



TRAFFIC PLANNING AND DESIGN, INC.



Cornwall Center

Multimodal Transportation Study
Cornwall Borough, Lebanon County, PA

For Submission To:

Lebanon County Planning Department

CORNWALL CENTER MULTIMODAL TRANSPORTATION STUDY

Cornwall Borough, Lebanon County, PA

Prepared For:

Lebanon County
Planning Department
Room 206, Municipal Building
400 South 8th Street
Lebanon, PA 17042-6794

June 24, 2016

TPD # LBCO.00004

Phone: (717) 975-7575

Prepared By:

Traffic Planning and Design, Inc.
1426 N. Third Street, Suite 250
Harrisburg, Pennsylvania 17102

Phone: (610) 326-3100

Fax: (610) 326-9410

E-mail: TPD@TrafficPD.com

Web Site: www.trafficpd.com

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	i
INTRODUCTION.....	1
Study Overview	1
Study Purpose.....	3
Study Procedure	3
Study Area.....	3
EXISTING ROADWAY NETWORK.....	4
Existing Roadway Characteristics.....	4
Multi-Modal Facilities	4
Crash Data Investigation	4
EXISTING TRAFFIC CONDITIONS.....	5
Manual Traffic Counts	5
FUTURE TRAFFIC CONDITIONS.....	6
Area Developments.....	6
Annual Background Growth.....	7
Future Condition Traffic Volumes.....	7
LEVELS OF SERVICE FOR AN INTERSECTION	7
Criteria	7
CAPACITY ANALYSIS METHODOLOGY and findings	8
Methodology	8
Operational Criteria.....	9
Identified Roadway Improvements	9
Levels of Service in the Study Area	10
95th Percentile Queue Analysis	10
CONCLUSIONS.....	11

FIGURES:

- Figure 1: Study Area Location Map
- Figure 2: Existing Lane Configurations and Intersection Controls
- Figures 3-4: Existing Condition Traffic Volumes
- Figures 5-6: 2035 Future Condition (20-Year Build-Out) Traffic Volumes

APPENDICES:

- Appendix A: Project Correspondence
- Appendix B: Study Area Photographs
- Appendix C: Manual Traffic Count Data Sheets
- Appendix D: Trip Generation/Distribution Information: Four (4) Area Developments
- Appendix E: Volume Development Spreadsheets
- Appendix F: Capacity Analysis Worksheets
- Appendix G: Conceptual Improvement Plans and Cost Estimates

EXECUTIVE SUMMARY

The Cornwall Center Multimodal Transportation Study is intended to provide a comprehensive evaluation of the transportation operations within the study area, identify needed improvements, and provide the Lebanon County Metropolitan Planning organization (LEBCO MPO) and identified project stakeholders the necessary information to begin the long-range planning for multimodal transportation improvements to the study area intersections. This study summarizes and documents the existing and future condition traffic volumes and operations, evaluates area developments that will contribute additional future traffic, and identifies potential context-sensitive roadway improvements to achieve the identified operational criteria for the future conditions.

Based on the evaluation performed, the following conclusions were reached:

1. The scope of this Multimodal Transportation Study was based on discussions with the LEBCO MPO, as well as feedback from the following project stakeholders: Cornwall Borough, Cornwall Elementary School, Lebanon Valley Economic Development Corporation, Sacred Heart of Jesus Church, Lebanon Transit, Lebanon Valley Rail Trail (Wilson Engineering), and the Lebanon Valley Bicycle Coalition.
2. The study includes an evaluation of the following intersections:
 - » Freeman Drive (Route 419) and Burd Coleman Road/Cornwall Road;
 - » Schaeffer Road (Route 419) and Boyd Street/Cornwall Road; and,
 - » Cornwall Road (Route 419) and Lebanon Valley Rail Trail mid-block crossing.
3. Existing condition traffic volumes were developed based upon manual traffic counts conducted at the study area intersections during the weekday morning (6:30 to 10:00 A.M.) and weekday evening (2:30 to 6:00 P.M.) peak periods in May 2015 when the Cornwall Elementary School was in session. In addition, supplementary counts were conducted at the Lebanon Valley Rail Trail crossing of Cornwall Road over Labor Day weekend (September 2015).
4. Future condition traffic volumes were developed for the 2035 conditions (20-year build-out) assuming a background growth factor of 0.98% per year and traffic from four (4) area developments.
5. Capacity analyses were conducted to determine the quality of operation (levels or service) at the study area intersections for the following conditions:
 - » Existing Conditions; and,
 - » 2035 Future Conditions (20-year build-out).
6. Based upon the capacity analyses performed, levels of service (LOS) for the study area intersections were summarized in matrix form. **Table 6** of the report details the overall intersection LOS for each of the study area intersections for the analyzed conditions and time periods. Matrices detailing the LOS for all approaches and turning movements at the study area intersections are contained in **Appendix F** along with the capacity analysis worksheets.
7. Identification of recommended roadway improvements at the study area intersections for the 2035 future conditions (20-year build-out) was based upon achieving the following operational criteria:
 - » Accommodate the needs of the project stakeholders, to the greatest extent feasible;
 - » Increase capacity for both motorized and non-motorized users at the study area intersections;
 - » Promote the use of multimodal facilities; and,

- » Provide a controlled crossing of the at-grade Lebanon Valley Rail Trail (LVRT) crossing within the context of the individual improvement scenarios.

8. Based upon the noted operational criteria, TPD identified the following two (2) potential improvement scenarios at the study area intersections:

- » **Roundabout** – Under this scenario, TPD evaluated construction of a single-lane roundabout at the intersection of Freeman Drive (Route 419) and Burd Coleman Road/Cornwall Road. The roundabout has been sized to accommodate turning movements by a WB-67 design vehicle based upon the needs of the Lebanon Valley Economic Development Corporation. This improvement scenario would include bicycle ramps leading to/from a wide shared facility with pedestrians, thus allowing for separated facilities for bicyclists who prefer not to navigate the roundabout on the roadway. In addition, bike lanes would be provided on each approach and departure to the roundabout, including along Cornwall Road (SR 0419) between the roundabout and the existing LVRT crossing. Furthermore, trail-user activated rectangular rapid flashing beacons are proposed at the existing LVRT crossing to increase safety and visibility at the highly utilized trail crossing. Lastly, shared lane markings or “Sharrows” are proposed on the roadway departing the study area intersections to remind motorists of the multimodal use of the roadways.

As outlined on the concept plan and cost estimate included in **Appendix G**, the anticipated cost for the improvements identified in this scenario is **\$1,814,314.00**. This estimate includes Engineering, Right-of-Way Acquisition, Utility Relocations, and Construction Inspection costs.

- » **Signalization** – Under this scenario, TPD evaluated the signalization of both study area intersections. An initial evaluation of the two intersections operating under a single traffic signal controller resulted in inadequate levels of service and improvements could not be identified to mitigate these deficiencies. Therefore, the traffic signal scenario was evaluated with the two separate signals operating in a coordinated system. In order to provide a right-turn overlap phase for Schaeffer Road (Route 419) right-turns during the Cornwall Road left-turn phase, a separate Schaeffer Road right-turn lane is proposed under this scenario. This improvement scenario would include relocation of the existing LVRT crossing to the intersection of Schaeffer Road (Route 419) and Boyd Street/Cornwall Road to allow for a dedicated pedestrian crossing phase within the signal cycle. In addition, bike lanes would be provided between the relocated LVRT crossing and the intersection of Freeman Drive (Route 419) and Burd Coleman Road/Cornwall Road. Lastly, shared lane markings or “Sharrows” are proposed on the roadways departing the study area intersections to remind motorists of the multimodal use of the roadways.

As outlined on the concept plan and cost estimate included in **Appendix G**, the anticipated cost for the improvements identified in this scenario is **\$939,765.00**. This estimate includes Engineering, Right-of-Way Acquisition, Utility Relocations, and Construction Inspection costs.

The above outlined improvements are conceptual in nature. Therefore, upon selection of a preferred alternative, additional planning and design will be required in accordance with all applicable Municipal ordinances and State regulations.

INTRODUCTION

Study Overview

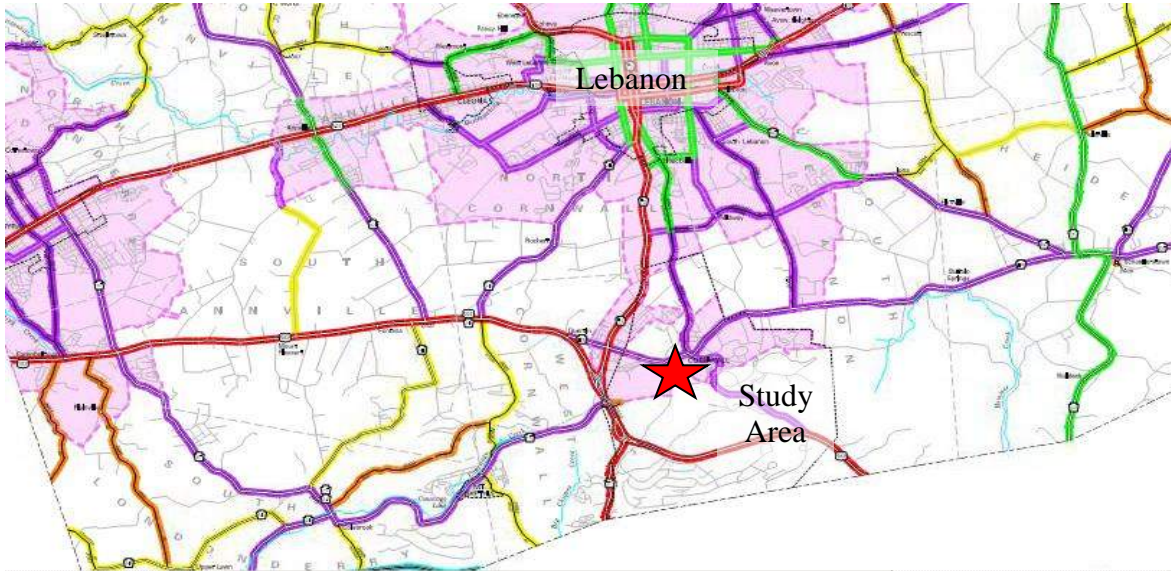
As part of the Lebanon County Metropolitan Planning Organization's (LEBCO MPO) 2015-2016 Unified Planning Work Program (UPWP), Traffic Planning and Design, Inc. (TPD) has prepared this Cornwall Center Multimodal Transportation Study to evaluate operations and identify potential context-sensitive improvements to key intersections located in historic Cornwall Borough, Lebanon County, Pennsylvania.

As shown in Exhibits 1 and 2, below, the study area is at a confluence point for several key motorized vehicle routes as well as various important corridors for bicycle travel in Southern Lebanon County. **Exhibit 1** illustrates how the collector roadway system (shown in purple) in the study area is the only relatively direct east-west connection south of the City of Lebanon and above the PA Turnpike. These routes provide critical motorized vehicle access to this portion of the County, including critical truck access to local industrial uses. In addition, due to the relatively direct north-south and east-west connectivity, these same collector roadways provide cyclists with a safer on-road travel alternative to heavily traveled Route 72 and Route 422, which have sections with very high travel speeds.

As shown in **Exhibit 2**, a number of regional, collector, and scenic bicycle routes converge at this location. Also located in the study area is a trailhead and access point for the Lebanon Valley Rail Trail, which provides protected bicycle and pedestrian facilities to the west side of Route 72, into Mount Gretna and beyond to Dauphin County.

Developing improvements that provide for safe and convenient multi-modal access are a key measure of success for this project. In order to maximize active transportation and recreational opportunities for local residents and visitors to the area, the final roadway improvement at this location must provide reasonable access for all roadway users, thinking beyond the motorized vehicle, to develop a balanced improvement scenario.

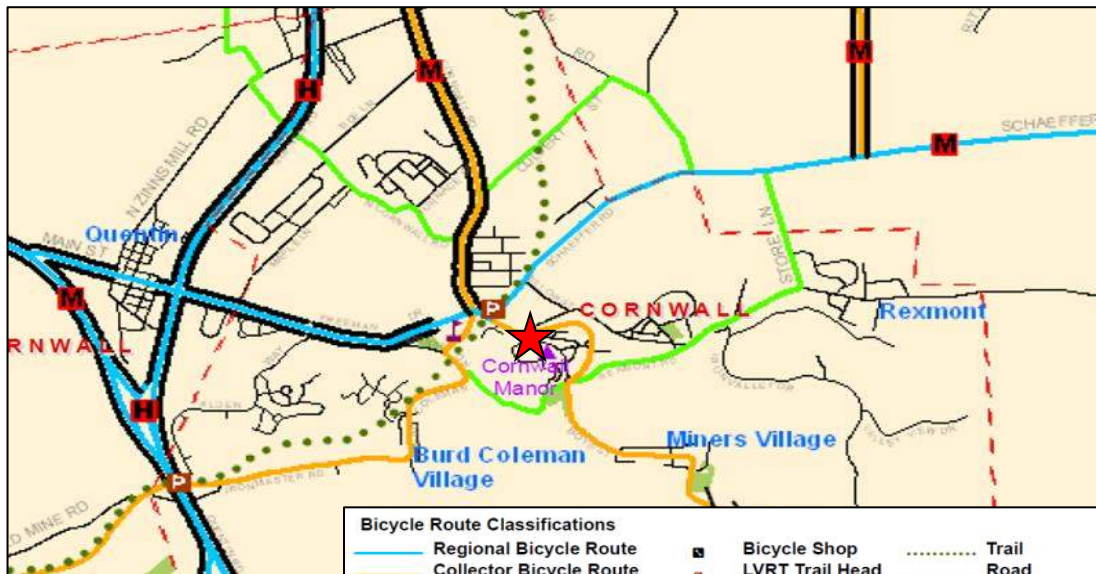
EXHIBIT 1
LEBANON COUNTY FUNCTIONAL CLASSIFICATION MAP (EXCERPT)



LEGEND

- | | | | |
|--|---|--|--|
| | INTERSTATE HIGHWAYS (1, 11) | | URBAN COLLECTOR OR RURAL MAJOR COLLECTOR (7, 17) |
| | OTHER FREEWAYS AND EXPRESSWAYS (12) | | RURAL MINOR COLLECTOR (8) |
| | OTHER PRINCIPAL ARTERIAL HIGHWAYS (2, 14) | | LOCAL ROADS (9, 19) |
| | MINOR ARTERIALS (6, 16) | | 2000 URBANIZED AREA BOUNDARY |
| | | | 2000 SMALL URBAN AREA BOUNDARY |

EXHIBIT 2
LEBANON COUNTY BICYCLE TRANSPORTATION MAP (EXCERPT)



- | | | | |
|--------------------------------------|-------------------------|--|--------------------------------------|
| Bicycle Route Classifications | | | |
| | Regional Bicycle Route | | Bicycle Shop |
| | Collector Bicycle Route | | LVRT Trail Head |
| | Scenic Bicycle Route | | Park & Ride |
| | 4' Shoulders | | Transfer Station |
| | 0 to 2500 | | Major Employer |
| | 2501 to 8000 | | School |
| | Greater than 8000 | | Library |
| | | | Airport |
| | | | Shopping |
| | | | Trail |
| | | | Road |
| | | | Park |
| | | | Municipal Boundary |
| | | | Steep Grade (indicated by frequency) |
| | | | =Study Area |

Study Purpose

The Cornwall Center Multimodal Transportation Study is intended to provide a comprehensive evaluation of the transportation operations within the study area, identify needed improvements, and provide Cornwall Borough, LEBCO MPO, and Lebanon Transit the necessary information to begin the long-range planning for multimodal transportation improvements to the study area intersections.

