0.09			0.09	0.19
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		5.5			5.5	6.0
Vehicle Extension (s)	3.0	6.0		6.0	6.0	6.0		3.0			3.0	3.0
Lane Grp Cap (vph)	511	1195		430	863	759		132			138	308
v/s Ratio Prot	0.02	c0.30			c0.30							0.01
v/s Ratio Perm	0.11			0.01		0.01		0.03			c0.05	0.01
v/c Ratio	0.18	0.42		0.01	0.60	0.03		0.34			0.57	0.07
Uniform Delay, d1	3.9	3.4		7.2	10.2	7.3		24.0			24.5	18.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.2	0.7		0.0	2.1	0.0		1.5			5.2	0.1
Delay (s)	4.1	4.1		7.3	12.4	7.3		25.6			29.7	18.6
Level of Service	A	A		A	B	A		C			C	B
Approach Delay (s)		4.1			12.0			25.6			23.1	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	17.5
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

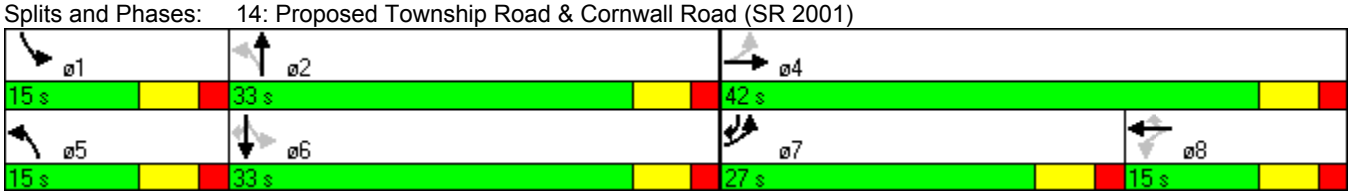
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	416	64	1	65	23	212	219	44	386	249
Lane Group Flow (vph)	452	191	1	71	25	230	239	48	420	271
Turn Type	pm+pt		Perm		Perm	pm+pt		pm+pt		pm+ov
Protected Phases	7	4		8		5	2	1	6	7
Permitted Phases	4		8		8	2		6		6
Detector Phase	7	4	8	8	8	5	2	1	6	7
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	15.0	7.0	15.0	7.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	21.0	13.0	21.0	13.0
Total Split (s)	27.0	42.0	15.0	15.0	15.0	15.0	33.0	15.0	33.0	27.0
Total Split (%)	30.0%	46.7%	16.7%	16.7%	16.7%	16.7%	36.7%	16.7%	36.7%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	None
v/c Ratio	0.93	0.28	0.01	0.42	0.15	0.67	0.31	0.09	0.67	0.25
Control Delay	52.0	8.8	37.0	46.1	17.2	22.3	18.2	21.2	40.9	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	8.8	37.0	46.1	17.2	22.3	18.2	21.2	40.9	2.1
Queue Length 50th (ft)	206	27	1	39	0	85	104	20	209	0
Queue Length 95th (ft)	#346	70	5	81	24	#144	167	m33	#322	m38
Internal Link Dist (ft)		240		318			830		570	
Turn Bay Length (ft)	500		100		100	325		400		350
Base Capacity (vph)	488	743	115	186	181	343	764	539	624	1104
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.26	0.01	0.38	0.14	0.67	0.31	0.09	0.67	0.25

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Proposed Township Road & Cornwall Road (SR 2001)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	416	64	111	1	65	23	212	219	1	44	386	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	12	11	12	12	11	12	12
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	1686		1711	1863	1583	1702	1852		1711	1863	1583
Flt Permitted	0.38	1.00		0.64	1.00	1.00	0.25	1.00		0.61	1.00	1.00
Satd. Flow (perm)	685	1686		1148	1863	1583	451	1852		1099	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	452	70	121	1	71	25	230	238	1	48	420	271
RTOR Reduction (vph)	0	72	0	0	0	23	0	0	0	0	0	121
Lane Group Flow (vph)	452	119	0	1	71	2	230	239	0	48	420	150
Turn Type	pm+pt			Perm		Perm	pm+pt			pm+pt		pm+ov
Protected Phases	7	4			8		5	2		1	6	7
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	33.9	33.9		6.9	6.9	6.9	42.7	33.5		33.5	28.9	49.9
Effective Green, g (s)	33.9	33.9		6.9	6.9	6.9	42.7	33.5		33.5	28.9	49.9
Actuated g/C Ratio	0.38	0.38		0.08	0.08	0.08	0.47	0.37		0.37	0.32	0.55
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	497	635		88	143	121	342	689		440	598	983
v/s Ratio Prot	c0.21	0.07			0.04		c0.07	0.13		0.01	0.23	0.04
v/s Ratio Perm	c0.13			0.00		0.00	c0.25			0.04		0.06
v/c Ratio	0.91	0.19		0.01	0.50	0.02	0.67	0.35		0.11	0.70	0.15
Uniform Delay, d1	24.1	18.8		38.4	39.9	38.4	16.6	20.4		18.2	26.8	9.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.71	0.79		1.54	1.31	1.53
Incremental Delay, d2	20.4	0.1		0.1	2.7	0.1	4.9	1.3		0.1	5.2	0.1
Delay (s)	44.4	19.0		38.4	42.6	38.5	16.7	17.4		28.2	40.3	15.0
Level of Service	D	B		D	D	D	B	B		C	D	B
Approach Delay (s)		36.9			41.5			17.0			30.2	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	29.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	454	93	0	436	90	0	0	137	0	0	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		150	0		0	0		0
Storage Lanes	0		1	0		1	0		1	0		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.865			0.865
Flt Protected												
Satd. Flow (prot)	0	1863	1583	0	1863	1583	0	0	1611	0	0	1611
Flt Permitted												
Satd. Flow (perm)	0	1863	1583	0	1863	1583	0	0	1611	0	0	1611
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		525			320			264			247	
Travel Time (s)		10.2			6.2			7.2			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	493	101	0	474	98	0	0	149	0	0	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	493	101	0	474	98	0	0	149	0	0	80
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.0%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	454	93	0	436	90	0	0	137	0	0	74
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	493	101	0	474	98	0	0	149	0	0	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)		525			320							
pX, platoon unblocked	0.91			0.88			0.92	0.92	0.88	0.92	0.92	0.91
vC, conflicting volume	572			595			1048	1065	493	1116	1068	474
vC1, stage 1 conf vol							493	493		474	474	
vC2, stage 2 conf vol							554	572		642	595	
vCu, unblocked vol	477			468			786	804	353	860	808	370
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	75	100	100	87
cM capacity (veh/h)	985			959			408	437	606	330	434	614

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	493	101	474	98	149	80
Volume Left	0	0	0	0	0	0
Volume Right	0	101	0	98	149	80
cSH	1700	1700	1700	1700	606	614
Volume to Capacity	0.29	0.06	0.28	0.06	0.25	0.13
Queue Length 95th (ft)	0	0	0	0	24	11
Control Delay (s)	0.0	0.0	0.0	0.0	12.9	11.7
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		12.9	11.7
Approach LOS					B	B

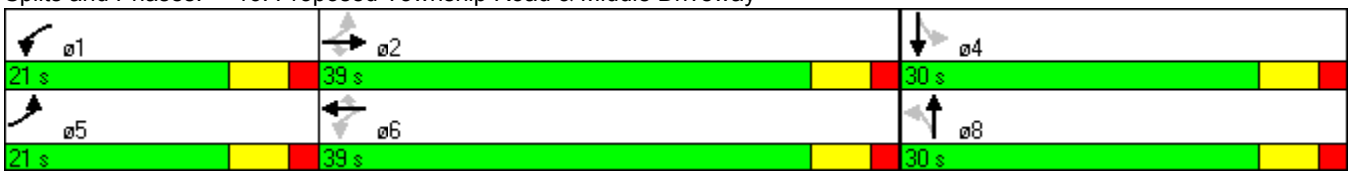
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Volume (vph)	271	150	220	301	121	88	281	0	258	0
Lane Group Flow (vph)	295	163	239	327	132	96	305	151	280	187
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm		Perm	
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	21.0	21.0	13.0	21.0	21.0	13.0	13.0	13.0	13.0
Total Split (s)	21.0	39.0	39.0	21.0	39.0	39.0	30.0	30.0	30.0	30.0
Total Split (%)	23.3%	43.3%	43.3%	23.3%	43.3%	43.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?										
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None
v/c Ratio	0.51	0.40	0.45	0.55	0.31	0.22	0.75	0.14	0.67	0.17
Control Delay	14.8	27.6	6.8	15.5	25.8	7.2	35.2	0.3	29.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	27.6	6.8	15.5	25.8	7.2	35.2	0.3	29.9	0.3
Queue Length 50th (ft)	74	62	0	84	48	0	116	0	102	0
Queue Length 95th (ft)	124	116	53	138	97	35	#251	0	#217	0
Internal Link Dist (ft)		276			445			160		173
Turn Bay Length (ft)	275		250	325		150				
Base Capacity (vph)	651	876	871	643	876	795	408	1045	421	1078
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.19	0.27	0.51	0.15	0.12	0.75	0.14	0.67	0.17

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 70.3
Natural Cycle: 60
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 16: Proposed Township Road & Middle Driveway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	271	150	220	301	121	88	281	0	139	258	0	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1583		1770	1583	
Flt Permitted	0.67	1.00	1.00	0.63	1.00	1.00	0.64	1.00		0.66	1.00	
Satd. Flow (perm)	1253	1863	1583	1172	1863	1583	1192	1583		1231	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	295	163	239	327	132	96	305	0	151	280	0	187
RTOR Reduction (vph)	0	0	187	0	0	74	0	99	0	0	123	0
Lane Group Flow (vph)	295	163	52	327	132	22	305	52	0	280	64	0
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	27.6	15.3	15.3	28.8	15.9	15.9	24.0	24.0		24.0	24.0	
Effective Green, g (s)	27.6	15.3	15.3	28.8	15.9	15.9	24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.39	0.22	0.22	0.41	0.23	0.23	0.34	0.34		0.34	0.34	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	583	406	345	591	422	359	408	541		421	541	
v/s Ratio Prot	0.09	0.09		c0.10	0.07			0.03			0.04	
v/s Ratio Perm	0.11		0.03	c0.13		0.01	c0.26			0.23		
v/c Ratio	0.51	0.40	0.15	0.55	0.31	0.06	0.75	0.10		0.67	0.12	
Uniform Delay, d1	15.5	23.5	22.2	15.0	22.6	21.3	20.4	15.7		19.7	15.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.7	0.2	1.1	0.4	0.1	7.3	0.1		3.9	0.1	
Delay (s)	16.2	24.2	22.4	16.1	23.0	21.4	27.7	15.8		23.6	15.9	
Level of Service	B	C	C	B	C	C	C	B		C	B	
Approach Delay (s)		20.2			18.7			23.8			20.5	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	637	16	2	571	1	4	0	2	2	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	75		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996						0.955			0.884	
Flt Protected	0.950			0.950				0.968			0.993	
Satd. Flow (prot)	1770	1855	0	1770	1863	0	0	1722	0	0	1635	0
Flt Permitted	0.950			0.950				0.968			0.993	
Satd. Flow (perm)	1770	1855	0	1770	1863	0	0	1722	0	0	1635	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		717			356			195			278	
Travel Time (s)		14.0			6.9			5.3			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	692	17	2	621	1	4	0	2	2	0	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	709	0	2	622	0	0	6	0	0	14	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 44.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	637	16	2	571	1	4	0	2	2	0	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	692	17	2	621	1	4	0	2	2	0	12
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)		717			356							
pX, platoon unblocked	0.82			0.90			0.87	0.87	0.90	0.87	0.87	0.82
vC, conflicting volume	622			710			1368	1358	701	1351	1366	621
vC1, stage 1 conf vol							732	732		626	626	
vC2, stage 2 conf vol							637	626		725	740	
vCu, unblocked vol	427			626			1099	1087	616	1079	1096	427
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			99	100	100	99	100	98
cM capacity (veh/h)	927			864			331	342	443	341	342	514

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	15	710	2	622	7	14
Volume Left	15	0	2	0	4	2
Volume Right	0	17	0	1	2	12
cSH	927	1700	864	1700	361	477
Volume to Capacity	0.02	0.42	0.00	0.37	0.02	0.03
Queue Length 95th (ft)	1	0	0	0	1	2
Control Delay (s)	8.9	0.0	9.2	0.0	15.1	12.8
Lane LOS	A		A		C	B
Approach Delay (s)	0.2		0.0		15.1	12.8
Approach LOS					C	B

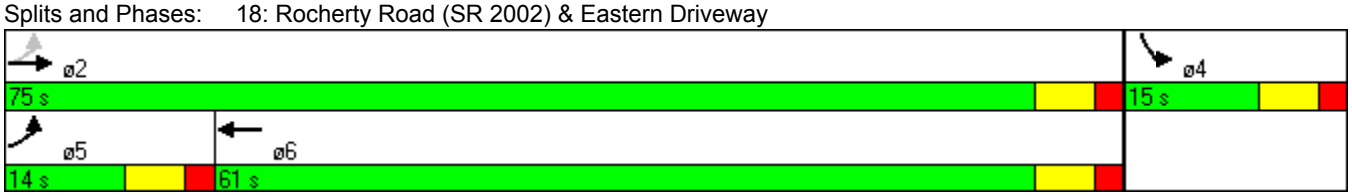
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Volume (vph)	20	495	548	51
Lane Group Flow (vph)	22	538	655	68
Turn Type	pm+pt			
Protected Phases	5	2	6	4
Permitted Phases	2			
Detector Phase	5	2	6	4
Switch Phase				
Minimum Initial (s)	7.0	15.0	15.0	7.0
Minimum Split (s)	13.0	21.0	21.0	13.0
Total Split (s)	14.0	75.0	61.0	15.0
Total Split (%)	15.6%	83.3%	67.8%	16.7%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	None	None	None
v/c Ratio	0.04	0.39	0.48	0.17
Control Delay	4.0	5.2	8.6	20.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.0	5.2	8.6	20.0
Queue Length 50th (ft)	2	69	89	10
Queue Length 95th (ft)	7	126	306	59
Internal Link Dist (ft)		400	1268	325
Turn Bay Length (ft)	225			
Base Capacity (vph)	584	1807	1787	490
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.04	0.30	0.37	0.14

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 40.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 18: Rocherty Road (SR 2002) & Eastern Driveway



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	495	548	54	51	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	12	12
Grade (%)		4%	-4%		0%	
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.97	
Flt Protected	0.95	1.00	1.00		0.96	
Satd. Flow (prot)	1676	1825	1877		1744	
Flt Permitted	0.24	1.00	1.00		0.96	
Satd. Flow (perm)	427	1825	1877		1744	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	538	596	59	55	13
RTOR Reduction (vph)	0	0	5	0	10	0
Lane Group Flow (vph)	22	538	650	0	58	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	31.8	31.8	25.0		3.9	
Effective Green, g (s)	31.8	31.8	25.0		3.9	
Actuated g/C Ratio	0.67	0.67	0.52		0.08	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	306	1217	984		143	
v/s Ratio Prot	0.00	c0.29	c0.35		c0.03	
v/s Ratio Perm	0.05					
v/c Ratio	0.07	0.44	0.66		0.40	
Uniform Delay, d1	4.5	3.8	8.3		20.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.3	1.7		1.9	
Delay (s)	4.6	4.0	9.9		22.7	
Level of Service	A	A	A		C	
Approach Delay (s)		4.0	9.9		22.7	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	47.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	515	558	2	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		1%	-2%		0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	0	1853	1881	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	1853	1881	0	0	1611
Link Speed (mph)		40	40		25	
Link Distance (ft)		485	480		351	
Travel Time (s)		8.3	8.2		9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	560	607	2	0	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	560	609	0	0	9
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.01	1.01	0.99	0.99	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	515	558	2	0	8
Sign Control		Free	Free		Stop	
Grade		1%	-2%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	560	607	2	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		485	480			
pX, platoon unblocked	0.74				0.84	0.74
vC, conflicting volume	609				1167	608
vC1, stage 1 conf vol					608	
vC2, stage 2 conf vol					560	
vCu, unblocked vol	293				565	291
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	937				505	552

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	560	609	9
Volume Left	0	0	0
Volume Right	0	2	9
cSH	1700	1700	552
Volume to Capacity	0.33	0.36	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	11.6
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.6
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	13	419	11	16	497
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)	0%		-1%			1%
Storage Length (ft)	0	0		125	125	
Storage Lanes	0	1		1	1	
Taper Length (ft)	25	25		25	25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865		0.850		
Flt Protected					0.950	
Satd. Flow (prot)	0	1611	1872	1591	1702	1853
Flt Permitted					0.950	
Satd. Flow (perm)	0	1611	1872	1591	1702	1853
Link Speed (mph)	25		45			45
Link Distance (ft)	174		340			450
Travel Time (s)	4.7		5.2			6.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Adj. Flow (vph)	0	14	455	12	17	518
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	14	455	12	17	518
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	0		11			11
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			Yes
Headway Factor	1.00	1.00	0.99	0.99	1.05	1.01
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 32.1%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	13	419	11	16	497
Sign Control	Stop		Free			Free
Grade	0%		-1%			1%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96
Hourly flow rate (vph)	0	14	455	12	17	518
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			340			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	1008	455			467	
vC1, stage 1 conf vol	455					
vC2, stage 2 conf vol	552					
vCu, unblocked vol	936	304			317	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			98	
cM capacity (veh/h)	475	643			1085	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	14	455	12	17	518
Volume Left	0	0	0	17	0
Volume Right	14	0	12	0	0
cSH	643	1700	1700	1085	1700
Volume to Capacity	0.02	0.27	0.01	0.02	0.30
Queue Length 95th (ft)	2	0	0	1	0
Control Delay (s)	10.7	0.0	0.0	8.4	0.0
Lane LOS	B			A	
Approach Delay (s)	10.7	0.0		0.3	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	88	0	432	425	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			175
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	1863	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	1583
Link Speed (mph)	25			45	45	
Link Distance (ft)	247			450	910	
Travel Time (s)	6.7			6.8	13.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	96	0	470	462	79
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	96	0	470	462	79
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			11	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 34.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	88	0	432	425	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	96	0	470	462	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				790	910	
pX, platoon unblocked	0.87	0.82	0.82			
vC, conflicting volume	932	462	541			
vC1, stage 1 conf vol	462					
vC2, stage 2 conf vol	470					
vCu, unblocked vol	605	235	331			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	86	100			
cM capacity (veh/h)	552	660	1007			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	96	470	462	79
Volume Left	0	0	0	0
Volume Right	96	0	0	79
cSH	660	1700	1700	1700
Volume to Capacity	0.14	0.28	0.27	0.05
Queue Length 95th (ft)	13	0	0	0
Control Delay (s)	11.4	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	11.4	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	45	0	789	757	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			-3%	3%	
Storage Length (ft)	0	0	0			225
Storage Lanes	0	1	0			1
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	1891	1835	1560
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1891	1835	1560
Link Speed (mph)	30			45	45	
Link Distance (ft)	247			650	678	
Travel Time (s)	5.6			9.8	10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	49	0	858	823	159
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	49	0	858	823	159
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	0.98	0.98	1.02	1.02
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	45	0	789	757	146
Sign Control	Stop			Free	Free	
Grade	0%			-3%	3%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	49	0	858	823	159
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				650	678	
pX, platoon unblocked	0.84	0.69	0.69			
vC, conflicting volume	1680	823	982			
vC1, stage 1 conf vol	823					
vC2, stage 2 conf vol	858					
vCu, unblocked vol	884	513	744			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	347	385	592			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	49	858	823	159
Volume Left	0	0	0	0
Volume Right	49	0	0	159
cSH	385	1700	1700	1700
Volume to Capacity	0.13	0.50	0.48	0.09
Queue Length 95th (ft)	11	0	0	0
Control Delay (s)	15.7	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	15.7	0.0	0.0	
Approach LOS	C			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	9	4	0	23	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.968					
Flt Protected					0.950	
Satd. Flow (prot)	1790	0	0	1863	1770	0
Flt Permitted					0.950	
Satd. Flow (perm)	1790	0	0	1863	1770	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	111			98	238	
Travel Time (s)	2.5			2.2	5.4	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%
Adj. Flow (vph)	13	4	0	31	3	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	31	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 13.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	9	4	0	23	3	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.92	0.92	0.74	0.92	0.92
Hourly flow rate (vph)	13	4	0	31	3	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1194					
pX, platoon unblocked						
vC, conflicting volume			17		46	15
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		46	15
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1600		964	1065

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	31	3
Volume Left	0	0	3
Volume Right	4	0	0
cSH	1700	1600	964
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX L

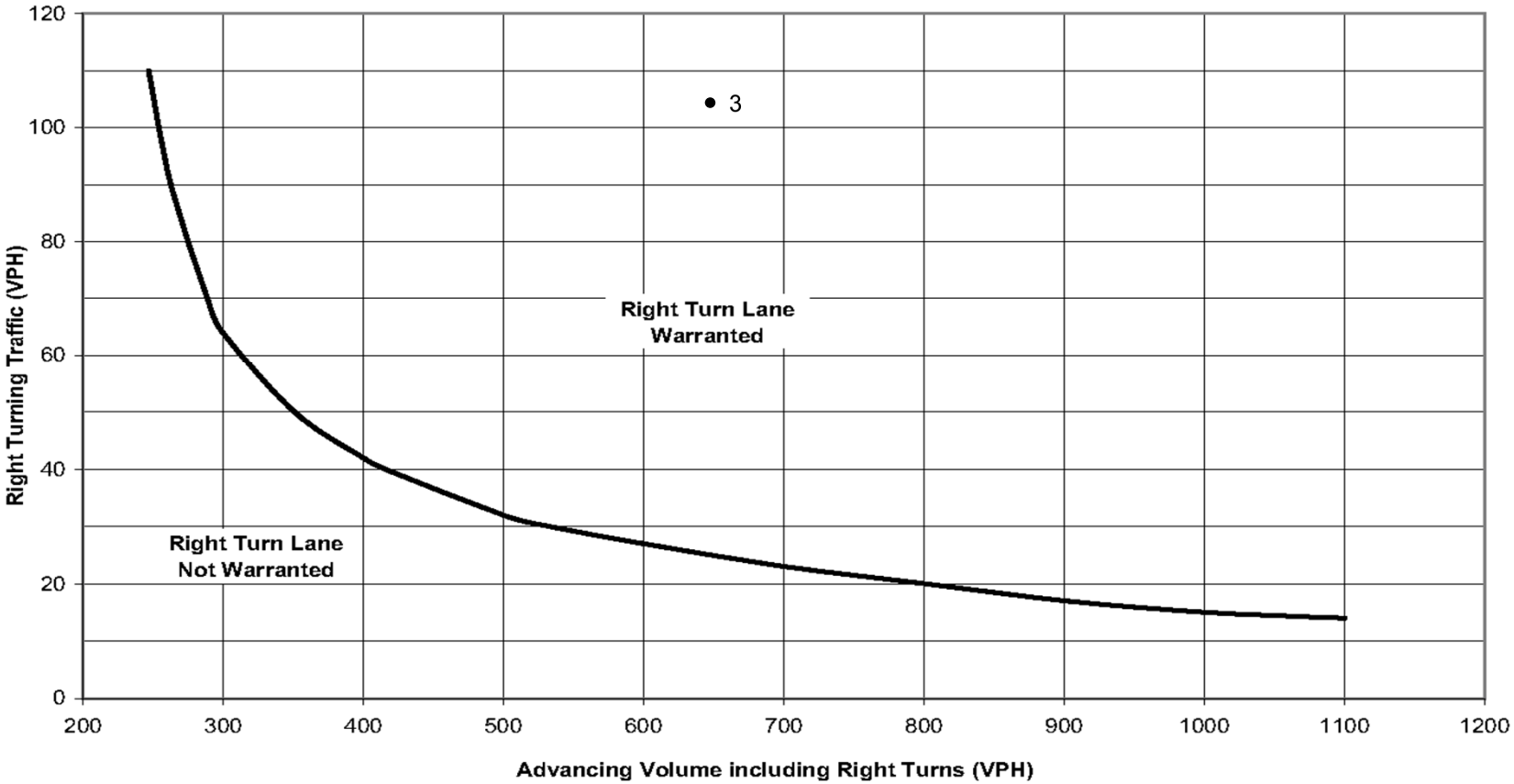
AUXILIARY TURN LANE ANALYSIS WORKSHEETS

2025 CONDITIONS

Quentin Road (SR 0072) & Rocherty Road (SR 2002)

Northbound Right Turn to Rocherty Road (S.R. 2002)

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2025 Projected AM - 748 approach total, 252 right turns - MET
2. 2025 Projected PM - 690 approach total, 144 right turns - MET
3. 2025 Projected SAT - 648 approach total, 104 right turns - MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Quenting Road (SR 0072) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	712	10%	Level	1.05	748
Number of Right Turns =	247	4%	Level	1.02	252
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	34%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	8	
Storage Length:	400	feet

RESULTS

A right-turn lane is warranted. The required storage length is 400 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Quenting Road (SR 0072) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	676	4%	Level	1.02	690
Number of Right Turns =	141	4%	Level	1.02	144
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	21%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	5	
Storage Length:	275	feet

RESULTS

A right-turn lane is warranted. The required storage length is 275 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Quenting Road (SR 0072) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	645	1%	Level	1.005	648
Number of Right Turns =	102	4%	Level	1.02	104
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	16%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

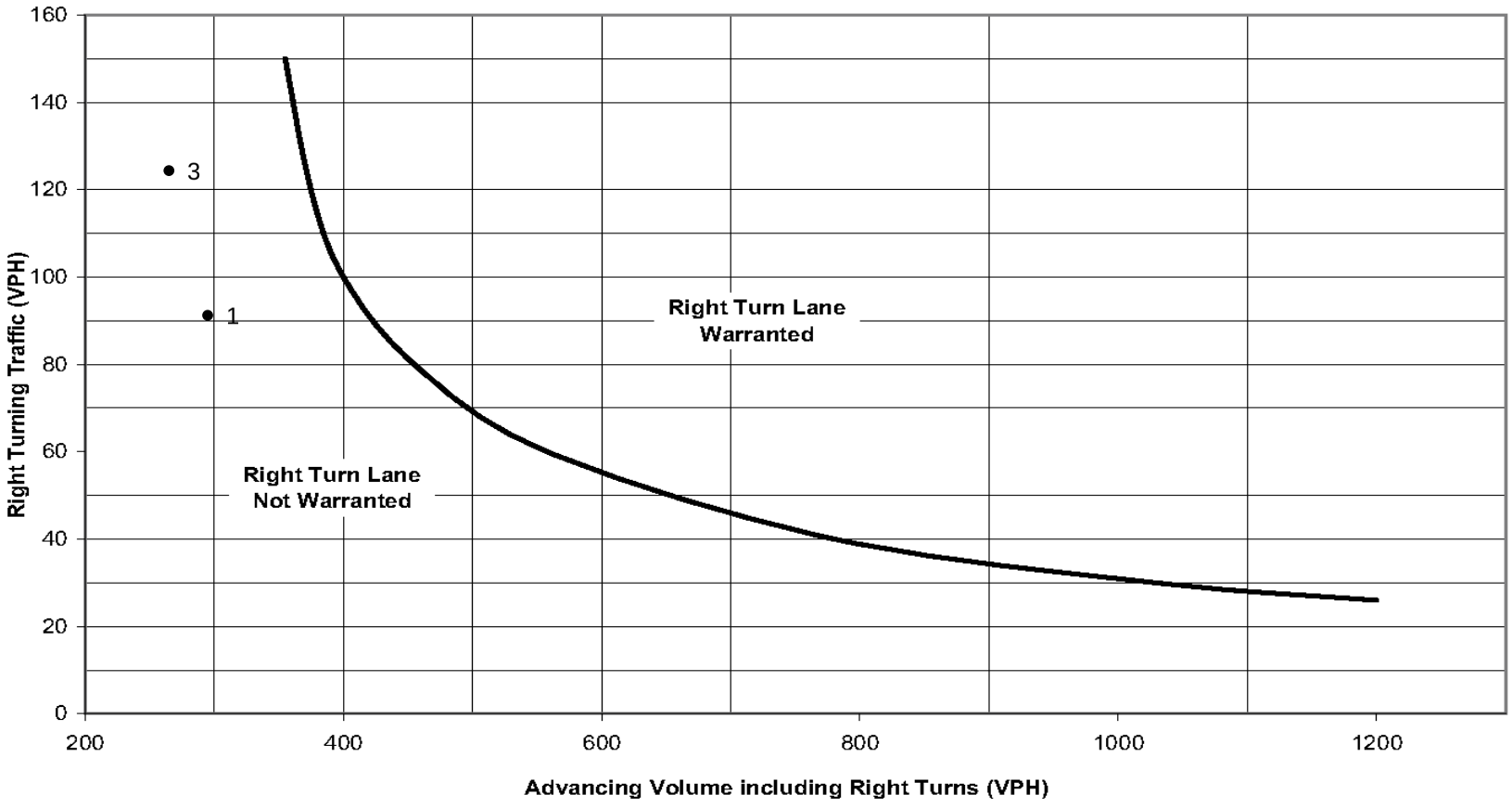
RESULTS

A right-turn lane is warranted. The required storage length is 225 feet.

Rocherty Road (S.R. 2002) & Quentin Road (S.R. 0072)

Westbound Right-Turns to Quentin Road (S.R. 0072)

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2025 Projected AM - 296 approach total, 92 right turns - NOT MET
2. 2025 Projected PM - 453 approach total, 183 right turns - MET
3. 2025 Projected SAT - 266 approach total, 125 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Quentin Road (S.R. 0072)
Movement:	Westbound Right-Turns to Quentin Road (S.R. 0072)
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	292	3%	Level	1.015	296
Number of Right Turns =	89	6%	Level	1.03	92
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	31%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Quentin Road (S.R. 0072)
Movement:	Westbound Right-Turns to Quentin Road (S.R. 0072)
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	451	1%	Level	1.005	453
Number of Right Turns =	183	0%	Level	1	183
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	40%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	6	
Storage Length:	325	feet

RESULTS

A right-turn lane is warranted. The required storage length is 325 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Quentin Road (S.R. 0072)
Movement:	Westbound Right-Turns to Quentin Road (S.R. 0072)
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	258	6%	Level	1.03	266
Number of Right Turns =	122	5%	Level	1.025	125
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	47%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Route 72 & Isabel Drive
Movement:	Left Turns to Isabel Drive
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	684	10%	Level	1.05	718
Opposing Volume (V_O) =	591	10%	Level	1.05	621
Number of Left Turns =	94	10%	Level	1.05	99
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	14%		Cycle Length:	120	sec.

WARRANT CALCULATION

t_w = 2.94 sec

t_A = 5.01 sec

t_{median} = 3.34 sec

λ = 125.09 veh/hr

μ = 778 veh/hr

Limiting advancing volume = 237

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

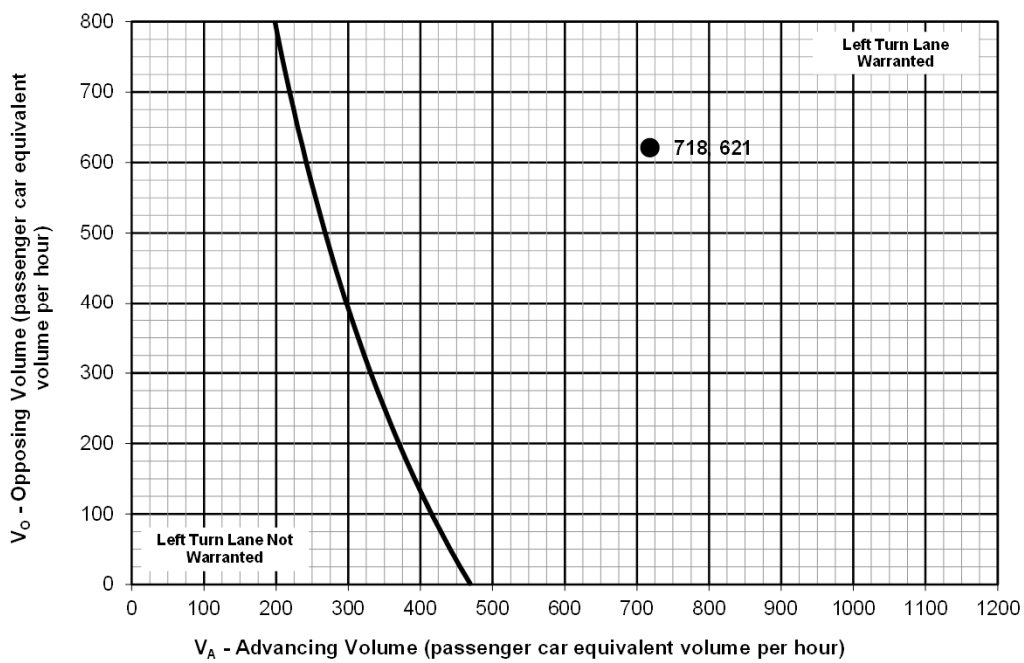
ρ = 0.1608 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A left turn lane is warranted. The required storage length is 225 feet.



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Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Route 72 & Isabel Drive
Movement:	Left Turns to Isabel Drive
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	940	5%	Level	1.025	964
Opposing Volume (V_O) =	1008	2%	Level	1.01	1018
Number of Left Turns =	92	5%	Level	1.025	94
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	10%		Cycle Length:	120	sec.

WARRANT CALCULATION

t_w = 6.00 sec

t_A = 3.73 sec

t_{median} = 2.49 sec

λ = 275.47 veh/hr

μ = 583 veh/hr

Limiting advancing volume = 185

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

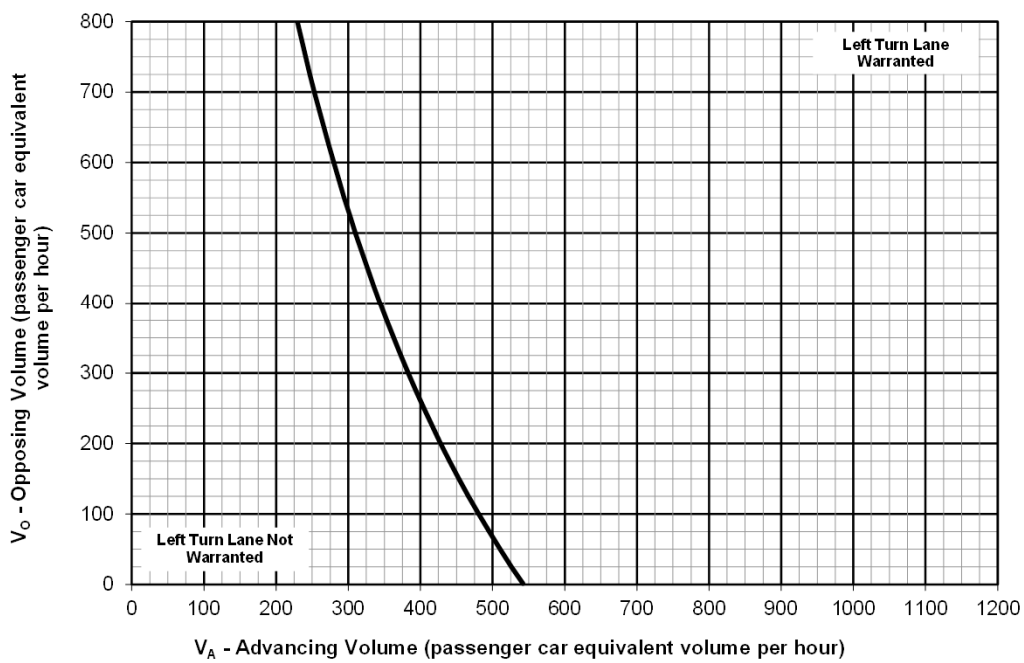
ρ = 0.4728 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A left turn lane is warranted. The required storage length is 225 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Route 72 & Isabel Drive
Movement:	Left Turns to Isabel Drive
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	1161	1%	Level	1.005	1167
Opposing Volume (V_O) =	1071	0%	Level	1	1071
Number of Left Turns =	63	1%	Level	1.005	63
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	5%		Cycle Length:	120	sec.