Study Procedure

The scope of and methodologies used to prepare this Multimodal Transportation Study were confirmed with representatives of LEBCO MPO.

The following procedures were utilized in preparing the Multimodal Transportation Study:

- » Completion of a site visit to obtain field measurements and photographs at the study area intersections.
- » Coordination and meetings with project stakeholders, including the following:
 - LEBCO MPO, Cornwall Borough, Cornwall Elementary School, Lebanon Valley Economic Development Corporation, Sacred Heart of Jesus Church, Lebanon Transit, Lebanon Valley Rail Trail (Wilson Engineering), and the Lebanon Valley Bicycle Coalition. Minutes from the stakeholder meetings are included in **Appendix A**.
- » Completion of manual traffic counts at each of the study area intersections during the weekday morning (6:30 – 10:00 A.M.) and weekday evening (2:30 – 6:00 P.M.) time periods.
- » Completion of weekday and weekend manual traffic counts at the at-grade Lebanon Valley Rail Trail crossing on Cornwall Road (Route 419).
- » Development of existing condition traffic volumes at each of the study area intersections based upon the manual traffic counts.
- » Development of 2035 future condition (20-year build-out) traffic volumes assuming a background growth factor of 0.98% per year and traffic from four (4) known nearby developments.
- » Completion of capacity analyses at the study area intersections for the existing and 2035 future conditions (20 year build-out).

Study Area

The LEBCO MPO identified the following study area intersections for consideration as part of this Multimodal Transportation Study:

- » Freeman Drive (Route 419) and Burd Coleman Road/Cornwall Road;
- » Schaeffer Road (Route 419) and Boyd Street/Cornwall Road; and,
- » Cornwall Road (Route 419) and Lebanon Valley Rail Trail mid-block crossing.

The study area intersections are illustrated in **Figure 1**.

EXISTING ROADWAY NETWORK

Existing Roadway Characteristics

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 are illustrated in **Figure 2**. Photographs of the study area intersections are included in **Appendix B**.

TABLE 1
ROADWAY CHARACTERISTICS WITHIN STUDY AREA

Roadway	Roadway Jurisdiction	PennDOT Functional Classification	Posted Speed Limit	ADT ¹
Schaeffer Road	PennDOT (SR 0419)	Urban Collector	40 mph	4,955 vpd
Boyd Street	Cornwall Borough	Urban Collector	25 mph	2,828 vpd
Cornwall Road	PennDOT (SR 2001)	Urban Collector	35 mph	4,037 vpd
Burd Coleman Road	Cornwall Borough	Local Street	25 mph	---
Freeman Drive	PennDOT (SR 0419)	Urban Collector	25 mph	5,562 vpd

1 = Obtained from PennDOT's Internet Traffic Monitoring System (iTMS) website (April 2016)

Multi-Modal Facilities

Based on field observations of the study area, there are limited pedestrian facilities that exist along the study area roadways. At the intersection of Freeman Drive (Route 419) and Burd Coleman Road/Cornwall Road, sidewalks are provided on the southwest and eastern quadrants of the intersection. In addition, a crosswalk is provided through the middle of the intersection.

An at-grade crossing of the Lebanon Valley Rail trail exists on Cornwall Road, approximately 50 feet north of the intersection of Schaeffer Road (Route 419) and Boyd Street/Cornwall Road. In addition, a trailhead for the Lebanon Valley Rail Trail is located on the northeast corner of the intersection with access to Schaeffer Road (Route 419) approximately 375 feet east of Boyd Street.

Lebanon Transit (LT), the mass transit provider in the study area, has three (3) divisions: Fixed Route (bus), Express Services, and Paratransit (Americans with Disabilities (ADA) Program). LT does not currently provide Fixed Route (bus) or Express Services to or through Cornwall Borough; however, LT does operate paratransit service to Cornwall Manor.

Crash Data Investigation

Crash data were obtained from PennDOT for the study area intersections. PennDOT defines a reportable crash as follows, "A reportable (crash) is one in which an injury or fatality occurs or if at least one of the vehicles involved requires towing from the scene." Reportable crashes were tabulated for the five-year time period beginning 01/01/2010 and ending 12/31/2014. For a given intersection, PennDOT considers a crash

occurrence of 5 reportable, correctable crashes over a continuous twelve-month period during the past five years to be a threshold value, above which the intersection design should be reviewed to examine if corrective measures can be taken to enhance safety. The number of reportable crashes at the study area intersections is shown in **Table 2**.

TABLE 2
PENNDOT REPORTABLE CRASH DATA

Study Area Intersection	Number of Reportable Crashes				
	2010	2011	2012	2013	2014
Freeman Drive (SR 0419) and Cornwall Road (SR 2001)/ Burd Coleman Road	0	0	0	0	0
Schaeffer Road (SR 0419) and Boyd Street/Cornwall Road	2	2	0	1	1
Cornwall Road (SR 0419) and Lebanon Valley Rail Trail Crossing	0	0	2	0	0

Based on a review of the crash data, there were no continuous twelve-month periods during the past five years where 5 or more crashes occurred that were deemed correctable.

EXISTING TRAFFIC CONDITIONS

Manual Traffic Counts

Manual traffic counts were conducted in 15-minute intervals during the weekday morning (6:30 to 10:00 A.M.) and weekday evening (2:30 to 6:00 P.M.) peak periods when the Cornwall Elementary School was in session. 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 3**.

TABLE 3
MANUAL TRAFFIC COUNT INFORMATION

Intersection	Date of Traffic Counts	Time Period	Intersection Peak Hour ¹
Freeman Drive (Route 419) and Burd Coleman Road/ Cornwall Road	Thursday, May 14, 2015	Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:15 to 5:15 P.M.
Schaeffer Road (Route 419) and Boyd Street/Cornwall Road	Thursday, May 14, 2015	Weekday A.M.	7:00 to 8:00 A.M.
		Weekday P.M.	4:15 to 5:15 P.M.

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

The manual traffic count data sheets containing a summary of the peak hours and count dates for each of the study area intersections are provided in **Appendix C**. Existing condition traffic volumes for the weekday A.M. and weekday P.M. peak hours are illustrated in **Figures 3-4**, respectively.

In addition, counts were conducted at the Lebanon Valley Rail Trail mid-block crossing of Cornwall Road in May 2015 in conjunction with the manual traffic counts, as well as over Labor Day weekend (September 2015). **Table 4** summarizes the number of observed mid-block crossings (pedestrian and bicycles).

TABLE 4
LEBANON VALLEY RAIL TRAIL MID-BLOCK CROSSING SUMMARY

Date of Counts	Peak Hour		Mid-Block Crossings		
			Total	Northbound	Southbound
Thursday, May 14, 2015	Morning	11:00 AM – 12:00 PM	34	18	16
	Afternoon	4:30 PM – 5:30 PM	47	18	29
Saturday, September 5, 2015	Morning	10:15 AM – 11:15 AM	80	45	35
	Afternoon	12:00 PM – 1:00 PM	95	36	59
Sunday, September 6, 2015	Morning	11:00 AM – 12:00 PM	90	40	50
	Afternoon	2:30 PM – 3:30 PM	116	58	58
Monday, September 7, 2015	Morning	10:00 AM – 11:00 AM	130	69	61
	Afternoon	12:00 PM – 1:00 PM	115	63	52

FUTURE TRAFFIC CONDITIONS

Area Developments

There are four (4) area developments that are anticipated to contribute traffic to the study area intersections over the next 20 year period, and thus the traffic from each development was specifically considered in preparation of this Multimodal Transportation Study.

A summary of each development is provided below:

- » **The Preserve at Cornwall Village**, located in Cornwall Borough between Route 322 and Route 419, in the vicinity of Burd Coleman Village and Minersvillage. The proposed mixed use 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. The development is proposed to be phased and for the purposes of this study, TPD assumed full buildout of the site.
- » **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 consist of 505 residential dwelling units developed in five (5) phases. For the purposes of this study, TPD assumed full build out of the site.
- » **VA 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 450 employees at the existing facility.
- » **North Cornwall Commons**, located in North Cornwall Township on ±148 acres along Cornwall Road between Rocherty Road and the Tuck Business Park. At full build-out, the mixed use community retail/office town center will be comprised of approximately 600,000 SF of retail on the west side of Cornwall Road and approximately 550,000 SF of commercial, office, and residential building on the east side of Cornwall Road.

The trip generation for the area developments was derived based upon either; (1) the manual Trip Generation, Ninth Edition, 2012, an Institute of Transportation Engineers (ITE) Informational Report; or (2) information presented in the Transportation Impact Study for the individual development. Detailed information regarding the trip generation/distribution for each development is contained in **Appendix D**.

Annual Background Growth

A background growth factor for the roadways in the study area was developed based on growth factors for August 2015 to July 2016 obtained from the PennDOT Bureau of Planning and Research (BPR). The PennDOT BPR suggests using a background growth trend factor of 0.98% per year in Lebanon County for urban non-interstate roadways. As such, the background growth factor was applied annually to yield an overall growth percentage of 21.5% (0.98% per year, compounded over 20 years) for the 2035 future year.

Future Condition Traffic Volumes

The additional traffic volumes due to background growth and the four (4) area developments were added to the existing traffic data to produce the 2035 future condition (20-year build-out) traffic volumes. The 2035 future condition (20-year build-out) traffic volumes for the weekday A.M. and weekday P.M. peak hours are illustrated in **Figures 5-6**, respectively.

Traffic volume development spreadsheets are contained in **Appendix E**.

LEVELS OF SERVICE FOR AN INTERSECTION

Criteria

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 5**. 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 5
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 or $v/c > 1.0$	> 50 or $v/c > 1.0$

1 = Obtained from Exhibits 18-4 and 19-1 of the Transportation Research Board's *Highway Capacity Manual 2010*

CAPACITY ANALYSIS METHODOLOGY AND FINDINGS

Methodology

Capacity analyses were conducted for the weekday A.M. and weekday P.M. peak hours at the study area intersections. The analyses were conducted according to the methodologies contained in the *2010 Highway Capacity Manual (HCM)* using *Synchro 8* software, a Trafficware product. The following conditions were analyzed, as applicable:

- » Existing Conditions; and,
- » 2035 Future Conditions (20-year build-out).

The following items should be noted with respect to the capacity analyses:

- » The Pennsylvania default values for signalized intersections in a suburban land use context contained in Chapter 10 of PennDOT's *Publication 46* were utilized for the base saturation flow rate (1800 pcphpl), start-up lost time (2.5 seconds), extension of effective green time (3.5 seconds) and number of left turn sneakers (2 vehicles).
- » Synchro's SimTraffic software was utilized to analyze the study area intersections under the existing and future (unimproved) conditions due to the non-traditional STOP-sign configurations at the intersections and the 2010 HCM's limitations to analyze such configurations.
- » Synchro's percentile methodology was utilized for the signalized, future condition capacity analyses at the intersection of Schaeffer Road (Route 419) and Boyd Street/Cornwall Road in order to model a dedicated pedestrian signal phase for the Lebanon Valley Rail Trail crossing and the 2010 HCM's limitations to analyze such configurations.

The capacity analysis worksheets are included in **Appendix F**.

Operational Criteria

The need for future improvements at the study area intersections was based upon achieving the following operational criteria:

- » Accommodate the needs of the project stakeholders, to the greatest extent feasible;
- » Increase capacity for both motorized and non-motorized users at the study area intersections;
- » Promote the use of multimodal facilities; and,
- » Provide a controlled crossing of the at-grade Lebanon Valley Rail Trail (LVRT) crossing within the context of the individual improvement scenarios.

Identified Roadway Improvements

Based upon the noted operational criteria, TPD identified the following two (2) potential improvement scenarios at the study area intersections:

Roundabout

Under this scenario, TPD evaluated construction of a single-lane roundabout at the intersection of Freeman Drive (Route 419) and Burd Coleman Road/Cornwall Road. The roundabout has been sized to accommodate turning movements by a WB-67 design vehicle based upon the needs of the Lebanon Valley Economic Development Corporation. This improvement scenario would include bicycle ramps leading to/from a wide shared facility with pedestrians, thus allowing for separated facilities for bicyclists who prefer not to navigate the roundabout on the roadway. In addition, bike lanes would be provided on each approach and departure to the roundabout, including along Cornwall Road (SR 0419) between the roundabout and the existing LVRT crossing. Furthermore, trail-user activated rectangular rapid flashing beacons are proposed at the existing LVRT crossing to increase safety and visibility at the highly utilized trail crossing. Lastly, shared lane markings or "Sharrows" are proposed on the roadway departing the study area intersections to remind motorists of the multimodal use of the roadways.

It should be noted that under this scenario, no improvements are proposed at the intersection of Schaeffer Road (Route 419) and Cornwall Road/Boyd Street.