WARRANT CALCULATION

t_w = 6.52 sec

t_A = 3.08 sec

t_{median} = 2.06 sec

λ = 226.85 veh/hr

μ = 560 veh/hr

Limiting advancing volume = 243

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

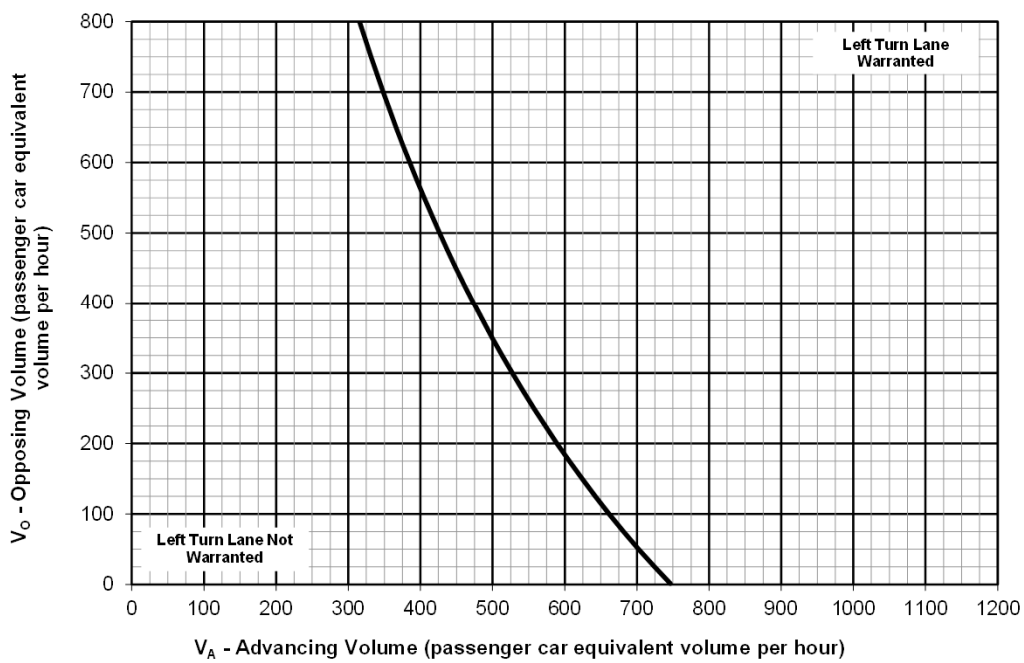
ρ = 0.4050 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A left turn lane is warranted. The required storage length is 175 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Eastbound Left Turns to Cornwall Road
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	647	6%	Level	1.03	666
Opposing Volume (V_O) =	574	9%	Level	1.045	600
Number of Left Turns =	96	4%	Level	1.02	98
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	15%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 2.81 sec

t_A = 5.41 sec

t_{median} = 3.60 sec

λ = 110.89 veh/hr

μ = 789 veh/hr

Limiting advancing volume = 251

Left turn lane warrants are for ρ > than

0.02 for 40 mph

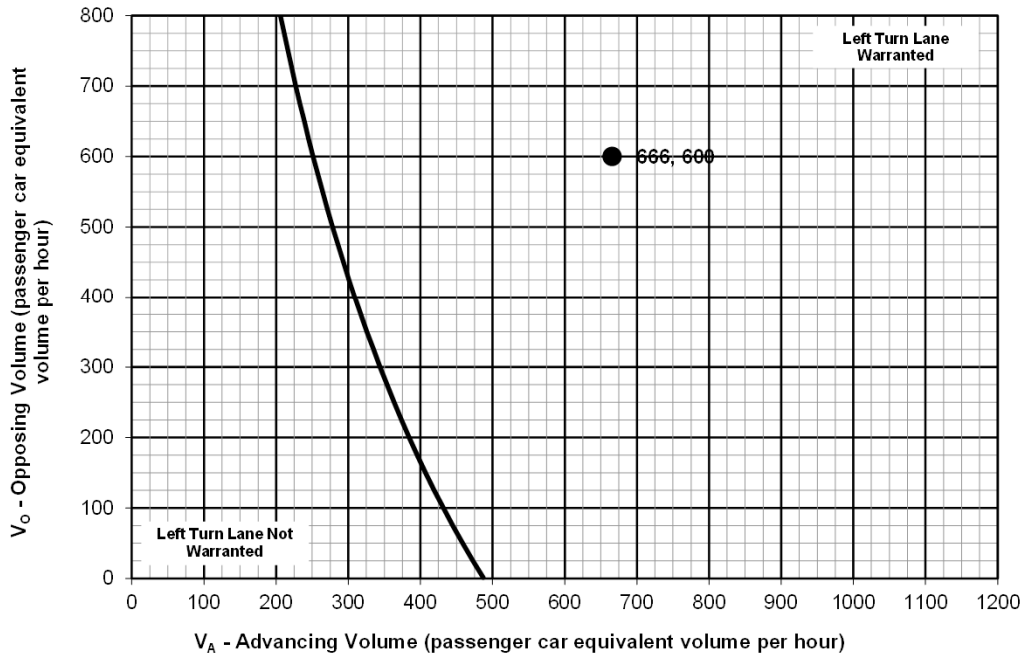
ρ = 0.1405 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A left turn lane is warranted. The required storage length is 225 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Eastbound Left Turns to Cornwall Road
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	548	4%	Level	1.02	559
Opposing Volume (V_O) =	663	2%	Level	1.01	670
Number of Left Turns =	75	4%	Level	1.02	77
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	14%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 3.25 sec

t_A = 6.44 sec

t_{median} = 4.29 sec

λ = 80.77 veh/hr

μ = 751 veh/hr

Limiting advancing volume = 241

Left turn lane warrants are for ρ > than

0.02 for 40 mph

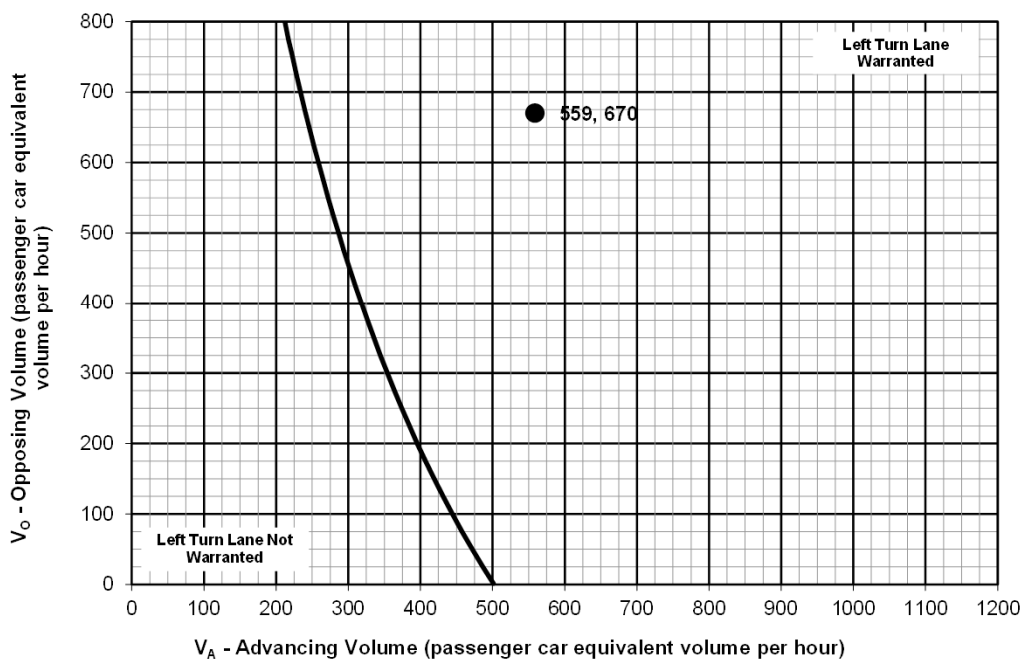
ρ = 0.1076 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A left turn lane is warranted. The required storage length is 175 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Eastbound Left Turns to Cornwall Road
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	439	2%	Level	1.01	443
Opposing Volume (V_O) =	393	1%	Level	1.005	395
Number of Left Turns =	66	0%	Level	1	66
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	15%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 1.66 sec

t_A = 8.13 sec

t_{median} = 5.42 sec

λ = 37.12 veh/hr

μ = 913 veh/hr

Limiting advancing volume = 311

Left turn lane warrants are for ρ > than

0.02 for 40 mph

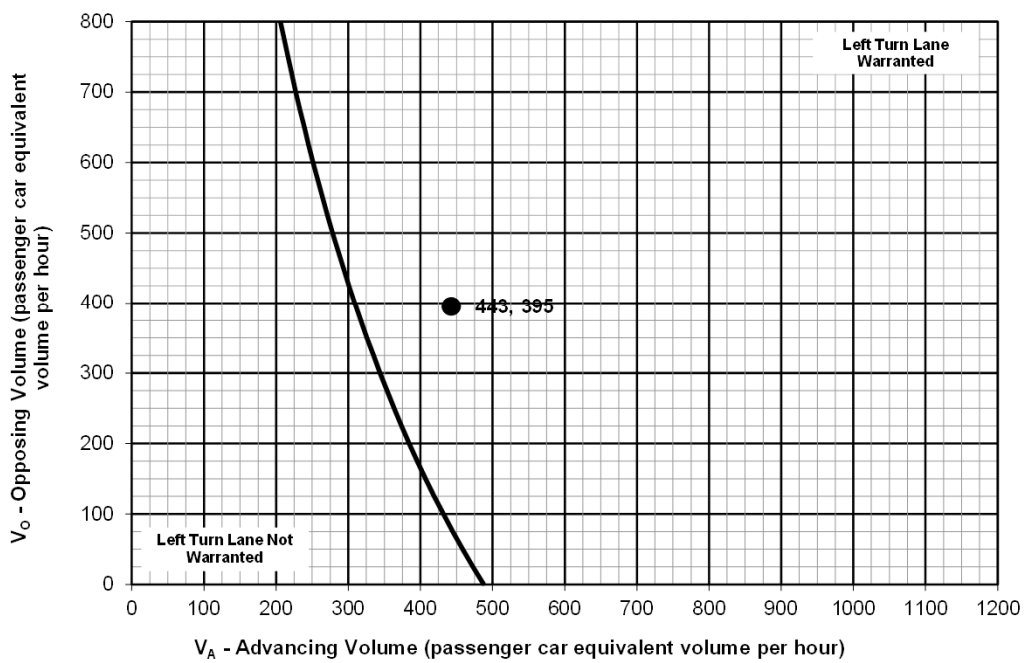
ρ = 0.0407 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A left turn lane is warranted. The required storage length is 175 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Westbound Left Turns to Cornwall Road
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	443	9%	Level	1.045	463
Opposing Volume (V_O) =	551	6%	Level	1.03	568
Number of Left Turns =	43	16%	Level	1.08	46
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	10%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 2.61 sec

t_A = 7.78 sec

t_{median} = 5.18 sec

λ = 36.27 veh/hr

μ = 808 veh/hr

Limiting advancing volume = 309

Left turn lane warrants are for ρ > than

0.02 for 40 mph

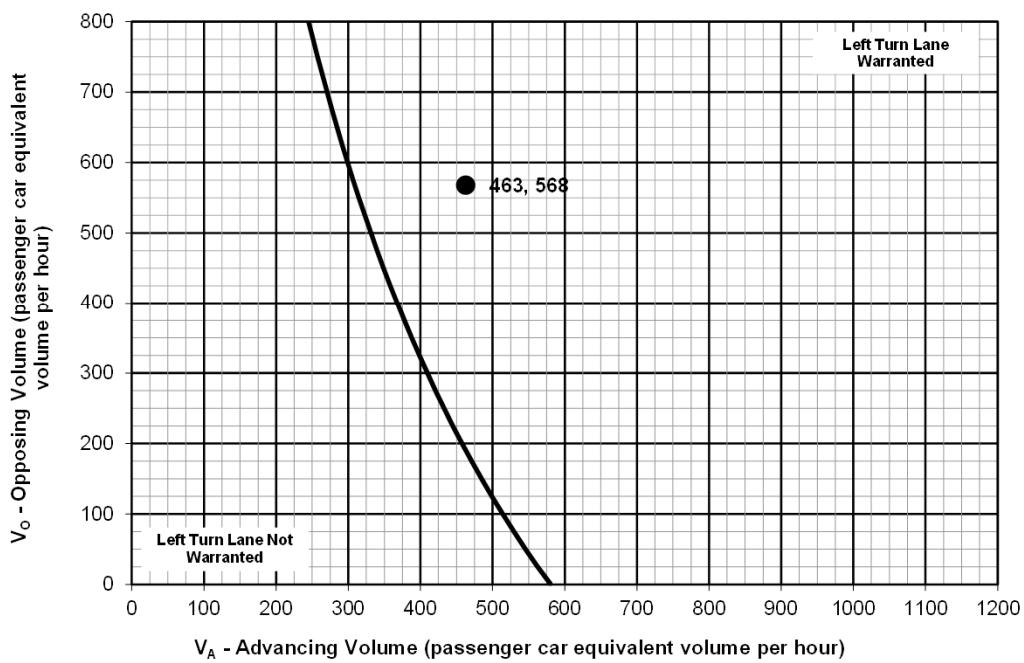
ρ = 0.0449 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	1	
Storage Length:	150	feet

RESULTS

A left turn lane is warranted. The required storage length is 150 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Westbound Left Turns to Cornwall Road
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	601	2%	Level	1.01	607
Opposing Volume (V_O) =	473	4%	Level	1.02	482
Number of Left Turns =	82	5%	Level	1.025	84
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	14%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 2.12 sec

t_A = 5.93 sec

t_{median} = 3.95 sec

λ = 74.29 veh/hr

μ = 859 veh/hr

Limiting advancing volume = 292

Left turn lane warrants are for ρ > than

0.02 for 40 mph

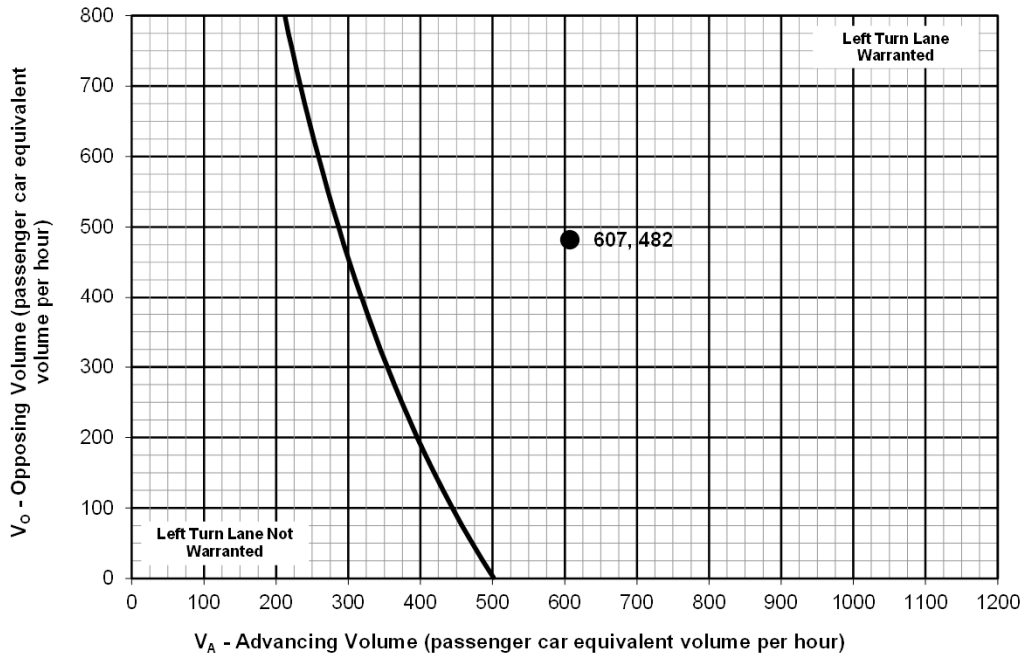
ρ = 0.0865 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A left turn lane is warranted. The required storage length is 175 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Westbound Left Turns to Cornwall Road
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	394	1%	Level	1.005	396
Opposing Volume (V_O) =	373	2%	Level	1.01	377
Number of Left Turns =	68	2%	Level	1.01	69
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	17%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 1.57 sec

t_A = 9.09 sec

t_{median} = 6.06 sec

λ = 32.00 veh/hr

μ = 925 veh/hr

Limiting advancing volume = 301

Left turn lane warrants are for ρ > than

0.02 for 40 mph

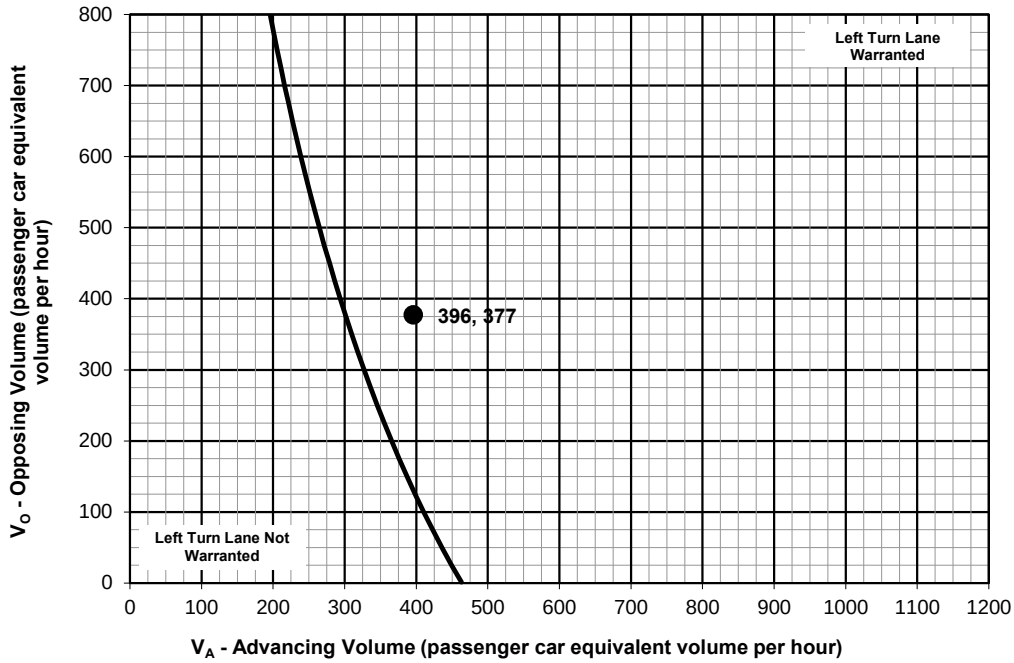
ρ = 0.0346 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A left turn lane is warranted. The required storage length is 175 feet.



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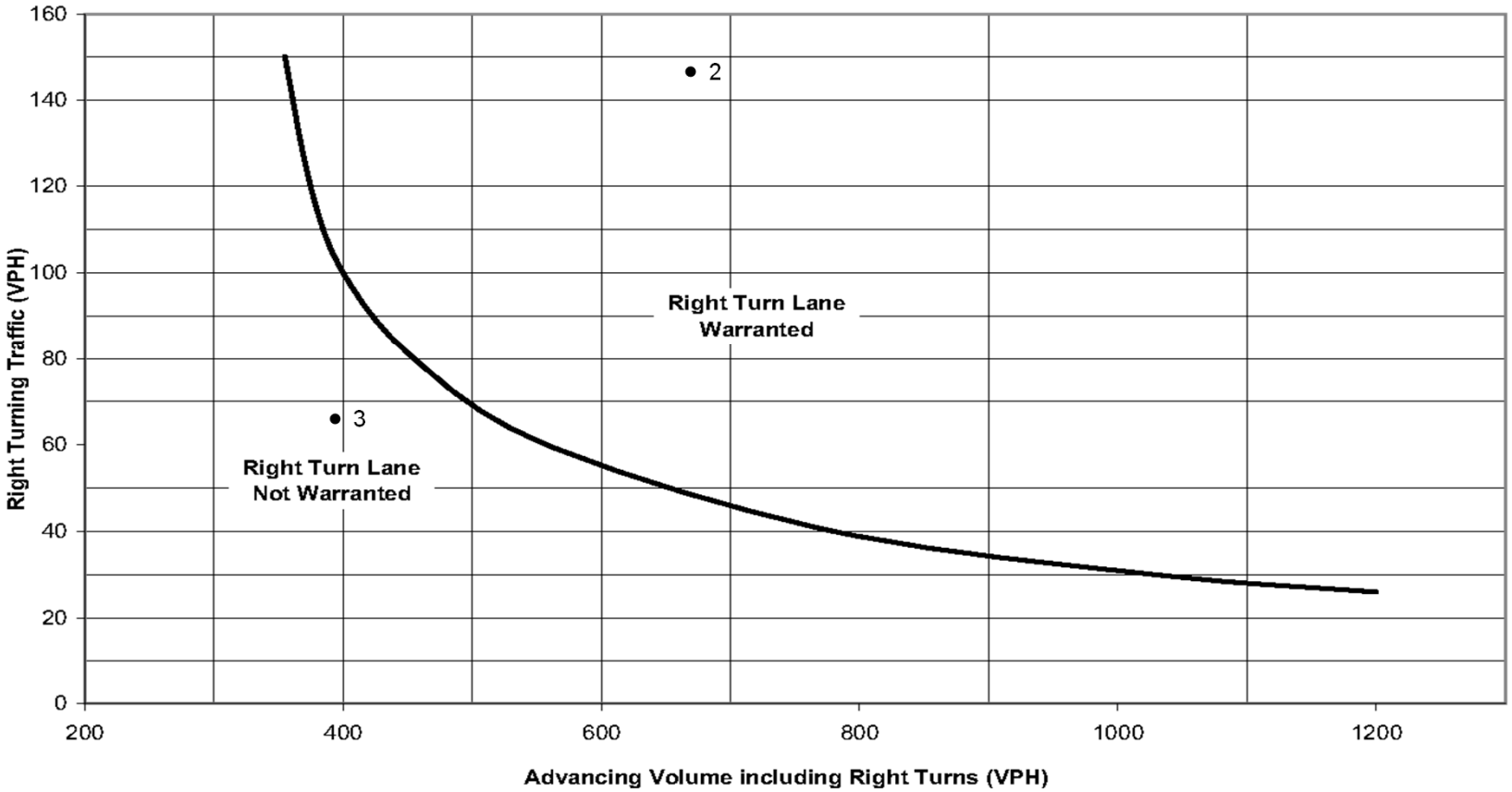
Rocherty Road (S.R. 2002) & Cornwall Road (S.R. 2001)

Westbound Right-Turns to Cornwall Road

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2025 Projected AM - 600 approach total, 179 right turns - MET
2. 2025 Projected PM - 670 approach total, 147 right turns - MET
3. 2025 Projected SAT - 395 approach total, 67 right turns - MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Cornwall Road (S.R. 2001)
Movement:	Westbound Right-Turns to Cornwall Road
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	574	9%	Level	1.045	600
Number of Right Turns =	174	6%	Level	1.03	179
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	30%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	5	
Storage Length:	275	feet

RESULTS

A right-turn lane is warranted. The required storage length is 275 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Cornwall Road (S.R. 2001)
Movement:	Westbound Right-Turns to Cornwall Road
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	663	2%	Level	1.01	670
Number of Right Turns =	144	4%	Level	1.02	147
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	22%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	4	
Storage Length:	250	feet

RESULTS

A right-turn lane is warranted. The required storage length is 250 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Cornwall Road (S.R. 2001)
Movement:	Westbound Right-Turns to Cornwall Road
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	393	1%	Level	1.005	395
Number of Right Turns =	67	0%	Level	1	67
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	17%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A right-turn lane is warranted. The required storage length is 175 feet.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Northbound Left Turns to Rocherty Road
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	273	1%	Level	1.005	274
Opposing Volume (V_O) =	189	3%	Level	1.015	192
Number of Left Turns =	22	0%	Level	1	22
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	8%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 0.73 sec

t_A = 13.14 sec

t_{median} = 8.76 sec

λ = 6.06 veh/hr

μ = 1052 veh/hr

Limiting advancing volume = 478

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0058 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

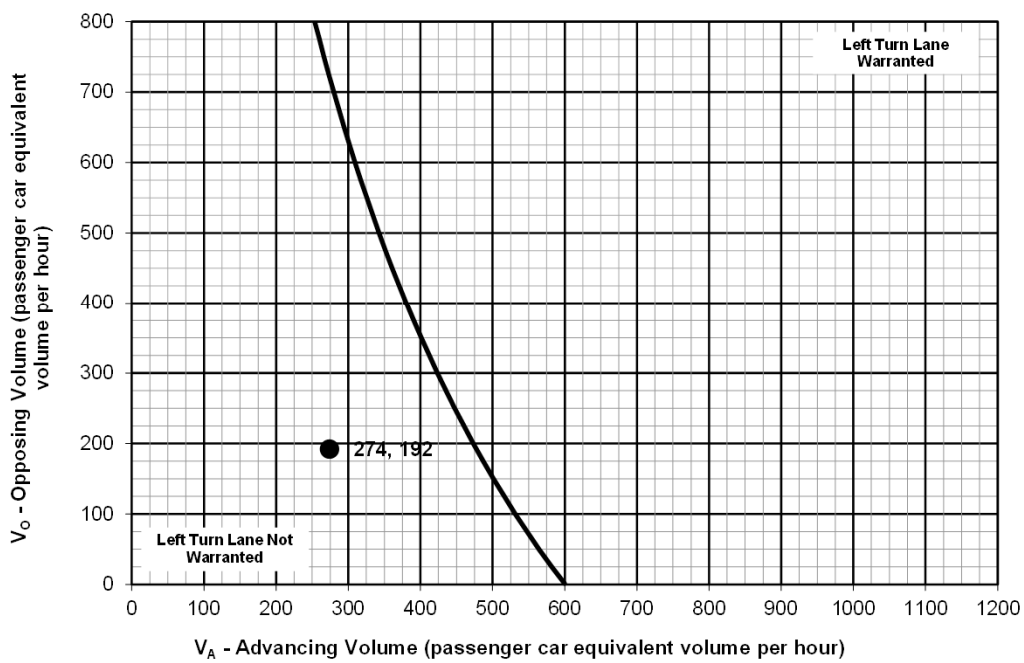
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



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Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Northbound Left Turns to Rocherty Road
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	230	1%	Level	1.005	231
Opposing Volume (V_O) =	398	9%	Level	1.045	416
Number of Left Turns =	48	0%	Level	1	48
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	21%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 1.77 sec

t_A = 15.58 sec

t_{median} = 10.39 sec

λ = 13.53 veh/hr

μ = 900 veh/hr

Limiting advancing volume = 249

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0150 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

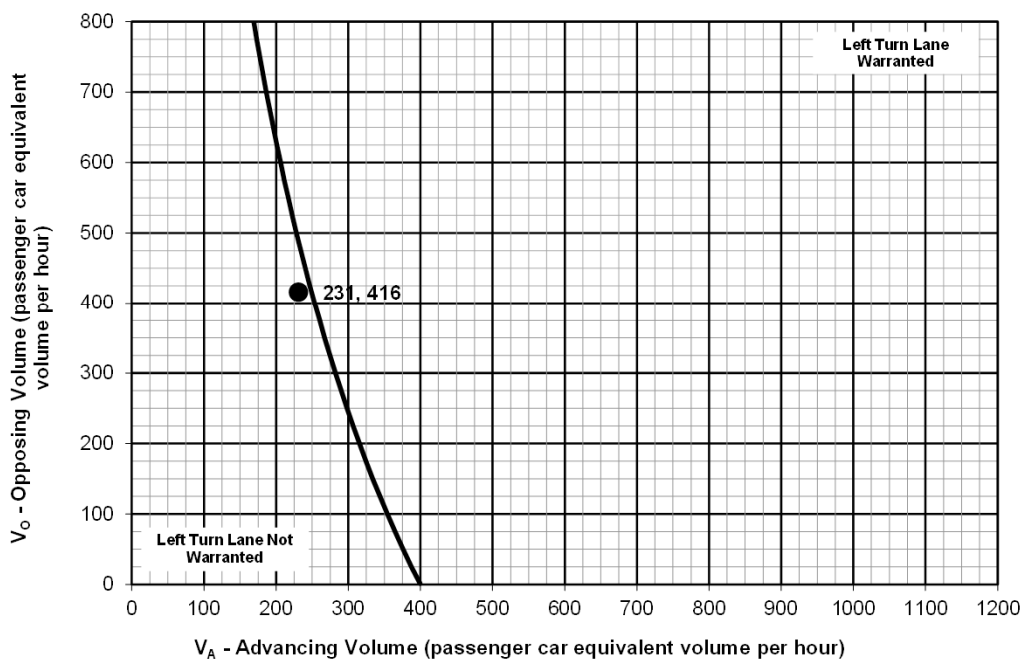
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



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Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Northbound Left Turns to Rocherty Road
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	176	2%	Level	1.01	178
Opposing Volume (V_O) =	231	3%	Level	1.015	234
Number of Left Turns =	61	0%	Level	1	61
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	34%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 0.91 sec

t_A = 20.22 sec

t_{median} = 13.48 sec

λ = 8.32 veh/hr

μ = 1022 veh/hr

Limiting advancing volume = 261

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0081 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

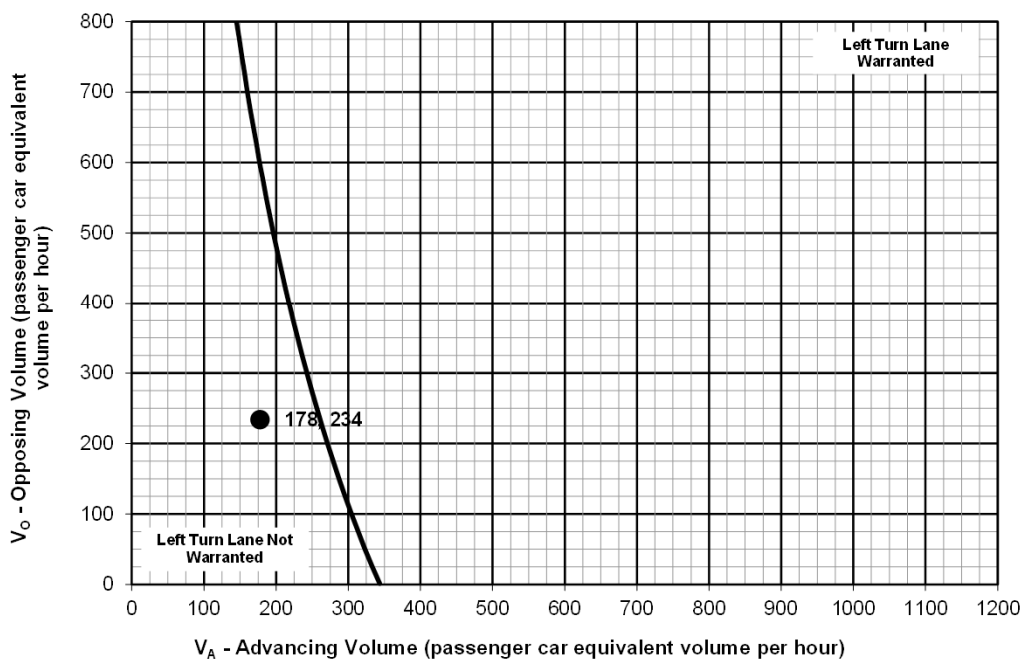
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

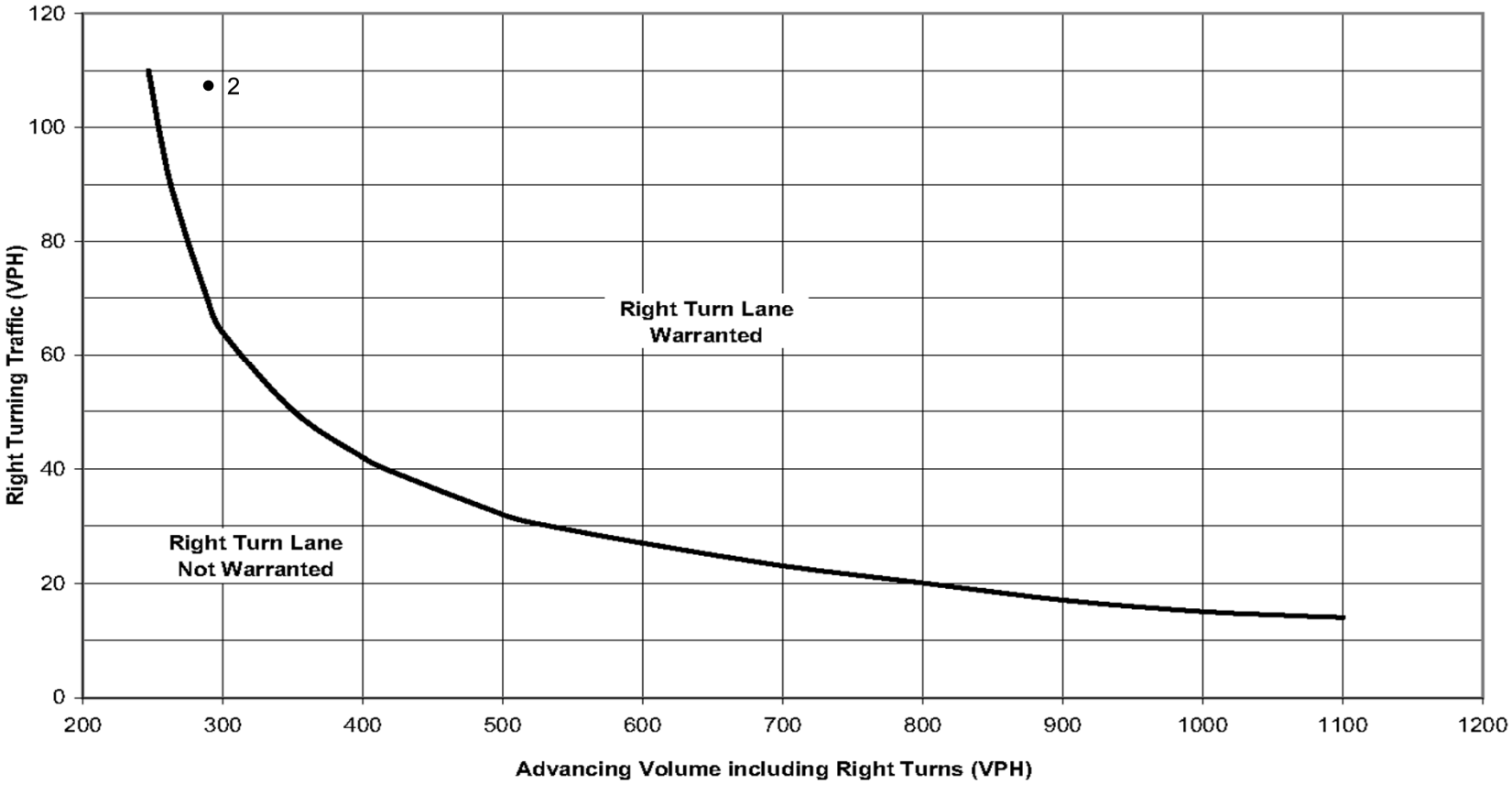
A left turn lane is not required.



Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)

Northbound Right Turn to Rocherty Road (S.R. 2002)

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2025 Projected AM - 472 approach total, 222 right turns - MET
2. 2025 Projected PM - 290 approach total, 107 right turns - MET
3. 2025 Projected SAT - 174 approach total, 58 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	470	1%	Level	1.005	472
Number of Right Turns =	219	3%	Level	1.015	222
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	47%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	6	
Storage Length:	325	feet

RESULTS

A right-turn lane is warranted. The required storage length is 325 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	289	1%	Level	1.005	290
Number of Right Turns =	107	0%	Level	1	107
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	37%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A right-turn lane is warranted. The required storage length is 225 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	172	2%	Level	1.01	174
Number of Right Turns =	57	2%	Level	1.01	58
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	33%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Southbound Left Turns to Rocherty Road
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	389	3%	Level	1.015	395
Opposing Volume (V_O) =	470	1%	Level	1.005	472
Number of Left Turns =	200	12%	Level	1.06	212
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	54%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 2.06 sec

t_A = 9.11 sec

t_{median} = 6.08 sec

λ = 64.02 veh/hr

μ = 865 veh/hr

Limiting advancing volume = 192

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

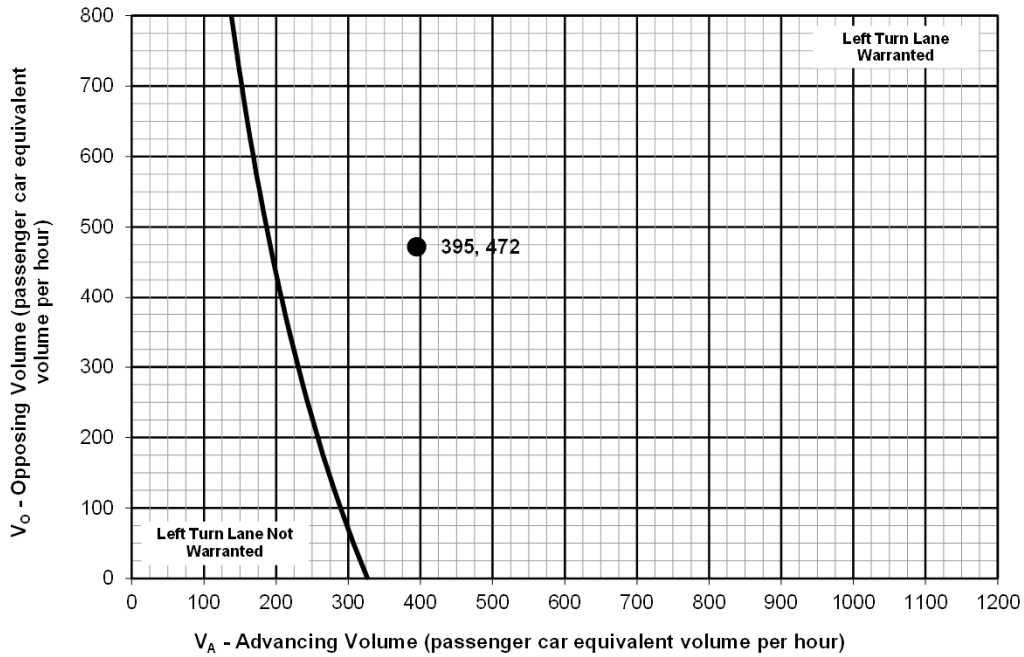
ρ = 0.0740 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	6	
Storage Length:	325	feet

RESULTS

A left turn lane is warranted. The required storage length is 325 feet.



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Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Southbound Left Turns to Rocherty Road
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	566	9%	Level	1.045	591
Opposing Volume (V_O) =	289	1%	Level	1.005	290
Number of Left Turns =	168	7%	Level	1.035	174
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	29%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 1.16 sec

t_A = 6.09 sec

t_{median} = 4.06 sec

λ = 91.60 veh/hr

μ = 983 veh/hr

Limiting advancing volume = 256

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

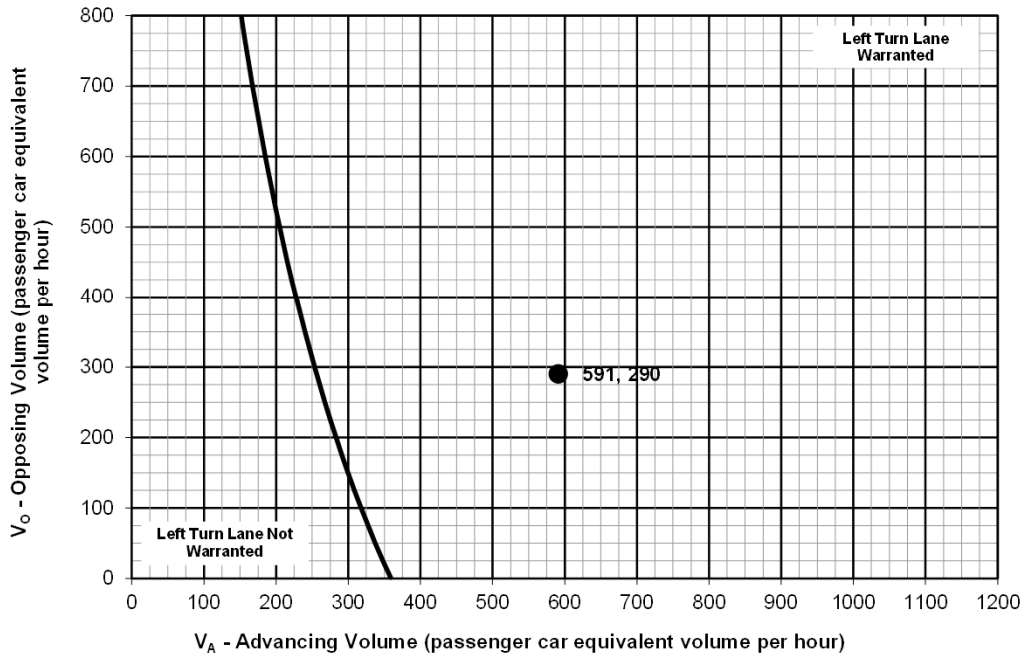
ρ = 0.0932 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	4	
Storage Length:	250	feet

RESULTS

A left turn lane is warranted. The required storage length is 250 feet.



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Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Southbound Left Turns to Rocherty Road
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	302	3%	Level	1.015	307
Opposing Volume (V_O) =	172	2%	Level	1.01	174
Number of Left Turns =	71	2%	Level	1.01	72
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	23%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 0.66 sec

t_A = 11.73 sec

t_{median} = 7.82 sec

λ = 17.78 veh/hr

μ = 1065 veh/hr

Limiting advancing volume = 314

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0167 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

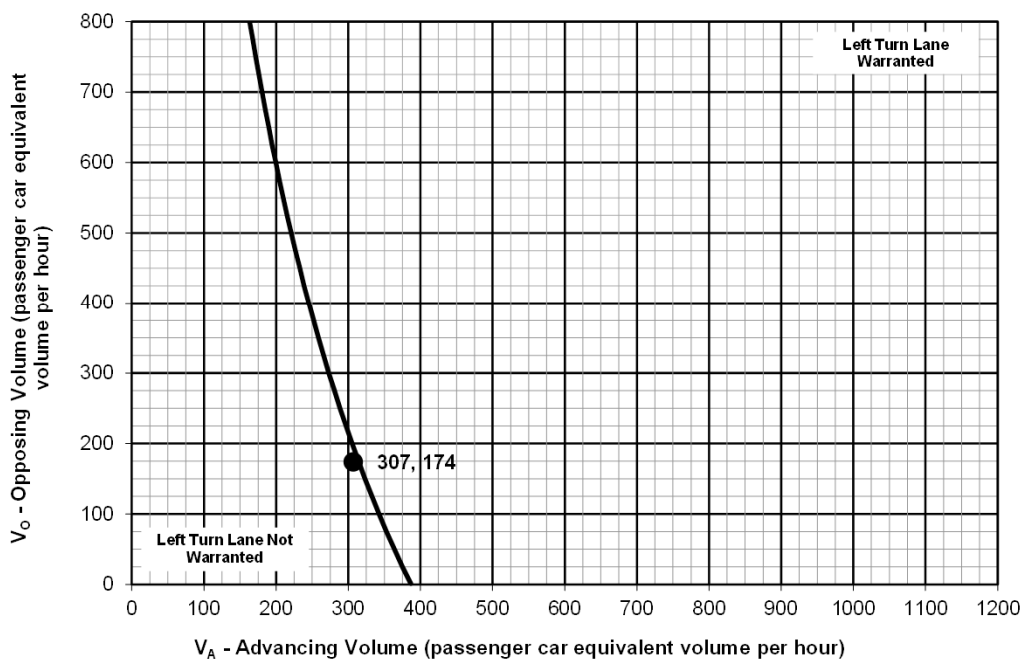
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

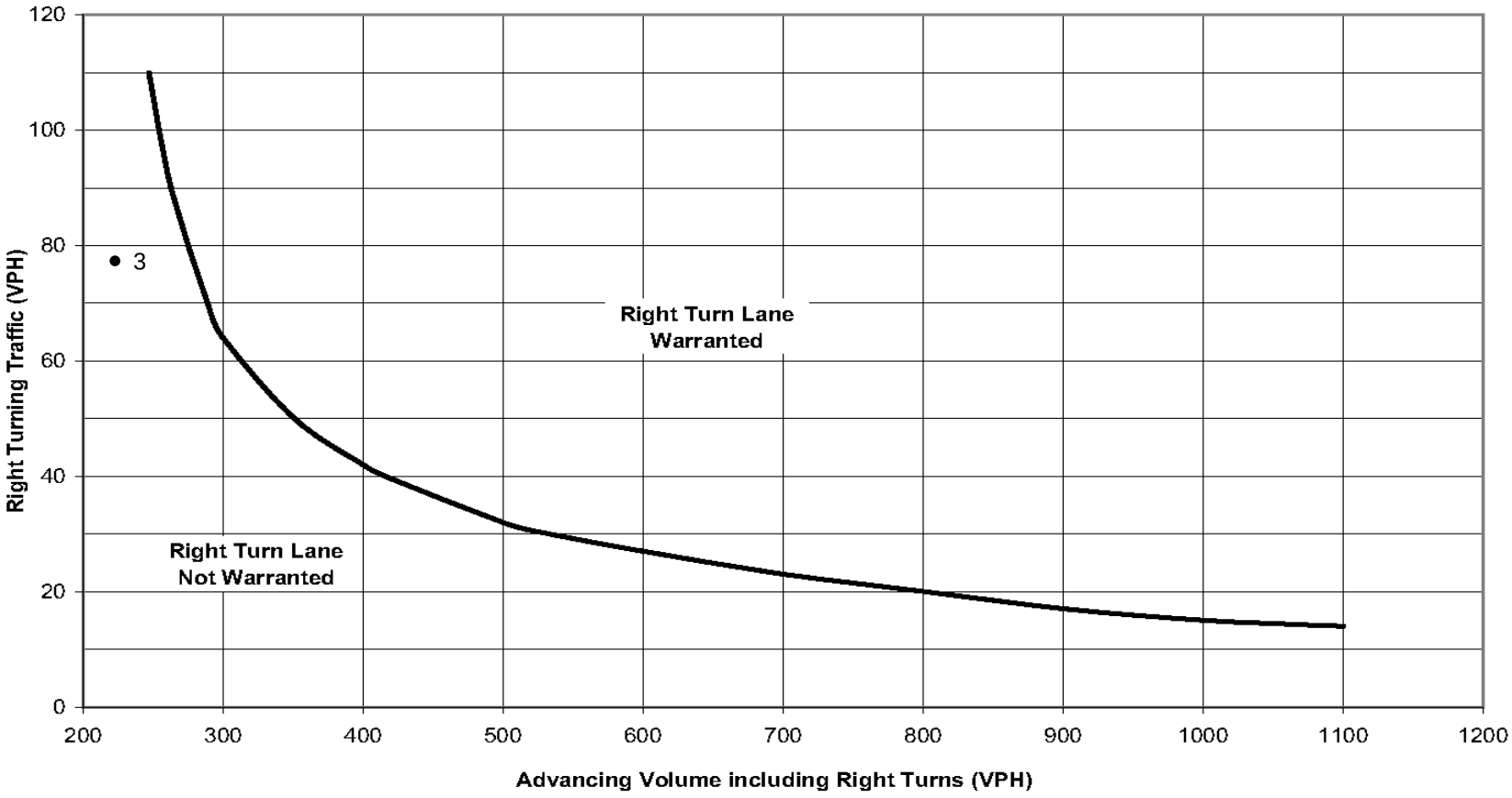
A left turn lane is not required.



Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)

Southbound Right Turn to Rocherty Road (S.R. 2002)

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2025 Projected AM - 181 approach total, 59 right turns - NOT MET
2. 2025 Projected PM - 378 approach total, 139 right turns - MET
3. 2025 Projected SAT - 223 approach total, 77 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Southbound Right Turn to Rocherty Road
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	178	3%	Level	1.015	181
Number of Right Turns =	56	9%	Level	1.045	59
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	33%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Southbound Right Turn to Rocherty Road
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	362	9%	Level	1.045	378
Number of Right Turns =	136	4%	Level	1.02	139
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	37%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	4	
Storage Length:	250	feet

RESULTS

A right-turn lane is warranted. The required storage length is 250 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Southbound Right Turn to Rocherty Road
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	220	3%	Level	1.015	223
Number of Right Turns =	77	0%	Level	1	77
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	35%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

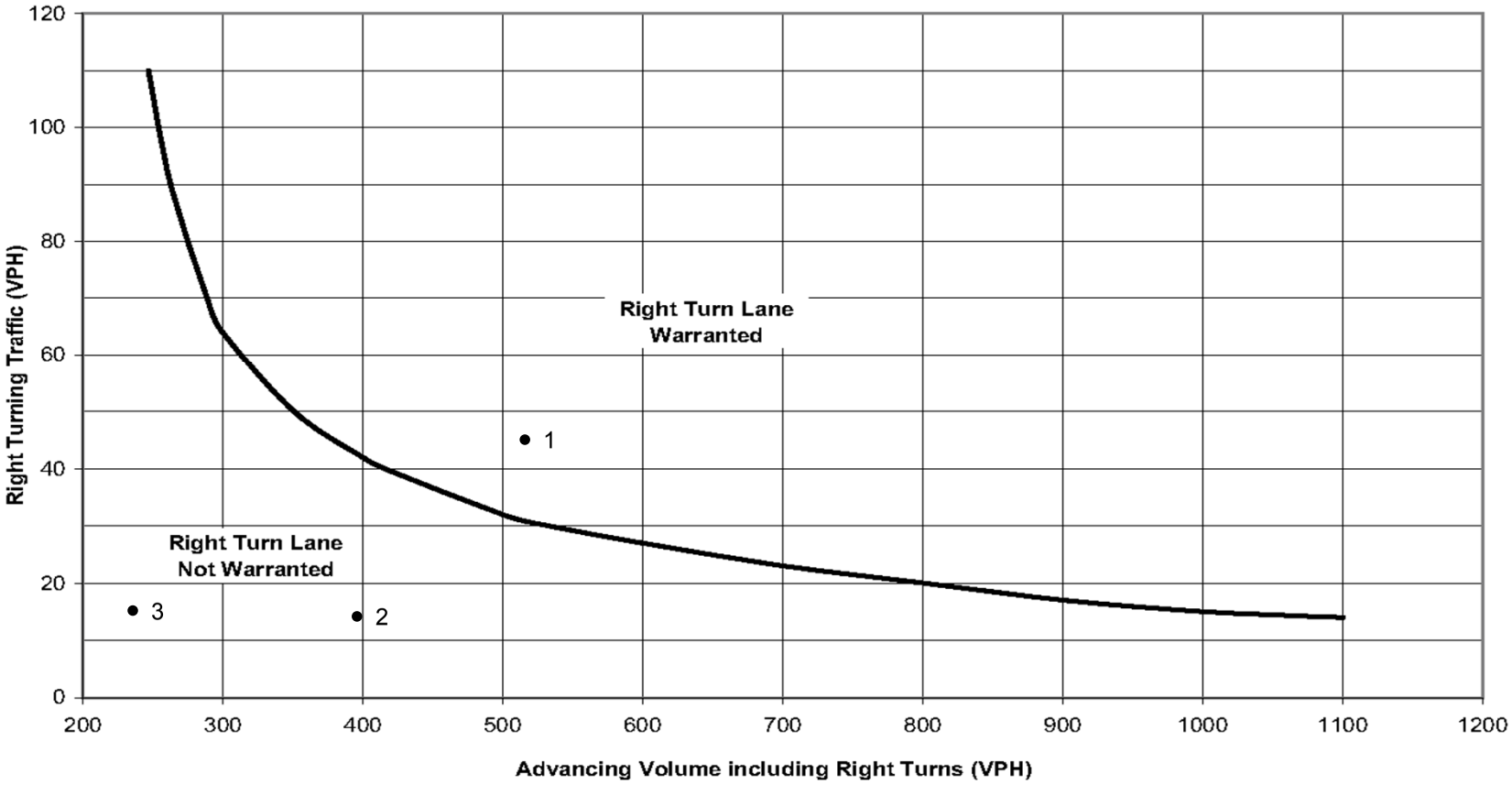
RESULTS

A right-turn lane is not required.

Cornwall Road (SR 2001) & Southern Site Driveway

Right Turn to Southern Site Driveway

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2025 Projected AM - 516 approach total, 45 right turns - MET
2. 2025 Projected PM - 396 approach total, 14 right turns - NOT MET
3. 2025 Projected SAT - 236 approach total, 15 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Right Turn to Southern Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	511	2%	Level	1.01	516
Number of Right Turns =	45	2%	Level	1.01	45
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Right Turns =	9%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	1	
Storage Length:	125	feet

RESULTS

A right-turn lane is warranted. The required storage length is 125 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Right Turn to Southern Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	392	2%	Level	1.01	396
Number of Right Turns =	14	2%	Level	1.01	14
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Right Turns =	4%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Right Turn to Southern Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	234	2%	Level	1.01	236
Number of Right Turns =	15	2%	Level	1.01	15
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Right Turns =	6%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Left Turns to Southern Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	441	3%	Level	1.015	448
Opposing Volume (V_O) =	511	4%	Level	1.02	521
Number of Left Turns =	71	2%	Level	1.01	72
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Left Turns =	16%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 2.34 sec

t_A = 8.04 sec

t_{median} = 5.36 sec

λ = 47.62 veh/hr

μ = 835 veh/hr

Limiting advancing volume = 248

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

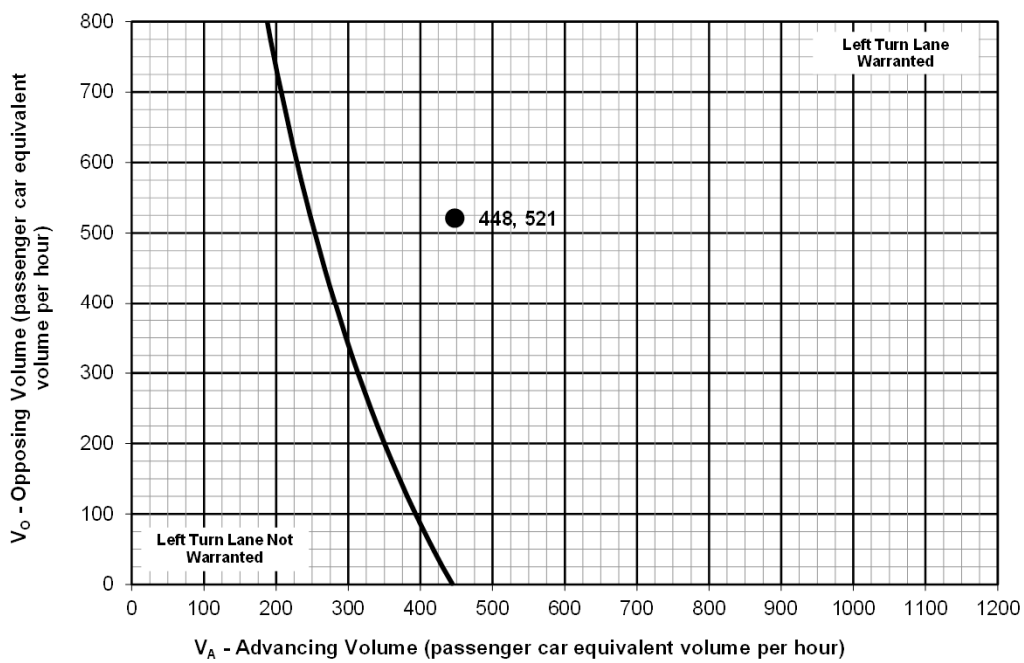
ρ = 0.0570 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	C	
Avg # of veh/cycle:	1	
Storage Length:	150	feet

RESULTS

A left turn lane is warranted. The required storage length is 150 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Left Turns to Southern Site Driveway
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	568	2%	Level	1.01	574
Opposing Volume (V_O) =	392	2%	Level	1.01	396
Number of Left Turns =	49	2%	Level	1.01	49
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Left Turns =	9%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 1.67 sec

t_A = 6.27 sec

t_{median} = 4.18 sec

λ = 40.09 veh/hr

μ = 912 veh/hr

Limiting advancing volume = 362

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

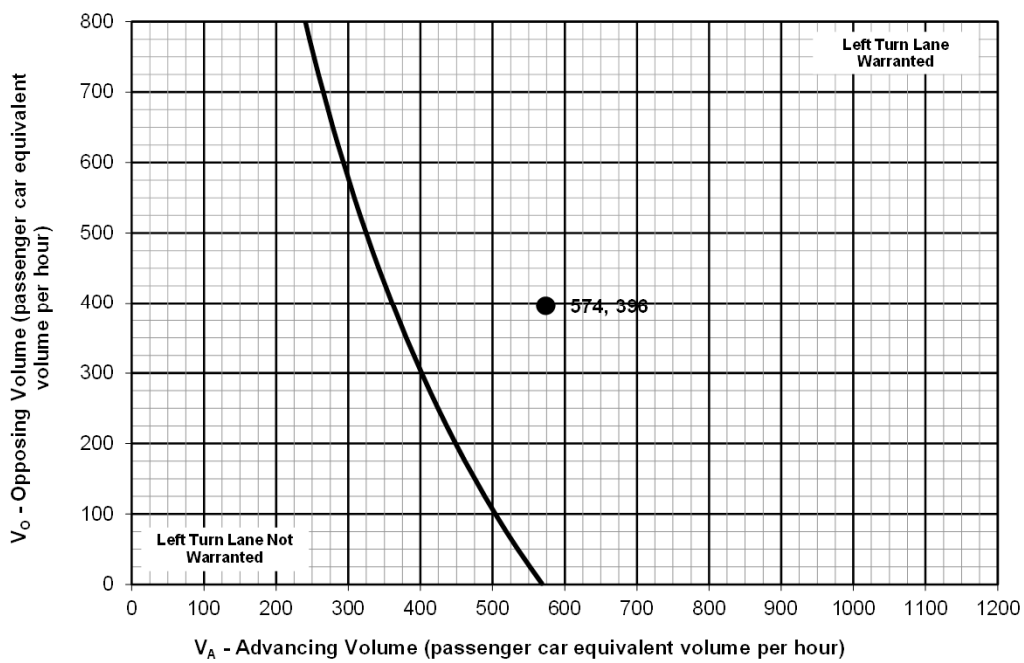
ρ = 0.0439 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	1	
Storage Length:	125	feet

RESULTS

A left turn lane is warranted. The required storage length is 125 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Left Turns to Southern Site Driveway
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	323	3%	Level	1.015	328
Opposing Volume (V_O) =	234	0%	Level	1	234
Number of Left Turns =	46	2%	Level	1.01	46
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Left Turns =	14%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 0.91 sec

t_A = 10.98 sec

t_{median} = 7.32 sec

λ = 15.16 veh/hr

μ = 1022 veh/hr

Limiting advancing volume = 356

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0148 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

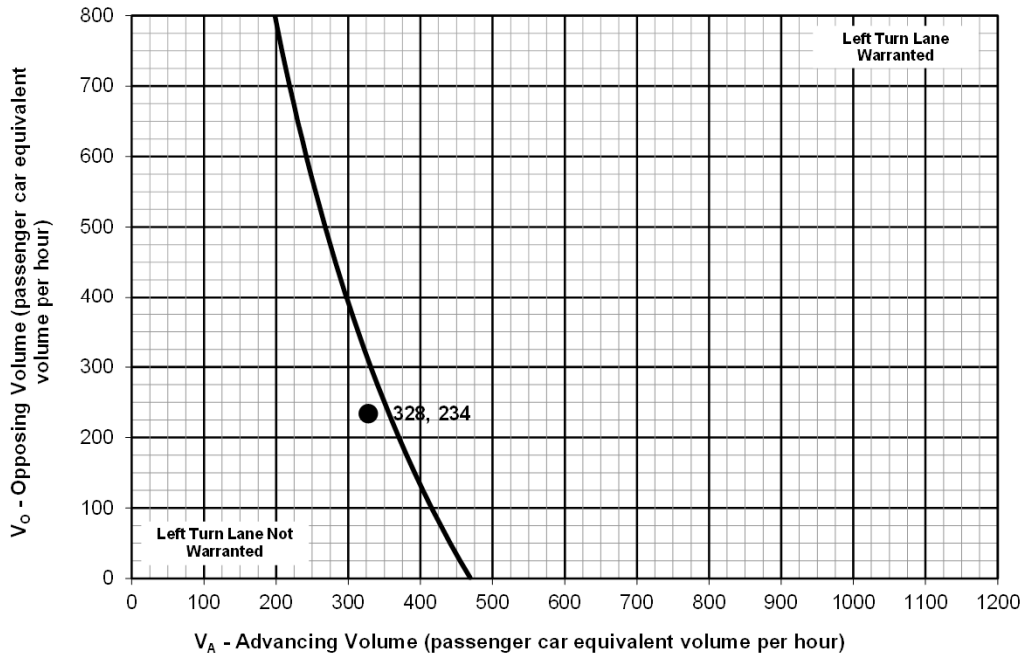
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Left Turns to Eastern Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	918	2%	Level	1.01	927
Opposing Volume (V_O) =	588	2%	Level	1.01	594
Number of Left Turns =	52	2%	Level	1.01	53
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Left Turns =	6%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 2.77 sec

t_A = 3.88 sec

t_{median} = 2.59 sec

λ = 94.29 veh/hr

μ = 793 veh/hr

Limiting advancing volume = 380

Left turn lane warrants are for ρ > than

0.02 for 40 mph

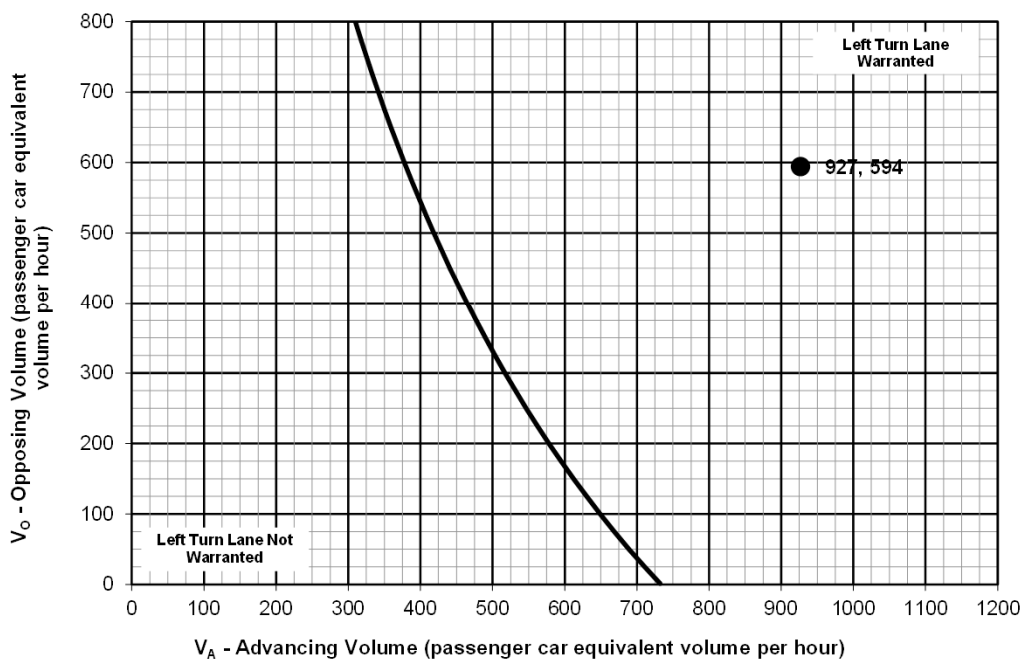
ρ = 0.1189 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	1	
Storage Length:	75	feet

RESULTS

A left turn lane is warranted. The required storage length is 75 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Left Turns to Eastern Site Driveway
Analysis Period:	2025 Projected Conditions - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	688	2%	Level	1.01	695
Opposing Volume (V_O) =	684	2%	Level	1.01	691
Number of Left Turns =	32	2%	Level	1.01	32
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Left Turns =	5%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 3.39 sec

t_A = 5.18 sec

t_{median} = 3.45 sec

λ = 50.60 veh/hr

μ = 740 veh/hr

Limiting advancing volume = 376

Left turn lane warrants are for ρ > than

0.02 for 40 mph

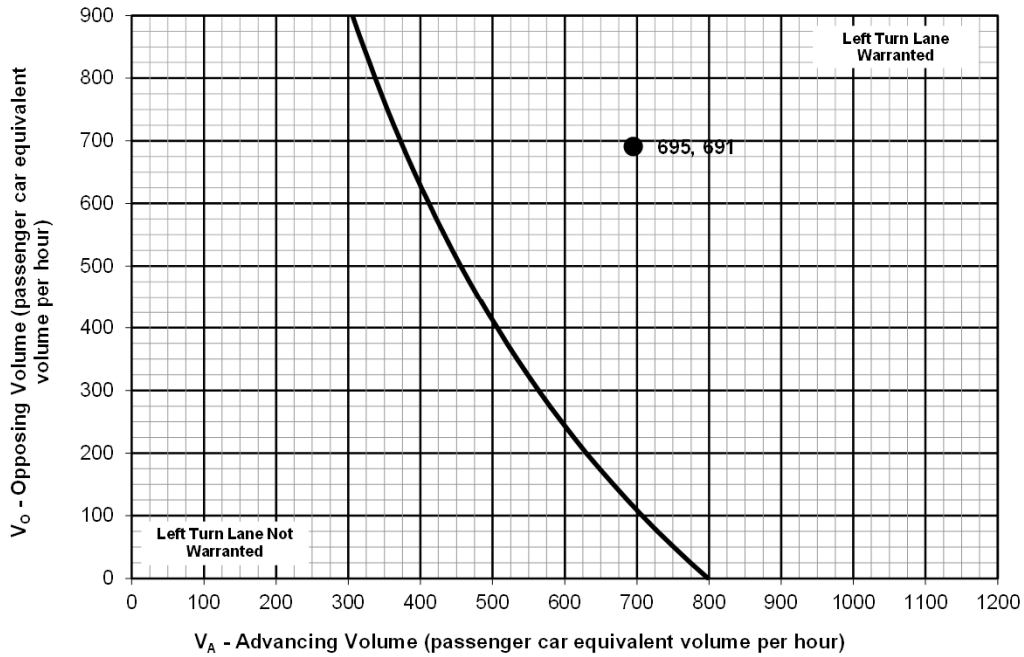
ρ = 0.0684 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	1	
Storage Length:	75	feet

RESULTS

A left turn lane is warranted. The required storage length is 75 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Left Turns to Eastern Site Driveway
Analysis Period:	2025 Projected Conditions - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	420	2%	Level	1.01	424
Opposing Volume (V_O) =	440	2%	Level	1.01	444
Number of Left Turns =	24	2%	Level	1.01	24
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Left Turns =	6%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 1.91 sec

t_A = 8.49 sec

t_{median} = 5.66 sec

λ = 16.11 veh/hr

μ = 882 veh/hr

Limiting advancing volume = 444

Left turn lane warrants are for ρ > than

0.02 for 40 mph

ρ = 0.0183 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

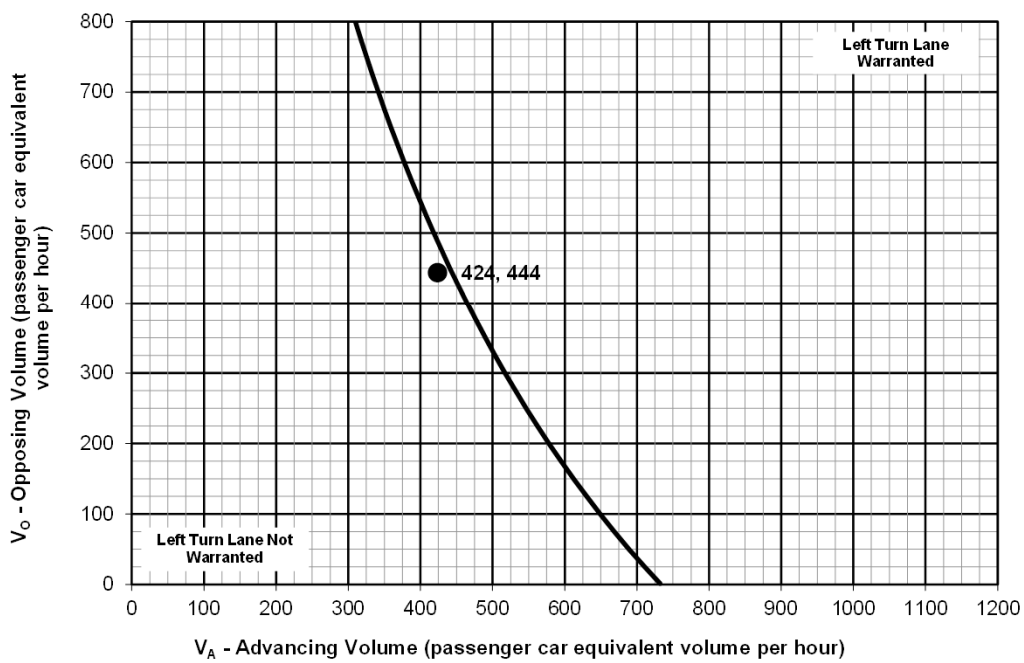
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

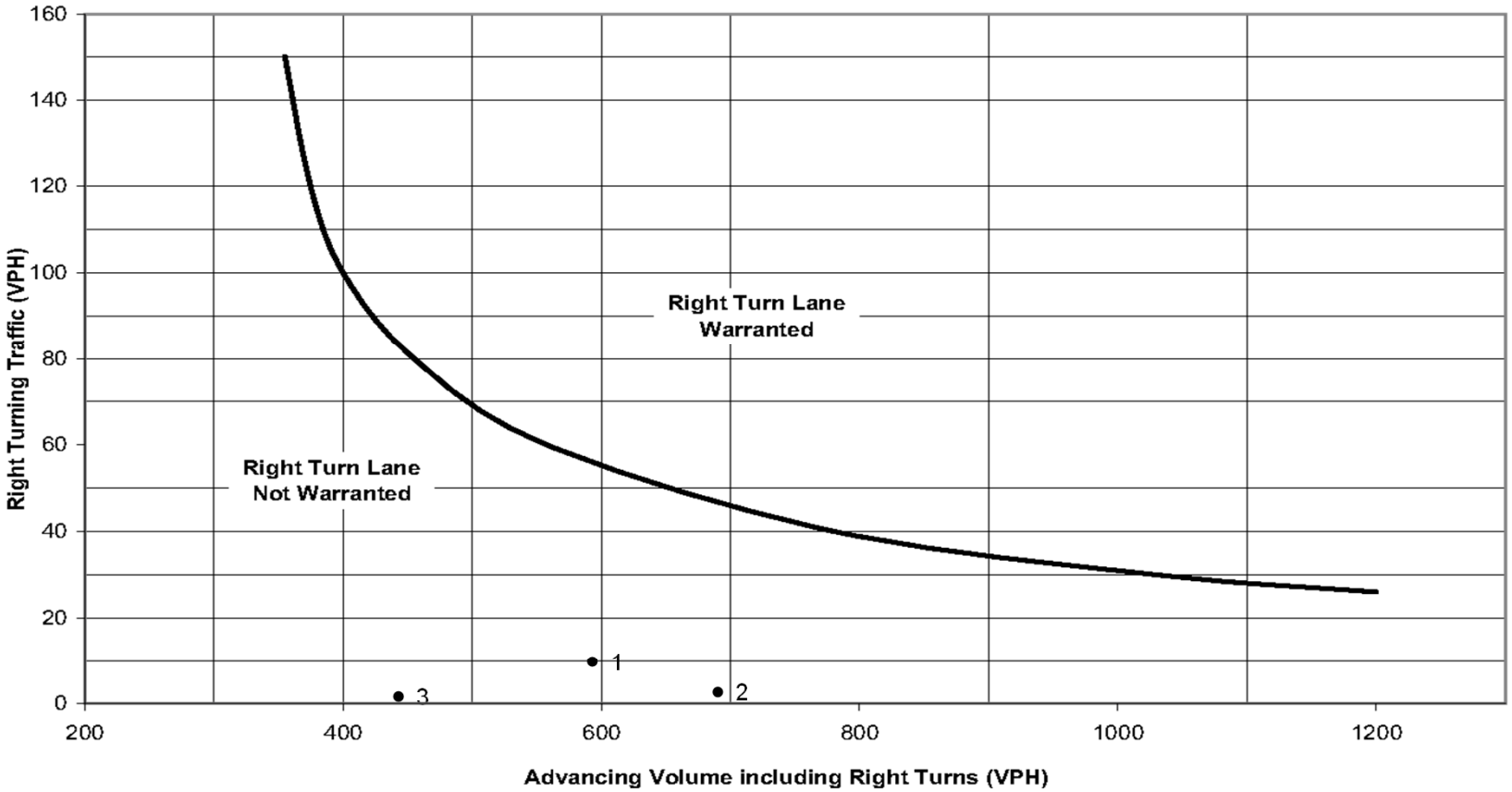
A left turn lane is not required.



Rocherty Road (SR 2002) & Eastern Site Driveway

Right-Turns to Eastern Site Driveway

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2025 Projected AM - 594 approach total, 11 right turns - NOT MET
2. 2025 Projected PM - 691 approach total, 4 right turns - NOT MET
3. 2025 Projected SAT - 444 approach total, 3 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Right-Turns to Eastern Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	588	2%	Level	1.01	594
Number of Right Turns =	11	2%	Level	1.01	11
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	2%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Right-Turns to Eastern Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	684	2%	Level	1.01	691
Number of Right Turns =	4	2%	Level	1.01	4
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	1%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:		
Table 1 Condition:		
Avg # of veh/cycle:		
Storage Length:		feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Right-Turns to Eastern Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	440	2%	Level	1.01	444
Number of Right Turns =	3	2%	Level	1.01	3
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	1%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

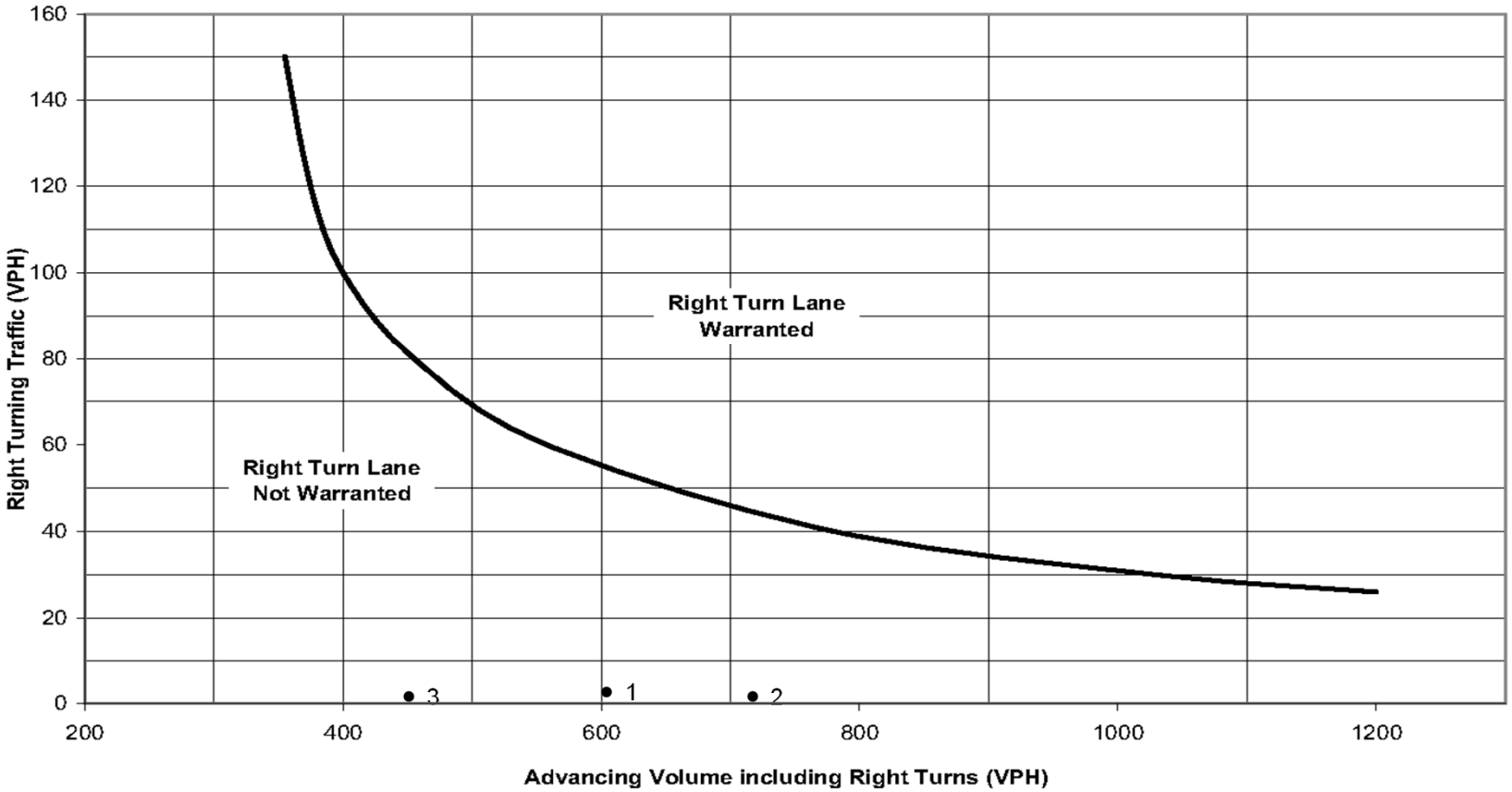
RESULTS

A right-turn lane is not required.

Rocherty Road (SR 2002) & Western Site Driveway

Right-Turns to Western Site Driveway

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2025 Projected AM - 605 approach total, 4 right turns - NOT MET
2. 2025 Projected PM - 718 approach total, 3 right turns - NOT MET
3. 2025 Projected SAT - 452 approach total, 3 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Western Site Driveway
Movement:	Right-Turns to Western Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	599	2%	Level	1.01	605
Number of Right Turns =	4	2%	Level	1.01	4
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	1%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:		
Table 1 Condition:		
Avg # of veh/cycle:		
Storage Length:		feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Western Site Driveway
Movement:	Right-Turns to Western Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	711	2%	Level	1.01	718
Number of Right Turns =	3	2%	Level	1.01	3
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	0%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Western Site Driveway
Movement:	Right-Turns to Western Site Driveway
Analysis Period:	2025 Projected Conditions - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	448	2%	Level	1.01	452
Number of Right Turns =	3	2%	Level	1.01	3
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	1%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

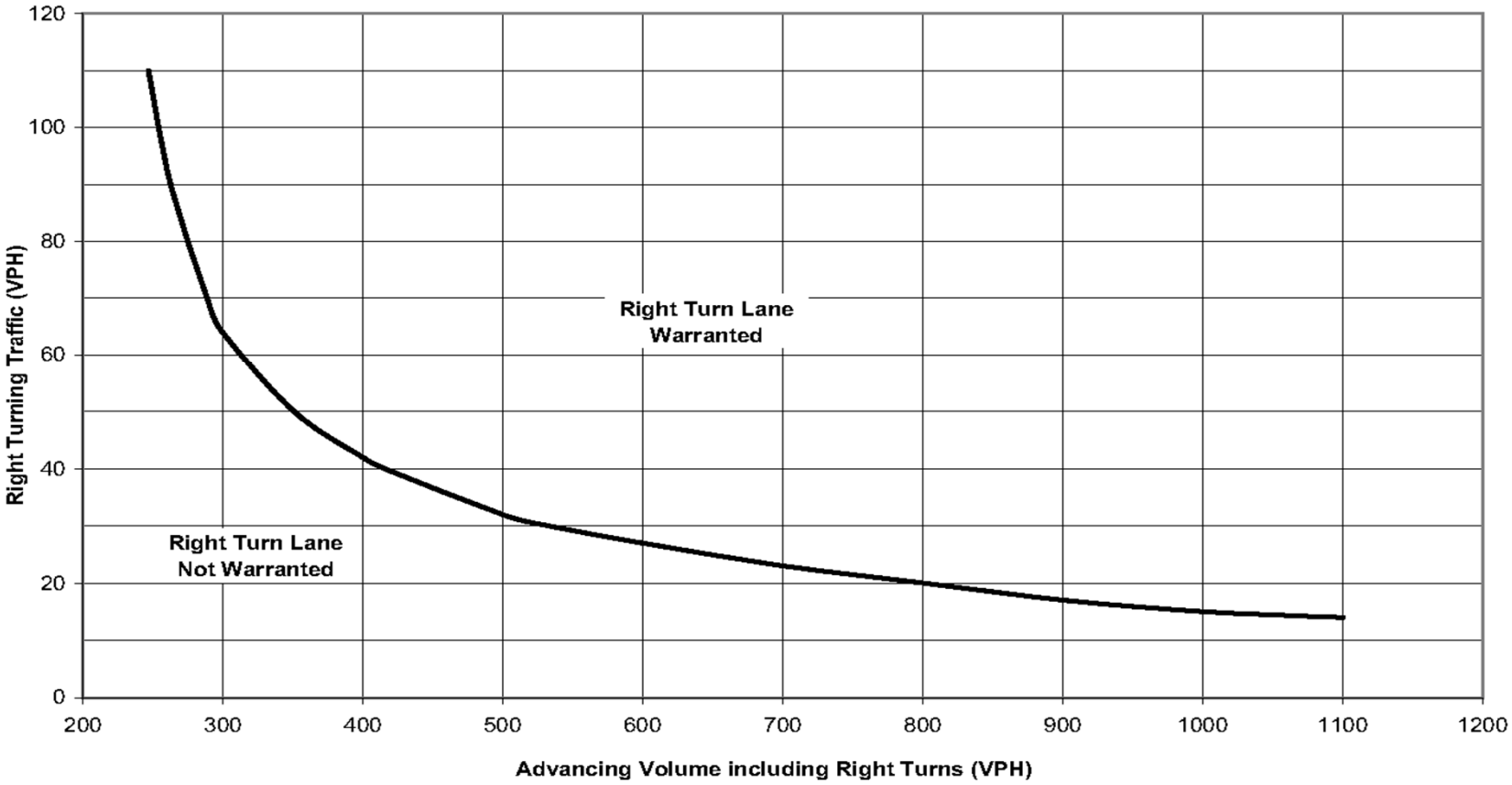
A right-turn lane is not required.