Under this scenario, all properties adjacent to the intersection of Freeman Drive (Route 419) and Burd Coleman/Cornwall Road may be impacted by the proposed improvements. Right-of-way and easements may be necessary to accommodate these improvements.

Signalization

Under this scenario, TPD evaluated the signalization of both study area intersections. An initial evaluation of the two intersections operating under a single traffic signal controller resulted in inadequate levels of service and improvements could not be identified to mitigate these deficiencies. Therefore, the traffic signal scenario was evaluated with the two separate signals operating in a coordinated system. In order to provide a right-turn overlap phase for Schaeffer Road (Route 419) right-turns during the Cornwall Road left-turn phase, a separate Schaeffer Road right-turn lane is proposed under this scenario. This improvement scenario would include relocation of the existing LVRT crossing to the intersection of Schaeffer Road (Route 419) and Boyd Street/Cornwall Road to allow for a dedicated pedestrian crossing phase within the signal cycle. In addition, bike lanes would be provided between the relocated LVRT crossing and the intersection of Freeman Drive (Route 419) and Burd Coleman Road/Cornwall Road. Lastly, shared lane markings or

“Sharrows” are proposed on the roadways departing the study area intersections to remind motorists of the multimodal use of the roadways.

Under this scenario, properties on the northwest and southern corners of the intersection of Freeman Drive (Route 419) and Burd Coleman/Cornwall Road as well as the northeast, southeast, and southwest corners of the intersection of Schaeffer Road (Route 419) and Boyd Street/Cornwall Road may be impacted by the proposed improvements. Right-of-way and easements may be necessary to accommodate these improvements.

In addition to the improvement-specific multimodal facilities proposed, through discussions with Lebanon Transit, a potential future need for a bus shelter to accommodate any future expansion of service to the study area was also identified.

Conceptual layout plans and cost estimates for the proposed improvement scenarios are contained in **Appendix G**.

Levels of Service in the Study Area

Levels of Service (LOS) for the study area intersections have been summarized in matrix form. **Table 6** below details the overall intersection LOS for each of the study area intersections for the analyzed conditions and time periods. Matrices detailing the LOS for all approaches and turning movements at the study area intersections are contained in **Appendix F** along with the capacity analysis worksheets.

TABLE 6
OVERALL INTERSECTION LEVEL OF SERVICE SUMMARY

Intersection	Time Period	Existing Conditions	2035 Future Conditions		
			Without Improvements	With Roundabout	With Signalization
Freeman Drive (Route 419) & Burd Coleman Road/ Cornwall Road	AM Peak	A (4.4)	A (9.8)	B (10.2)	B (17.8)
	PM Peak	A (9.0)	F (102.9)	B (12.2)	C (30.5)
Schaeffer Road (Route 419) & Boyd Street/Cornwall Road	AM Peak	A (4.3)	A (6.3)	A (6.0)	A (8.6)
	PM Peak	A (4.5)	A (7.0)	A (6.9)	D (41.7)

95th Percentile Queue Analysis

Queue analyses were conducted at the study area intersections using the results obtained via the *Synchro 8* software. For this analysis, the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. The queue analysis results are summarized in **Tables 7-8** for the weekday A.M. and weekday P.M. peak hours, respectively.

TABLE 7
95TH PERCENTILE QUEUE SUMMARY (FEET): WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement	Existing Conditions	2035 Future Conditions		
			Without Improvements	With Roundabout	With Signalization
Freeman Drive (Route 419) & Burd Coleman Road/ Cornwall Road	EB	88	179	50	195
	WB	5	10	100	328
	NB	60	96	25	163
	SB	54	109	25	240
Schaeffer Road (Route 419) & Boyd Street/Cornwall Road	EB	0	3	3	110
	WB	73	99	106	99
	SB L	86	124	120	53
	SB R				46

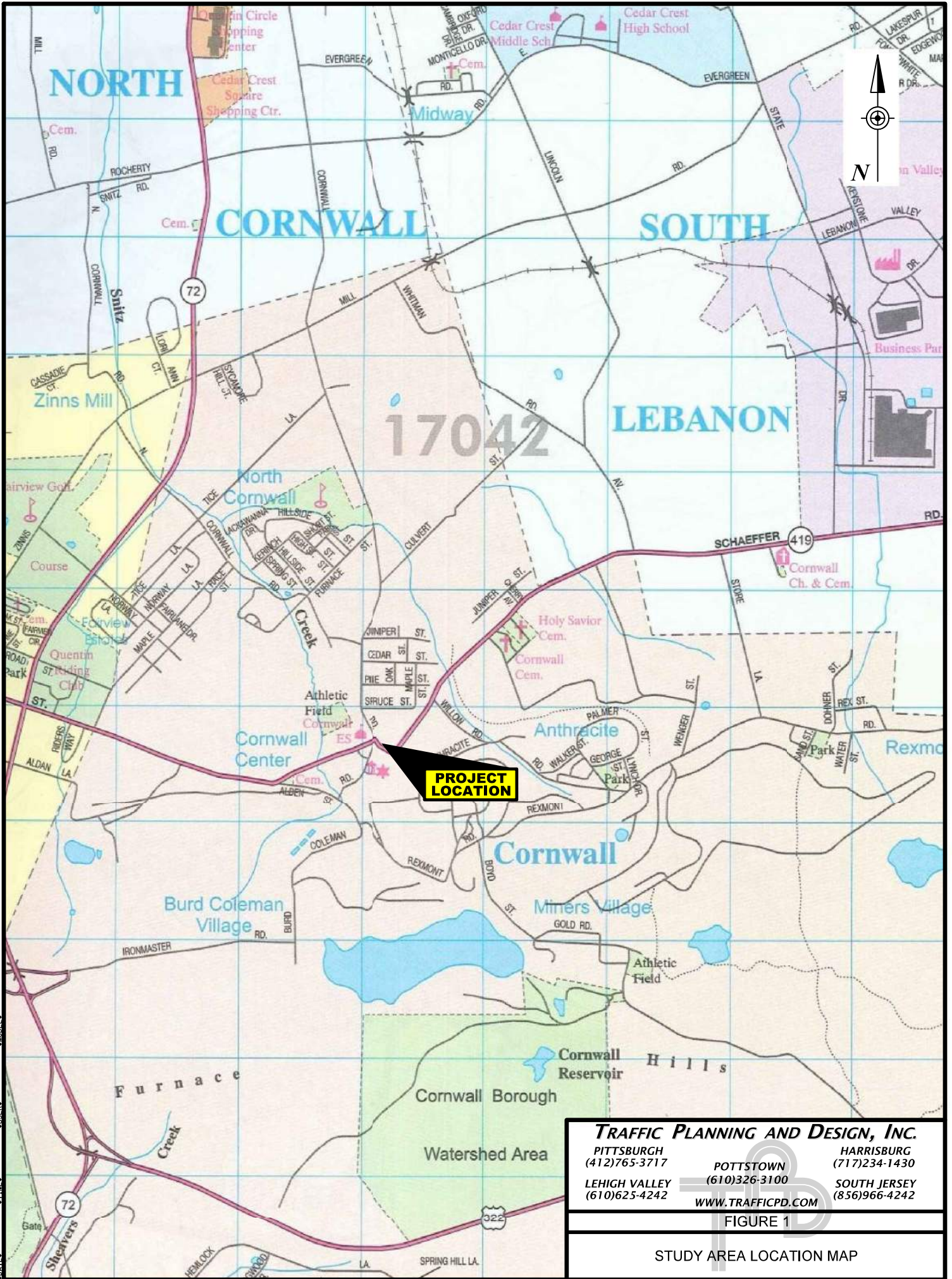
TABLE 8
95TH PERCENTILE QUEUE SUMMARY (FEET): WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement	Existing Conditions	2035 Future Conditions		
			Without Improvements	With Roundabout	With Signalization
Freeman Drive (Route 419) & Burd Coleman Road/ Cornwall Road	EB	137	794	75	275
	WB	5	10	100	540
	NB	68	192	25	118
	SB	128	797	75	405
Schaeffer Road (Route 419) & Boyd Street/Cornwall Road	EB	9	3	9	696
	WB	85	123	125	228
	SB L	97	174	164	48
	SB R				36

The distance between the study area intersections is approximately three hundred (300) feet. As shown in **Table 8**, under the signalization scenario, the queues in both directions between the intersections (westbound and eastbound Cornwall Road, respectively) exceed the available stacking area.

CONCLUSIONS

As a result of the Cornwall Center Multimodal Transportation Study, TPD identified two (2) improvement scenarios to be considered by LEBCO MPO and the project stakeholders as part of the long-range planning process for the study area intersections.



PROJECT LOCATION

TRAFFIC PLANNING AND DESIGN, INC.

PITTSBURGH
(412)765-3717

POTTSTOWN
(610)326-3100

HARRISBURG
(717)234-1430

LEHIGH VALLEY
(610)625-4242

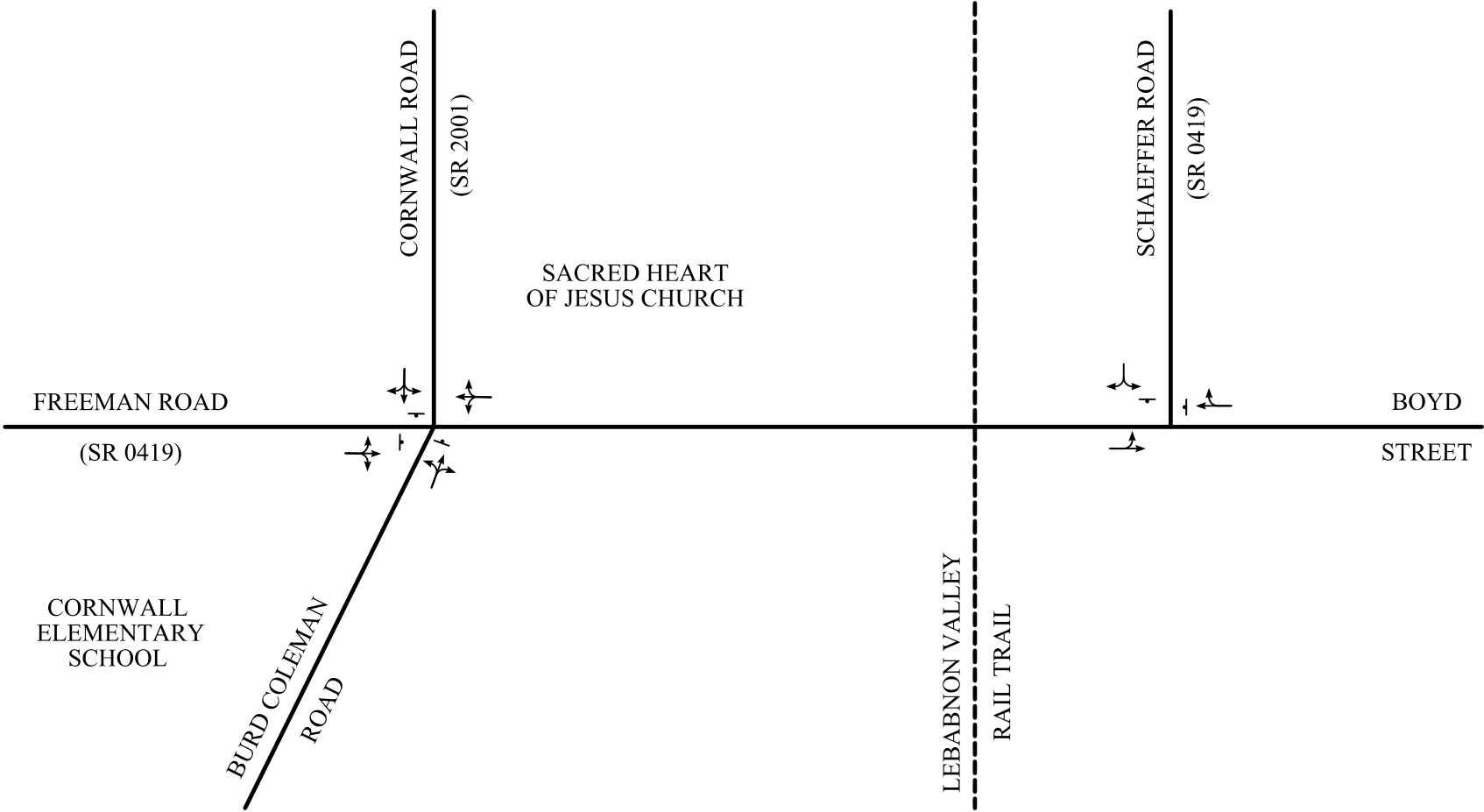
WWW.TRAFFICPD.COM

SOUTH JERSEY
(856)966-4242

FIGURE 1

STUDY AREA LOCATION MAP

\$FILES \$SPLATS \$TIMES \$SUBSECS \$MODELS



KEY:

— STOP CONTROLLED

SCHEMATIC DRAWING: NOT TO SCALE

TRAFFIC PLANNING AND DESIGN, INC.