2035 CONDITIONS

Quentin Road (SR 0072) & Rocherty Road (SR 2002)

Northbound Right Turn to Rocherty Road (S.R. 2002)

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 951 approach total, 316 right turns - MET
2. 2035 Projected PM (Phases 1-4) - 837 approach total, 170 right turns - MET
3. 2035 Projected SAT (Phases 1-4) - 822 approach total, 129 right turns - MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Quenting Road (SR 0072) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	906	10%	Level	1.05	951
Number of Right Turns =	310	4%	Level	1.02	316
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	33%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	11	
Storage Length:	475	feet

RESULTS

A right-turn lane is warranted. The required storage length is 475 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Quenting Road (SR 0072) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	821	4%	Level	1.02	837
Number of Right Turns =	167	4%	Level	1.02	170
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	20%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	6	
Storage Length:	325	feet

RESULTS

A right-turn lane is warranted. The required storage length is 325 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Quenting Road (SR 0072) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	818	1%	Level	1.005	822
Number of Right Turns =	126	4%	Level	1.02	129
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	16%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	4	
Storage Length:	250	feet

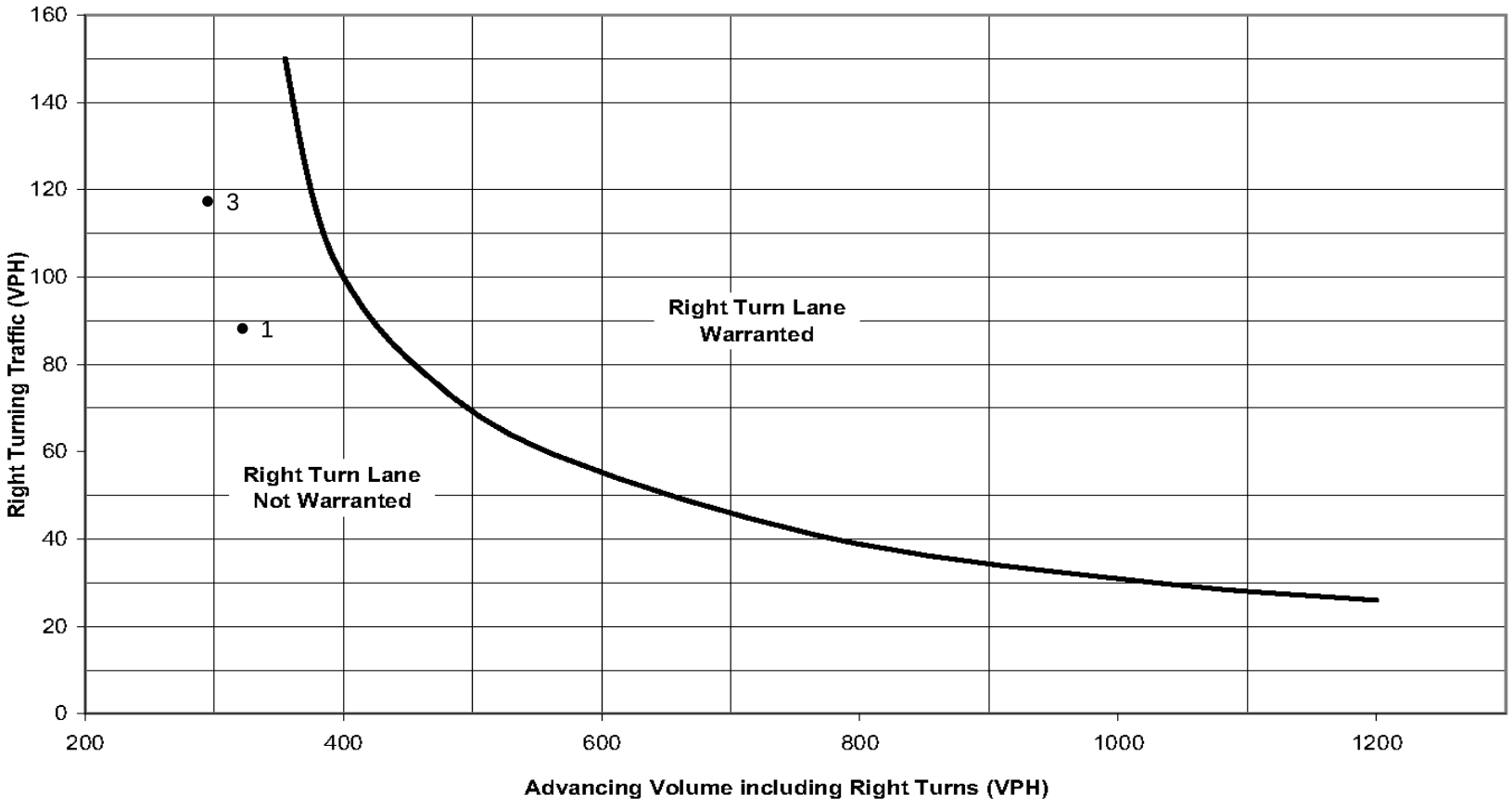
RESULTS

A right-turn lane is warranted. The required storage length is 250 feet.

Rocherty Road (S.R. 2002) & Quentin Road (S.R. 0072)

Westbound Right-Turns to Quentin Road (S.R. 0072)

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 323 approach total, 89 right turns - NOT MET
2. 2035 Projected PM (Phases 1-4) - 495 approach total, 171 right turns - MET
3. 2035 Projected SAT (Phases 1-4) - 296 approach total, 118 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Quentin Road (S.R. 0072)
Movement:	Westbound Right-Turns to Quentin Road (S.R. 0072)
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	318	3%	Level	1.015	323
Number of Right Turns =	86	6%	Level	1.03	89
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	28%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Quentin Road (S.R. 0072)
Movement:	Westbound Right-Turns to Quentin Road (S.R. 0072)
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	493	1%	Level	1.005	495
Number of Right Turns =	171	0%	Level	1	171
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	35%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	6	
Storage Length:	325	feet

RESULTS

A right-turn lane is warranted. The required storage length is 325 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Quentin Road (S.R. 0072)
Movement:	Westbound Right-Turns to Quentin Road (S.R. 0072)
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	287	6%	Level	1.03	296
Number of Right Turns =	115	5%	Level	1.025	118
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	40%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Route 72 & Isabel Drive
Movement:	Left Turns to Isabel Drive
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	856	10%	Level	1.05	899
Opposing Volume (V_O) =	694	10%	Level	1.05	729
Number of Left Turns =	138	10%	Level	1.05	145
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	16%		Cycle Length:	120	sec.

WARRANT CALCULATION

t_w = 3.65 sec

t_A = 4.00 sec

t_{median} = 2.67 sec

λ = 251.38 veh/hr

μ = 720 veh/hr

Limiting advancing volume = 201

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

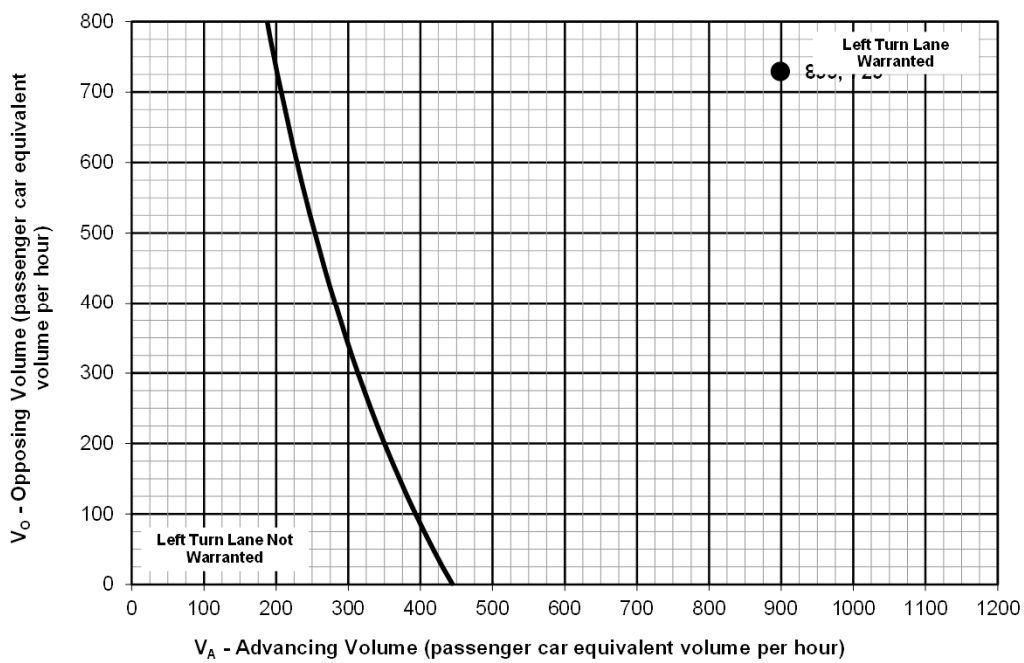
ρ = 0.3494 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	5	
Storage Length:	275	feet

RESULTS

A left turn lane is warranted. The required storage length is 275 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Route 72 & Isabel Drive
Movement:	Left Turns to Isabel Drive
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	1102	5%	Level	1.025	1130
Opposing Volume (V_O) =	1208	2%	Level	1.01	1220
Number of Left Turns =	114	5%	Level	1.025	117
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	10%		Cycle Length:	120	sec.

WARRANT CALCULATION

t_w = 8.11 sec

t_A = 3.19 sec

t_{median} = 2.12 sec

λ = 479.43 veh/hr

μ = 501 veh/hr

Limiting advancing volume = 153

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

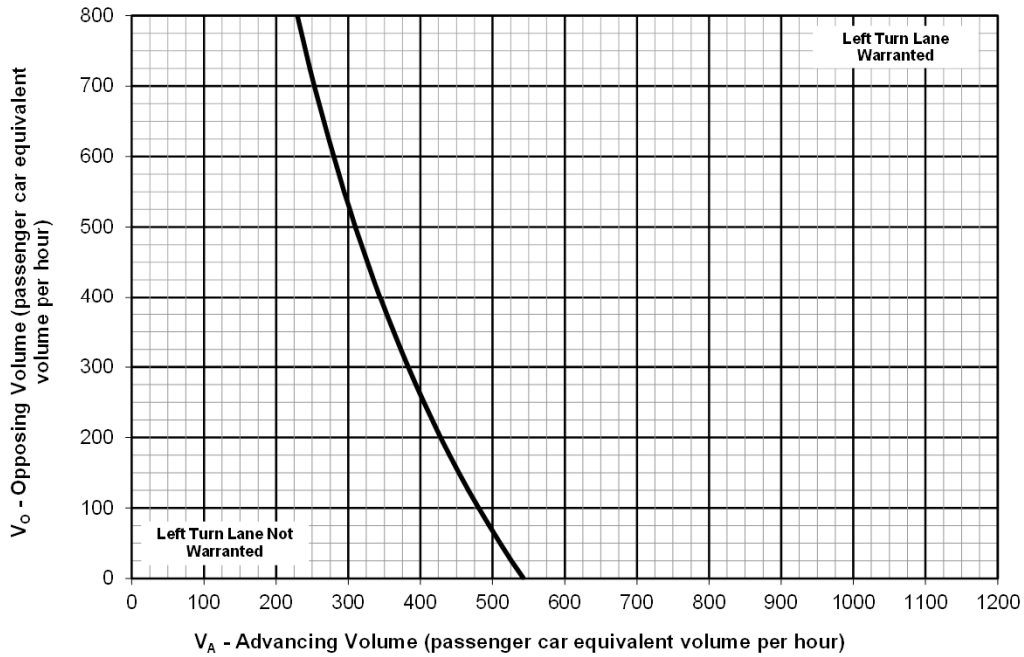
ρ = 0.9565 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	4	
Storage Length:	250	feet

RESULTS

A left turn lane is warranted. The required storage length is 250 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Route 72 & Isabel Drive
Movement:	Left Turns to Isabel Drive
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	1392	1%	Level	1.005	1399
Opposing Volume (V_O) =	1266	0%	Level	1	1266
Number of Left Turns =	89	1%	Level	1.005	89
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	6%		Cycle Length:	120	sec.

WARRANT CALCULATION

t_w = 8.66 sec

t_A = 2.57 sec

t_{median} = 1.72 sec

λ = 485.57 veh/hr

μ = 484 veh/hr

Limiting advancing volume = 185

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

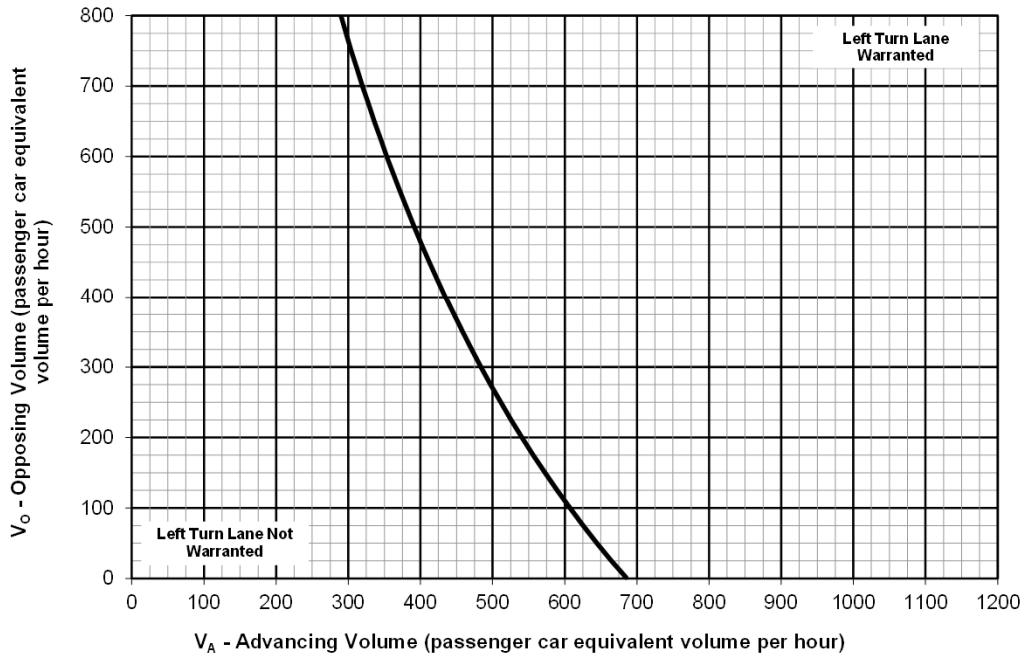
ρ = 1.0028 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A left turn lane is warranted. The required storage length is 225 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Eastbound Left Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	752	6%	Level	1.03	775
Opposing Volume (V_O) =	647	9%	Level	1.045	676
Number of Left Turns =	113	4%	Level	1.02	115
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	15%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 3.29 sec

t_A = 4.65 sec

t_{median} = 3.10 sec

λ = 165.68 veh/hr

μ = 748 veh/hr

Limiting advancing volume = 233

Left turn lane warrants are for ρ > than

0.02 for 40 mph

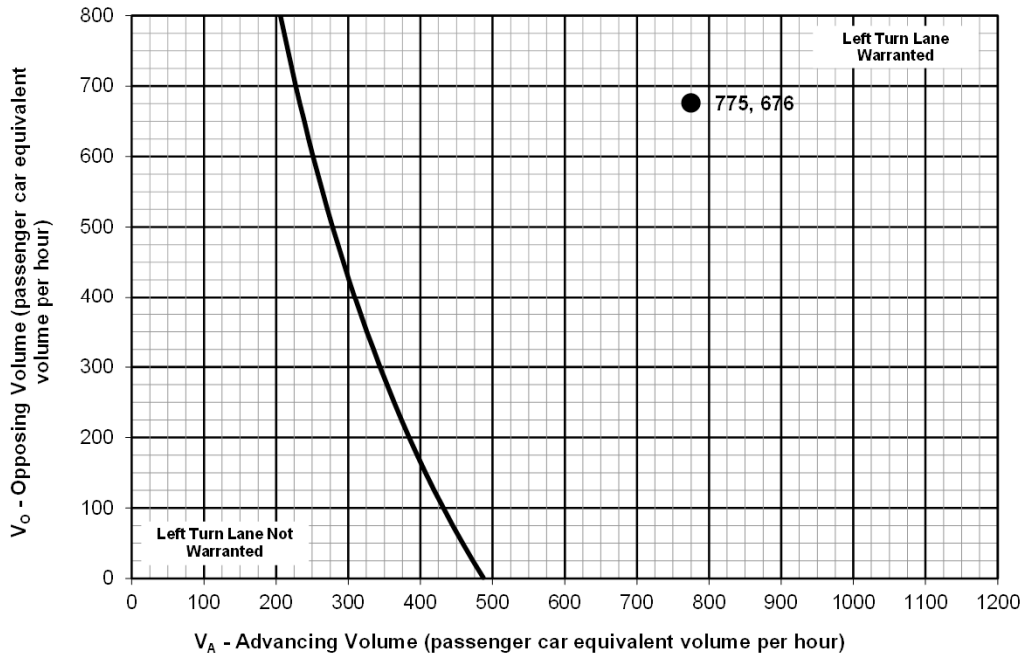
ρ = 0.2216 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A left turn lane is warranted. The required storage length is 225 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Eastbound Left Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	601	4%	Level	1.02	613
Opposing Volume (V_O) =	778	2%	Level	1.01	786
Number of Left Turns =	96	4%	Level	1.02	98
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	16%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 4.07 sec

t_A = 5.87 sec

t_{median} = 3.92 sec

λ = 125.53 veh/hr

μ = 690 veh/hr

Limiting advancing volume = 203

Left turn lane warrants are for ρ > than

0.02 for 40 mph

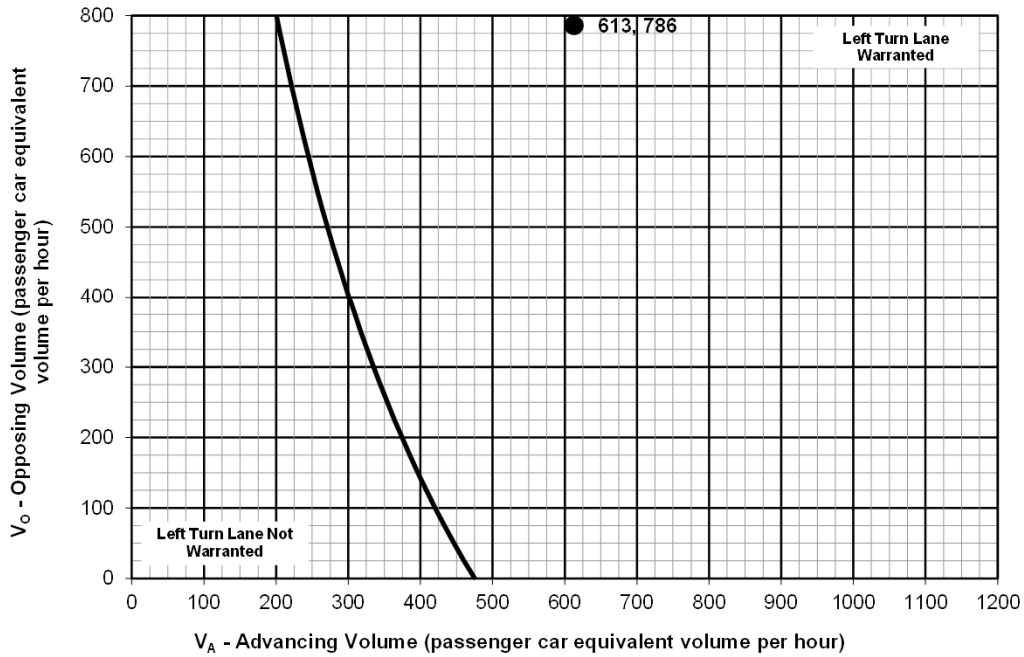
ρ = 0.1818 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A left turn lane is warranted. The required storage length is 175 feet.



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Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Eastbound Left Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	482	2%	Level	1.01	487
Opposing Volume (V_O) =	469	1%	Level	1.005	471
Number of Left Turns =	89	0%	Level	1	89
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	18%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 2.06 sec

t_A = 7.39 sec

t_{median} = 4.93 sec

λ = 57.74 veh/hr

μ = 865 veh/hr

Limiting advancing volume = 267

Left turn lane warrants are for ρ > than

0.02 for 40 mph

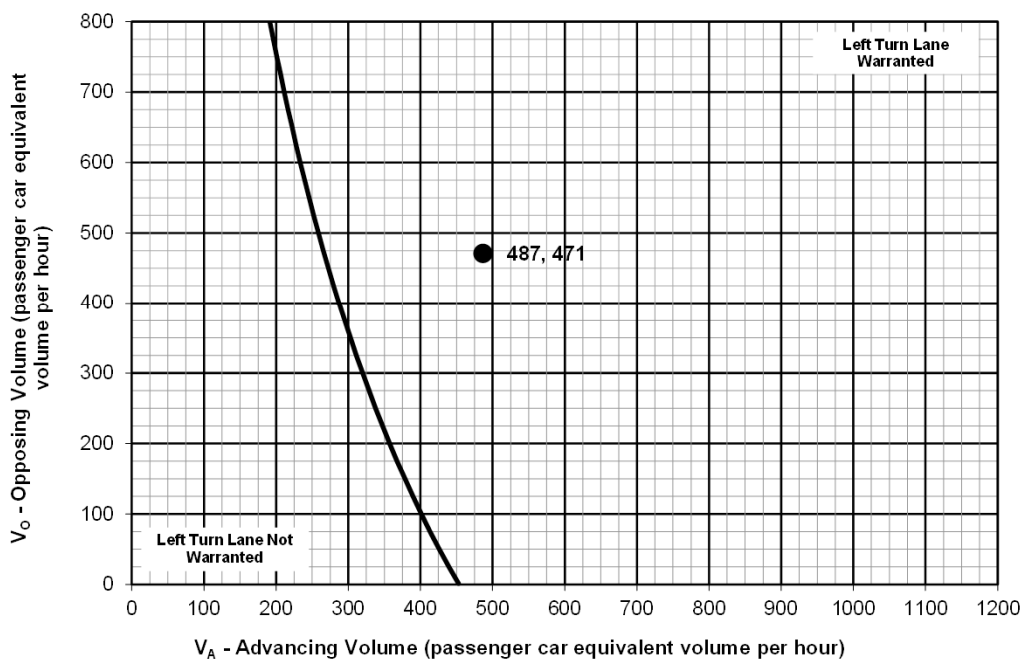
ρ = 0.0667 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A left turn lane is warranted. The required storage length is 175 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Westbound Left Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	492	9%	Level	1.045	514
Opposing Volume (V_O) =	639	6%	Level	1.03	658
Number of Left Turns =	50	16%	Level	1.08	54
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	11%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 3.17 sec

t_A = 7.00 sec

t_{median} = 4.67 sec

λ = 54.68 veh/hr

μ = 757 veh/hr

Limiting advancing volume = 271

Left turn lane warrants are for ρ > than

0.02 for 40 mph

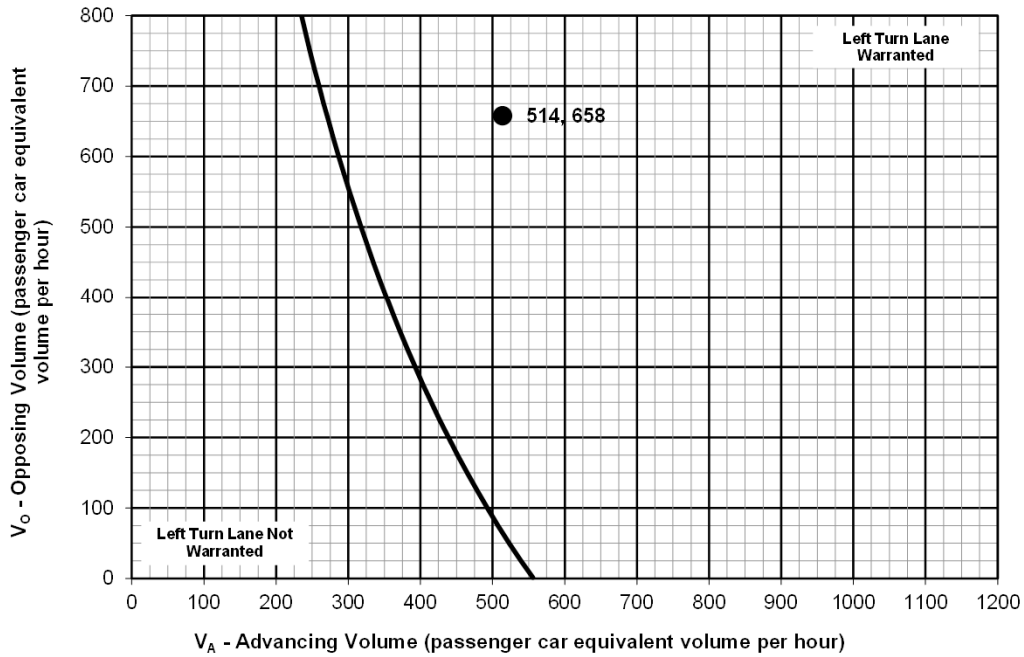
ρ = 0.0722 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A left turn lane is warranted. The required storage length is 175 feet.



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Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Westbound Left Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	697	2%	Level	1.01	704
Opposing Volume (V_O) =	505	4%	Level	1.02	515
Number of Left Turns =	105	5%	Level	1.025	108
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	15%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 2.30 sec

t_A = 5.11 sec

t_{median} = 3.41 sec

λ = 110.67 veh/hr

μ = 839 veh/hr

Limiting advancing volume = 274

Left turn lane warrants are for ρ > than

0.02 for 40 mph

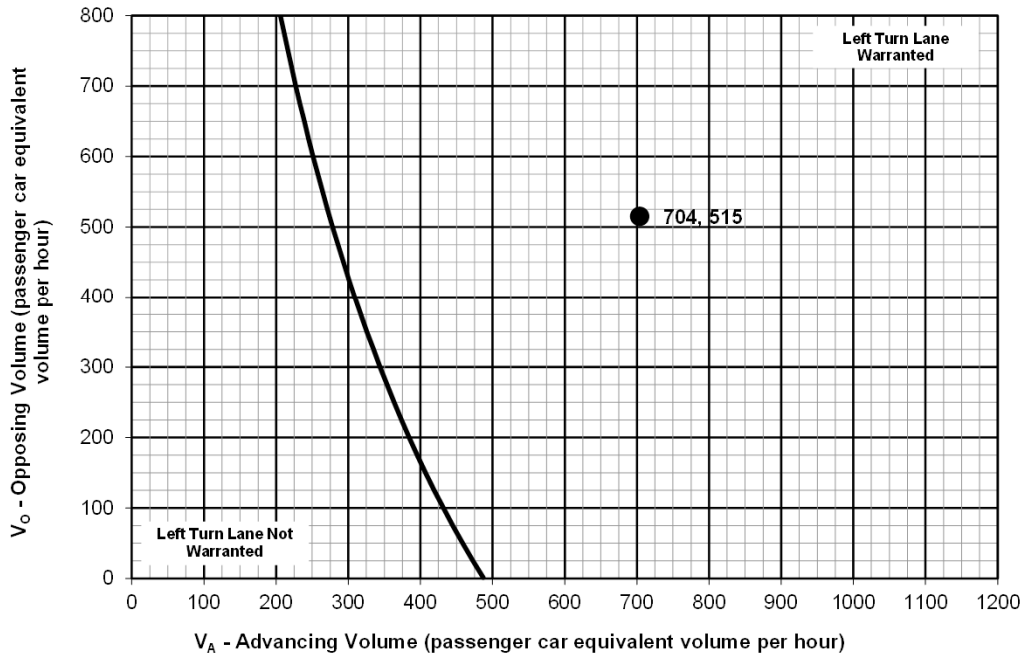
ρ = 0.1319 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A left turn lane is warranted. The required storage length is 225 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Eastbound Left Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	429	1%	Level	1.005	431
Opposing Volume (V_O) =	393	2%	Level	1.01	397
Number of Left Turns =	77	2%	Level	1.01	78
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Left Turns =	18%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 1.67 sec

t_A = 8.35 sec

t_{median} = 5.57 sec

λ = 40.80 veh/hr

μ = 912 veh/hr

Limiting advancing volume = 288

Left turn lane warrants are for ρ > than

0.02 for 40 mph

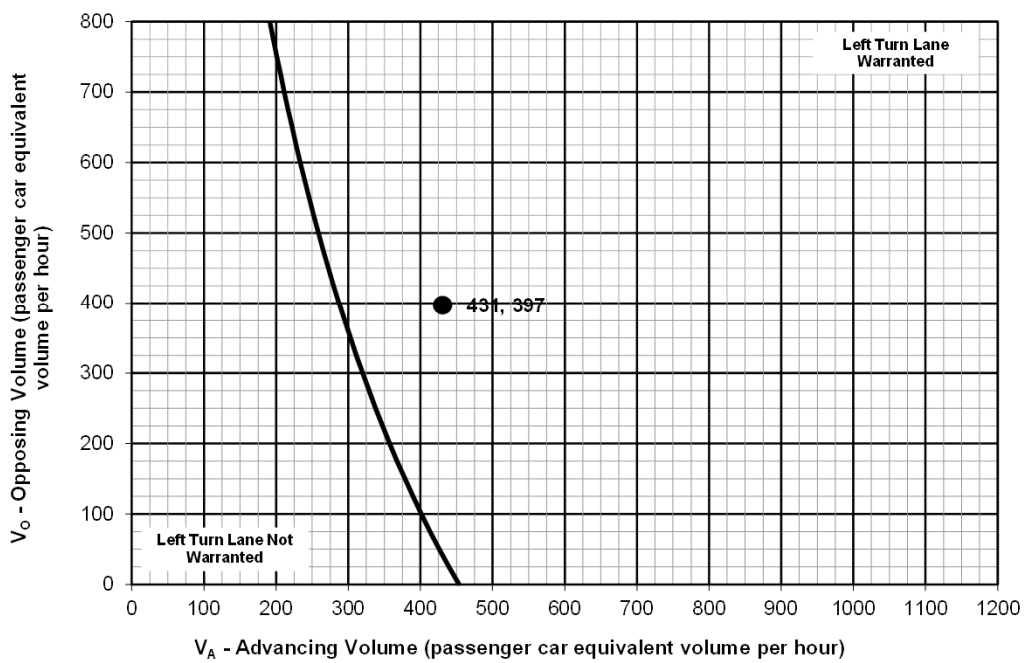
ρ = 0.0447 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

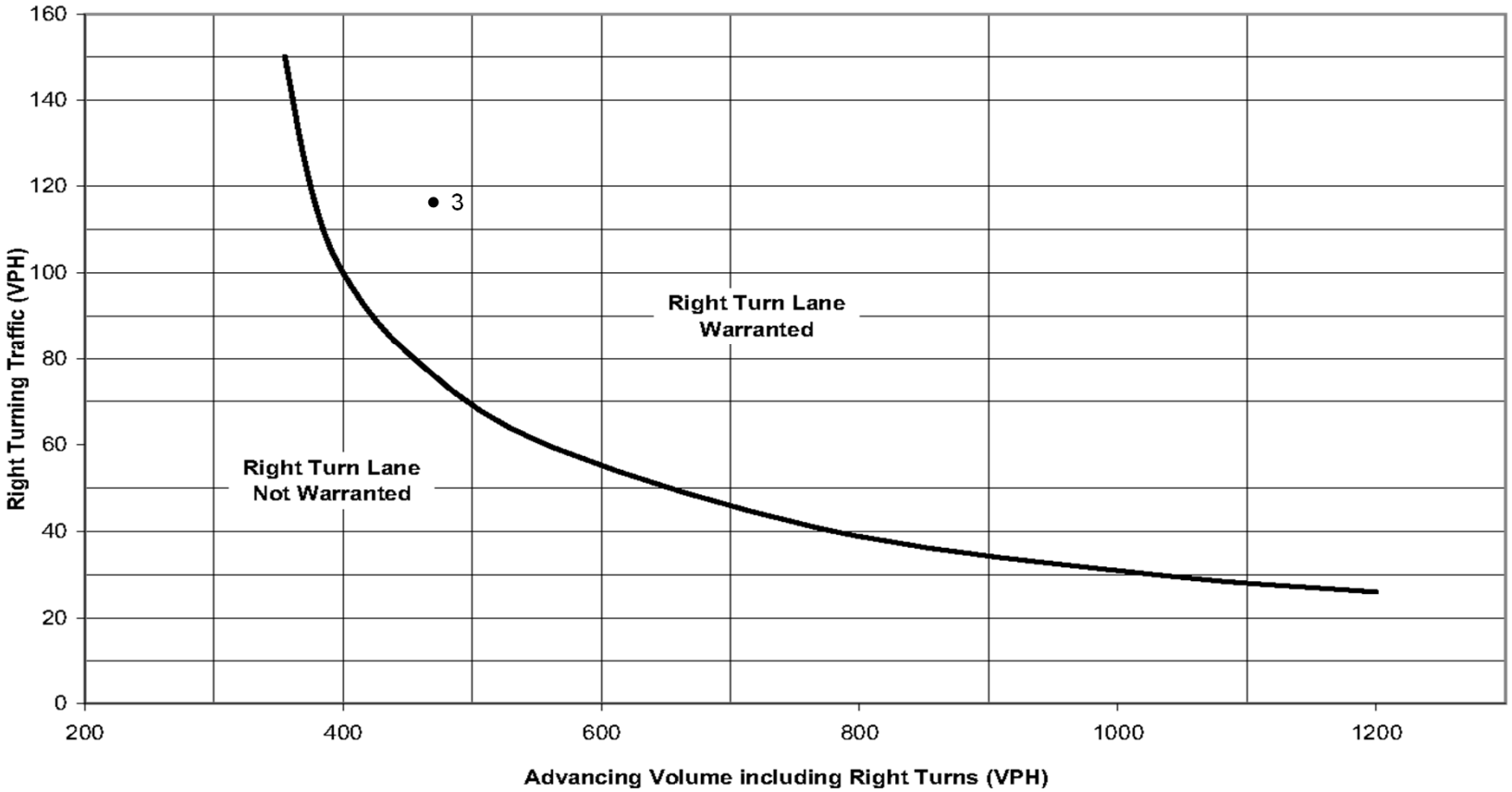
A left turn lane is warranted. The required storage length is 175 feet.



Rocherty Road (S.R. 2002) & Cornwall Road (S.R. 2001)

Westbound Right-Turns to Cornwall Road

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 676 approach total, 211 right turns - MET
2. 2035 Projected PM (Phases 1-4) - 786 approach total, 190 right turns - MET
3. 2035 Projected SAT (Phases 1-4) - 471 approach total, 117 right turns - MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Cornwall Road (S.R. 2001)
Movement:	Westbound Right-Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	647	9%	Level	1.045	676
Number of Right Turns =	205	6%	Level	1.03	211
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	31%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	6	
Storage Length:	325	feet

RESULTS

A right-turn lane is warranted. The required storage length is 325 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Cornwall Road (S.R. 2001)
Movement:	Westbound Right-Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	778	2%	Level	1.01	786
Number of Right Turns =	186	4%	Level	1.02	190
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	24%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	5	
Storage Length:	275	feet

RESULTS

A right-turn lane is warranted. The required storage length is 275 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (S.R. 2002) & Cornwall Road (S.R. 2001)
Movement:	Westbound Right-Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	469	1%	Level	1.005	471
Number of Right Turns =	117	0%	Level	1	117
Speed Limit =	40		Type of Control:	Signalized	
Proportion of Right Turns =	25%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A right-turn lane is warranted. The required storage length is 225 feet.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Northbound Left Turns to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	320	1%	Level	1.005	322
Opposing Volume (V_O) =	214	3%	Level	1.015	217
Number of Left Turns =	24	0%	Level	1	24
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	7%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 0.84 sec

t_A = 11.18 sec

t_{median} = 7.45 sec

λ = 7.69 veh/hr

μ = 1034 veh/hr

Limiting advancing volume = 494

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0074 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

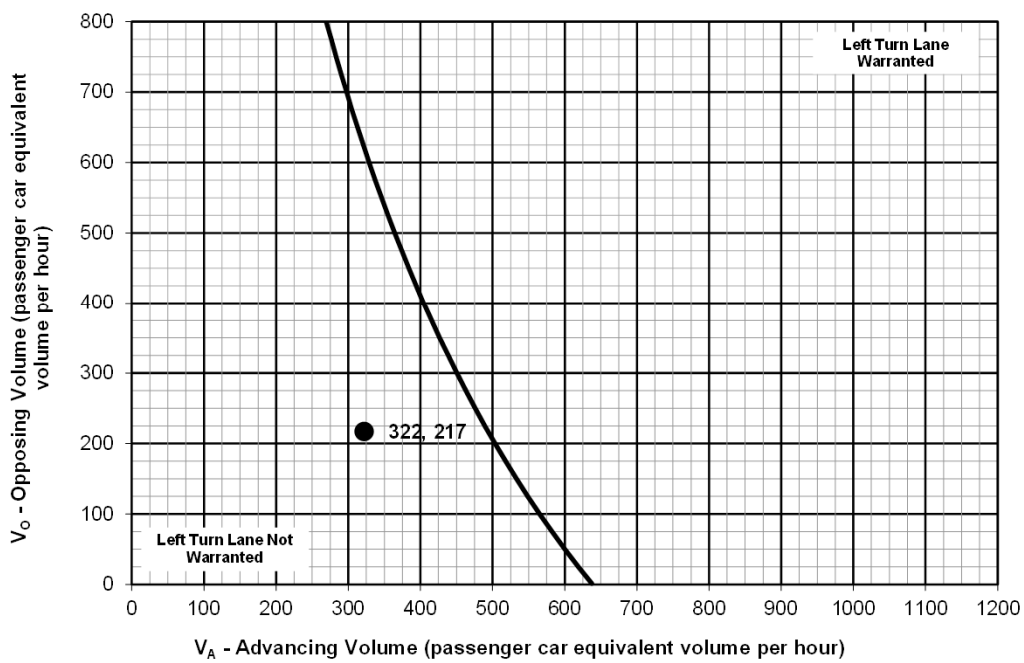
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Northbound Left Turns to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	274	1%	Level	1.005	275
Opposing Volume (V_O) =	484	9%	Level	1.045	506
Number of Left Turns =	52	0%	Level	1	52
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	19%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 2.25 sec

t_A = 13.09 sec

t_{median} = 8.73 sec

λ = 20.14 veh/hr

μ = 844 veh/hr

Limiting advancing volume = 236

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

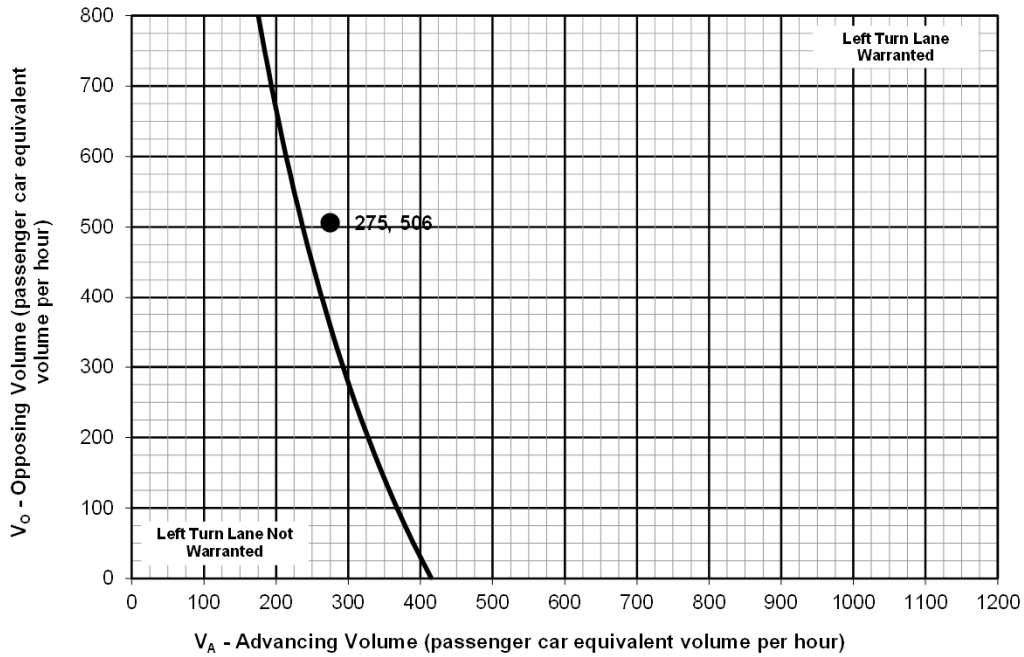
ρ = 0.0239 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	1	
Storage Length:	150	feet

RESULTS

A left turn lane is warranted. The required storage length is 150 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Northbound Left Turns to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	234	2%	Level	1.01	236
Opposing Volume (V_O) =	324	3%	Level	1.015	329
Number of Left Turns =	66	0%	Level	1	66
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	28%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 1.34 sec

t_A = 15.25 sec

t_{median} = 10.17 sec

λ = 15.15 veh/hr

μ = 956 veh/hr

Limiting advancing volume = 248

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0158 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

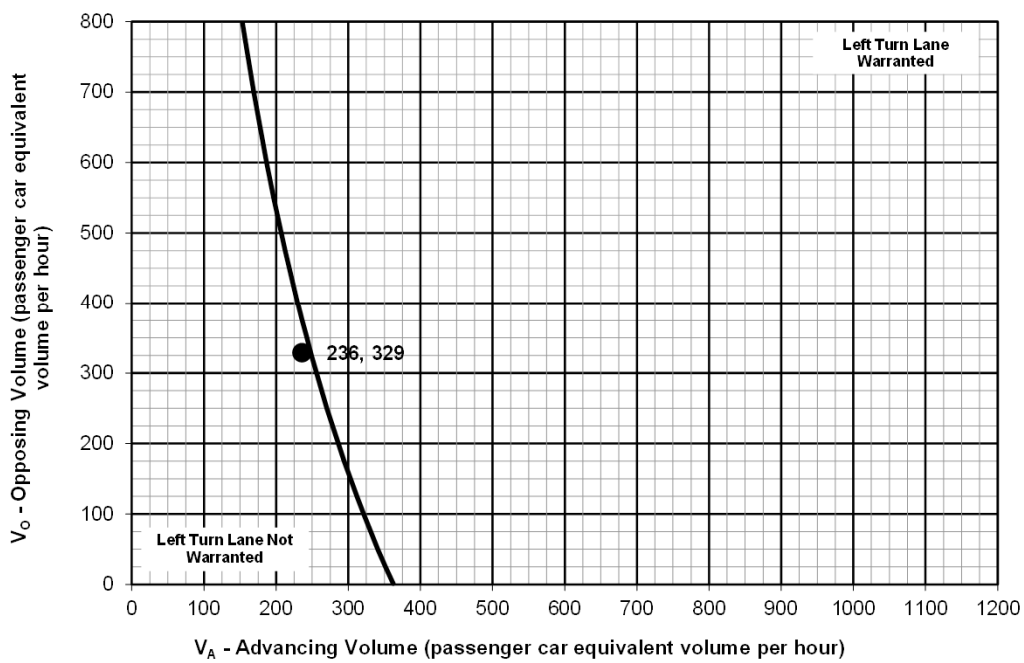
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

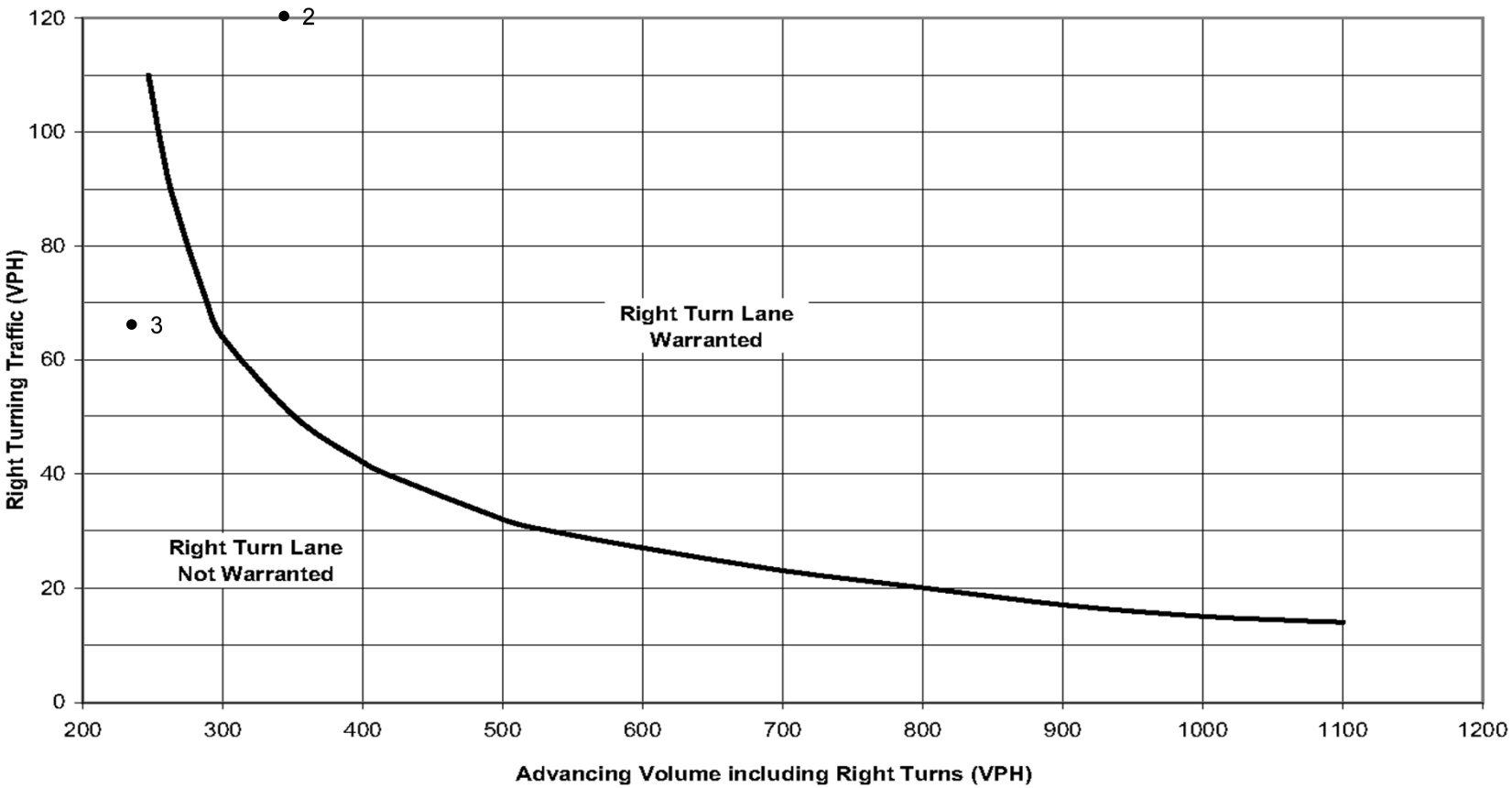
A left turn lane is not required.



Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)

Northbound Right Turn to Rocherty Road (S.R. 2002)

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 557 approach total, 262 right turns - MET
2. 2035 Projected PM (Phases 1-4) - 344 approach total, 120 right turns - MET
3. 2035 Projected SAT (Phases 1-4) - 235 approach total, 66 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	554	1%	Level	1.005	557
Number of Right Turns =	258	3%	Level	1.015	262
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	47%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	7	
Storage Length:	350	feet

RESULTS

A right-turn lane is warranted. The required storage length is 350 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	342	1%	Level	1.005	344
Number of Right Turns =	120	0%	Level	1	120
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	35%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A right-turn lane is warranted. The required storage length is 225 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	233	2%	Level	1.01	235
Number of Right Turns =	65	2%	Level	1.01	66
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	28%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Southbound Left Turns to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	439	3%	Level	1.015	446
Opposing Volume (V_O) =	554	1%	Level	1.005	557
Number of Left Turns =	225	12%	Level	1.06	239
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	54%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 2.55 sec

t_A = 8.07 sec

t_{median} = 5.38 sec

λ = 91.54 veh/hr

μ = 814 veh/hr

Limiting advancing volume = 176

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

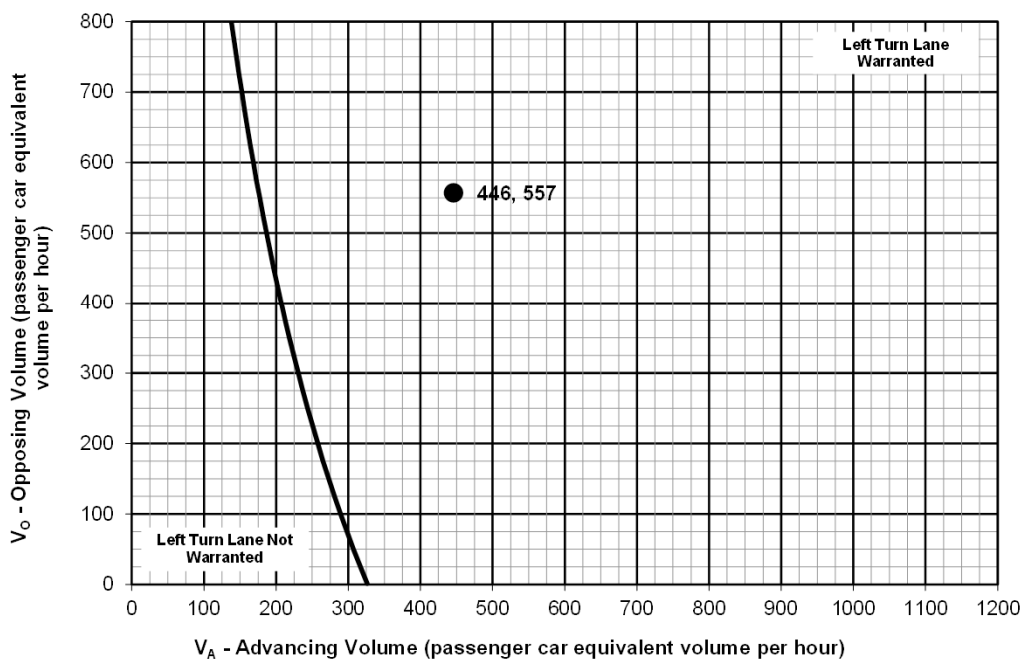
ρ = 0.1124 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	7	
Storage Length:	350	feet

RESULTS

A left turn lane is warranted. The required storage length is 350 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Southbound Left Turns to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	705	9%	Level	1.045	737
Opposing Volume (V_O) =	342	1%	Level	1.005	344
Number of Left Turns =	221	7%	Level	1.035	229
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	31%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 1.41 sec

t_A = 4.88 sec

t_{median} = 3.26 sec

λ = 160.22 veh/hr

μ = 946 veh/hr

Limiting advancing volume = 237

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

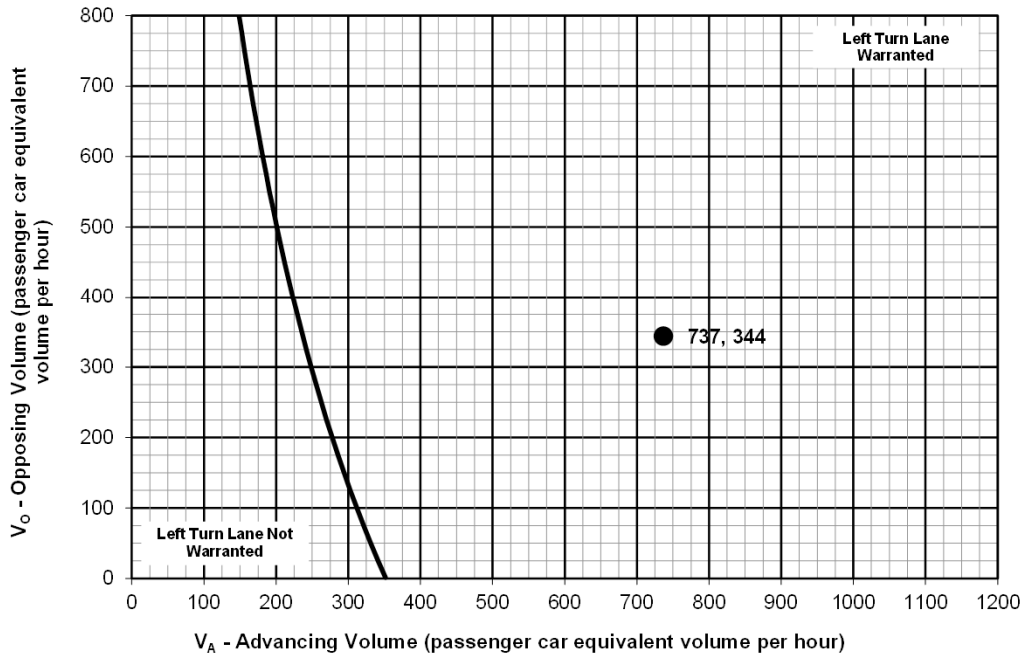
ρ = 0.1693 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	6	
Storage Length:	325	feet

RESULTS

A left turn lane is warranted. The required storage length is 325 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Rocherty Roadway (SR 2002)
Movement:	Southbound Left Turns to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	441	3%	Level	1.015	448
Opposing Volume (V_O) =	233	2%	Level	1.01	235
Number of Left Turns =	117	2%	Level	1.01	118
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	26%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 0.91 sec

t_A = 8.04 sec

t_{median} = 5.36 sec

λ = 45.25 veh/hr

μ = 1021 veh/hr

Limiting advancing volume = 282

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

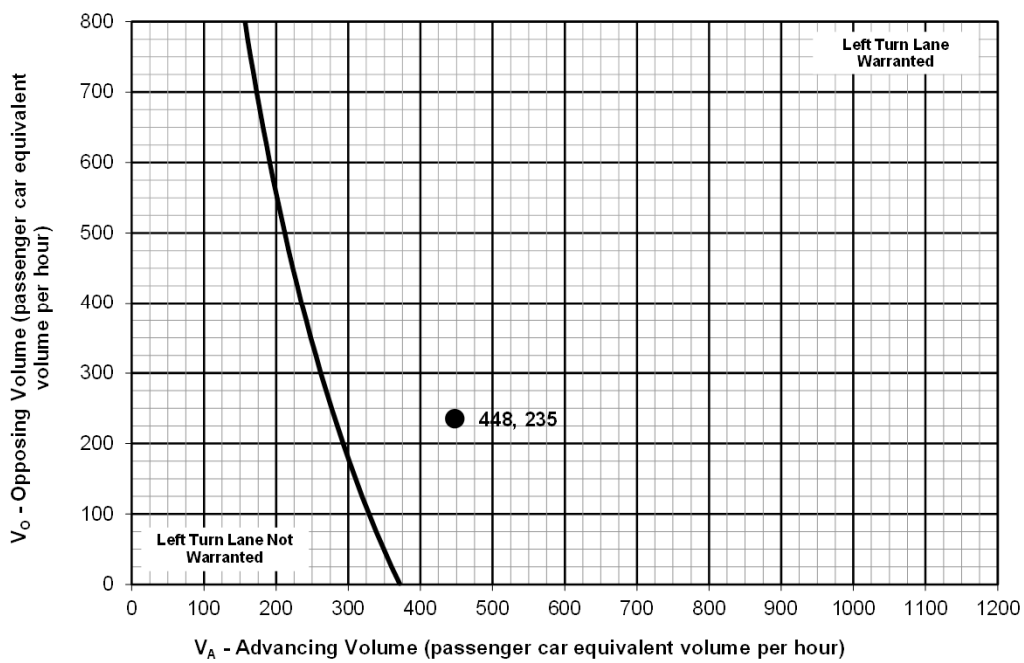
ρ = 0.0443 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A left turn lane is warranted. The required storage length is 225 feet.



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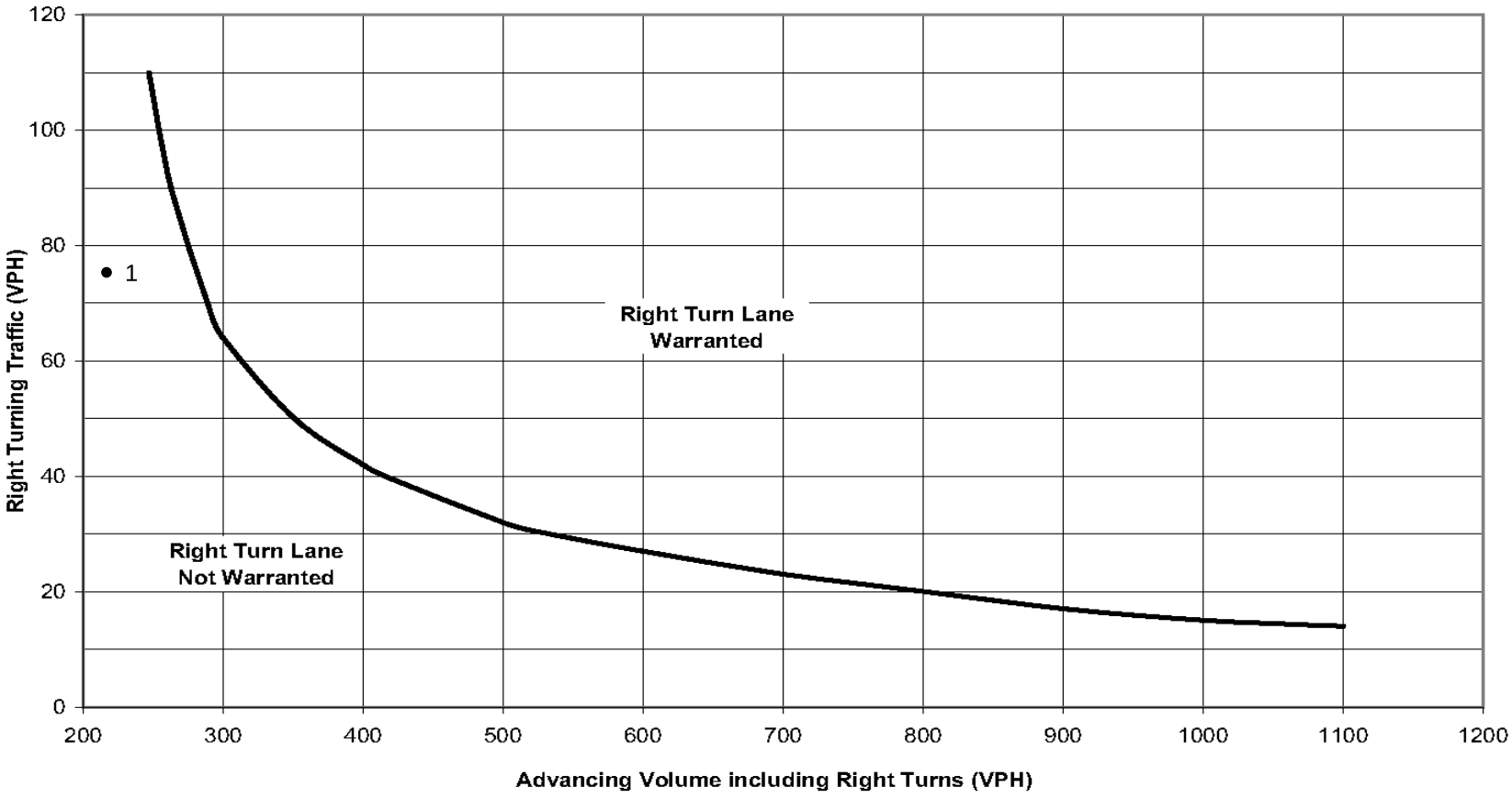
Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)

Southbound Right Turn to Rocherty Road (S.R. 2002)

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2035 Projected (Phases 1-4) AM - 217 approach total, 75 right turns - NOT MET
2. 2035 Projected (Phases 1-4) PM - 506 approach total, 209 right turns - MET
3. 2035 Projected (Phases 1-4) SAT - 329 approach total, 125 right turns - MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Southbound Right Turn to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	214	3%	Level	1.015	217
Number of Right Turns =	72	9%	Level	1.045	75
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	35%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Northbound Right Turn to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	484	9%	Level	1.045	506
Number of Right Turns =	205	4%	Level	1.02	209
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	41%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	5	
Storage Length:	275	feet

RESULTS

A right-turn lane is warranted. The required storage length is 275 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Rocherty Road (SR 2002)
Movement:	Southbound Right Turn to Rocherty Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	324	3%	Level	1.015	329
Number of Right Turns =	125	0%	Level	1	125
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	38%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

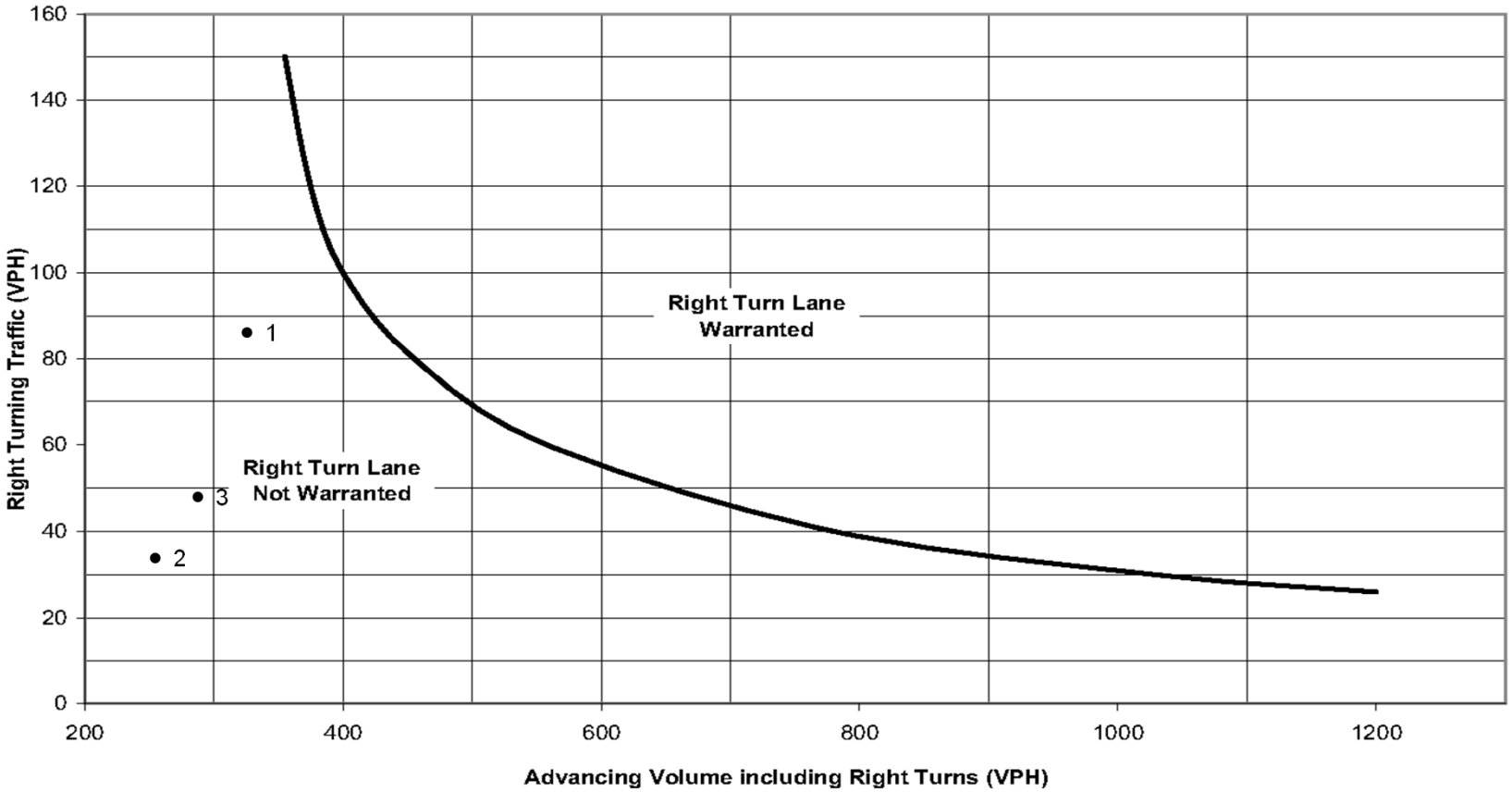
RESULTS

A right-turn lane is warranted. The required storage length is 225 feet.

Cornwall Road (S.R. 2001) & Wilhelm Avenue

Westbound Right-Turns to Cornwall Road

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 327 approach total, 87 right turns - NOT MET
2. 2035 Projected PM (Phases 1-4) - 256 approach total, 35 right turns - NOT MET
3. 2035 Projected SAT (Phases 1-4) - 289 approach total, 49 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Wilhelm Avenue
Movement:	Westbound Right-Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	324	2%	Level	1.01	327
Number of Right Turns =	84	8%	Level	1.04	87
Speed Limit =	35		Type of Control:	Signalized	
Proportion of Right Turns =	27%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Wilhelm Avenue
Movement:	Westbound Right-Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	253	2%	Level	1.01	256
Number of Right Turns =	34	8%	Level	1.04	35
Speed Limit =	35		Type of Control:	Signalized	
Proportion of Right Turns =	14%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Wilhelm Avenue
Movement:	Westbound Right-Turns to Cornwall Road
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	286	2%	Level	1.01	289
Number of Right Turns =	47	9%	Level	1.045	49
Speed Limit =	35		Type of Control:	Signalized	
Proportion of Right Turns =	17%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

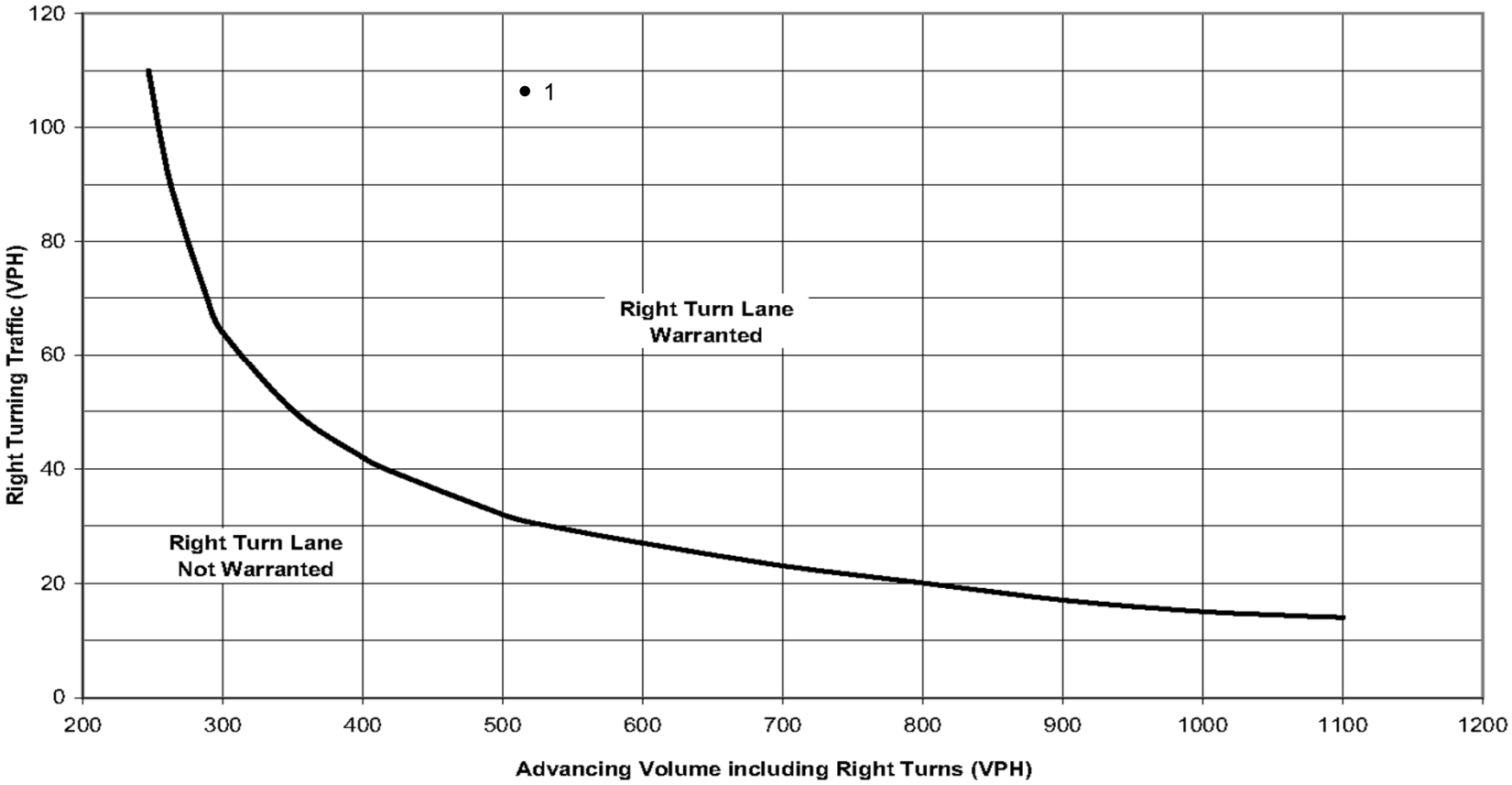
RESULTS

A right-turn lane is not required.

Cornwall Road (S.R. 2001) & Wilhelm Avenue

Northbound Right Turn to Wilhelm Avenue

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 516 approach total, 106 right turns - MET
2. 2035 Projected PM (Phases 1-4) - 1144 approach total, 365 right turns - MET
3. 2035 Projected SAT (Phases 1-4) - 684 approach total, 270 right turns - MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Wilhelm Avenue
Movement:	Northbound Right Turn to Wilhelm Avenue
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	506	4%	Level	1.02	516
Number of Right Turns =	106	0%	Level	1	106
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	21%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

A right-turn lane is warranted. The required storage length is 225 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Wilhelm Avenue
Movement:	Northbound Right Turn to Wilhelm Avenue
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	1133	2%	Level	1.01	1144
Number of Right Turns =	365	0%	Level	1	365
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	32%		Cycle Length:	120	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	12	
Storage Length:	525	feet

RESULTS

A right-turn lane is warranted. The required storage length is 525 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (S.R. 2001) & Wilhelm Avenue
Movement:	Northbound Right Turn to Wilhelm Avenue
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	MB

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	674	3%	Level	1.015	684
Number of Right Turns =	269	1%	Level	1.005	270
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	39%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	7	
Storage Length:	350	feet

RESULTS

A right-turn lane is warranted. The required storage length is 350 feet.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Township Roadway
Movement:	Northbound Left Turns to Township Roadway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	574	2%	Level	1.01	580
Opposing Volume (V_O) =	480	2%	Level	1.01	485
Number of Left Turns =	26	2%	Level	1.01	26
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	4%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 2.14 sec

t_A = 6.21 sec

t_{median} = 4.14 sec

λ = 21.72 veh/hr

μ = 857 veh/hr

Limiting advancing volume = 482

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

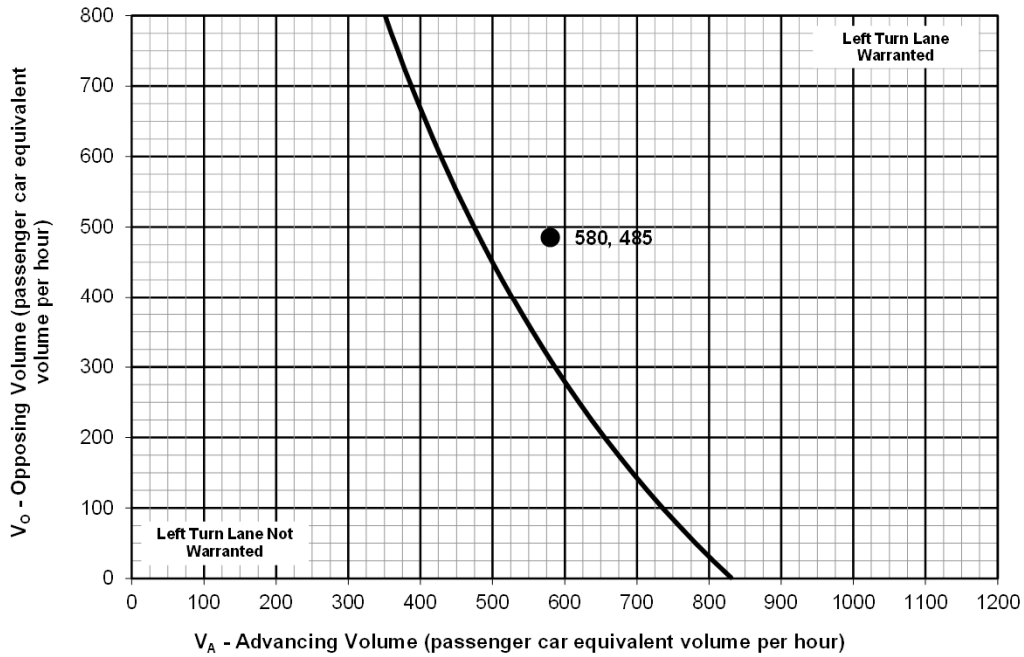
ρ = 0.0254 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	1	
Storage Length:	150	feet

RESULTS

A left turn lane is warranted. The required storage length is 150 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Township Roadway
Movement:	Northbound Left Turns to Township Roadway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	507	2%	Level	1.01	512
Opposing Volume (V_O) =	735	2%	Level	1.01	742
Number of Left Turns =	89	2%	Level	1.01	90
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	18%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 3.75 sec

t_A = 7.03 sec

t_{median} = 4.69 sec

λ = 91.02 veh/hr

μ = 713 veh/hr

Limiting advancing volume = 190

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

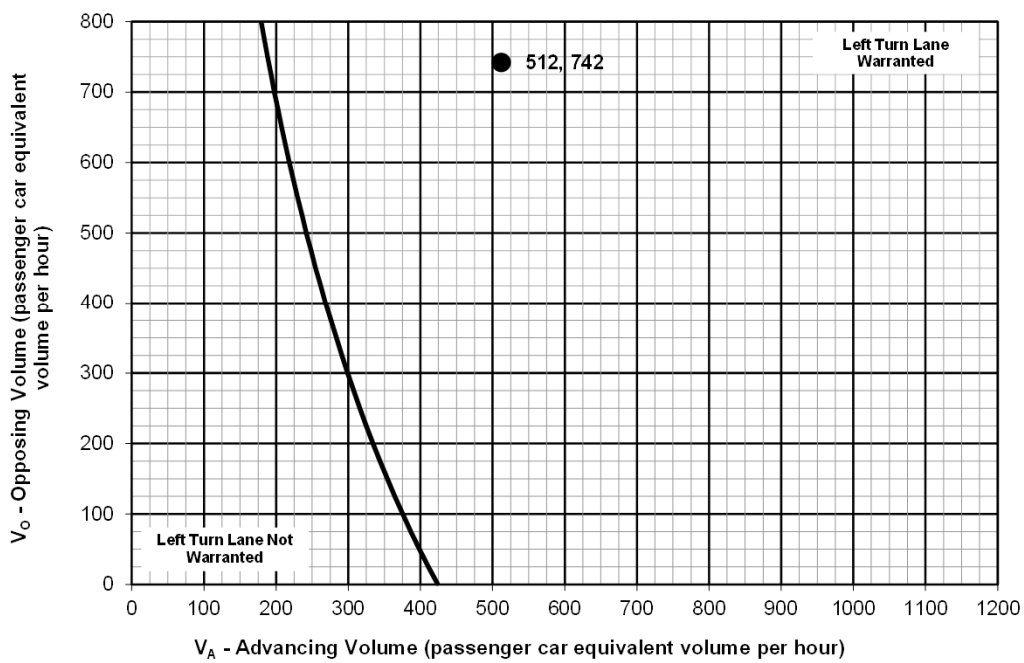
ρ = 0.1277 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	2	
Storage Length:	175	feet

RESULTS

A left turn lane is warranted. The required storage length is 175 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Township Roadway
Movement:	Northbound Left Turns to Township Roadway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	356	2%	Level	1.01	360
Opposing Volume (V_O) =	556	2%	Level	1.01	562
Number of Left Turns =	119	2%	Level	1.01	120
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	33%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 2.58 sec

t_A = 10.00 sec

t_{median} = 6.67 sec

λ = 53.44 veh/hr

μ = 811 veh/hr

Limiting advancing volume = 186

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

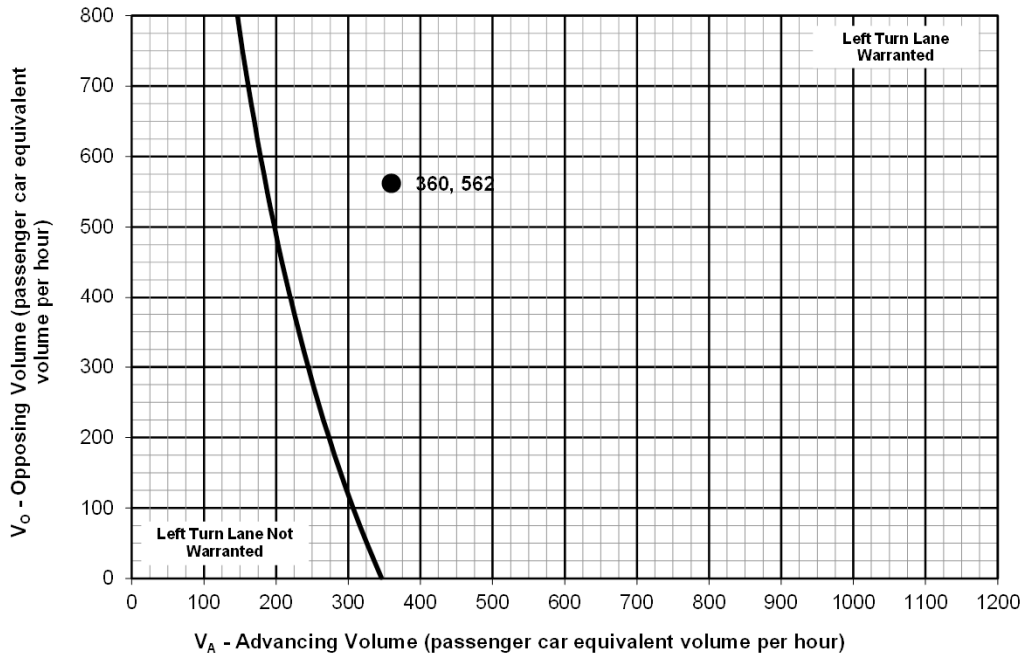
ρ = 0.0659 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	3	
Storage Length:	225	feet

RESULTS

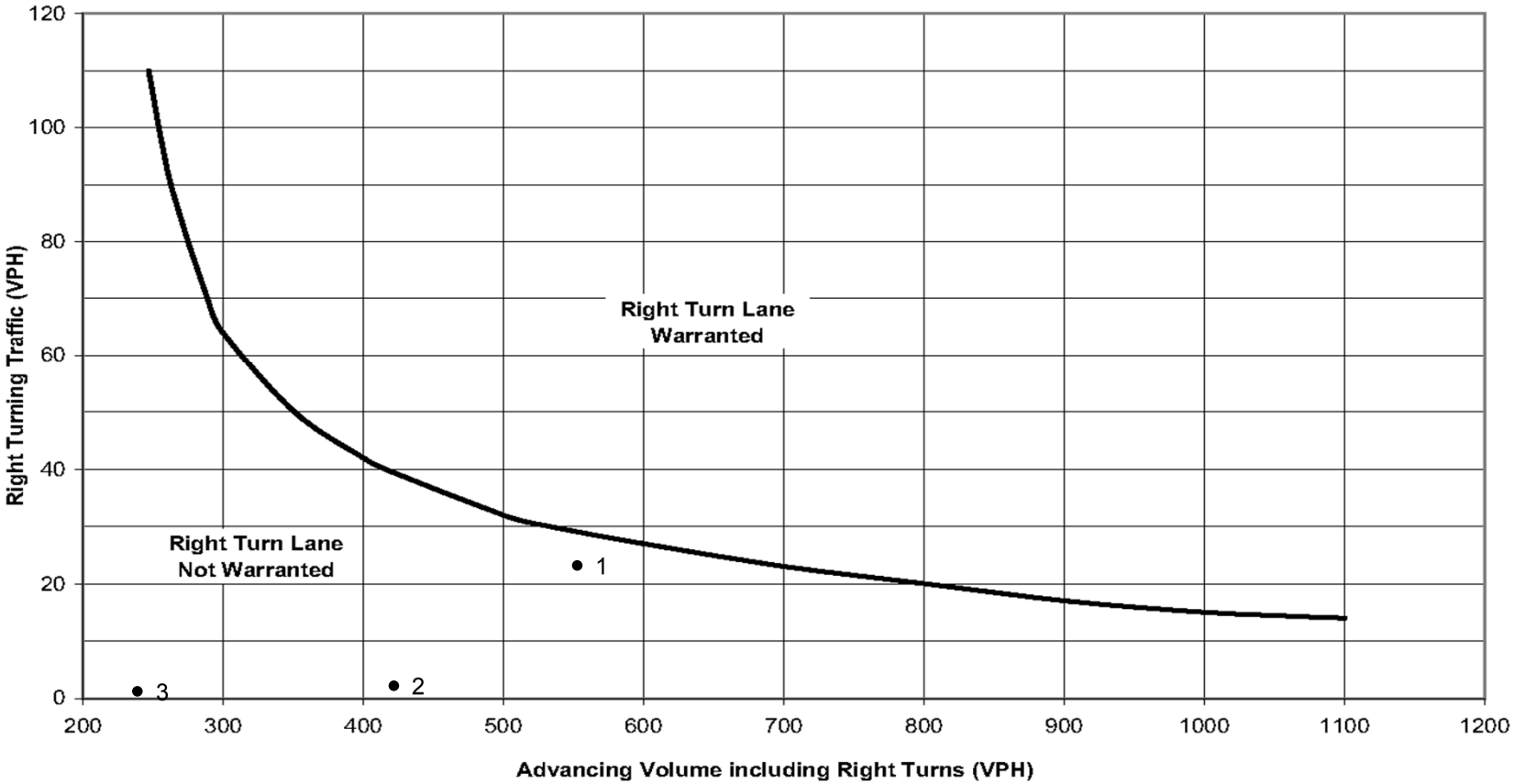
A left turn lane is warranted. The required storage length is 225 feet.