PITTSBURGH
(412)765-3717

POTTSTOWN
(610)326-3100

HARRISBURG
(717)234-1430

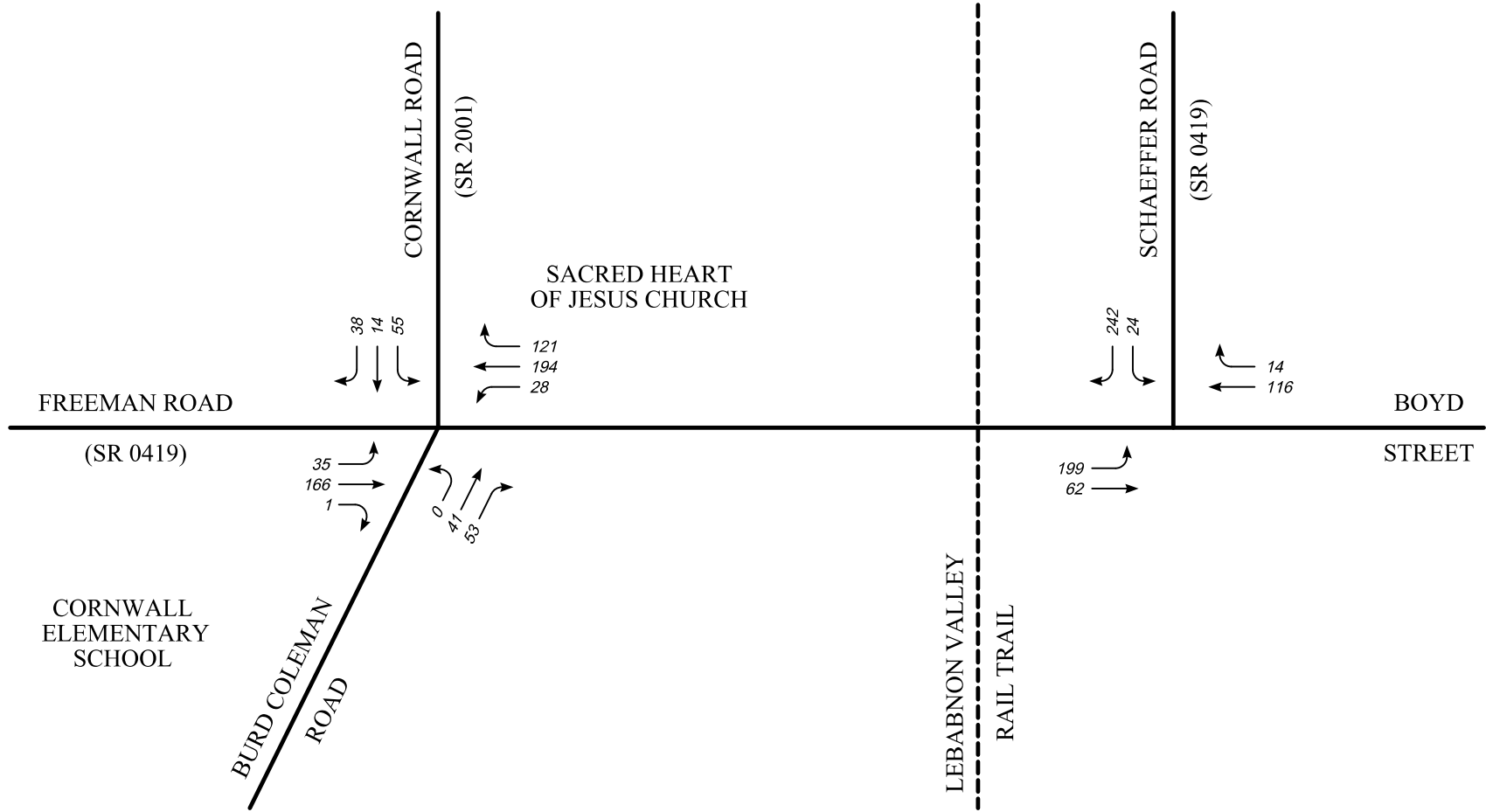
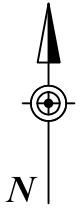
LEHIGH VALLEY
(610)625-4242

WWW.TRAFFICPD.COM

SOUTH JERSEY
(856)966-4242

FIGURE 2

EXISTING LANE CONFIGURATION
AND INTERSECTION CONTROLS



KEY:
SCHEMATIC DRAWING: NOT TO SCALE

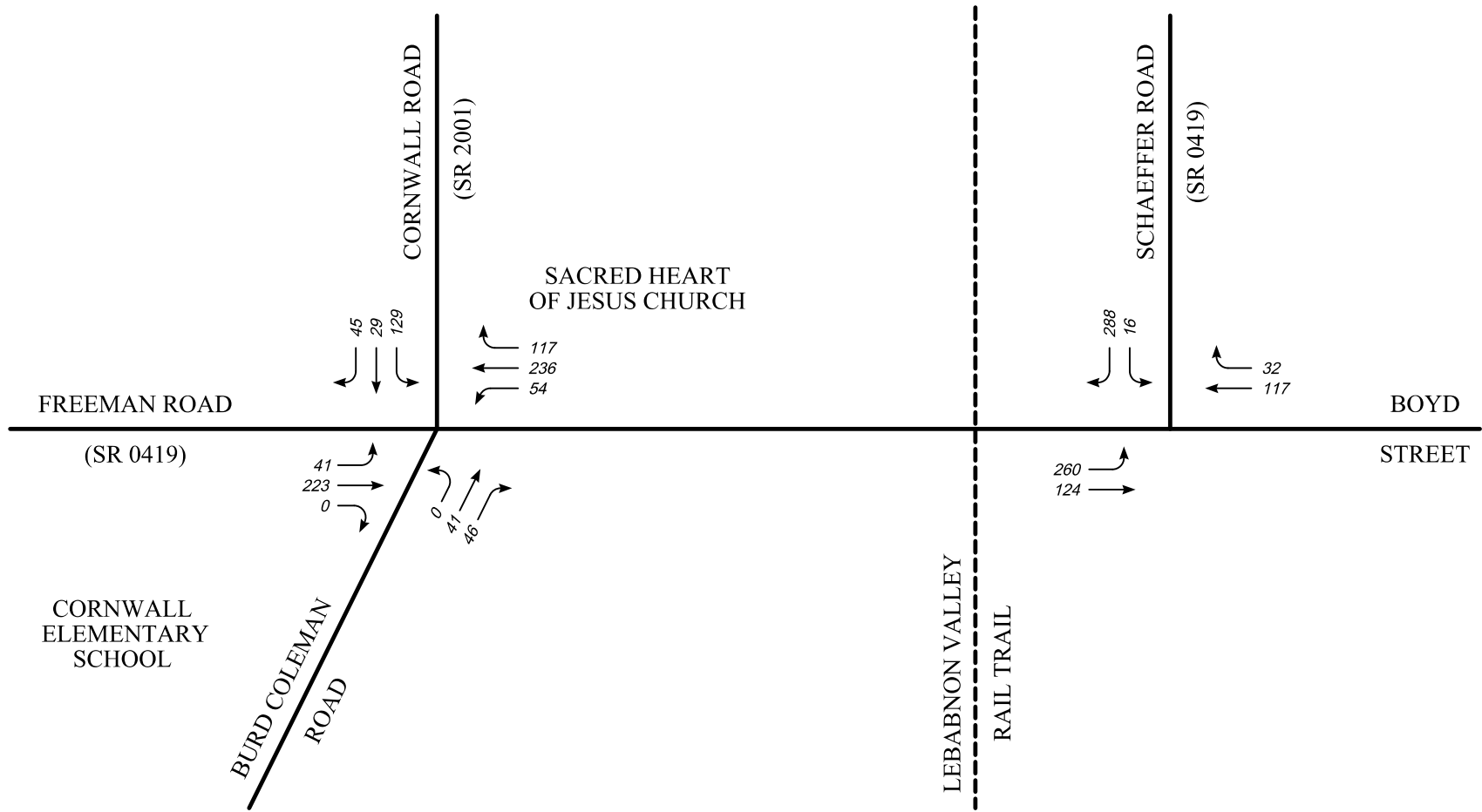
TRAFFIC PLANNING AND DESIGN, INC.

PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	SOUTH JERSEY (856)966-4242	

WWW.TRAFFICPD.COM

FIGURE 3

EXISTING CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES



KEY:
 SCHEMATIC DRAWING: NOT TO SCALE

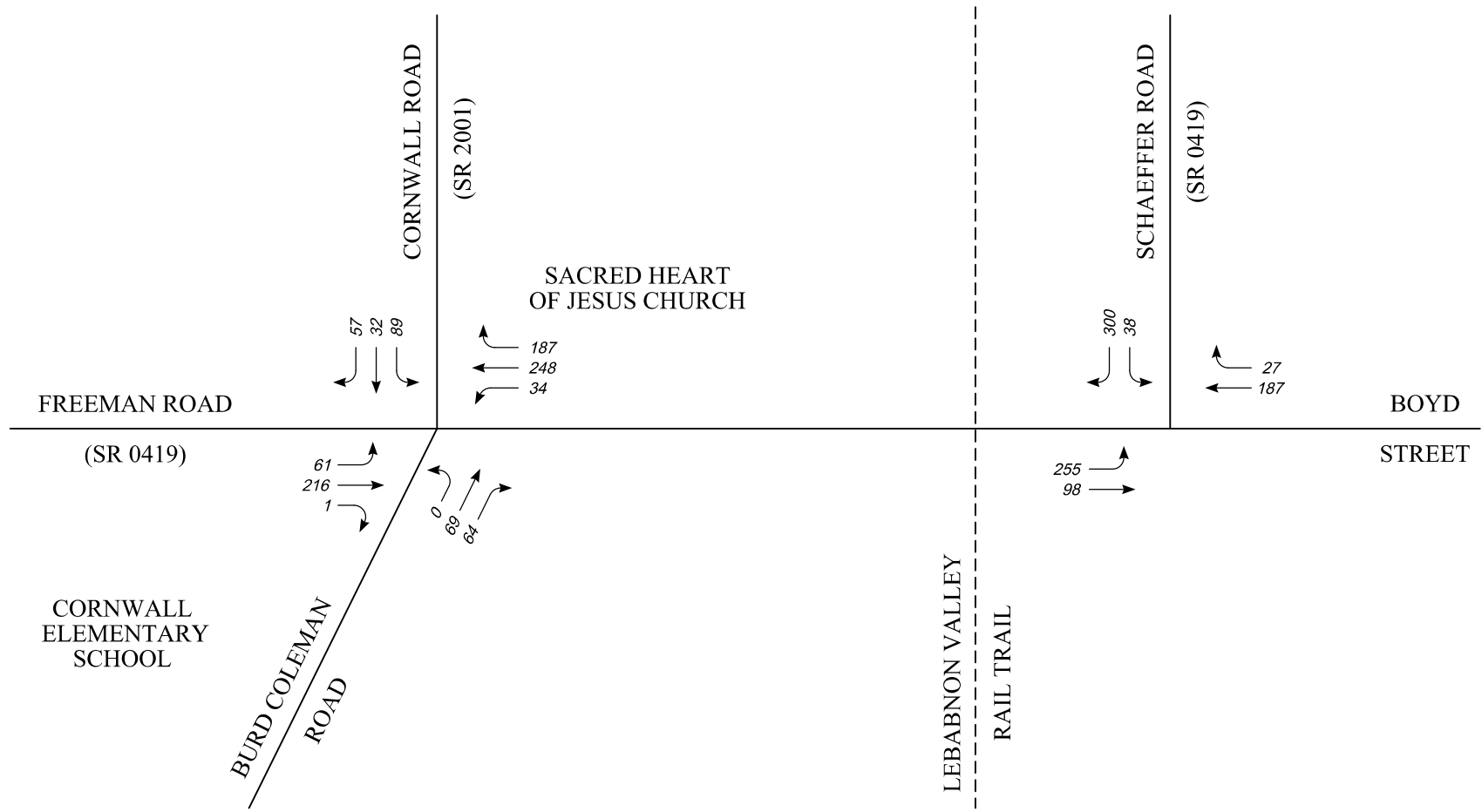
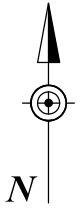
TRAFFIC PLANNING AND DESIGN, INC.

PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	SOUTH JERSEY (856)966-4242	

WWW.TRAFFICPD.COM

FIGURE 4

EXISTING CONDITIONS
 WEEKDAY PM PEAK HOUR
 TRAFFIC VOLUMES



KEY:
 SCHEMATIC DRAWING: NOT TO SCALE

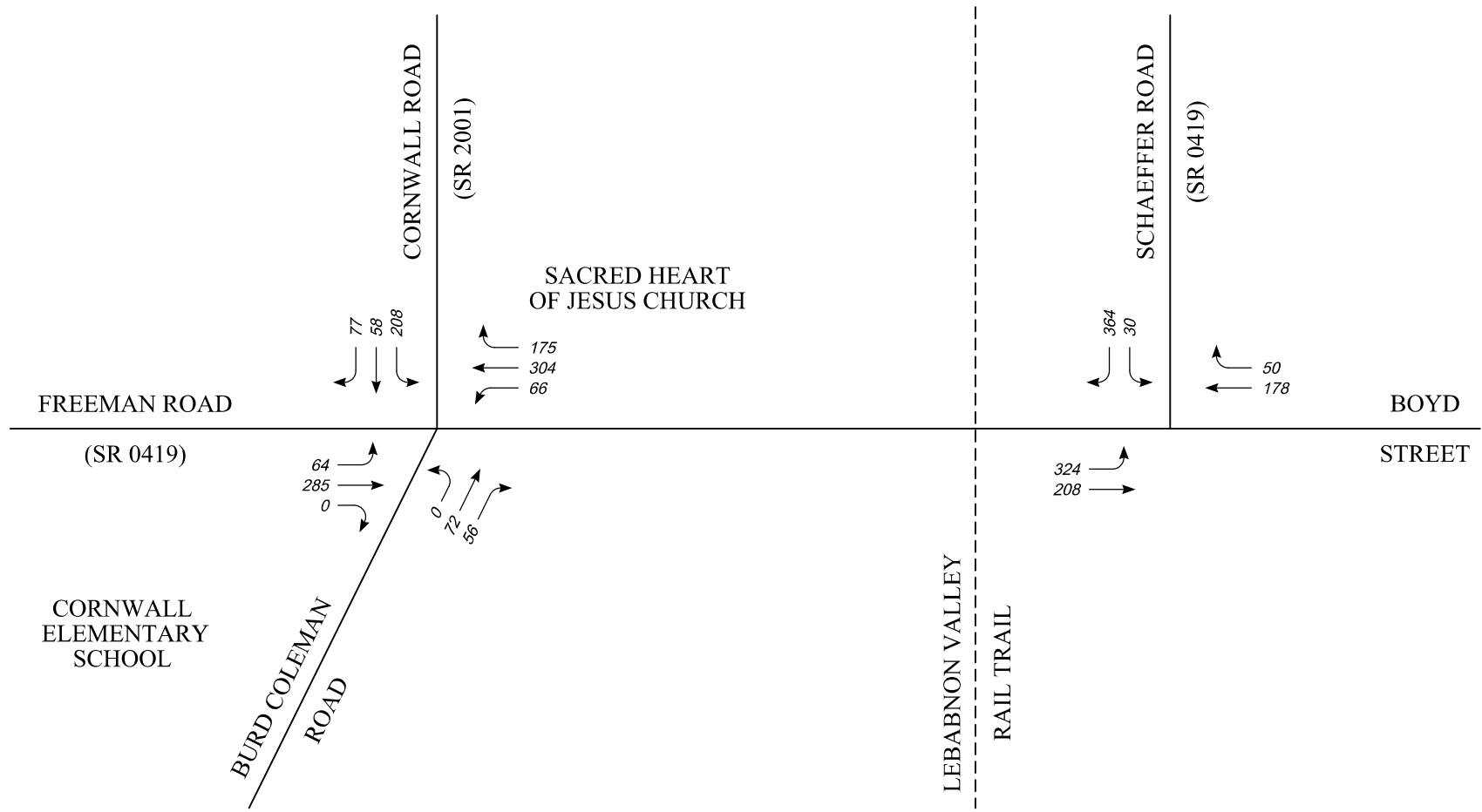
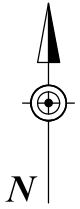
TRAFFIC PLANNING AND DESIGN, INC.

PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	SOUTH JERSEY (856)966-4242	

WWW.TRAFFICPD.COM

FIGURE 5

2035 FUTURE CONDITIONS (20-YEAR BUILD-OUT)
 WEEKDAY AM PEAK HOUR
 TRAFFIC VOLUMES



KEY:
SCHEMATIC DRAWING: NOT TO SCALE

TRAFFIC PLANNING AND DESIGN, INC.

PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	SOUTH JERSEY (856)966-4242	

WWW.TRAFFICPD.COM

FIGURE 6

2035 FUTURE CONDITIONS (20-YEAR BUILD-OUT)
 WEEKDAY PM PEAK HOUR
 TRAFFIC VOLUMES

APPENDIX A

PROJECT CORRESPONDENCE

Lincoln, Chris

From: Mountz, Eric
Sent: Monday, July 20, 2015 11:42 AM
To: Danz, S (sdanz@cornwall-pa.com)
Cc: Tom Kotay (dtkotay@comcast.net); Jon Fitzkee (jfitzkee@lebcnty.org)
Subject: Cornwall Center Multi-Modal Study - Meeting Follow Up

Steve,

Thank you for the time to meet with Borough staff on July 15th to gain preliminary feedback regarding the Cornwall Center Multi-Modal Study to be completed by TPD in the coming months on behalf of the Lebanon County Planning Department (LCPD). Below is a brief summary of the key takeaways from the meeting:

- Borough staff indicated that their preferred alternative is a roundabout at the intersection of Route 419/Cornwall Road/Burd Coleman Road since it would provide for traffic calming through the area, increase pedestrian safety and allow for a gateway feature into the Borough.
- Borough staff indicated that if a roundabout is identified as the preferred alternative, the design will need to be large enough to accommodate tractor trailers.
- Borough staff questioned who would pay for the additional sidewalk in the area. Tom Kotay indicated that the County would pay any sidewalk within the limits of the selected project, however, the Borough would be responsible for anything outside the limits. It was noted that the Borough does have an ordinance regarding sidewalk.
- Borough staff indicated that, if possible, impacts should be minimized for the residential property located on the SE corner of the intersection. Eric Mountz indicated that providing proper alignment will likely shift the bulk of the improvements to the NW corner of the intersection. Borough staff indicated that the NW corner is owned by the Freeman Family Trust which is managed by PNC Bank out of Philadelphia.
- Borough staff questioned the time of implementing the improvements identified via the study. Tom Kotay indicated that the timing will be subject to available funding, however, he would expect physical construction of the improvements to occur within the next 4-6 years.

Please let me know if there are any questions.

Eric Mountz, P.E., PTOE

Project Manager



Traffic Planning and Design, Inc.

1426 North Third Street
Suite 250
Harrisburg, PA, 17102
717.234.1430

www.TrafficPD.com

Lincoln, Chris

From: Mountz, Eric
Sent: Thursday, September 17, 2015 4:57 PM
To: 'mrobinson@clsd.k12.pa.us'
Cc: Jon Fitzkee (jfitzkee@lebcnty.org); Tom Kotay (dtkotay@comcast.net)
Subject: Cornwall Center Multi-Modal Study - Meeting Follow Up

Mike,

Thank you for the meeting earlier today to discuss the Cornwall Center Multi-Modal Study to be completed by TPD in the coming months on behalf of the Lebanon County Planning Department (LCPD). Below is a brief summary of the key takeaways from the meeting:

- Cornwall Center is comprised the Route 419 intersections with Cornwall Road, Burd Coleman Road and Boyd Street.
- TPD is working with the LCPD to complete a planning study to evaluate alternatives for potential improvements to Cornwall Center. The scope of work does not include any physical improvements at this time.
- Based upon the interviews with other stakeholders in the project, two alternatives that have been identified for consideration are: (1) a roundabout at the intersection of Route 419/Cornwall Road/Burd Coleman Road and geometric/signing improvements at the intersection of Route 419/Boyd Street; and (2) traffic signalization and turn lanes at both route 419 intersections.
- The Cornwall Elementary School (CES) currently designates the Sacred Heart Church at the intersection of Route 419/Cornwall Road/Burd Coleman Road as an evacuation shelter. Therefore, if an evacuation situation were to occur, students will need the ability to safely and efficiently cross the subject intersection. As an aside, the church located to the west of the school is also a designated evacuation shelter.
- On an as needed basis, the CES utilizes the parking lot that serves the Sacred Heart Church for overflow parking. In these instances, students/parents need to cross the intersection of Route 419/Cornwall Road/Burd Coleman Road.
- There is a pedestrian tunnel located under Route 419 to the west of Cornwall Road/Burd Coleman Road.
- If the improvements identified in the study facilitate the need to acquire property from the school district in the triangular area between Route 419 and Burd Coleman Road, the district may be open to the discussions as long as the improvements do not impact the monument and associated landscape area generally located in the center of the triangular area. You also indicated that the parking area to the rear of the triangular area must remain, along with the associated access to/from Route 419 and Burd Coleman Road.
- The CES is currently served by 8 buses and 3 vans. However, Brightbill Transportation houses approximately 30 buses on a lot located on the northern side of Route 419, opposite the CES. All but 2 buses for the area school district originate from the subject lot. A majority of these buses travel through the intersection of Route 419/Cornwall Road/Burd Coleman Road.

- The peak times for bus/parent drop-off/pick-up at the CES occur between 8:40-9:15 am and 3:15-3:45 pm.
- As a rule-of-thumb, there are anywhere from 40-120 students dropped-off/picked-up on a daily basis.
- There are a total of approximately 50 employees at the CES. Approximately 35-40 of the employees arrive/depart during the peak times referenced for bus/parent drop-off/pick-up.
- Parents drop-off/pick-up in the internal loop accessed via Route 419.
- Buses drop-off/pick-up in the internal loop accessed via Burd Coleman Road.

Please let me know if there are any questions.

Thanks,
Eric

Eric Mountz, P.E., PTOE

Project Manager



Traffic Planning and Design, Inc.

1426 North Third Street
Suite 250
Harrisburg, PA, 17102
717.234.1430

www.TrafficPD.com

Connect with us!



Lincoln, Chris

From: Susan Eberly <seberly@lvedc.org>
Sent: Friday, September 11, 2015 1:05 PM
To: Mountz, Eric
Subject: RE: Cornwall Center Multimodal Study

Eric:

Sorry for the delayed response. I keep trying to come up with some creative answers, but I have not heard any negative or positive concerns regarding this area. I sent out an email to my Park Association members for their feedback. Hopefully, they can elaborate on any concerns. We do not track trucking statistics.

I would think that the turn at 419 and Cornwall would be narrow for tractor trailer trucks.

From personal bike riding experience the shoulder along Route 419 is very limited.

Sorry I cannot be more of a help.

With your expertise and the staff at County Planning you will come up with a nice plan.

Best Regards,
Susan

SUSAN EBERLY, President
Lebanon Valley Economic Development Corporation
16 Lebanon Valley Parkway, Lebanon, PA 17042
t: 717-274-3180 --- c: 717-269-2299



From: Mountz, Eric [mailto:emountz@trafficpd.com]
Sent: Friday, September 11, 2015 11:49 AM
To: 'seberly@lvedc.org' <seberly@lvedc.org>
Cc: Tom Kotay (dtkotay@comcast.net) <dtkotay@comcast.net>; Jon Fitzkee (jfitzkee@lebcnty.org) <jfitzkee@lebcnty.org>
Subject: Cornwall Center Multimodal Study

Susan,

As you are aware, we've recently been playing phone tag, so I'm going to try and connect via email. As I've described in my voicemails, my firm, Traffic Planning & Design (TPD), is working with the Lebanon County Planning Department to prepare a Multimodal Study for Cornwall Center. The purpose of this study is to evaluate future roadway improvements (vehicular, bike and pedestrian) at

the Route 419 intersections with Cornwall Road/Burd Coleman Road and Boyd Street. In conjunction with our preliminary tasks, TPD is conducting interviews with key stakeholders in the project, with the Lebanon Valley Economic Development Corporation (LVEDC) being one such stakeholder given its proximity to the study area. Specifically, we are trying to obtain feedback regarding the following:

1. A general synopsis of truck traffic associated with the LVEDC to/from the noted Route 419 intersections being evaluated. The items we are looking for is frequency (i.e. a few trucks a day, a few trucks an hour, etc.), size of trucks (i.e. vans, box trucks, tractor trailers), typical routes (i.e. only utilize route 419, some use Cornwall Road, etc.).
2. Any specific considerations that the LVEDC feels need to be incorporated into the planning of future improvements at the noted Route 419 intersections.

We will be attending the LEBCO MPO Policy Board and technical Committee Meeting next Thursday (9/17), and would greatly appreciate your input in advance of that meeting.

Please feel free to contact me with any questions.

Thanks,
Eric

Eric Mountz, P.E., PTOE

Project Manager



Traffic Planning and Design, Inc.

1426 North Third Street
Suite 250
Harrisburg, PA, 17102
717.234.1430

www.TrafficPD.com

Connect with us!



Mountz, Eric

From: lauren.lake@us.schott.com
Sent: Monday, September 14, 2015 11:52 AM
To: Mountz, Eric

Hi Eric,

I got a report from my Warehouse guy, and here is the information for SCHOTT. He always directs trucks to follow either Rt 72 or Rt 422 whenever possible. He normally steers them away from Cornwall Road or Rt 419. He estimates we have about 45 trucks per 5 day week, so about 9 per day, mostly tractor trailers.

I hope this helps with your study.

Regards,

Lauren Lake
HR Director

Pharmaceutical Packaging
SCHOTT North America, Inc.
30 Lebanon Valley Parkway
Lebanon, PA 17042

phone: +1 717 228 4231
fax: +1 717 274 3190
emailto: lauren.lake@us.schott.com
<http://www.us.schott.com>

The information transmitted is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. Any review, retransmission, dissemination or other use of, or taking of any action in reliance upon, this information by persons or entities other than the intended recipient is prohibited. If you received this in error, please contact the sender and delete the material from any computer.

Mountz, Eric

From: Leon Kauffman <leon.kauffman@ka-hi.com>
Sent: Tuesday, September 15, 2015 10:48 AM
To: Mountz, Eric
Cc: seberly@lvedc.org
Subject: Multimodal Study for Cornwall Center

Mr. Mountz: Susan Eberly of LVEDC has asked us to provide information relative to truck traffic to our business, Kauffman's Animal Health, Inc., 21 Keystone Dr., Lebanon, Pa. Our best estimate is that we have six tractor trailers and three box trucks per day during our working hours, 6:00 AM to 5:00 PM. They would have to access State Drive via Rt. 419, Rocherty Rd. or directly from center city - it would depend on where they are coming from. This is the best we can do.

Leon J. Kauffman

Lincoln, Chris

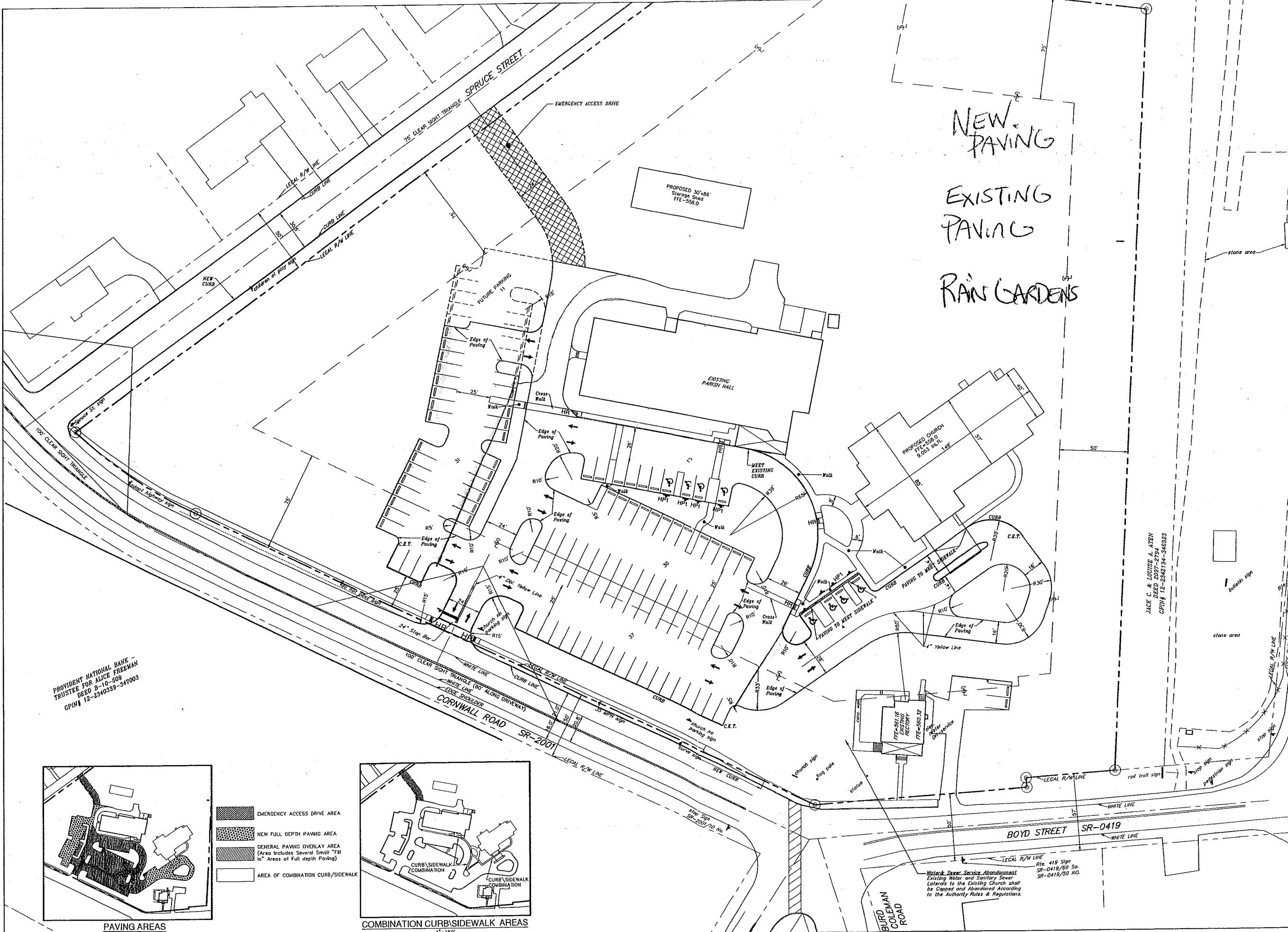
From: Mountz, Eric
Sent: Monday, July 20, 2015 12:04 PM
To: Dennis Tulli (tulli@comcast.net)
Cc: Tom Kotay (dtkotay@comcast.net); Jon Fitzkee (jfitzkee@lebcnty.org)
Subject: Cornwall Center Multi-Modal Study - Conference Call Follow Up