Cornwall Road (SR 2001) & Township Roadway

Northbound Right Turn to Township Roadway

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 553 approach total, 23 right turns - NOT MET
2. 2035 Projected PM (Phases 1-4) - 422 approach total, 2 right turns - NOT MET
3. 2035 Projected SAT (Phases 1-4) - 239 approach total, 1 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Township Roadway
Movement:	Northbound Right Turn to Township Roadway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	548	2%	Level	1.01	553
Number of Right Turns =	23	2%	Level	1.01	23
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	4%		Cycle Length:	100	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Township Roadway
Movement:	Northbound Right Turn to Township Roadway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	418	2%	Level	1.01	422
Number of Right Turns =	2	2%	Level	1.01	2
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	0%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Township Roadway
Movement:	Northbound Right Turn to Township Roadway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	237	2%	Level	1.01	239
Number of Right Turns =	1	2%	Level	1.01	1
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Right Turns =	0%		Cycle Length:	90	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Township Roadway
Movement:	Southbound Left Turns to Township Roadway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	707	2%	Level	1.01	714
Opposing Volume (V_O) =	548	2%	Level	1.01	553
Number of Left Turns =	269	2%	Level	1.01	272
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	38%		Cycle Length:	100	sec.

WARRANT CALCULATION

t_w = 2.52 sec

t_A = 5.04 sec

t_{median} = 3.36 sec

λ = 221.33 veh/hr

μ = 816 veh/hr

Limiting advancing volume = 181

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

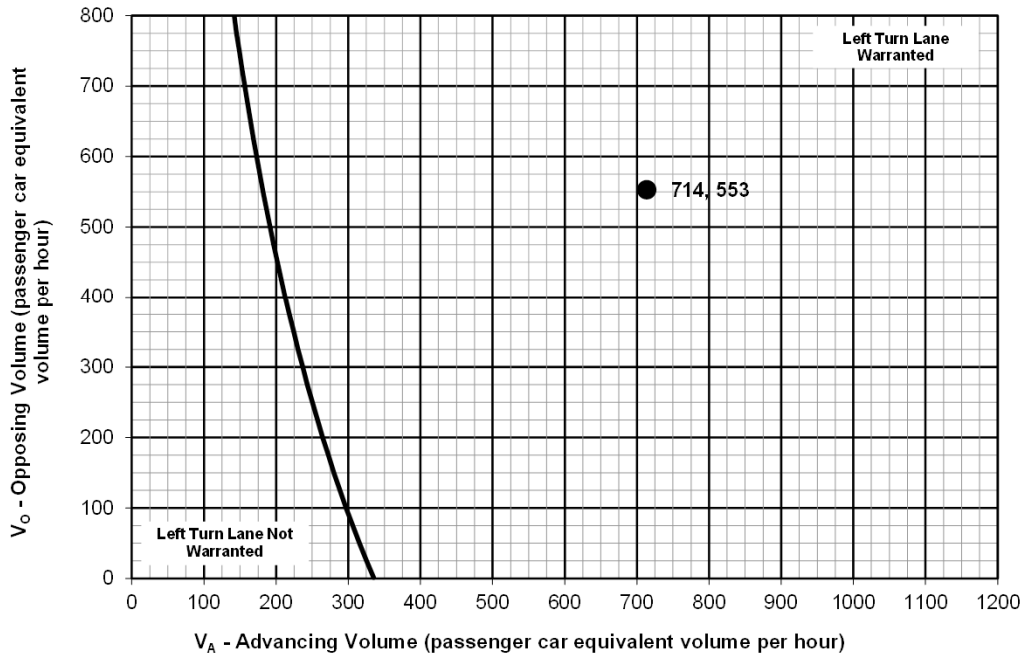
ρ = 0.2711 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	8	
Storage Length:	400	feet

RESULTS

A left turn lane is warranted. The required storage length is 400 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Township Roadway
Movement:	Southbound Left Turns to Township Roadway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	660	2%	Level	1.01	667
Opposing Volume (V_O) =	418	2%	Level	1.01	422
Number of Left Turns =	53	2%	Level	1.01	54
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	8%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 1.80 sec

t_A = 5.40 sec

t_{median} = 3.60 sec

λ = 50.47 veh/hr

μ = 896 veh/hr

Limiting advancing volume = 372

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

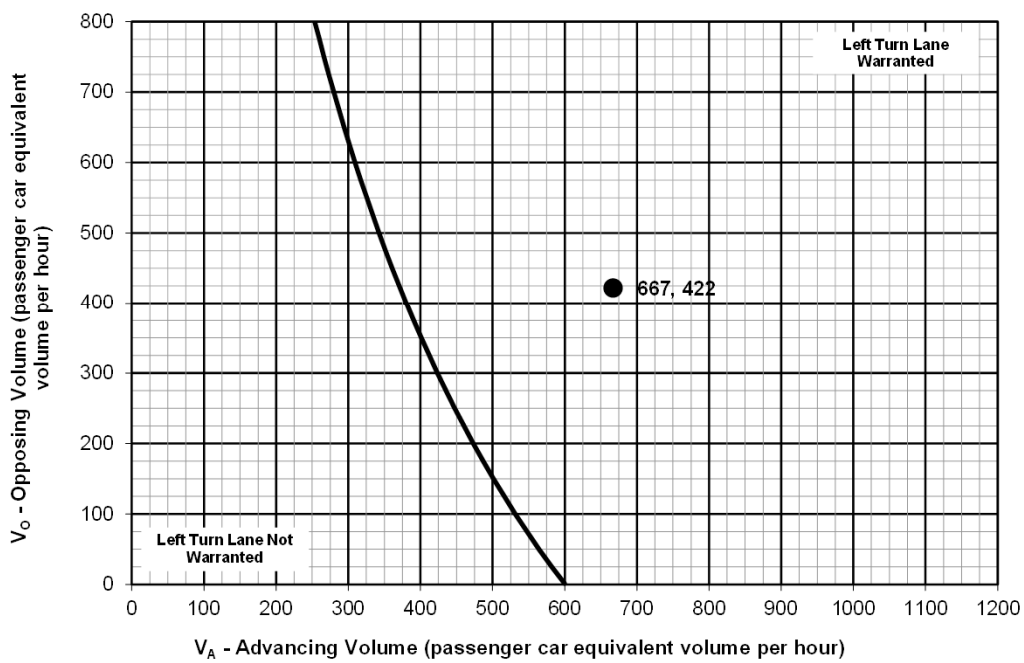
ρ = 0.0563 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B or C	
Avg # of veh/cycle:	1	
Storage Length:	150	feet

RESULTS

A left turn lane is warranted. The required storage length is 150 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Township Roadway
Movement:	Southbound Left Turns to Township Roadway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	406	2%	Level	1.01	410
Opposing Volume (V_O) =	237	2%	Level	1.01	239
Number of Left Turns =	37	2%	Level	1.01	37
Speed Limit =	45		Type of Control:	Signalized	
Proportion of Left Turns =	9%		Cycle Length:	90	sec.

WARRANT CALCULATION

t_w = 0.93 sec

t_A = 8.78 sec

t_{median} = 5.85 sec

λ = 16.23 veh/hr

μ = 1018 veh/hr

Limiting advancing volume = 430

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0159 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

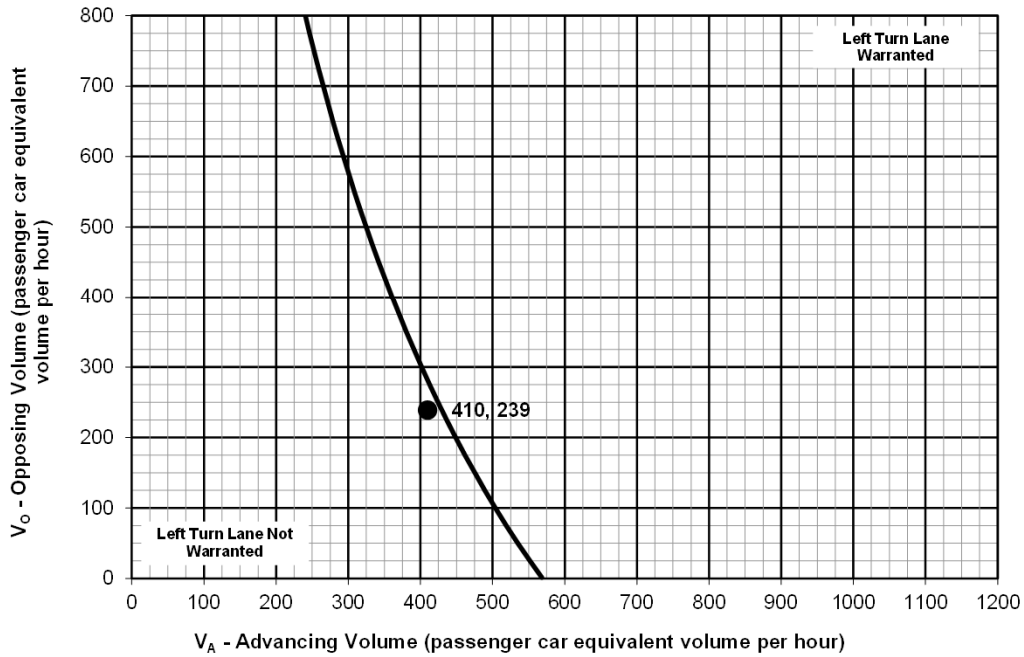
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

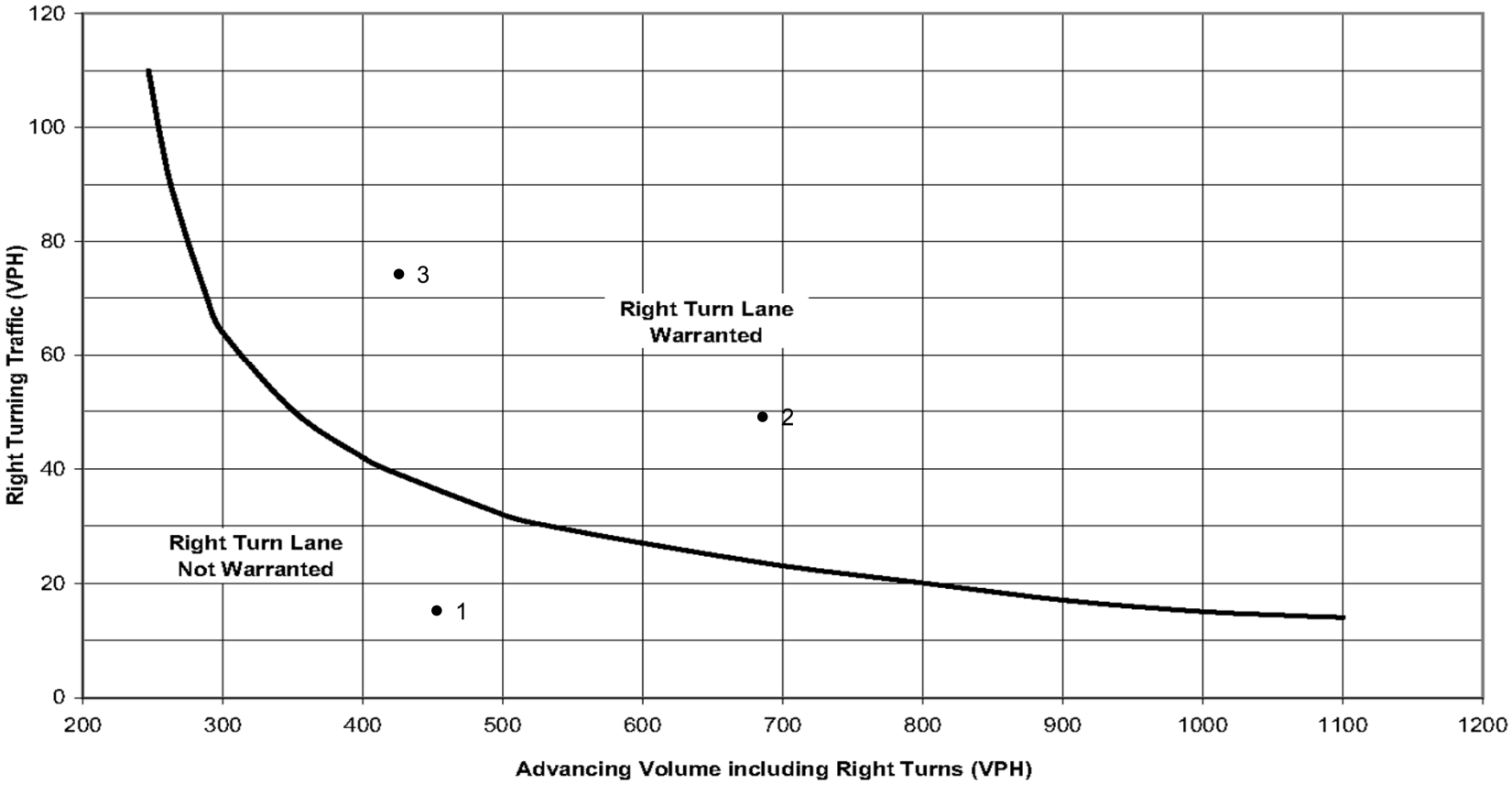
A left turn lane is not required.



Cornwall Road (SR 2001) & Middle Site Driveway

Right Turn to Middle Site Driveway

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 453 approach total, 15 right turns - NOT MET
2. 2035 Projected PM (Phases 1-4) - 686 approach total, 49 right turns - MET
3. 2035 Projected SAT (Phases 1-4) - 426 approach total, 74 right turns - MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Middle Site Driveway
Movement:	Right Turn to Middle Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	449	2%	Level	1.01	453
Number of Right Turns =	15	2%	Level	1.01	15
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Right Turns =	3%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Middle Site Driveway
Movement:	Right Turn to Middle Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	679	2%	Level	1.01	686
Number of Right Turns =	49	2%	Level	1.01	49
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Right Turns =	7%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	1	
Storage Length:	125	feet

RESULTS

A right-turn lane is warranted. The required storage length is 125 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Middle Site Driveway
Movement:	Right Turn to Middle Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	422	2%	Level	1.01	426
Number of Right Turns =	73	2%	Level	1.01	74
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Right Turns =	17%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	C	
Avg # of veh/cycle:	1	
Storage Length:	150	feet

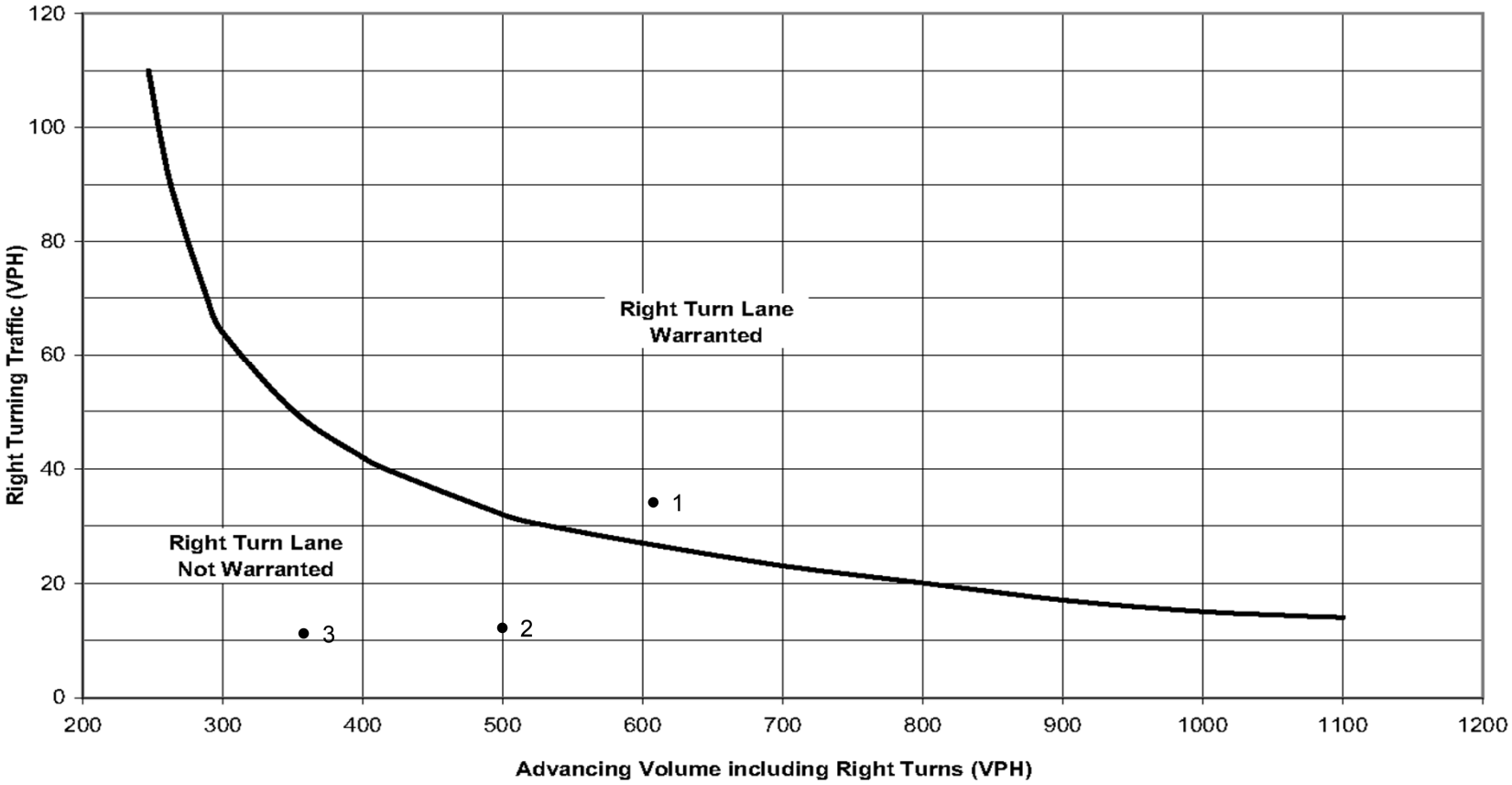
RESULTS

A right-turn lane is warranted. The required storage length is 150 feet.

Cornwall Road (SR 2001) & Southern Site Driveway

Northbound Right Turn to Southern Site Driveway

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 608 approach total, 34 right turns - MET
2. 2035 Projected PM (Phases 1-4) - 500 approach total, 12 right turns - NOT MET
3. 2035 Projected SAT (Phases 1-4) - 358 approach total, 11 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Northbound Right Turn to Southern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	602	2%	Level	1.01	608
Number of Right Turns =	34	2%	Level	1.01	34
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Right Turns =	6%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	1	
Storage Length:	125	feet

RESULTS

A right-turn lane is warranted. The required storage length is 125 feet.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Northbound Right Turn to Southern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	495	2%	Level	1.01	500
Number of Right Turns =	12	2%	Level	1.01	12
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Right Turns =	2%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Northbound Right Turn to Southern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	354	2%	Level	1.01	358
Number of Right Turns =	11	2%	Level	1.01	11
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Right Turns =	3%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Left Turns to Southern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	445	2%	Level	1.01	449
Opposing Volume (V_O) =	602	2%	Level	1.01	608
Number of Left Turns =	15	2%	Level	1.01	15
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Left Turns =	3%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 2.86 sec

t_A = 8.02 sec

t_{median} = 5.35 sec

λ = 11.62 veh/hr

μ = 785 veh/hr

Limiting advancing volume = 488

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0148 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

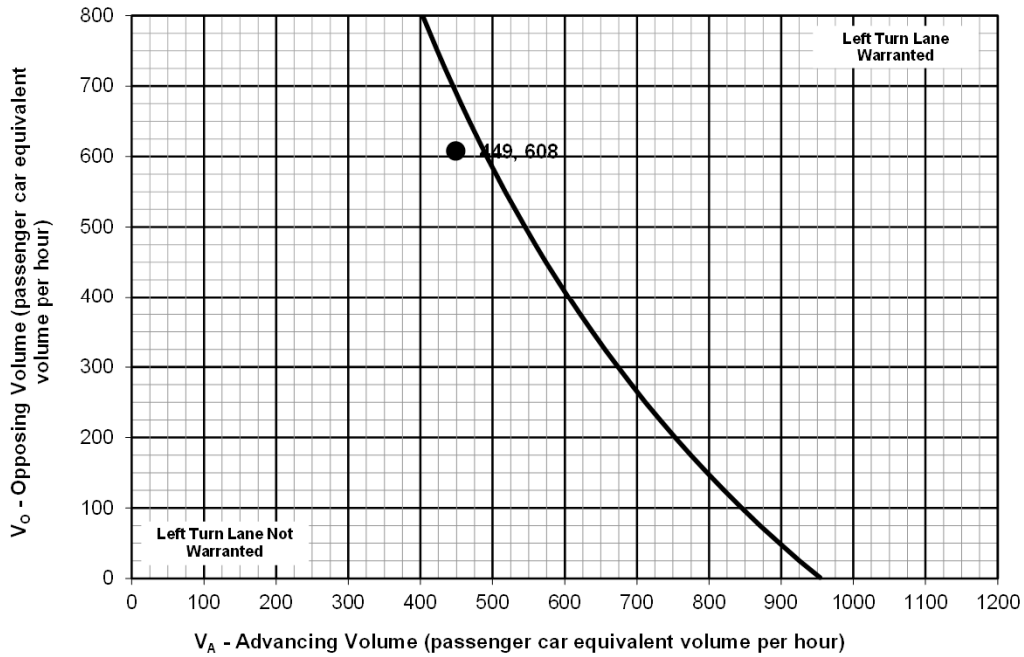
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Left Turns to Southern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	708	2%	Level	1.01	715
Opposing Volume (V_O) =	495	2%	Level	1.01	500
Number of Left Turns =	16	2%	Level	1.01	16
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Left Turns =	2%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 2.22 sec

t_A = 5.03 sec

t_{median} = 3.36 sec

λ = 17.20 veh/hr

μ = 848 veh/hr

Limiting advancing volume = 664

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

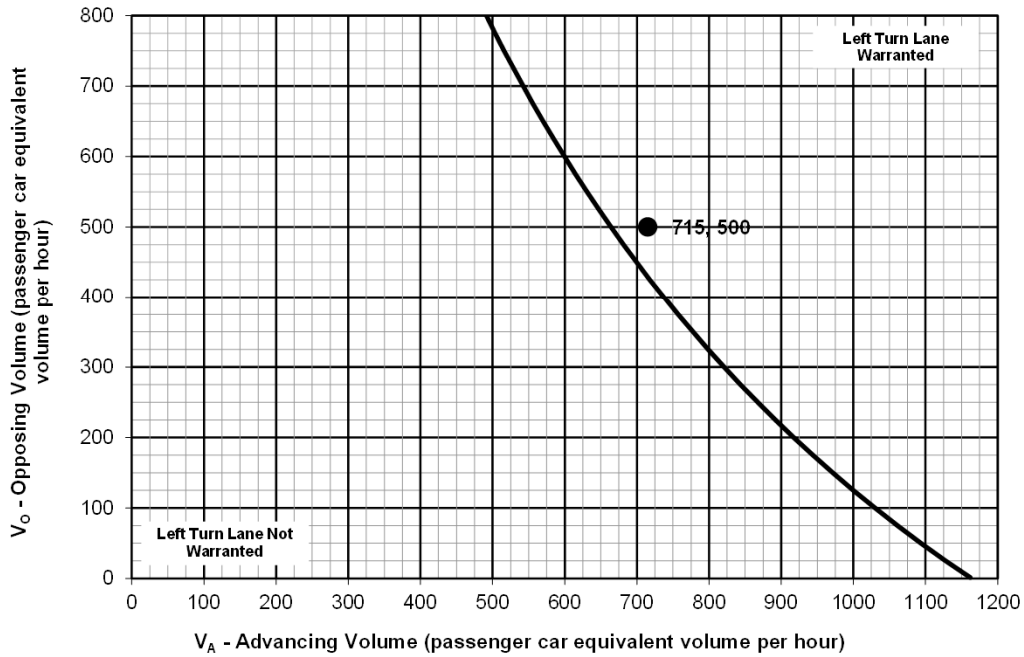
ρ = 0.0203 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	1	
Storage Length:	125	feet

RESULTS

A left turn lane is warranted. The required storage length is 125 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Cornwall Road (SR 2001) & Southern Site Driveway
Movement:	Left Turns to Southern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	437	2%	Level	1.01	441
Opposing Volume (V_O) =	354	2%	Level	1.01	358
Number of Left Turns =	16	2%	Level	1.01	16
Speed Limit =	45		Type of Control:	Unsignalized	
Proportion of Left Turns =	4%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 1.48 sec

t_A = 8.16 sec

t_{median} = 5.44 sec

λ = 10.51 veh/hr

μ = 937 veh/hr

Limiting advancing volume = 551

Left turn lane warrants are for ρ > than

0.0175 for 45 mph

ρ = 0.0112 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

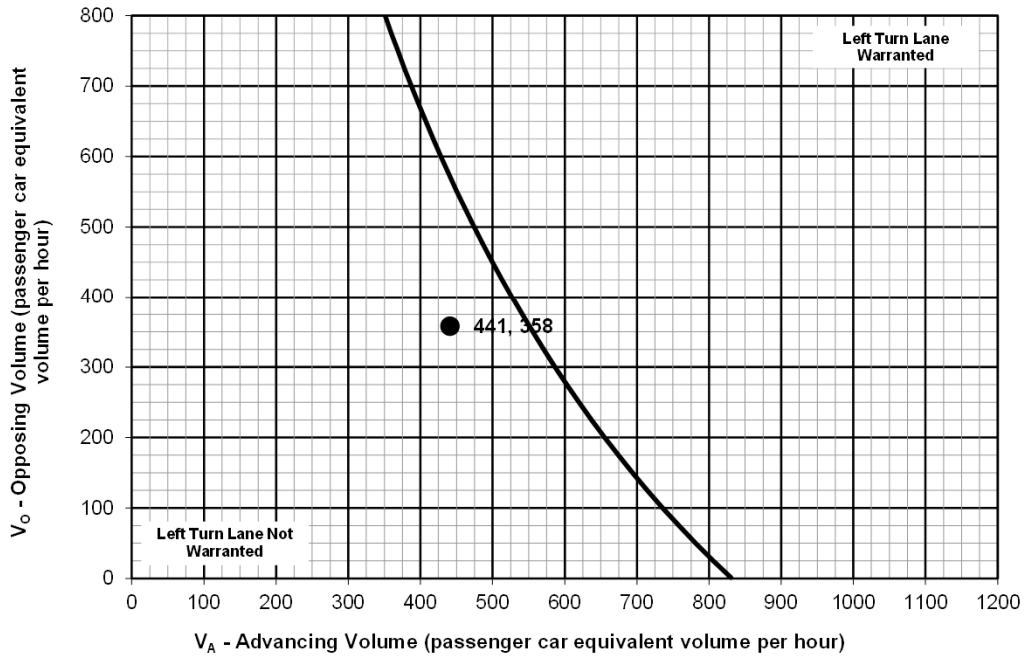
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Left Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	1066	2%	Level	1.01	1077
Opposing Volume (V_O) =	695	2%	Level	1.01	702
Number of Left Turns =	91	2%	Level	1.01	92
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Left Turns =	9%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 3.47 sec

t_A = 3.34 sec

t_{median} = 2.23 sec

λ = 212.46 veh/hr

μ = 734 veh/hr

Limiting advancing volume = 283

Left turn lane warrants are for ρ > than

0.02 for 40 mph

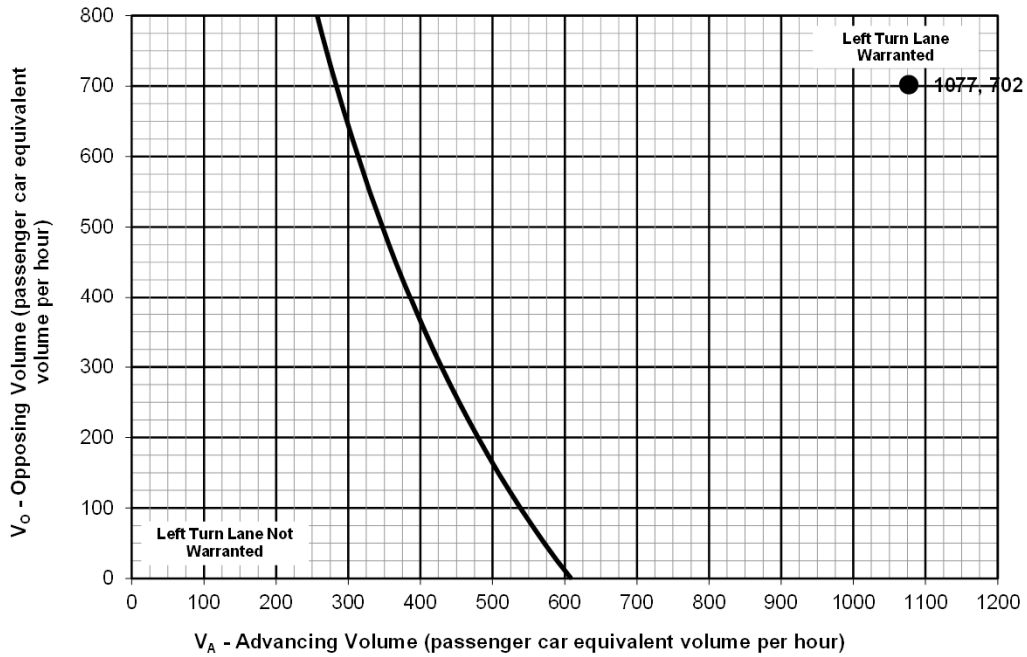
ρ = 0.2896 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	2	
Storage Length:	75	feet

RESULTS

A left turn lane is warranted. The required storage length is 75 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Left Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	780	2%	Level	1.01	788
Opposing Volume (V_O) =	802	2%	Level	1.01	810
Number of Left Turns =	29	2%	Level	1.01	29
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Left Turns =	4%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 4.25 sec

t_A = 4.57 sec

t_{median} = 3.05 sec

λ = 61.06 veh/hr

μ = 679 veh/hr

Limiting advancing volume = 372

Left turn lane warrants are for ρ > than

0.02 for 40 mph

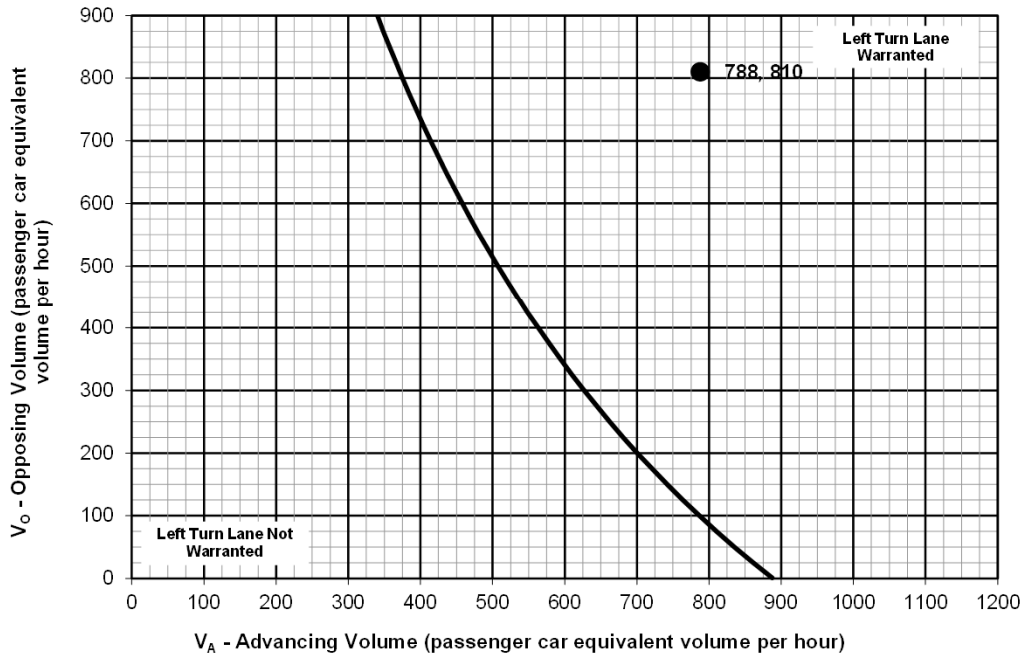
ρ = 0.0900 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	1	
Storage Length:	75	feet

RESULTS

A left turn lane is warranted. The required storage length is 75 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Left Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	489	2%	Level	1.01	494
Opposing Volume (V_O) =	552	2%	Level	1.01	558
Number of Left Turns =	20	2%	Level	1.01	20
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Left Turns =	4%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 2.55 sec

t_A = 7.29 sec

t_{median} = 4.86 sec

λ = 17.38 veh/hr

μ = 813 veh/hr

Limiting advancing volume = 478

Left turn lane warrants are for ρ > than

0.02 for 40 mph

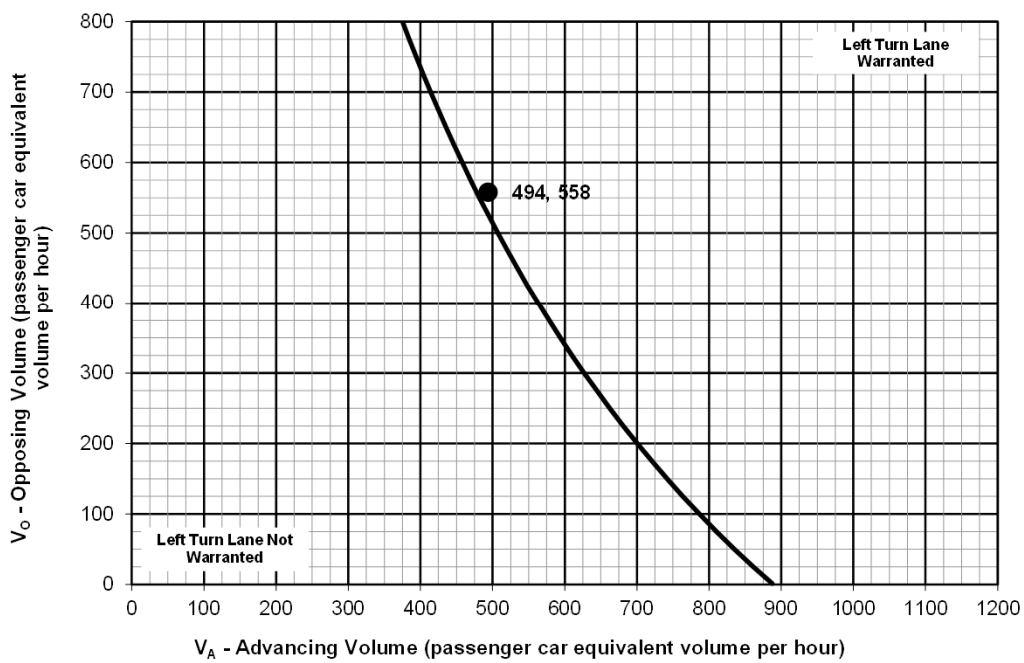
ρ = 0.0214 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	Low	
Table 1 Condition:	B	
Avg # of veh/cycle:	1	
Storage Length:	75	feet

RESULTS

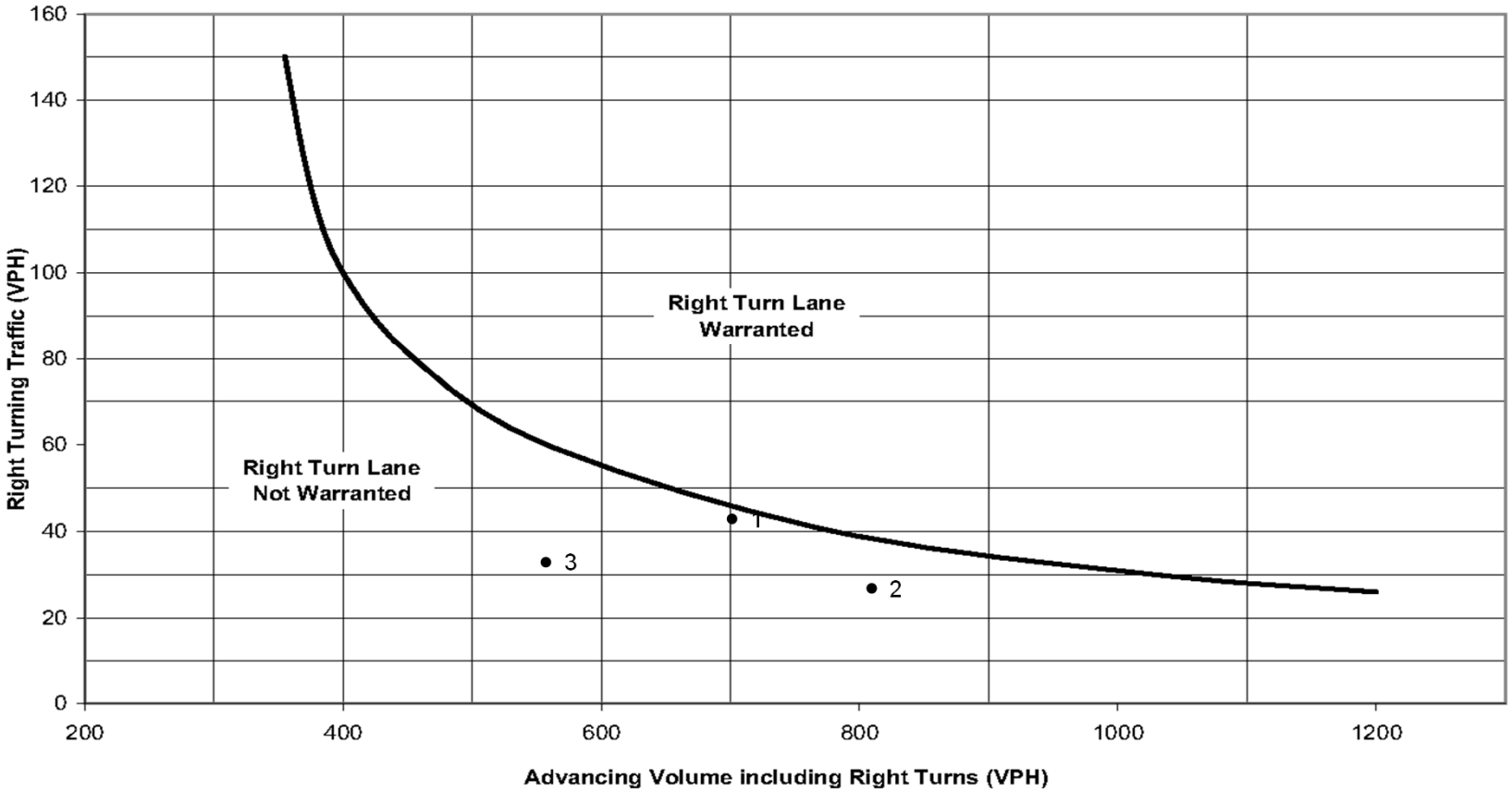
A left turn lane is warranted. The required storage length is 75 feet.



Rocherty Road (SR 2002) & Eastern Site Driveway

Right-Turns to Eastern Site Driveway

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 702 approach total, 44 right turns - NOT MET
2. 2035 Projected PM (Phases 1-4) - 810 approach total, 28 right turns - NOT MET
3. 2035 Projected SAT (Phases 1-4) - 558 approach total, 34 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Right-Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	695	2%	Level	1.01	702
Number of Right Turns =	44	2%	Level	1.01	44
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	6%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Right-Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	802	2%	Level	1.01	810
Number of Right Turns =	28	2%	Level	1.01	28
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	3%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Eastern Site Driveway
Movement:	Right-Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	552	2%	Level	1.01	558
Number of Right Turns =	34	2%	Level	1.01	34
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	6%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

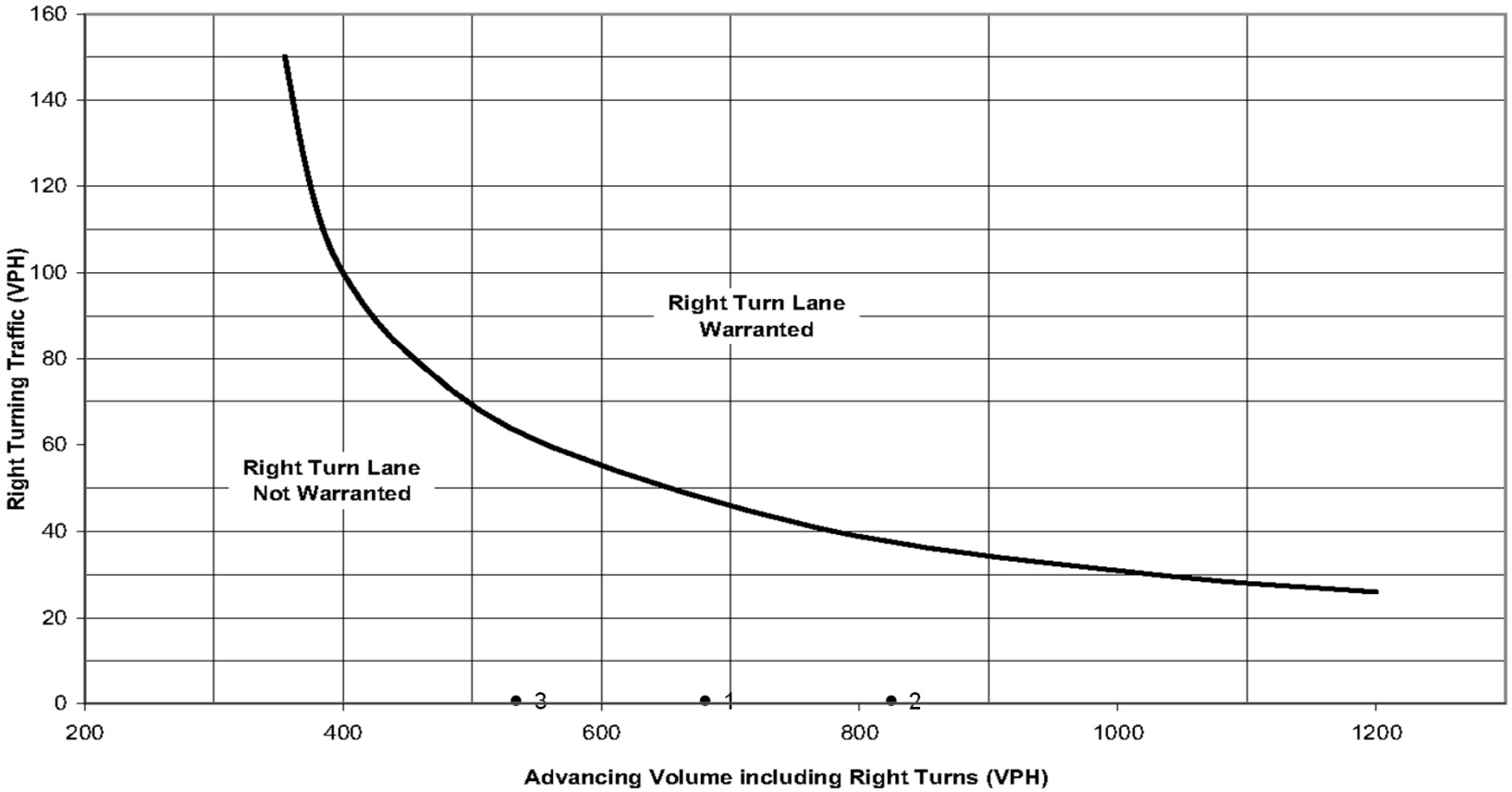
RESULTS

A right-turn lane is not required.

Rocherty Road (SR 2002) & Western Site Driveway

Right-Turns to Western Site Driveway

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 681 approach total, 2 right turns - NOT MET
2. 2035 Projected PM (Phases 1-4) - 825 approach total, 2 right turns - NOT MET
3. 2035 Projected SAT (Phases 1-4) - 535 approach total, 2 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Western Site Driveway
Movement:	Right-Turns to Western Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	674	2%	Level	1.01	681
Number of Right Turns =	2	2%	Level	1.01	2
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	0%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Western Site Driveway
Movement:	Right-Turns to Western Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	817	2%	Level	1.01	825
Number of Right Turns =	2	2%	Level	1.01	2
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	0%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Rocherty Road (SR 2002) & Western Site Driveway
Movement:	Right-Turns to Western Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	530	2%	Level	1.01	535
Number of Right Turns =	2	2%	Level	1.01	2
Speed Limit =	40		Type of Control:	Unsignalized	
Proportion of Right Turns =	0%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Township Roadway & Eastern Site Driveway
Movement:	Left Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	106	2%	Level	1.01	107
Opposing Volume (V_O) =	153	2%	Level	1.01	155
Number of Left Turns =	36	2%	Level	1.01	36
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Left Turns =	34%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 0.58 sec

t_A = 33.64 sec

t_{median} = 22.43 sec

λ = 2.65 veh/hr

μ = 1079 veh/hr

Limiting advancing volume = 324

Left turn lane warrants are for ρ > than

0.0225 for 35 mph

ρ = 0.0025 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

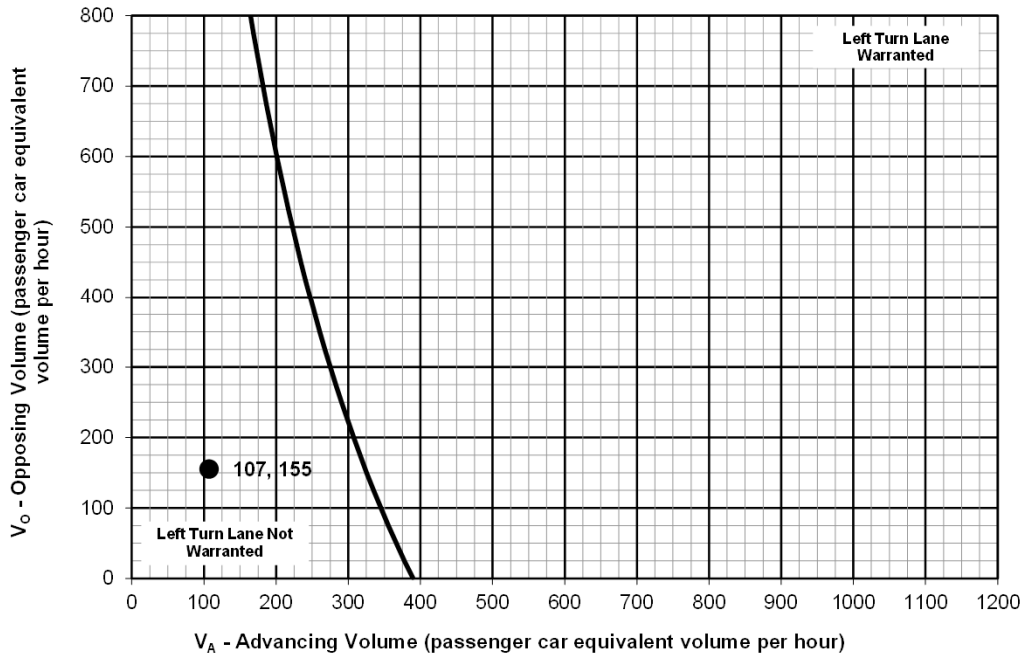
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Township Roadway & Eastern Site Driveway
Movement:	Left Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	350	2%	Level	1.01	354
Opposing Volume (V_O) =	235	2%	Level	1.01	237
Number of Left Turns =	117	2%	Level	1.01	118
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Left Turns =	33%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 0.92 sec

t_A = 10.17 sec

t_{median} = 6.78 sec

λ = 32.57 veh/hr

μ = 1020 veh/hr

Limiting advancing volume = 297

Left turn lane warrants are for ρ > than

0.0225 for 35 mph

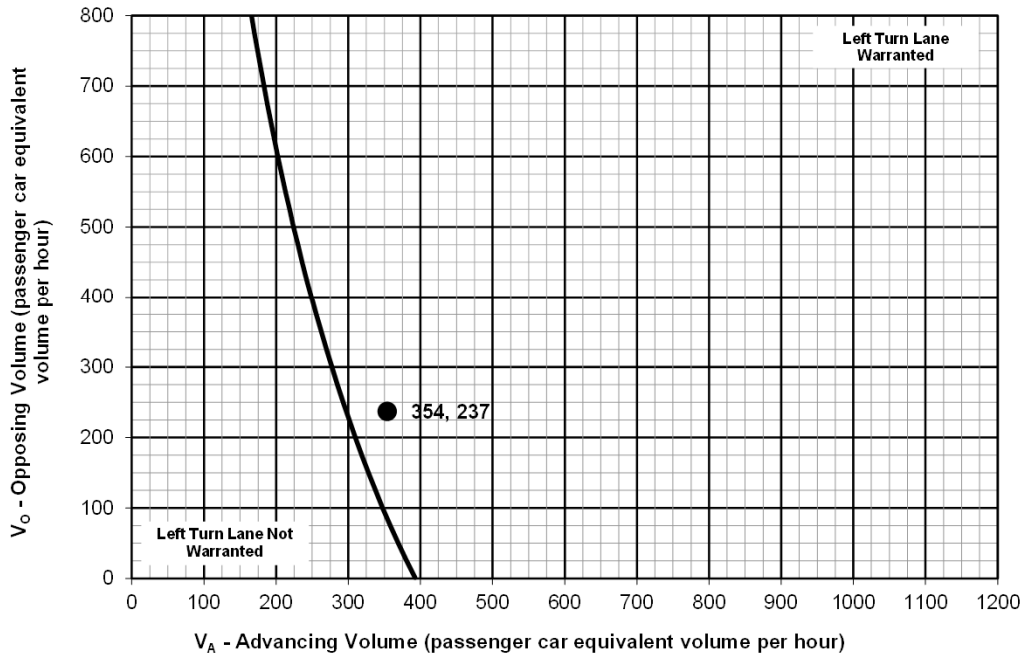
ρ = 0.0319 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	A	
Avg # of veh/cycle:	2	
Storage Length:	100	feet

RESULTS

A left turn lane is warranted. The required storage length is 100 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Township Roadway & Eastern Site Driveway
Movement:	Left Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	347	2%	Level	1.01	350
Opposing Volume (V_O) =	287	2%	Level	1.01	290
Number of Left Turns =	150	2%	Level	1.01	152
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Left Turns =	43%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 1.16 sec

t_A = 10.29 sec

t_{median} = 6.86 sec

λ = 38.24 veh/hr

μ = 983 veh/hr

Limiting advancing volume = 266

Left turn lane warrants are for ρ > than

0.0225 for 35 mph

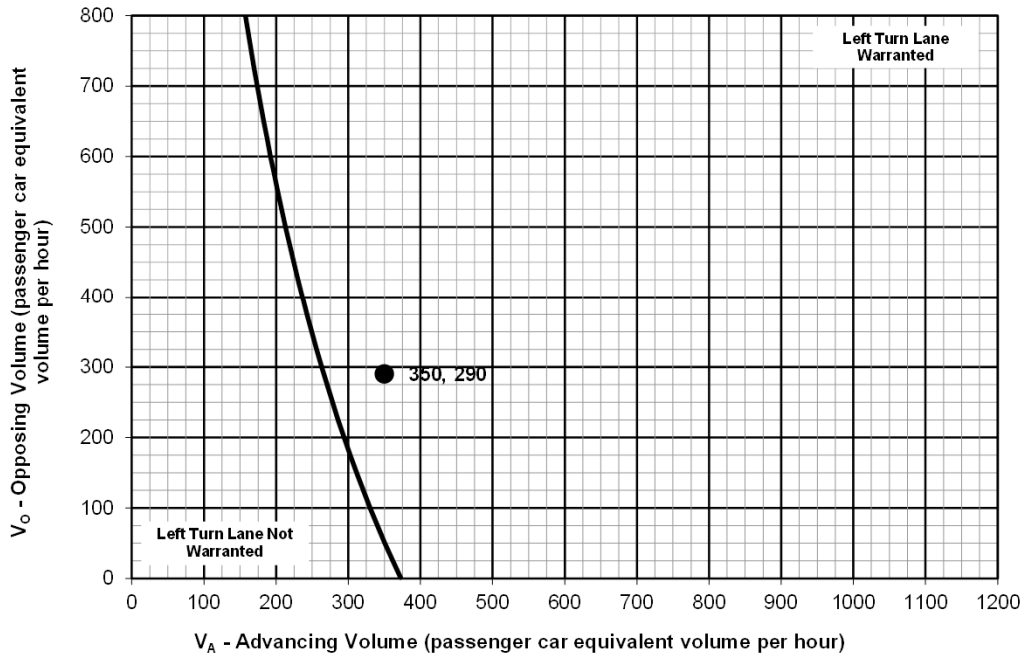
ρ = 0.0389 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	A	
Avg # of veh/cycle:	3	
Storage Length:	150	feet

RESULTS

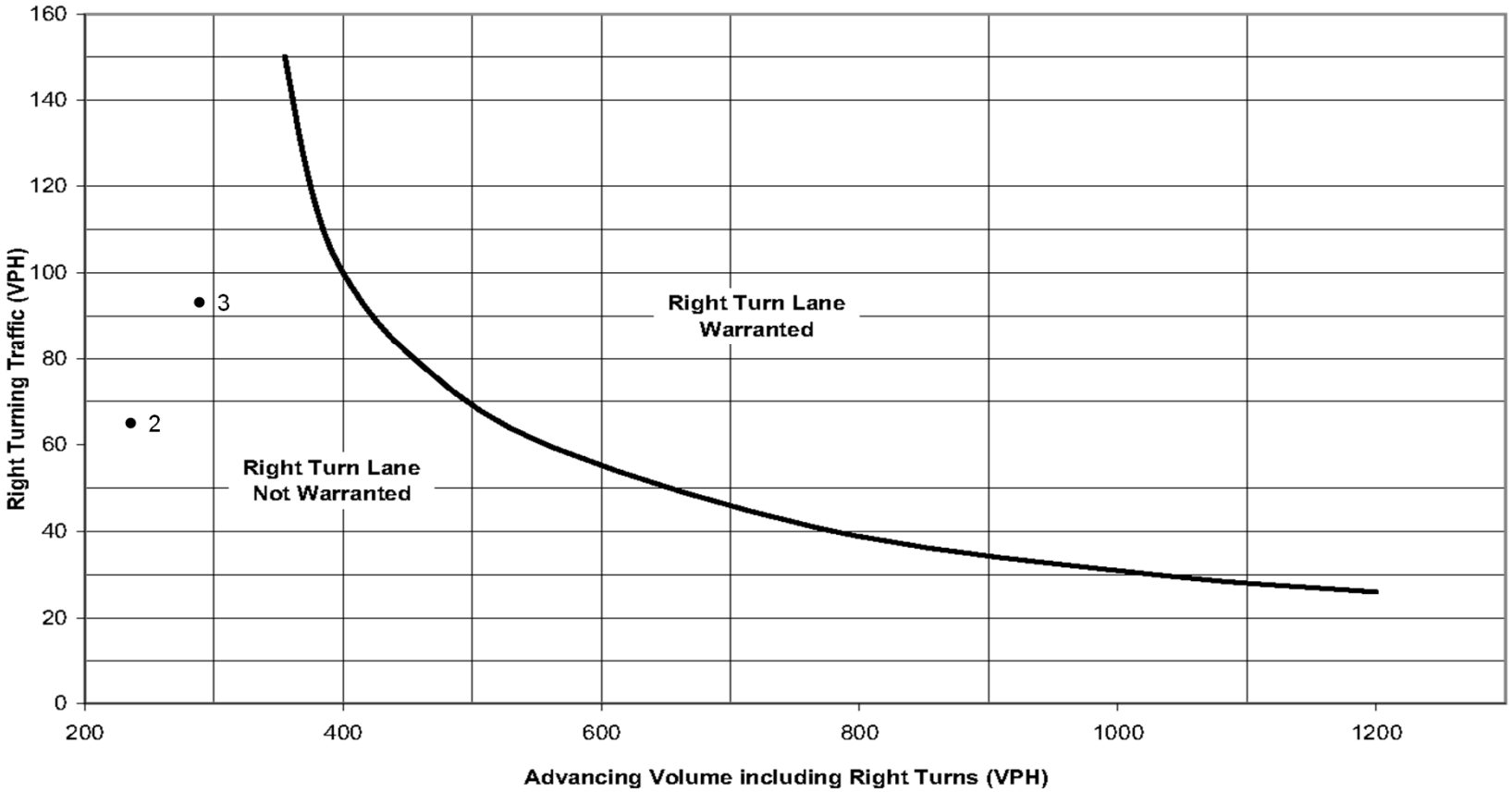
A left turn lane is warranted. The required storage length is 150 feet.



Township Roadway & Eastern Site Driveway

Right-Turns to Eastern Site Driveway

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 155 approach total, 13 right turns - NOT MET
2. 2035 Projected PM (Phases 1-4) - 237 approach total, 66 right turns - NOT MET
3. 2035 Projected SAT (Phases 1-4) - 290 approach total, 94 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Township Roadway & Eastern Site Driveway
Movement:	Right-Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	153	2%	Level	1.01	155
Number of Right Turns =	13	2%	Level	1.01	13
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Right Turns =	8%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Township Roadway & Eastern Site Driveway
Movement:	Right-Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	235	2%	Level	1.01	237
Number of Right Turns =	65	2%	Level	1.01	66
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Right Turns =	28%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Township Roadway & Eastern Site Driveway
Movement:	Right-Turns to Eastern Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	287	2%	Level	1.01	290
Number of Right Turns =	93	2%	Level	1.01	94
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Right Turns =	32%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Township Roadway & Middle Site Driveway
Movement:	Left Turns to Middle Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	82	2%	Level	1.01	83
Opposing Volume (V_O) =	159	2%	Level	1.01	161
Number of Left Turns =	36	2%	Level	1.01	36
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Left Turns =	43%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 0.60 sec

t_A = 43.37 sec

t_{median} = 28.92 sec

λ = 1.76 veh/hr

μ = 1075 veh/hr

Limiting advancing volume = 308

Left turn lane warrants are for ρ > than

0.0225 for 35 mph

ρ = 0.0016 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

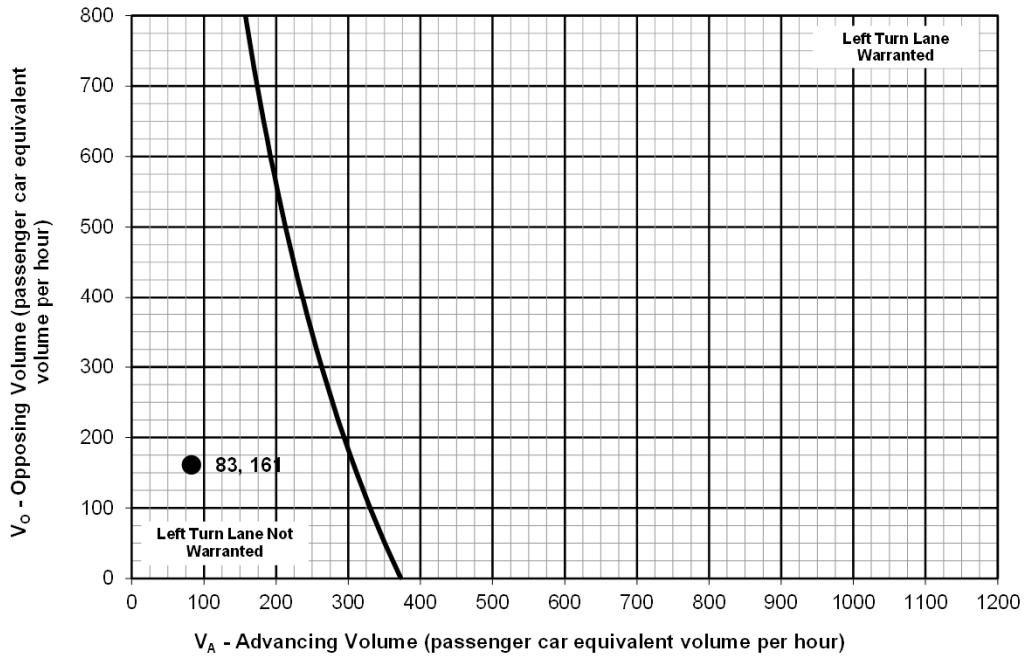
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Township Roadway & Middle Site Driveway
Movement:	Left Turns to Middle Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	344	2%	Level	1.01	347
Opposing Volume (V_O) =	274	2%	Level	1.01	277
Number of Left Turns =	116	2%	Level	1.01	117
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Left Turns =	34%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 1.10 sec

t_A = 10.37 sec

t_{median} = 6.92 sec

λ = 33.75 veh/hr

μ = 992 veh/hr

Limiting advancing volume = 282

Left turn lane warrants are for ρ > than

0.0225 for 35 mph

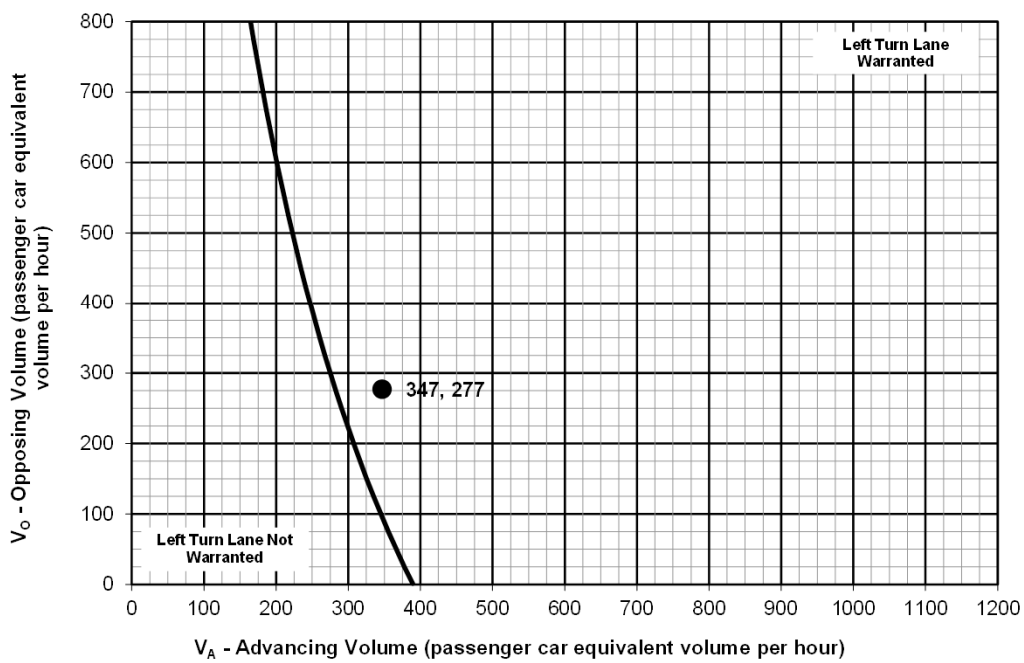
ρ = 0.0340 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	A	
Avg # of veh/cycle:	2	
Storage Length:	100	feet

RESULTS

A left turn lane is warranted. The required storage length is 100 feet.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Township Roadway & Middle Site Driveway
Movement:	Left Turns to Middle Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	337	2%	Level	1.01	340
Opposing Volume (V_O) =	368	2%	Level	1.01	372
Number of Left Turns =	151	2%	Level	1.01	153
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Left Turns =	45%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 1.55 sec

t_A = 10.59 sec

t_{median} = 7.06 sec

λ = 41.08 veh/hr

μ = 928 veh/hr

Limiting advancing volume = 242

Left turn lane warrants are for ρ > than

0.0225 for 35 mph

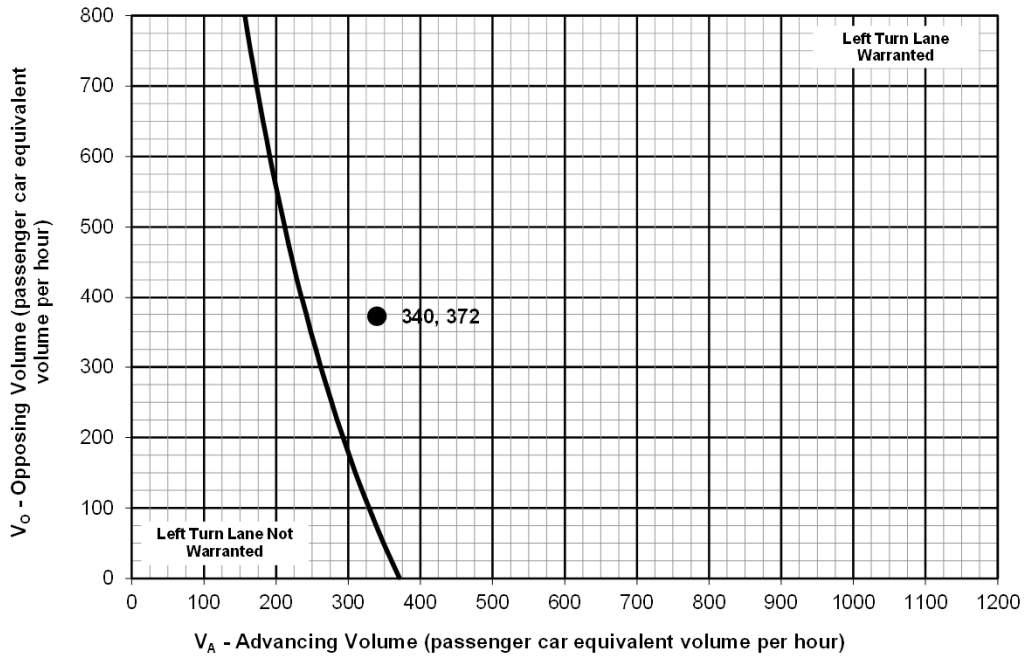
ρ = 0.0443 **satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	A	
Avg # of veh/cycle:	3	
Storage Length:	150	feet

RESULTS

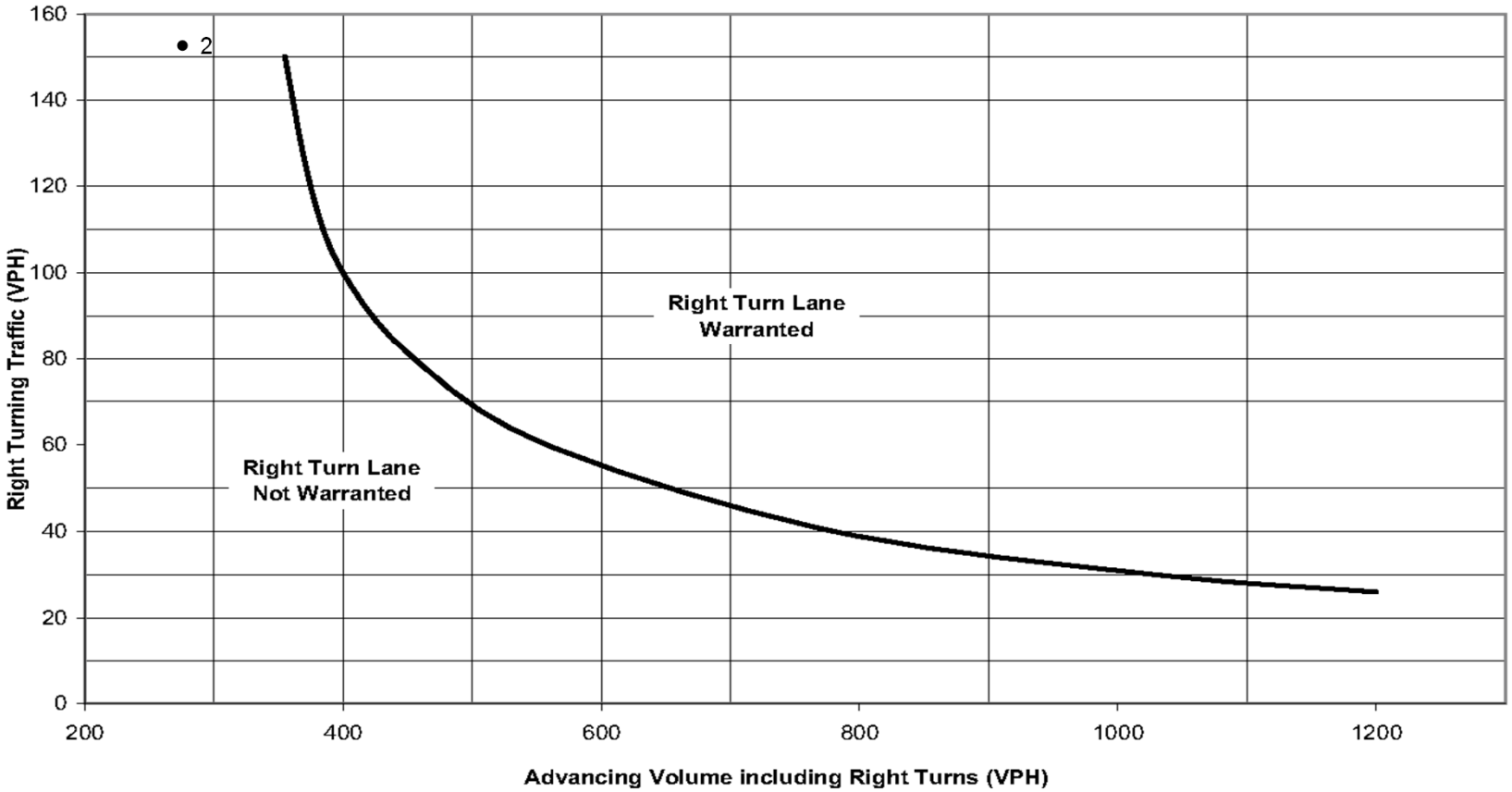
A left turn lane is warranted. The required storage length is 150 feet.



Township Roadway & MIddle Site Driveway

Right-Turns to MIddle Site Driveway

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 161 approach total, 31 right turns - NOT MET
2. 2035 Projected PM (Phases 1-4) - 277 approach total, 153 right turns - NOT MET
3. 2035 Projected SAT (Phases 1-4) - 372 approach total, 222 right turns - MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Township Roadway & MIddle Site Driveway
Movement:	Right-Turns to Middle Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	159	2%	Level	1.01	161
Number of Right Turns =	31	2%	Level	1.01	31
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Right Turns =	19%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Township Roadway & MIddle Site Driveway
Movement:	Right-Turns to Middle Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	274	2%	Level	1.01	277
Number of Right Turns =	151	2%	Level	1.01	153
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Right Turns =	55%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:		
Table 1 Condition:		
Avg # of veh/cycle:		
Storage Length:		feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Township Roadway & MIddle Site Driveway
Movement:	Right-Turns to Middle Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	368	2%	Level	1.01	372
Number of Right Turns =	220	2%	Level	1.01	222
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Right Turns =	60%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	High	
Table 1 Condition:	A	
Avg # of veh/cycle:	4	
Storage Length:	175	feet

RESULTS

A right-turn lane is warranted. The required storage length is 175 feet.

Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Township Roadway & Western Site Driveway
Movement:	Left Turns to Western Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	58	2%	Level	1.01	59
Opposing Volume (V_O) =	161	2%	Level	1.01	163
Number of Left Turns =	1	2%	Level	1.01	1
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Left Turns =	2%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 0.61 sec

t_A = 61.02 sec

t_{median} = 40.68 sec

λ = 0.07 veh/hr

μ = 1073 veh/hr

Limiting advancing volume = 1085

Left turn lane warrants are for ρ > than

0.0225 for 35 mph

ρ = 0.0001 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

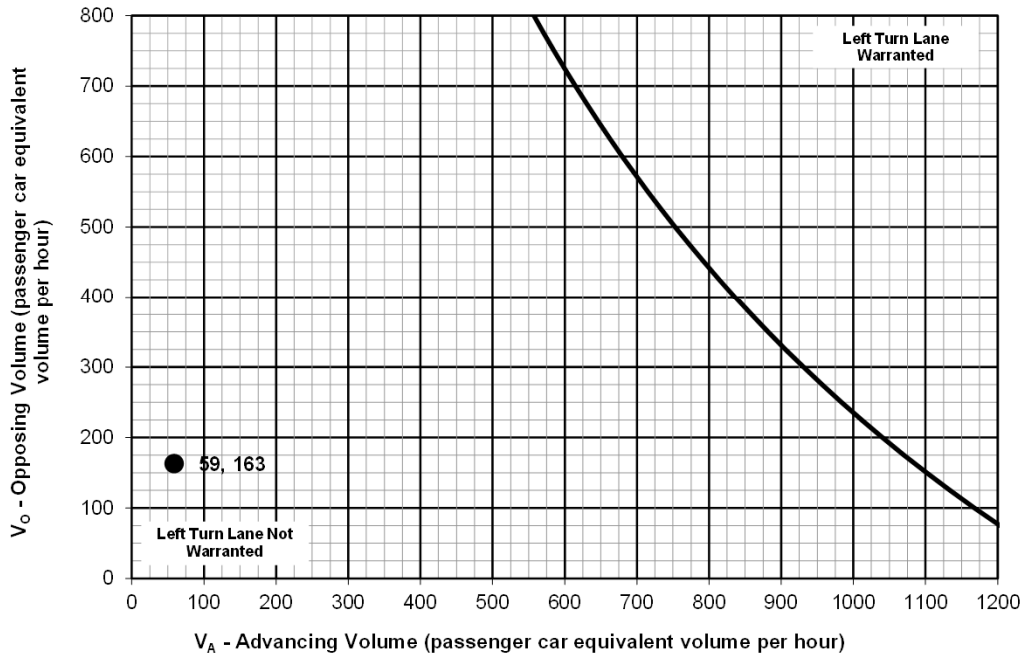
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Township Roadway & Western Site Driveway
Movement:	Left Turns to Western Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	340	2%	Level	1.01	343
Opposing Volume (V_O) =	285	2%	Level	1.01	288
Number of Left Turns =	1	2%	Level	1.01	1
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Left Turns =	0%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 1.15 sec

t_A = 10.50 sec

t_{median} = 7.00 sec

λ = 0.00 veh/hr

μ = 984 veh/hr

Limiting advancing volume = #DIV/0!

Left turn lane warrants are for ρ > than

0.0225 for 35 mph

ρ = 0.0000 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

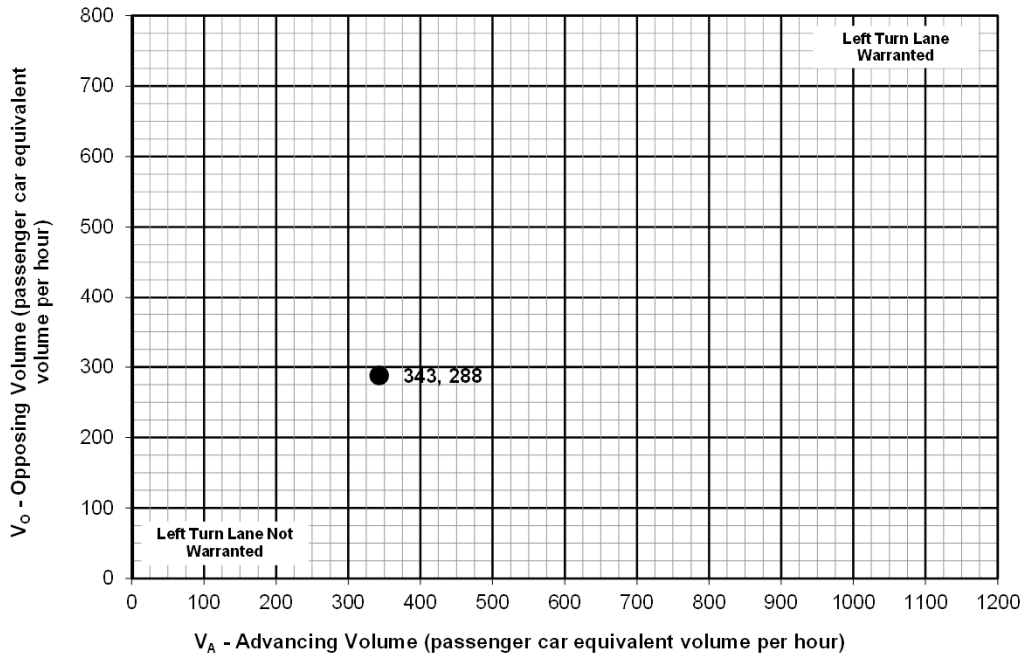
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

A left turn lane is not required.