Dennis,

Thank you for your participation in the conference call on July 15th to gain the Church's preliminary feedback regarding the Cornwall Center Multi-Modal Study to be completed by TPD in the coming months on behalf of the Lebanon County Planning Department (LCPD). Below is a brief summary of the key takeaways from the call:

- The Church's Board indicated that their preferred alternative is a roundabout at the intersection of Route 419/Cornwall Road/Burd Coleman Road, however, they will defer to the engineer's recommendation for improvements. I indicated that in addition to the roundabout alternative, we will also evaluate a traffic signal alternative.
- I questioned the status of the current development project for the Church. You indicated that the project is currently underway, and that the existing driveway on Cornwall Road closest to Route 419 will be eliminated with the project. I also questioned if I could receive a copy of the land development plan for the project. You indicated that if an address was provided, a copy of the plan would be sent. **As such, I would request that you please forward a copy of the plan to my attention at the below address.**
- I questioned how much traffic is generated by the Church outside of Sunday during mass. You indicated that the Church is used by community groups for various events throughout the year, but that the bulk of traffic is on a Sunday. I indicated that our intention is to complete traffic counts on a Sunday at the Church in order to allow us to factor the traffic needs of the Church into our planning.
- You indicated that the Father's house is located in close proximity to Route 419, just east of Cornwall Road. Therefore, the Church's Board would like to be kept informed if the identified improvements will impact that property and/or require relocation of the house. I indicated that, at a minimum, there would likely be a sidewalk or trail located along the frontage of the property. You indicated that the Board has had preliminary discussions regarding the future need to relocate the Father's home, thus there may be an opportunity to work together to accommodate the project.
- You questioned the timing of implementing the improvements identified via the study. Tom Kotay indicated that the timing will be subject to available funding, however, he would expect physical construction of the improvements to occur within the next 4-6 years.
- In the context of a roundabout, I indicated that providing proper alignment will likely shift the bulk of the improvements to the NW corner of the intersection. You indicated that that property is owned by the Freeman Family Trust which is managed by PNC Bank out of Philadelphia.
- You indicated that a gas line was just installed under Route 419 in conjunction with the Church's development project.

Please let me know if there are any questions.



NEW PAVING
 EXISTING PAVING
 RAIN GARDENS

PROPOSED 30x86 Storage Shed
 FFE-558.0

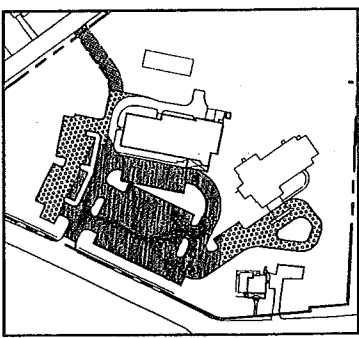
EMERGENCY ACCESS DRIVE

EXISTING PARISH HALL

PROPOSED CHURCH
 FFE-559.0
 9,953 sq. ft.

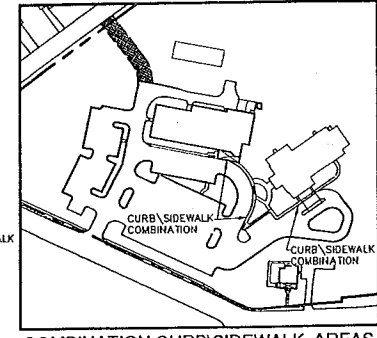
EXISTING RECTORY
 FFE-561.16
 FFE-560.12

PROVIDENT NATIONAL BANK -
 TRUSTEE FOR ALICE FREEMAN
 DEED 8-10-509
 CPIN# 12-2340393-347003



- EMERGENCY ACCESS DRIVE AREA
- NEW FULL DEPTH PAVING AREA
- GENERAL PAVING OVERLAY AREA
(Area Includes Several Small "7ft in" Areas of Full depth Paving)
- AREA OF COMBINATION CURB/SIDEWALK

PAVING AREAS
 1"=150'



COMBINATION CURB/SIDEWALK AREAS
 1"=150'

JACK C. & LOUISE A. ATEN
 DEED 2007-2794
 CPIN# 12-2342194-346923

Water & Sewer Service Abandonment
 Existing Water and Sanitary Sewer
 Laterals to the Existing Church shall
 be Capped and Abandoned According
 to the Authority Rules & Regulations.

PREPARED FOR OWNER
 SACRED HEART CHURCH
 2594 CORNWALL ROAD, CORNWALL PA 17016
 717-273-1574

DATE: FEBRUARY 14, 2014
 DRAWN BY: B. KOHR
 AS SHOWN

SCALE: AS SHOWN

SHEET 6 OF 18

DATE: 01-10-13 BRC per Bore Eng. review of 12-20-14
 08-14-14 BRC per Bore Eng. review of 07-03-14
 08-02-14 BRC per Bore Eng. review of 03-09-14 & County review of 02-28-14

SOURCE OF TITLE: DEED BK. PAGE VOLUME TRACT
 05F 12-2341725-346818 2159 3075

REVISION

Matthew & Fockley Associates, Ltd.
 ENGINEERING & SURVEYING

340 SOUTH EIGHTH STREET
 LEBANON, PENNSYLVANIA 17042
 PHONE: (717) 272-8026
 FAX: (717) 274-3586
 www.mfassoc.com

PRELIMINARY/FINAL LAND DEVELOPMENT PLAN
 LAYOUT PLAN
 FOR
 ROMAN CATHOLIC CONGREGATION OF SACRED
 HEART OF JESUS CHURCH,
 CORNWALL, LEBANON COUNTY, PA
 SITUATED IN
 CORNWALL BOROUGH, LEBANON COUNTY, PA.

Lincoln, Chris

From: Mountz, Eric
Sent: Monday, August 31, 2015 2:33 PM
To: 'tgiurintano@lebanontransit.org'
Cc: Tom Kotay (dtkotay@comcast.net); Jon Fitzkee (jfitzkee@lebcnty.org)
Subject: Cornwall Center Multi-Modal Transportation Study - Conference Call Follow Up

Teri,

Thank you for your participation in the conference call on August 24th to gain preliminary feedback from Lebanon Transit (LT) regarding the Cornwall Center Multi-Modal Study to be completed by TPD in the coming months on behalf of the Lebanon County Planning Department (LCPD). Below is a brief summary of the key takeaways from the call:

- LT believes that transit service will come to Cornwall Borough in the future as future development comes to the area.
- LT requests that planning for future roadway improvements at the Cornwall Center intersections consider transit vehicles.
- LT requests that a pull-off/small shelter be considered as part of the planning for future roadway improvements.

Please let me know if there are any questions.

Thanks,
Eric

Eric Mountz, P.E., PTOE

Project Manager



Traffic Planning and Design, Inc.

1426 North Third Street
Suite 250
Harrisburg, PA, 17102
717.234.1430

www.TrafficPD.com

Connect with us!     

Lincoln, Chris

From: Mark Wilson <markw@wcg-pc.com>
Sent: Monday, September 14, 2015 10:17 AM
To: Mountz, Eric
Cc: Tom Kotay (dtkotay@comcast.net); Jon Fitzkee (jfitzkee@lebcnty.org); John Wengert (John_Wengert@deanfoods.com)
Subject: RE: Cornwall Center Multimodal Study

As a follow up to your call....

I do not know of any plans to relocate any of the trail facilities outside of the existing County trail property (former railbed) in or around Cornwall
The Trailhead will remain at its current location within County property

Any improvements to the roadway outside of the trail should consider safety of trail users crossing the road as well as users entering the trail from the road and leaving the trail to enter the road....
As you know this is a very complicated intersection....probably worse for cyclists using the roadway....

Mark G. Wilson, P.E.

PRESIDENT

WILSON CONSULTING GROUP, P.C.

100 Old Schoolhouse Lane
Mechanicsburg, PA 17055
Phone: (717) 591-3070 ext. 10
Fax: (717) 591-3071
Email: markw@wcg-pc.com

Website: www.wcg-pc.com

From: Mark Wilson
Sent: Sunday, September 13, 2015 11:49 AM
To: 'Mountz, Eric' <emountz@trafficpd.com>
Cc: Tom Kotay (dtkotay@comcast.net) <dtkotay@comcast.net>; Jon Fitzkee (jfitzkee@lebcnty.org) <jfitzkee@lebcnty.org>
Subject: RE: Cornwall Center Multimodal Study

I just got back into town

Please call me on Monday the 14th after 930 am and we can discuss...

Mark G. Wilson, P.E.

PRESIDENT

WILSON CONSULTING GROUP, P.C.

100 Old Schoolhouse Lane

Mechanicsburg, PA 17055
Phone: (717) 591-3070 ext. 10
Fax: (717) 591-3071
Email: markw@wcg-pc.com

Website: www.wcg-pc.com

From: Mountz, Eric [<mailto:emountz@trafficpd.com>]
Sent: Friday, September 11, 2015 11:37 AM
To: Mark Wilson <markw@wcg-pc.com>
Cc: Tom Kotay (dtkotay@comcast.net) <dtkotay@comcast.net>; Jon Fitzkee (jfitzkee@lebcnty.org) <jfitzkee@lebcnty.org>
Subject: Cornwall Center Multimodal Study

Mark,

As you are aware, we've recently been playing phone tag, so I'm going to try and connect via email. As I've described in my voicemails, my firm, Traffic Planning & Design (TPD), is working with the Lebanon County Planning Department to prepare a Multimodal Study for Cornwall Center. The purpose of this study is to evaluate future roadway improvements (vehicular, bike and pedestrian) at the Route 419 intersections with Cornwall Road/Burd Coleman Road and Boyd Street. In conjunction with our preliminary tasks, TPD is conducting interviews with key stakeholders in the project, with the Lebanon Valley Rail-Trail (LVRT) being one such stakeholder given its proximity to the study area. Given your firm's current work associated with the LVRT, Tom Kotay requested that I reach out to you to gain an understanding of the currently proposed improvements. If possible, it would be greatly appreciated if you could please provide me with a quick synopsis of the proposed improvements, along with any documents/plans that would be beneficial in our preparation of the Multimodal Study.

We will be attending the LEBCO MPO Policy Board and technical Committee Meeting next Thursday (9/17), and would greatly appreciate your input in advance of that meeting.

Please feel free to contact me with any questions.

Thanks,
Eric

Eric Mountz, P.E., PTOE

Project Manager



Traffic Planning and Design, Inc.

1426 North Third Street
Suite 250
Harrisburg, PA, 17102
717.234.1430

www.TrafficPD.com

Mountz, Eric

From: LVBC President <president@bikelebanon.org>
Sent: Wednesday, July 29, 2015 11:52 AM
To: dtkotay@comcast.net; Mountz, Eric
Cc: Gordon & Jeannie Wirth; Michelle Robinson; Jonathan
Subject: Re: Cornwall Center Multi-Modal Study - Conference Call Follow Up

Hi

I've skimmed through the summary and may find other additions/corrections or Gordon, Ed, Michelle may have something to edit or add from the conference call discussion.

1. correction: Pat raised the issue of the electric assist bikes; Ed Krebs continued this topic.
2. There was discussion about doing counts including use of the rail trail. Pat raised the point that the rail trail count should be taken on a Saturday PM or a Sunday PM.
- 3 clarification: The FHWA has recommended to all the state DOTs that they use both AASHTO guide and NACTO guide in designing bike facilities. There's no assurance that Penn DOT will do this. We argue for their use at the MPO, municipal and state levels. Many state DOTs adopt the MUTCD in total; Penn DOT has a process that only adds the facilities /signs/road markings, etc that they want to use. I was told that they will be changing the process because they recognized that they left out signs that were appropriate for use.
4. clarification: In general, LVBC is not opposed to traffic signals if they detect bikes and provide the appropriate bike facilities as recommended by AASHTO.

We are ok with a roundabout at the Cornwall, 419, Burd Coleman intersection if done correctly for all users as noted in your summary.

Perhaps, your study will lead to the use of a traffic signal as some part of the "plan". If so, bike facilities including detection should be included.