Left-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17,

PROJECT INFORMATION

Project Number:	BLAC.A.A.000001
Intersection:	Township Roadway & Western Site Driveway
Movement:	Left Turns to Western Site Driveway
Analysis Period:	2035 Projected Conditions - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	327	2%	Level	1.01	330
Opposing Volume (V_O) =	382	2%	Level	1.01	386
Number of Left Turns =	2	2%	Level	1.01	2
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Left Turns =	1%		Cycle Length:	60	sec.

WARRANT CALCULATION

t_w = 1.62 sec

t_A = 10.91 sec

t_{median} = 7.27 sec

λ = 1.58 veh/hr

μ = 919 veh/hr

Limiting advancing volume = 1194

Left turn lane warrants are for ρ > than

0.0225 for 35 mph

ρ = 0.0017 **not satisfied**

STORAGE LENGTH CALCULATION

Turn Demand Volume:

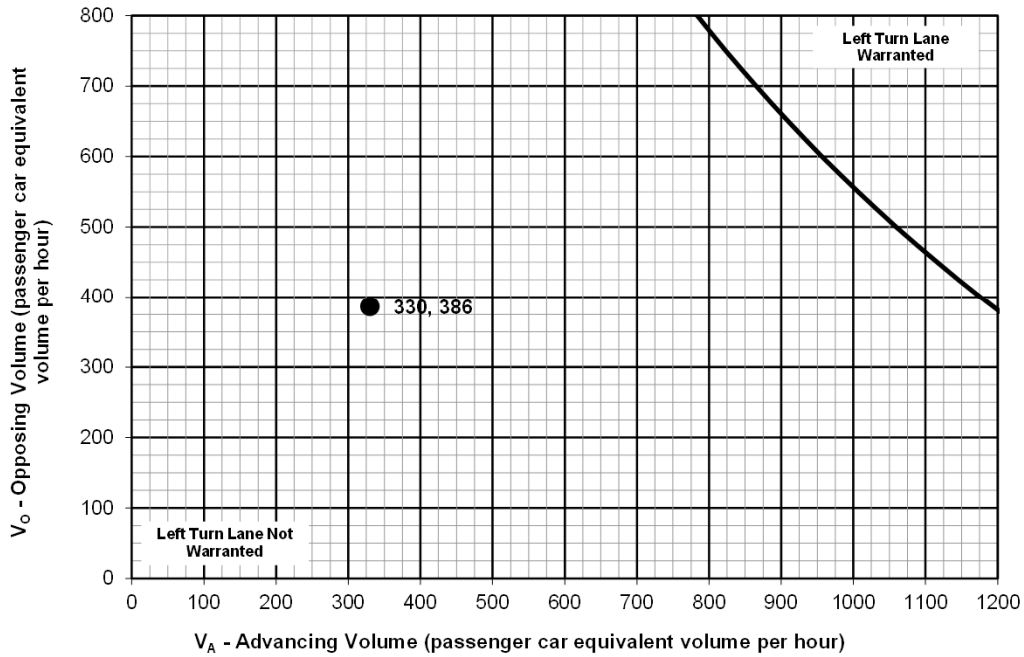
Table 1 Condition:

Avg # of veh/cycle:

Storage Length: feet

RESULTS

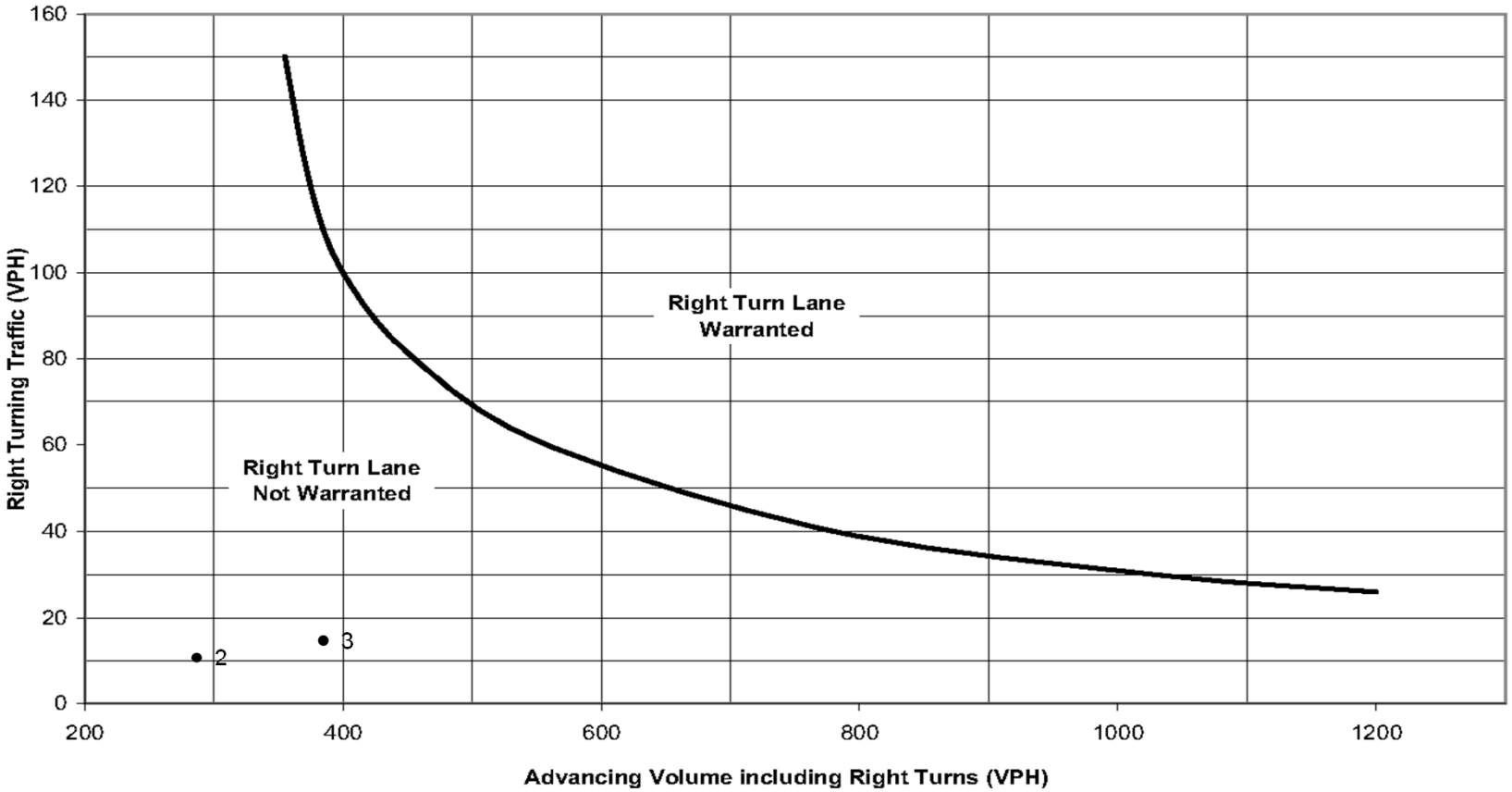
A left turn lane is not required.



Township Roadway & Western Site Driveway

Right-Turns to Western Site Driveway

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



1. 2035 Projected AM (Phases 1-4) - 163 approach total, 2 right turns - NOT MET
2. 2035 Projected PM (Phases 1-4) - 288 approach total, 12 right turns - NOT MET
3. 2035 Projected SAT (Phases 1-4) - 386 approach total, 16 right turns - NOT MET

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Township Roadway & Western Site Driveway
Movement:	Right-Turns to Western Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - AM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	161	2%	Level	1.01	163
Number of Right Turns =	2	2%	Level	1.01	2
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Right Turns =	1%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:		
Table 1 Condition:		
Avg # of veh/cycle:		
Storage Length:		feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Township Roadway & Western Site Driveway
Movement:	Right-Turns to Western Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - PM Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	285	2%	Level	1.01	288
Number of Right Turns =	12	2%	Level	1.01	12
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Right Turns =	4%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:		
Table 1 Condition:		
Avg # of veh/cycle:		
Storage Length:		feet

RESULTS

A right-turn lane is not required.

Right-Turn Lane Warrant Analysis

Two-Lane Highways

Based on PennDOT Publication 46 (October 2010 Edition), Section 11.17

PROJECT INFORMATION

Project Number:	BLAC.A.00001
Intersection:	Township Roadway & Western Site Driveway
Movement:	Right-Turns to Western Site Driveway
Analysis Period:	2035 Projected Conditions (Phases 1-4) - SAT Peak Hour
Analyst:	EMM

INPUTS

	Volume	Truck %	Terrain Type	T	PCE Volume
Advancing Volume (V_A) =	382	2%	Level	1.01	386
Number of Right Turns =	16	2%	Level	1.01	16
Speed Limit =	35		Type of Control:	Unsignalized	
Proportion of Right Turns =	4%		Cycle Length:	60	sec.

STORAGE LENGTH CALCULATION

Turn Demand Volume:	
Table 1 Condition:	
Avg # of veh/cycle:	
Storage Length:	feet

RESULTS

A right-turn lane is not required.

APPENDIX M

SIGNAL WARRANT ANALYSIS WORKSHEETS

WARRANT 2, FOUR-HOUR VOLUME

Traffic Signal Warrant Summary
Warrant 2 - Four Hour Volume

Municipality:	North Cornwall Township	Analyst:	EMM
County:	Lebanon	TPD Project #:	BLAC.A.00001
Condition:	Existing Conditions		

	Street Name	Lanes	Speed	Direction
Major Street:	Quentin Road (SR 0072)	1	45	North-South
Minor Street:	Isabel Drive	1		East-West

Volume Level Criteria

1. Is the critical speed of major street > 40 mph?	Yes
2. Is the intersection in a built-up area of isolated community of <10,000 population?	No

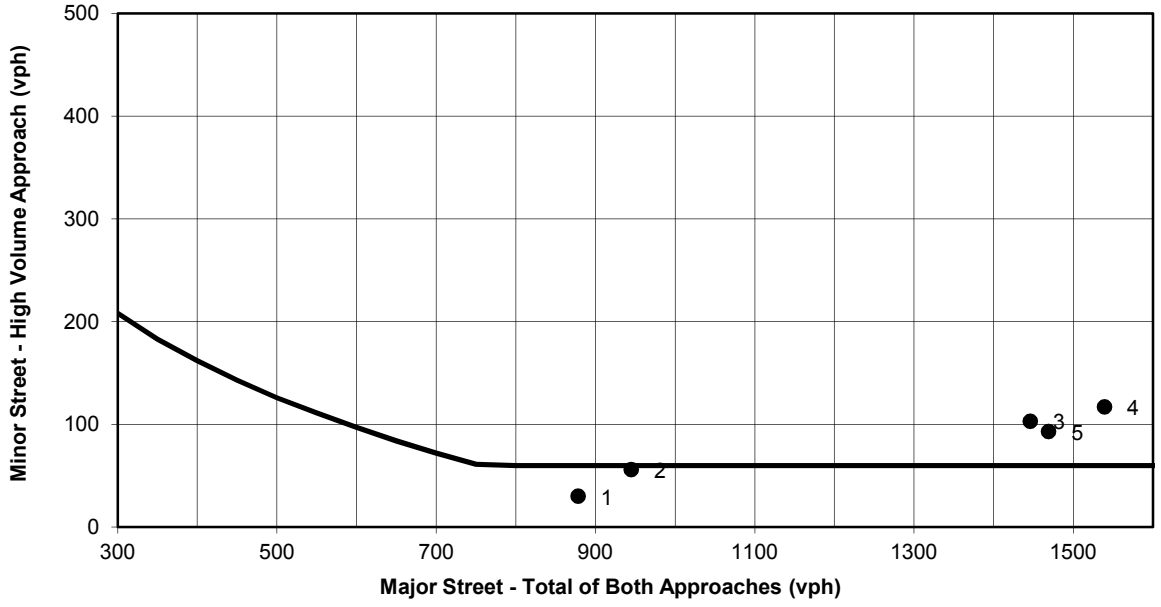
70% factor applied to volume thresholds

MUTCD Warrant 2 - Four Hour Volume

Hour	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:00-8:00 A.M.	0	0	0	8	0	22	0	359	41	30	448	0
8:00-9:00 A.M.	0	0	0	24	0	32	0	427	38	43	437	0
3:00-4:00 P.M.	0	0	0	24	0	79	0	705	70	44	627	0
4:00-5:00 P.M.	0	0	0	25	0	92	0	772	68	50	649	0
5:00-6:00 P.M.	0	0	0	32	0	61	0	709	45	66	649	0

Results

	Condition	Major Street Volume	Minor Street Volume	Minor Street Warrant	Meets Warrant?
1	7:00-8:00 A.M.	878	30	60	no
2	8:00-9:00 A.M.	945	56	60	no
3	3:00-4:00 P.M.	1446	103	60	yes
4	4:00-5:00 P.M.	1539	117	60	yes
5	5:00-6:00 P.M.	1469	93	60	yes



Traffic Signal Warrant Summary
Warrant 2 - Four Hour Volume

Municipality:	North Cornwall Township	Analyst:	EMM
County:	Lebanon	TPD Project #:	BLAC.A.00001
Condition:	Existing Conditions		

	Street Name	Lanes	Speed	Direction
Major Street:	Cornwall Road (SR 2001)	1	45	North-South
Minor Street:	Isabel Drive/Norman Drive	1		East-West

Volume Level Criteria

1. Is the critical speed of major street > 40 mph?	Yes
2. Is the intersection in a built-up area of isolated community of <10,000 population?	No

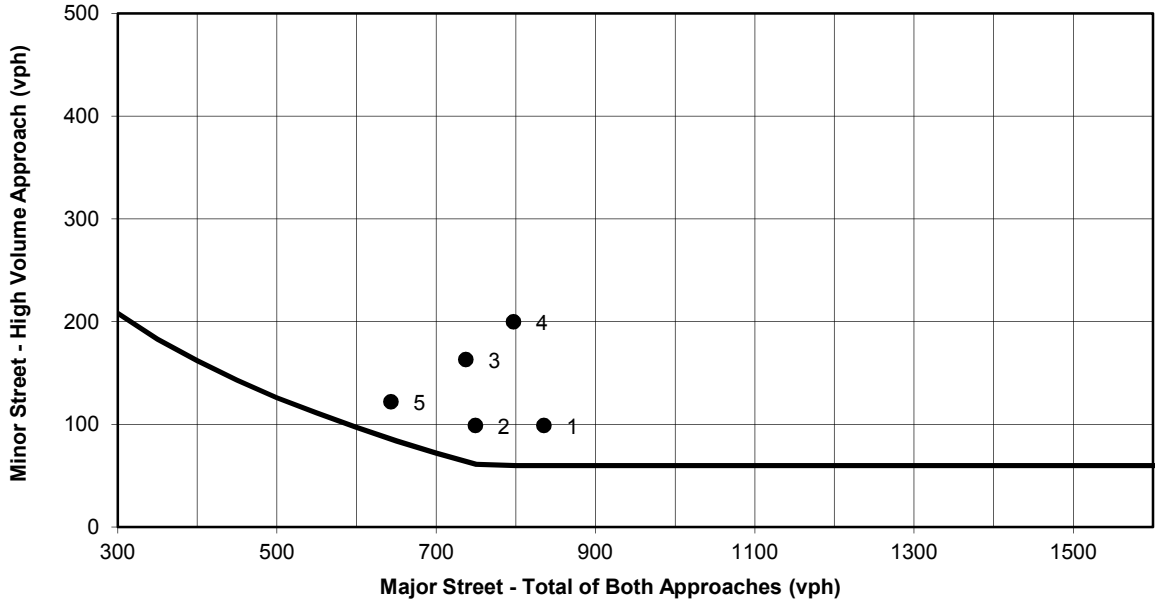
70% factor applied to volume thresholds

MUTCD Warrant 2 - Four Hour Volume

Hour	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:00-8:00 A.M.	3	24	21	39	10	50	27	284	80	103	331	10
8:00-9:00 A.M.	8	21	21	29	16	54	26	302	85	103	219	14
3:00-4:00 P.M.	33	23	52	56	27	80	26	292	51	69	283	16
4:00-5:00 P.M.	28	16	51	69	18	113	35	284	39	51	371	17
5:00-6:00 P.M.	23	6	51	45	14	63	20	223	14	19	354	13

Results

	Condition	Major Street Volume	Minor Street Volume	Minor Street Warrant	Meets Warrant?
1	7:00-8:00 A.M.	835	99	60	yes
2	8:00-9:00 A.M.	749	99	61	yes
3	3:00-4:00 P.M.	737	163	64	yes
4	4:00-5:00 P.M.	797	200	51	yes
5	5:00-6:00 P.M.	643	122	85	yes



Traffic Signal Warrant Summary
Warrant 2 - Four Hour Volume

Municipality:	North Cornwall Township	Analyst:	EMM
County:	Lebanon	TPD Project #:	BLAC.A.00001
Condition:	Existing Conditions		

	Street Name	Lanes	Speed	Direction
Major Street:	Cornwall Road (SR 2001)	1	41	North-South
Minor Street:	Wilhelm Avenue	1		East-West

Volume Level Criteria

1. Is the critical speed of major street > 40 mph?	Yes
2. Is the intersection in a built-up area of isolated community of <10,000 population?	No

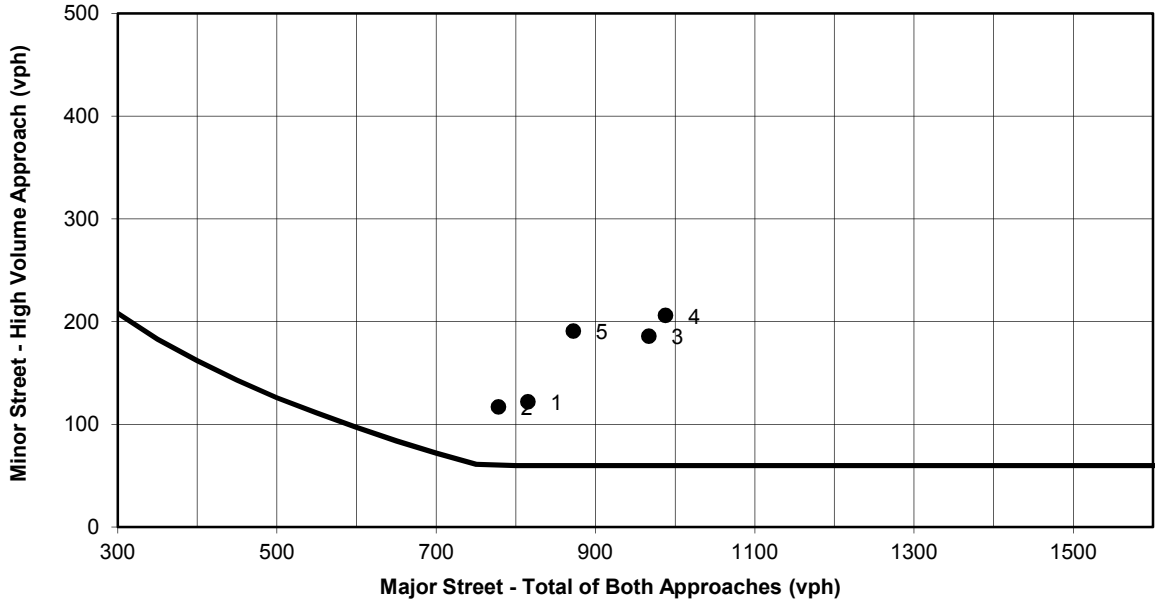
70% factor applied to volume thresholds

MUTCD Warrant 2 - Four Hour Volume

Hour	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:00-8:00 A.M.	0	0	0	97	0	25	0	248	61	117	389	0
8:00-9:00 A.M.	0	0	0	84	0	33	0	234	82	39	423	0
3:00-4:00 P.M.	0	0	0	129	0	57	0	363	181	60	363	0
4:00-5:00 P.M.	0	0	0	143	0	63	0	371	200	60	357	0
5:00-6:00 P.M.	0	0	0	141	0	50	0	288	192	69	323	0

Results

	Condition	Major Street Volume	Minor Street Volume	Minor Street Warrant	Meets Warrant?
1	7:00-8:00 A.M.	815	122	60	yes
2	8:00-9:00 A.M.	778	117	55	yes
3	3:00-4:00 P.M.	967	186	60	yes
4	4:00-5:00 P.M.	988	206	60	yes
5	5:00-6:00 P.M.	872	191	60	yes



WARRANT 3, PEAK HOUR

Traffic Signal Warrant Summary
MUTCD Warrant 3B - Peak Hour Volume

Municipality:	North Cornwall Township	Analyst:	EMM
County:	Lebanon	TPD Project #:	BLAC.A.00001

	Street Name	Lanes	Speed	Direction
Major Street:	Quentin Road (SR 0072)	1	45	North-South
Minor Street:	Isabel Drive	1		East-West

Volume Level Criteria

1. Is the critical speed of major street > 40 mph?	Yes
2. Is the intersection in a built-up area of isolated community of <10,000 population?	No

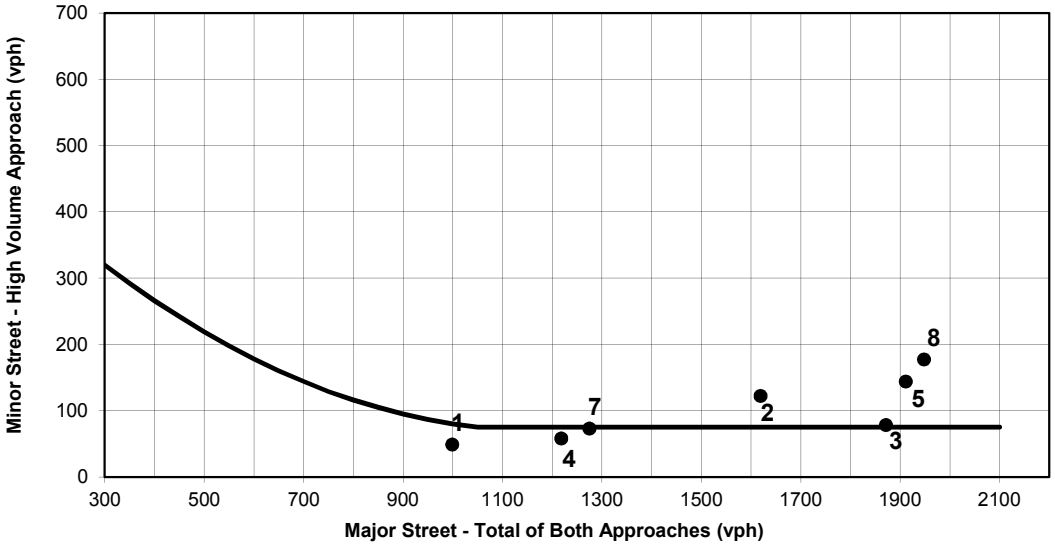
70% factor applied to volume thresholds

MUTCD Warrant 3B - Peak Hour Volume

Condition	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Existing AM	0	0	0	21	0	28	0	438	47	49	465	0
Existing PM	0	0	0	33	0	89	0	788	58	65	708	0
Existing SAT	0	0	0	26	0	52	0	844	62	42	923	0
2025 Base AM	0	0	0	25	0	33	0	530	55	58	575	0
2025 Base PM	0	0	0	39	0	105	0	926	68	76	841	0
2025 Base SAT	0	0	0	31	0	61	0	994	73	49	1092	0
2025 Projected AM	0	0	0	25	0	48	0	536	55	94	590	0
2025 Projected PM	0	0	0	39	0	138	0	940	68	92	848	0
2025 Projected SAT	0	0	0	31	0	72	0	998	73	63	1098	0

Results

	Condition	Major Street Volume	Minor Street Volume	Minor Street Warrant	Meets Warrant?
1	Existing AM	999	49	80	no
2	Existing PM	1619	122	75	yes
3	Existing SAT	1871	78	75	yes
4	2025 Base AM	1218	58	75	no
5	2025 Base PM	1911	144	75	yes
6	2025 Base SAT	2208	92	75	yes
7	2025 Projected AM	1275	73	75	no
8	2025 Projected PM	1948	177	75	yes
9	2025 Projected SAT	2232	103	75	yes



Traffic Signal Warrant Summary
MUTCD Warrant 3B - Peak Hour Volume

Municipality:	North Cornwall Township	Analyst:	EMM
County:	Lebanon	TPD Project #:	BLAC.A.00001

	Street Name	Lanes	Speed	Direction
Major Street:	Cornwall Road (SR 2001)	1	45	North-South
Minor Street:	Isabel Drive/Norman Drive	1		East-West

Volume Level Criteria

1. Is the critical speed of major street > 40 mph?	Yes
2. Is the intersection in a built-up area of isolated community of <10,000 population?	No

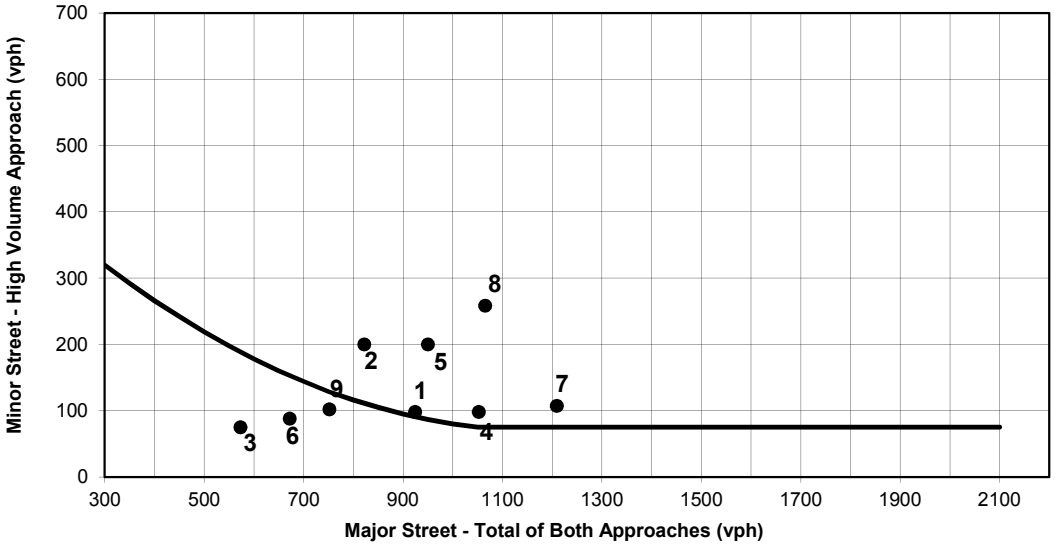
70% factor applied to volume thresholds

MUTCD Warrant 3B - Peak Hour Volume

Condition	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Existing AM	5	26	27	35	13	50	27	347	86	111	343	10
Existing PM	29	16	53	69	18	113	36	294	39	51	384	18
Existing SAT	27	2	46	3	5	15	34	244	3	4	274	14
2025 Base AM	6	26	32	35	13	50	32	408	86	111	403	12
2025 Base PM	34	16	62	69	18	113	42	346	39	51	451	21
2025 Base SAT	32	2	54	3	5	15	40	287	3	4	322	16
2025 Projected AM	6	42	52	35	15	57	45	445	86	159	462	12
2025 Projected PM	34	18	76	69	33	156	60	396	39	58	491	21
2025 Projected SAT	32	3	67	3	6	17	50	317	3	6	360	16

Results

	Condition	Major Street Volume	Minor Street Volume	Minor Street Warrant	Meets Warrant?
1	Existing AM	924	98	91	yes
2	Existing PM	822	200	111	yes
3	Existing SAT	573	75	189	no
4	2025 Base AM	1052	98	75	yes
5	2025 Base PM	950	200	87	yes
6	2025 Base SAT	672	88	153	no
7	2025 Projected AM	1209	107	75	yes
8	2025 Projected PM	1065	258	75	yes
9	2025 Projected SAT	752	102	129	no



Traffic Signal Warrant Summary
MUTCD Warrant 3B - Peak Hour Volume

Municipality:	North Cornwall Township	Analyst:	EMM
County:	Lebanon	TPD Project #:	BLAC.A.00001

	Street Name	Lanes	Speed	Direction
Major Street:	Cornwall Road (SR 2001)	1	41	North-South
Minor Street:	Wilhelm Avenue	1		East-West

Volume Level Criteria

1. Is the critical speed of major street > 40 mph?	Yes
2. Is the intersection in a built-up area of isolated community of <10,000 population?	No

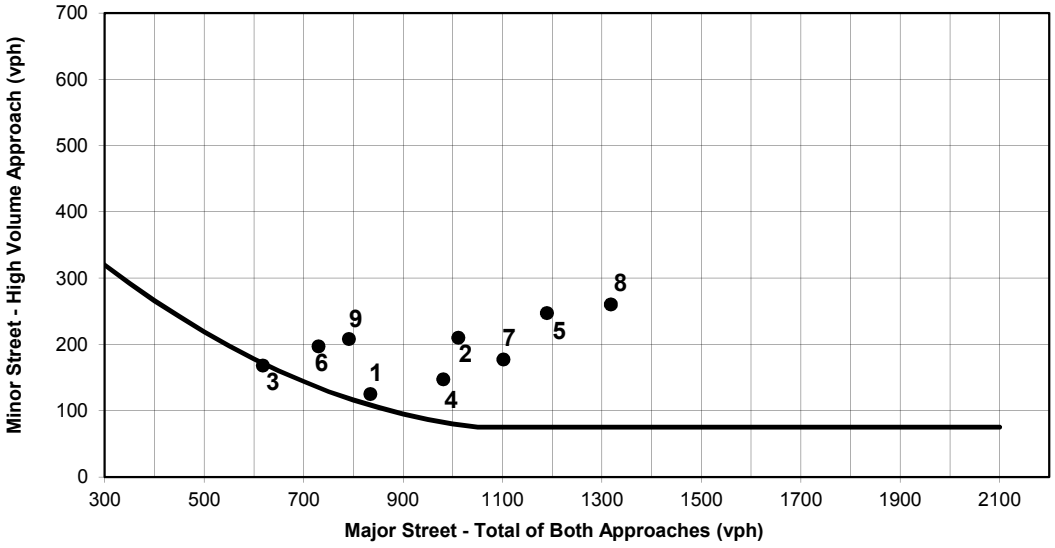
70% factor applied to volume thresholds

MUTCD Warrant 3B - Peak Hour Volume

Condition	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Existing AM	0	0	0	99	0	26	0	254	62	120	398	0
Existing PM	0	0	0	146	0	64	0	380	205	61	365	0
Existing SAT	0	0	0	132	0	36	0	180	161	44	233	0
2025 Base AM	0	0	0	116	0	31	0	299	73	141	468	0
2025 Base PM	0	0	0	172	0	75	0	447	241	72	429	0
2025 Base SAT	0	0	0	155	0	42	0	214	189	52	275	0
2025 Projected AM	0	0	0	146	0	31	0	331	85	141	545	0
2025 Projected PM	0	0	0	185	0	75	0	515	268	72	463	0
2025 Projected SAT	0	0	0	166	0	42	0	237	198	52	304	0

Results

	Condition	Major Street Volume	Minor Street Volume	Minor Street Warrant	Meets Warrant?
1	Existing AM	834	125	108	yes
2	Existing PM	1011	210	79	yes
3	Existing SAT	618	168	172	no
4	2025 Base AM	981	147	83	yes
5	2025 Base PM	1189	247	75	yes
6	2025 Base SAT	730	197	135	yes
7	2025 Projected AM	1102	177	75	yes
8	2025 Projected PM	1318	260	75	yes
9	2025 Projected SAT	791	208	118	yes



Traffic Signal Warrant Summary
MUTCD Warrant 3B - Peak Hour Volume

Municipality:	North Cornwall Township	Analyst:	EMM
County:	Lebanon	TPD Project #:	BLAC.A.00001

	Street Name	Lanes	Speed	Direction
Major Street:	Cornwall Road (SR 2001)	1	45	North-South
Minor Street:	Proposed Township Roadway	1		East-West

Volume Level Criteria

1. Is the critical speed of major street > 40 mph?	Yes
2. Is the intersection in a built-up area of isolated community of <10,000 population?	No

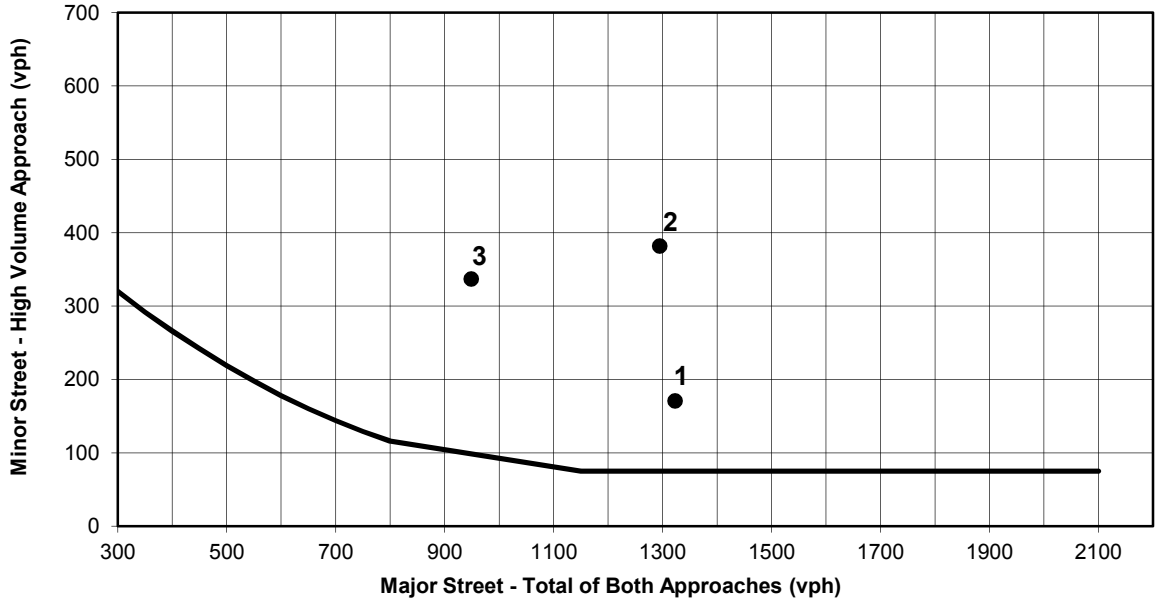
70% factor applied to volume thresholds

MUTCD Warrant 3B - Peak Hour Volume

Condition	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2035 Projected AM	38	125	8	3	50	54	26	525	23	269	438	42
2035 Projected PM	186	60	47	22	159	201	89	416	2	53	607	128
2035 Projected SAT	232	53	52	0	45	23	119	236	1	37	369	187

Results

	Condition	Major Street Volume	Minor Street Volume	Minor Street Warrant	Meets Warrant?
1	2035 Projected AM	1323	171	75	yes
2	2035 Projected PM	1295	382	75	yes
3	2035 Projected SAT	949	337	87	yes



Traffic Signal Warrant Summary
MUTCD Warrant 3B - Peak Hour Volume

Municipality:	North Cornwall Township	Analyst:	EMM
County:	Lebanon	TPD Project #:	BLAC.A.00001

	Street Name	Lanes	Speed	Direction
Major Street:	Rocherty Road (SR 2002)	1	41	East-West
Minor Street:	Eastern Driveway to 81± Acre Parcel	1		North-South

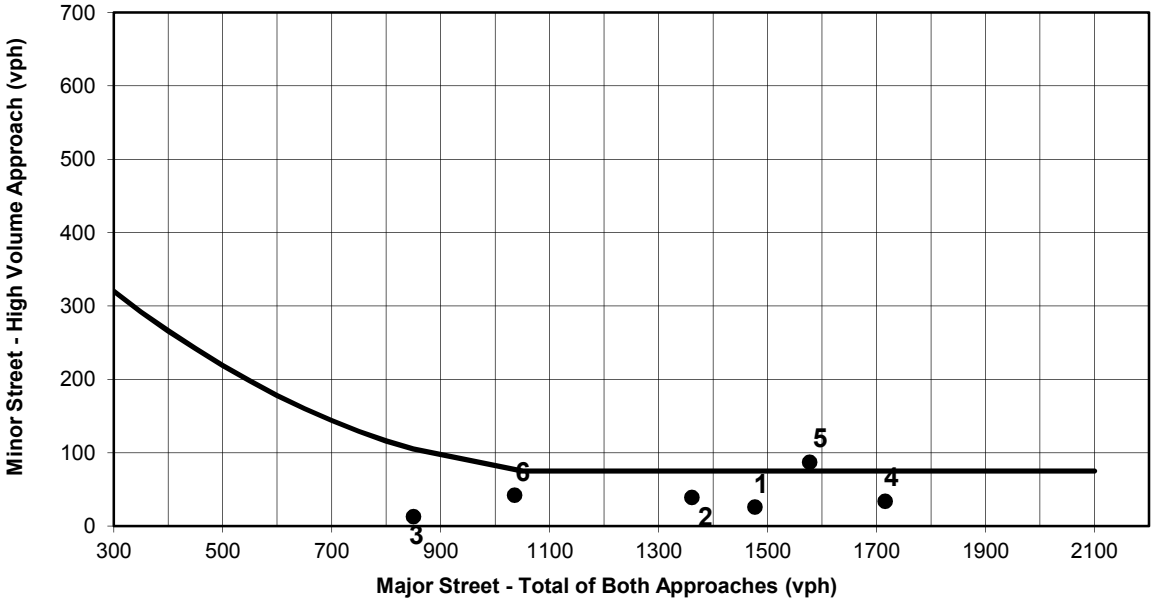
Volume Level Criteria

1. Is the critical speed of major street > 40 mph?	Yes
2. Is the intersection in a built-up area of isolated community of <10,000 population?	No

70% factor applied to volume thresholds

MUTCD Warrant 3B - Peak Hour Volume

Condition	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2025 Projected AM	13	876	0	0	577	11	0	0	0	4	0	22
2025 Projected PM	16	661	0	0	680	4	0	0	0	8	0	31
2025 Projected SAT	12	398	0	0	437	3	0	0	0	2	0	11
2035 Projected AM	45	976	0	0	651	44	0	0	0	12	0	22
2035 Projected PM	19	756	0	0	774	28	0	0	0	48	0	39
2035 Projected SAT	13	471	0	0	518	34	0	0	0	31	0	11

Results

	Condition	Major Street Volume	Minor Street Volume	Minor Street Warrant	Meets Warrant?
1	2025 Projected AM	1477	26	75	no
2	2025 Projected PM	1361	39	75	no
3	2025 Projected SAT	850	13	105	no
4	2035 Projected AM	1716	34	75	no
5	2035 Projected PM	1577	87	75	yes
6	2035 Projected SAT	1036	42	77	no