5. The commentary provided prior to the phone call should be considered part of the stakeholder input.

Pat

From: dtkotay@comcast.net
Sent: Tuesday, July 28, 2015 12:33 PM
To: [Mountz, Eric](#)
Cc: [LVBC, President](#) ; [Gordon & Jeannie Wirth](#) ; [Michelle Robinson](#) ; [Jonathan](#)
Subject: Re: Cornwall Center Multi-Modal Study - Conference Call Follow Up

Eric:

Thanks for the summary! Please let Jon and I know if you need any help getting the remaining stakeholder 1-hour interviews scheduled.

Tom

From: "Eric Mountz" <emountz@trafficpd.com>

To: "LVBC President" <president@bikelebanon.org>, "Gordon & Jeannie Wirth" <Gordon.Wirth@comcast.net>, "Michelle Robinson" <robinson.architect@verizon.net>

Cc: "Tom Kotay (dtkotay@comcast.net)" <dtkotay@comcast.net>, "Jon Fitzkee (jfitzkee@lebcnty.org)" <jfitzkee@lebcnty.org>

Sent: Tuesday, July 28, 2015 12:01:14 PM

Subject: Cornwall Center Multi-Modal Study - Conference Call Follow Up

All,

Thank you for your participation in the conference call on July 24th to gain the Lebanon Valley Bicycle Coalition's (LVBC) preliminary feedback regarding the Cornwall Center Multi-Modal Study to be completed by TPD in the coming months on behalf of the Lebanon County Planning Department (LCPD). Prior to the call, the LVBC provided the attached comments.

Below is a brief summary of the key takeaways from the call:

- Eric indicated that Cornwall Center is comprised the Route 419 intersections with Cornwall Road, Burd Coleman Road and Boyd Street.
- Eric reiterated that TPD is working with the LCPD to complete a planning study to evaluate alternatives for potential improvements to Cornwall Center. The scope of work does not include any physical improvements at this time.
- Eric indicated that based upon the initial meetings with Cornwall Borough and the Church, two alternatives that have been identified for consideration are: (1) a roundabout at the intersection of Route 419/Cornwall Road/Burd Coleman Road and geometric/signing improvements at the intersection of Route 419/Boyd Street; and (2) traffic signalization and turn lanes at both route 419 intersections.
- Michelle indicated that the planning needs to incorporate/follow the Lebanon County Bike Map.
- Michelle questioned if Lebanon Transit needs to be a stakeholder in the project since the increase in population for the area will likely facilitate the need for public transit in the area.
- Gordon indicated that the existing configuration and stop-control at the Route 419 intersections with Cornwall Road, Burd Coleman Road and Boyd Street is unconventional and creates confusion for drivers and bicyclists. Eric responded that he agrees, and is one of the primary reason the LCPD has chosen to complete the subject planning study.
- Gordon questioned if operations could be improved by closing off Burd Coleman Road at its intersection with Route 410, and creating a new connector roadway between Route 419 and Burd Coleman Road? Eric responded that the closure is not likely.
- Michelle indicated that the crash history needs to be considered. Eric responded that it will be part of the planning study.
- Gordon indicated that the Church's driveway on Cornwall Road is very close to Route 419. Eric responded that the driveway is being eliminated in conjunction with their current project, and a new driveway is being provided to Cornwall Road further away from the intersection.
- Gordon questioned if there will be a need to install flashing lights to control bicycle/pedestrians at the rail trail crossing. Eric responded that this will be evaluated in conjunction with the planning study.
- Gordon questioned if it would be appropriate to flip the locations of the rail trail and parking lot on the northern side of Route 419 in order to get the crossing closer to the intersection rather than occurring

mid-block. Eric responded that it is not likely feasible to change the location of the rail trail, but noted that he will be coordinating with Wilson Engineering to determine what improvements are currently being considered in conjunction with their project regarding the trailhead.

- The group from the LVBC collectively agreed that they do not prefer traffic signals and don't have a problem with roundabouts, assuming that they are designed properly to accommodate the needs of all users. Gordon stressed the importance of not providing rumble strips in area of travel for bicyclists. Pat added that PennDOT **is to be following** the AASHTO, "Guide for the development of Bicycle Facilities", MUTCD and NACTO, "Urban Bikeway Design Guide".
- Pat stressed the importance of providing accommodations for bicyclists on the roadways because the rail trail is not open 24 hours and is often closed as a result of winter weather.
- Gordon indicated that the recent legalization of electric bicycle use could have a significant impact on the length of trip people are willing to make, and thus could increase bicycle use for the area.

Please let me know if there are any questions.

Eric Mountz, P.E., PTOE

Project Manager



Traffic Planning and Design, Inc.

1426 North Third Street
Suite 250
Harrisburg, PA, 17102
717.234.1430

www.TrafficPD.com

Connect with us!





July, 2015

Cornwall Borough – Bicycling through intersecting roadways

Cornwall Road, SR 419, Boyd Street, Burd Coleman Road, LVRT

The Lebanon County Bicycle Transportation Maps identify SR 419 as a Regional Road. Cornwall Road is identified as a Collector Road. Boyd Street is utilized as part of our scenic bike riding and specifically on our 75 mile Lebanon Valley ride which we anticipate becoming a signed route in the near future. This scenic route has cyclists turning right onto SR 419 from Boyd.

SR 419 has been designated a scenic byway and it is anticipated that in the future road conditions (wider shoulders) will be improved for cycling on the scenic byway. This will attract more cyclists.

LVBC does not have traffic data to know the level of truck traffic at the intersection of Cornwall Road and SR 419. We can identify from experience that truck traffic is significant on SR 419.

We recognize that when the North Cornwall Commons project and the Preserve at Cornwall are developed, motorized traffic will significantly increase. The VA business expansion and the soon to open Lancaster medical facility will generate traffic.

Many residents of Cornwall Borough and the adjoining municipalities are bicyclists. With appropriate bicycling facilities on SR 419 and Cornwall Road, this population of cyclists will increase.

A Safe Routes to School program / project can enable more students to bike/walk to the elementary school.

Some bicyclists travel to and from destinations on SR 72, Cornwall Road, the City of Lebanon by combining the use of the roads and the LVRT. When LVRT is not available for use between dusk and dawn and winter weather conditions which can last for weeks or months, they must resort to using roads including Cornwall Road and SR 419 segments.

This is not quite relevant but should be noted. Some cyclists travel in and out of the Cornwall Trailhead in order to use the toilet facilities.

LVBC is surveying bicyclists to have their views on how they maneuver through this set of roadways.

To date in order of receiving:

Cornwall Borough Resident

“The LVRT crossing 419 is my main concern. The intersections I believe could use improved crosswalk paint on the roads and better signage. However, I pass thru every day by car or bicycle and generally don't have any issues.

Drivers' not yielding to pedestrians and bicyclists crossing 419 on the LVRT. I would like to see a push button activated crossing gate, similar to a railroad crossing gate, that would drop across the road for 10 seconds. If this isn't feasible, then at least a red light that can be activated by trail users waiting to cross that would give drivers a little more caution and alert them to yield.”

Cornwall Borough Resident

“The 419/Cornwall Rd/Burd Coleman intersection has always been a problem area for me on a bike as well as in a car. I always have to stop and think of who is on the right, who got there first and then who has the right of way. Vehicles continuing West on 419 with their left hand blinker on.... are they turning on Burd Coleman or on 419? When I am in that same position on my bike and signal left, I always fear that a vehicle on the 419 corner at the West end of the intersection will think I am turning onto 419 and proceed into the intersection. I actually turn onto Burd Coleman (by the police station) so I end up right in the path of that oncoming vehicle. I don't know the number of accidents at this intersection but I know the potential is very high.

As for the Rail Trail crossing, the slight elevation change and limited sight distance from the 419 turn at the south and the confusing intersection to the north make it “less than ideal”. The railroad cross bar would probably be costly and serve to infuriate many who pass by but I really like the flashing lights in the roadway idea. If you used motion sensors instead of pushbuttons for activation you would probably have a more reliable system in that it would activate even if someone didn't think to hit the button. It would also activate for the occasional deer crossing the road.”

Lebanon County resident:

“The 419 /Cornwall Road intersection is just as much of a concern for drivers as cyclists. However, cyclists following 419 east must deal with a series of additional pressures: Starting up toward the trailhead parking lot, assuming cyclists stop or slow from the right side of 419, in a relatively short distance they must cross traffic to continue on to 419 building speed while going up the slight grade while surrounded by motor vehicles, wondering if the car coming down the hill sees them and crossing the rail trail crosswalk, as drivers' attentions are diverted by their preparation to turn, cars coming down the hill (with a stop sign) and also crossing the rail trail crosswalk. From a traffic engineer's perspective there are multiple conflict points. From a cyclist's perspective it is a trying few minutes.

For everybody's safety the turn must be given careful consideration with bicyclists and walkers considered part of the planning from the beginning not simply an add-on after the motor vehicle plans have been completed.”

Cornwall Borough Resident:

“I agree with the flashing lights at the Rail Trail crossing. Lititz has an effective system at the pedestrian crossing on Route 501 at the park entrance. It combines lights in the roadway with overhead lights. Depending on the curvature of the roadway approaches, a flashing yellow light at the side of the road before the crossing might also be a consideration.” This resident during a phone conversation noted the system used on the Capital Trail between Williamsburg area and plantations; this will be expanded to Richmond. They have flashing lights that require motorists to stop and allow pedestrians and cyclists to cross the major highway. There are no push buttons so presume they are motion sensitive.

Cornwall Borough Resident:

Phone interview – He is a veteran cyclist and travels between the City of Lebanon and Cornwall regularly. He finds Cornwall Road worse to bike than the multi intersection in the Borough. In the Borough, drivers/cyclists must be cognizant of what each other is doing so most are very cautious. He is against roundabouts for cyclists. Motorists don't know how to use roundabouts. Many motorists don't know the rights of cyclists to use the roads; he can't ride in the shoulder if there is debris, glass, etc. He wants cyclists to exercise visibility and make eye contact with motorists as much as possible. His major concern is distracted drivers and the numbers of distracted drivers continues to increase. If North Cornwall Commons is constructed, traffic will be greater. He mentioned the Lancaster Health System Center that will soon be opening.

Footnote: (LVBC did not “catch” this development by Lancaster General in time to insist on the appropriate bike facilities as part of this HOP. District 8 has yet to be consistent on requiring facilities for the bike/ped modes of transportation when approving HOPs. Cornwall Road is a critically important bicycle Collector Road.)

From: Ranieri, Robert <RRANIERI@pa.gov>
Sent: Wednesday, October 14, 2015 12:16 PM
To: Lincoln, Chris
Subject: Re: Crash Data – Cornwall Borough, Lebanon County - TPD# LCBO.00004 - CISA Log No. 16347
Attachments: log 16347-01eer.pdf; log 16347-01ees.pdf; log 16347-03eer.pdf; log 16347-03ees.pdf; log 16347-01ah.pdf; log 16347-03ah.pdf

Dear Mr. Lincoln,

Attached you will find crash data for a five year period starting from January 1, 2010 through December 31, 2014 for the locations below you requested in Cornwall Borough, Lebanon County. The reports you are receiving are the standard engineering extract summaries, resumes, and public history reports that we provide.

- Schaeffer Road (S.R. 0419) and Boyd Street
- Cornwall Road (S.R. 0419) and Lebanon Valley Rail Trail Crossing

Please note that there were no reportable crashes for a five year period starting from January 1, 2010 through December 31, 2014 for Cornwall Road (S.R. 0419), Burd Coleman Road (S.R. 2001) and Freeman Drive (S.R. 0419) in Cornwall Borough, Lebanon County and subsequently no reports were generated for it.

These data are the property of the Commonwealth of Pennsylvania, Department of Transportation. The data and information contained herein are part of a traffic engineering and safety study. This safety study is only provided to those official agencies or persons who have responsibility in the highway transportation system and may only be used by such agencies or persons for traffic safety-related planning or research. The information is confidential pursuant to 75 Pa. C.S. 3754 and 23 U.S.C. 409 and may not be published, reproduced, released, or discussed without the written permission of the PA Department of Transportation.

If you have any questions, please feel free to contact John Poremba at (717) 705-1471.

Robert A. Ranieri | CISA Manager / PA TRCC Coordinator
Pennsylvania Department of Transportation
Bureau of Maintenance and Operations
400 North St. Keystone Building | Harrisburg, PA 17120
Phone: 717.705.1470 | Fax: 717.783.8012
www.dot.state.pa.us

CONFIDENTIALITY NOTICE: This e-mail message, including any attachments, is for the sole use of the intended recipient(s) and may contain confidential and privileged information. Any unauthorized review, use, disclosure or distribution is prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy all copies of the original message.

APPENDIX B

STUDY AREA PHOTOGRAPHS



Direction / Road:	EB Freeman Drive
Approach / Departure:	Approach
Distance:	200 Feet



Direction / Road:	EB Freeman Drive
Approach / Departure:	Approach
Distance:	50 Feet



Direction / Road:	WB Cornwall Road/Boyd Street
Approach / Departure:	Approach
Distance:	200 Feet



Direction / Road:	WB Cornwall Road/Boyd Street
Approach / Departure:	Approach
Distance:	50 Feet



Direction / Road:
Approach / Departure:
Distance:

NB Burd Coleman Road

Approach

200 Feet



Direction / Road:
Approach / Departure:
Distance:

NB Burd Coleman Road

Approach

50 Feet



Direction / Road:	<u>SB Cornwall Road</u>
Approach / Departure:	<u>Approach</u>
Distance:	<u>200 Feet</u>



Direction / Road:	<u>SB Cornwall Road</u>
Approach / Departure:	<u>Approach</u>
Distance:	<u>50 Feet</u>



Direction / Road:	EB Cornwall Road
Approach / Departure:	Approach
Distance:	200 Feet



Direction / Road:	EB Cornwall Road
Approach / Departure:	Approach
Distance:	50 Feet



Direction / Road:	WB Boyd Street
Approach / Departure:	Approach
Distance:	200 Feet



Direction / Road:	WB Boyd Street
Approach / Departure:	Approach
Distance:	50 Feet



Direction / Road:
Approach / Departure:
Distance:

SB Schaeffer Road
Approach
200 Feet



Direction / Road:
Approach / Departure:
Distance:

SB Schaeffer Road
Approach
50 Feet



Direction / Road:	EB Cornwall Road
Approach / Departure:	Approach
Distance:	50 Feet



Direction / Road:	WB Boyd Street
Approach / Departure:	Approach
Distance:	50 Feet



Direction / Road:
Approach / Departure:
Distance:

NB Trail Crossing
Approach
50 Feet



Direction / Road:
Approach / Departure:
Distance:

SB Trail Crossing
Approach
50 Feet

APPENDIX C

MANUAL TRAFFIC COUNT DATA SHEETS

Cornwall Road & Freeman Drive/Burd Coleman Road

File Name : AM_PM_Cornwall_Freeman
 Site Code : AM_PM_Cornwall_Freeman
 Start Date : 5/14/2015
 Page No : 1

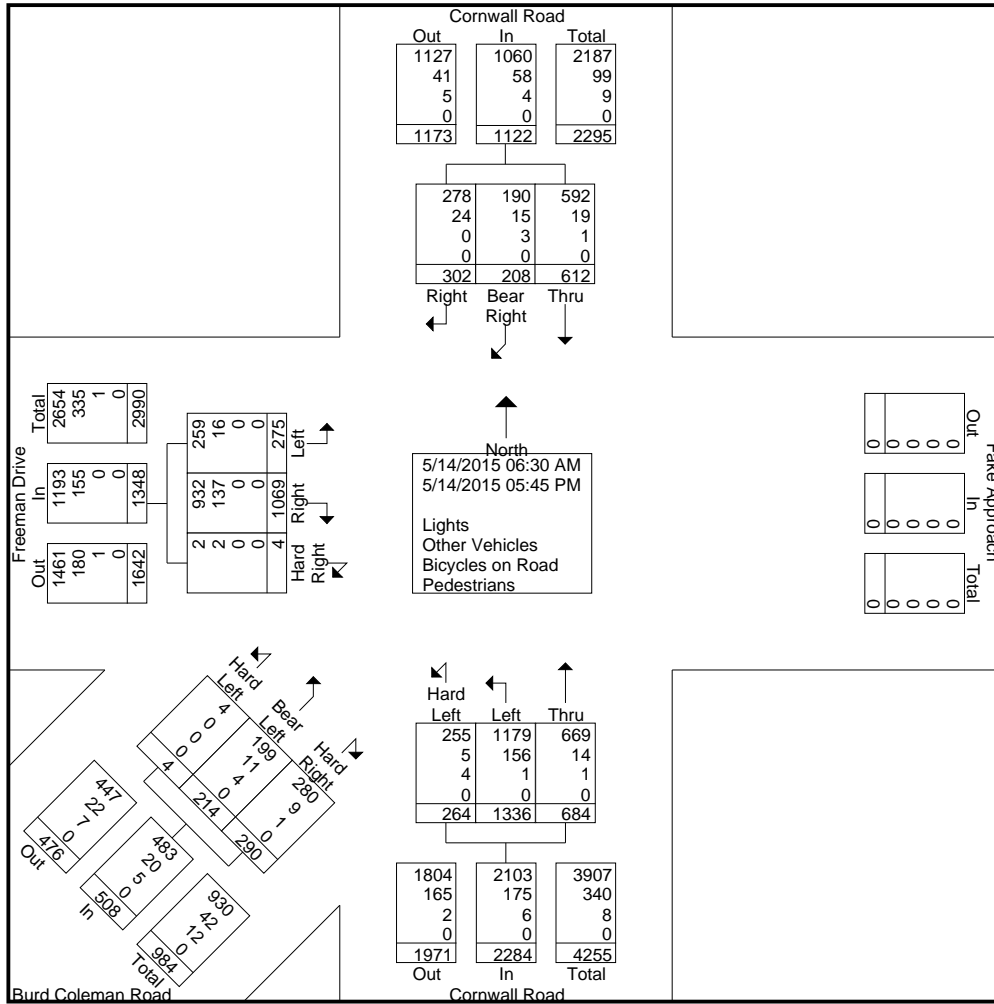
40.2767288708001, -76.4129470819171

Groups Printed- Lights - Other Vehicles - Bicycles on Road - Pedestrians

Start Time	Freeman Drive Eastbound					Cornwall Road Northbound					Cornwall Road Southbound					Burd Coleman Road Northeastbound					Exclu. Total	Inclu. Total	Int. Total
	Left	Right	Hard Right	Peds	App. Total	Hard Left	Left	Thru	Peds	App. Total	Thru	Bear Right	Right	Peds	App. Total	Hard Left	Bear Left	Hard Right	Peds	App. Total			
06:30 AM	9	35	1	49	45	10	49	16	0	75	13	7	12	49	32	0	10	9	0	19	98	171	269
06:45 AM	17	28	0	89	45	5	58	18	0	81	20	9	6	88	35	0	8	4	0	12	177	173	350
Total	26	63	1	138	90	15	107	34	0	156	33	16	18	137	67	0	18	13	0	31	275	344	619
07:00 AM	6	30	0	3	36	11	46	19	0	76	12	1	13	2	26	0	6	3	0	9	5	147	152
07:15 AM	5	39	0	0	44	9	53	27	0	89	12	4	12	0	28	0	5	10	0	15	0	176	176
07:30 AM	13	50	0	0	63	8	55	44	0	107	13	0	7	0	20	0	11	15	0	26	0	216	216
07:45 AM	11	43	1	1	55	5	47	34	0	86	20	2	5	0	27	0	18	12	0	30	1	198	199
Total	35	162	1	4	198	33	201	124	0	358	57	7	37	2	101	0	40	40	0	80	6	737	743
08:00 AM	6	34	0	0	40	6	39	16	0	61	10	8	14	0	32	0	7	16	0	23	0	156	156
08:15 AM	5	22	0	0	27	11	48	16	0	75	17	5	7	0	29	0	3	9	0	12	0	143	143
08:30 AM	5	24	0	0	29	8	37	15	0	60	16	7	11	0	34	0	5	10	0	15	0	138	138
08:45 AM	29	29	1	0	59	9	47	18	1	74	19	17	29	0	65	1	5	14	0	20	1	218	219
Total	45	109	1	0	155	34	171	65	1	270	62	37	61	0	160	1	20	49	0	70	1	655	656
09:00 AM	14	24	0	0	38	5	35	13	0	53	15	4	11	0	30	0	5	7	0	12	0	133	133
09:15 AM	11	25	0	0	36	5	36	21	0	62	11	6	5	0	22	0	2	4	0	6	0	126	126
09:30 AM	3	28	0	1	31	1	37	21	0	59	22	5	4	0	31	0	2	8	0	10	1	131	132
09:45 AM	4	31	0	0	35	6	48	17	0	71	12	3	4	0	19	0	0	9	0	9	0	134	134
Total	32	108	0	1	140	17	156	72	0	245	60	18	24	0	102	0	9	28	0	37	1	524	525
02:30 PM	5	24	0	0	29	9	36	22	0	67	26	10	4	0	40	0	5	8	0	13	0	149	149
02:45 PM	9	25	0	0	34	13	32	30	0	75	26	8	6	0	40	0	8	6	0	14	0	163	163
Total	14	49	0	0	63	22	68	52	0	142	52	18	10	0	80	0	13	14	0	27	0	312	312
03:00 PM	9	34	0	0	43	8	45	36	0	89	24	12	15	0	51	0	11	11	0	22	0	205	205
03:15 PM	6	37	0	0	43	12	57	30	0	99	29	11	18	0	58	0	6	12	0	18	0	218	218
03:30 PM	13	43	1	0	57	12	49	31	0	92	23	13	13	0	49	0	23	15	0	38	0	236	236
03:45 PM	8	47	0	0	55	12	52	19	0	83	26	10	11	0	47	1	6	14	0	21	0	206	206
Total	36	161	1	0	198	44	203	116	0	363	102	46	57	0	205	1	46	52	0	99	0	865	865
04:00 PM	10	57	0	0	67	12	56	39	0	107	22	5	16	0	43	0	4	9	0	13	0	230	230
04:15 PM	8	46	0	0	54	10	62	28	0	100	33	7	17	0	57	0	17	13	0	30	0	241	241
04:30 PM	9	64	0	0	73	20	66	27	0	113	25	10	10	0	45	0	9	13	0	22	0	253	253
04:45 PM	10	50	0	0	60	16	59	34	0	109	27	6	9	0	42	0	7	10	0	17	0	228	228
Total	37	217	0	0	254	58	243	128	0	429	107	28	52	0	187	0	37	45	0	82	0	952	952
05:00 PM	14	63	0	0	77	8	49	28	0	85	44	6	9	0	59	0	8	10	0	18	0	239	239
05:15 PM	15	39	0	0	54	12	50	29	0	91	39	10	15	0	64	0	9	16	0	25	0	234	234
05:30 PM	13	55	0	0	68	16	48	19	0	83	29	14	10	0	53	0	5	13	0	18	0	222	222
05:45 PM	8	43	0	0	51	5	40	17	0	62	27	8	9	0	44	2	9	10	0	21	0	178	178
Total	50	200	0	0	250	41	187	93	0	321	139	38	43	0	220	2	31	49	0	82	0	873	873
Grand Total	275	1069	4	143	1348	264	1336	684	1	2284	612	208	302	139	1122	4	214	290	0	508	283	5262	5545
Apprch %	20.4	79.3	0.3			11.6	58.5	29.9			54.5	18.5	26.9			0.8	42.1	57.1					
Total %	5.2	20.3	0.1	25.6		5	25.4	13	43.4		11.6	4	5.7	21.3		0.1	4.1	5.5	9.7		5.1	94.9	
Lights	259	932	2	1193		255	1179	669	2103		592	190	278	1060		4	199	280	483		0	0	4839
% Lights	94.2	87.2	50	0	80	96.6	88.2	97.8	0	92	96.7	91.3	92.1	0	84.1	100	93	96.6	0	95.1	0	0	87.3
Other Vehicles	16	137	2	155		5	156	14	175		19	15	24	58		0	11	9	20		0	0	408
% Other Vehicles	5.8	12.8	50	0	10.4	1.9	11.7	2	0	7.7	3.1	7.2	7.9	0	4.6	0	5.1	3.1	0	3.9	0	0	7.4
Bicycles on Road	0	0	0	0		4	1	1	6		1	3	0	4		0	4	1	5		0	0	15
% Bicycles on Road	0	0	0	0		1.5	0.1	0.1	0	0.3	0.2	1.4	0	0	0.3	0	1.9	0.3	0	1	0	0	0.3
Pedestrians	0	0	0	143		0	0	0	1		0	0	0	139		0	0	0	0		0	0	283
% Pedestrians	0	0	0	100	9.6	0	0	0	100	0	0	0	0	100	11	0	0	0	0	0	0	0	5.1

Cornwall Road & Freeman Drive/Burd Coleman Road

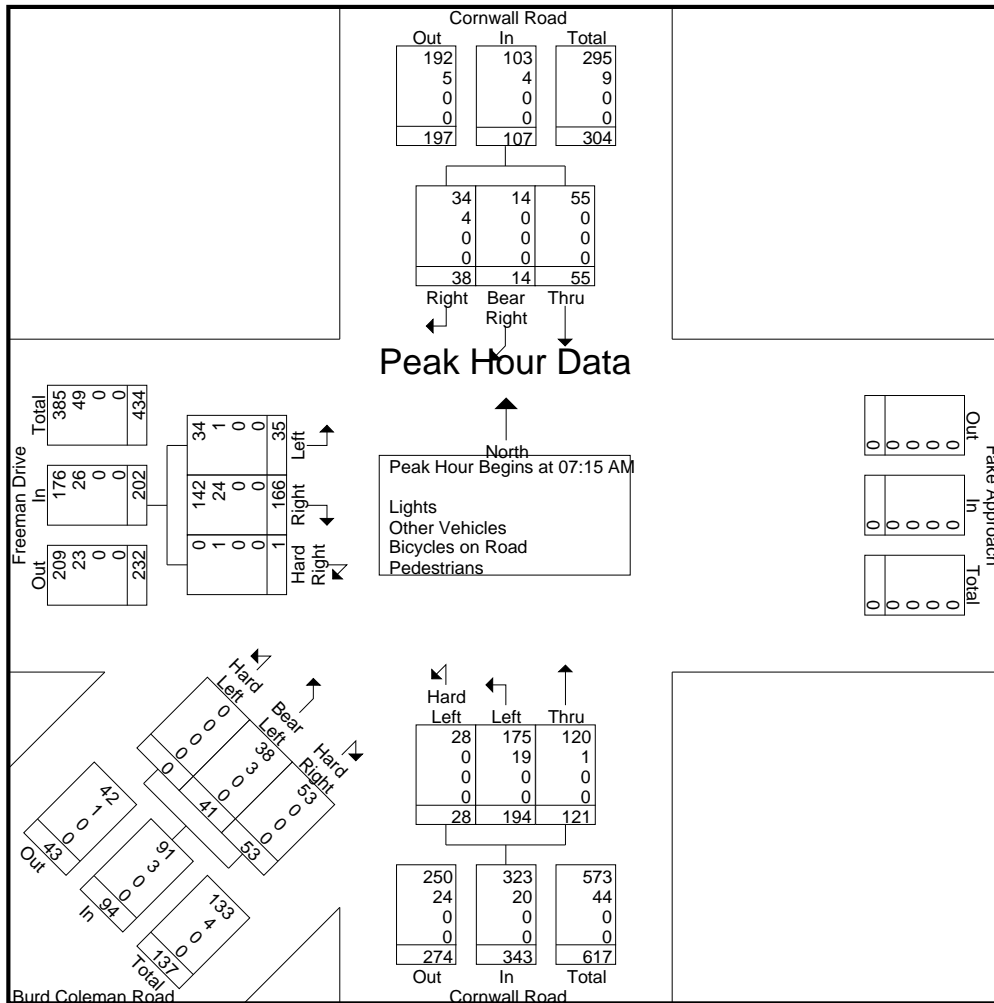
File Name : AM_PM_Cornwall_Freeman
 Site Code : AM_PM_Cornwall_Freeman
 Start Date : 5/14/2015
 Page No : 2



Cornwall Road & Freeman Drive/Burd Coleman Road

File Name : AM_PM_Cornwall_Freeman
 Site Code : AM_PM_Cornwall_Freeman
 Start Date : 5/14/2015
 Page No : 3

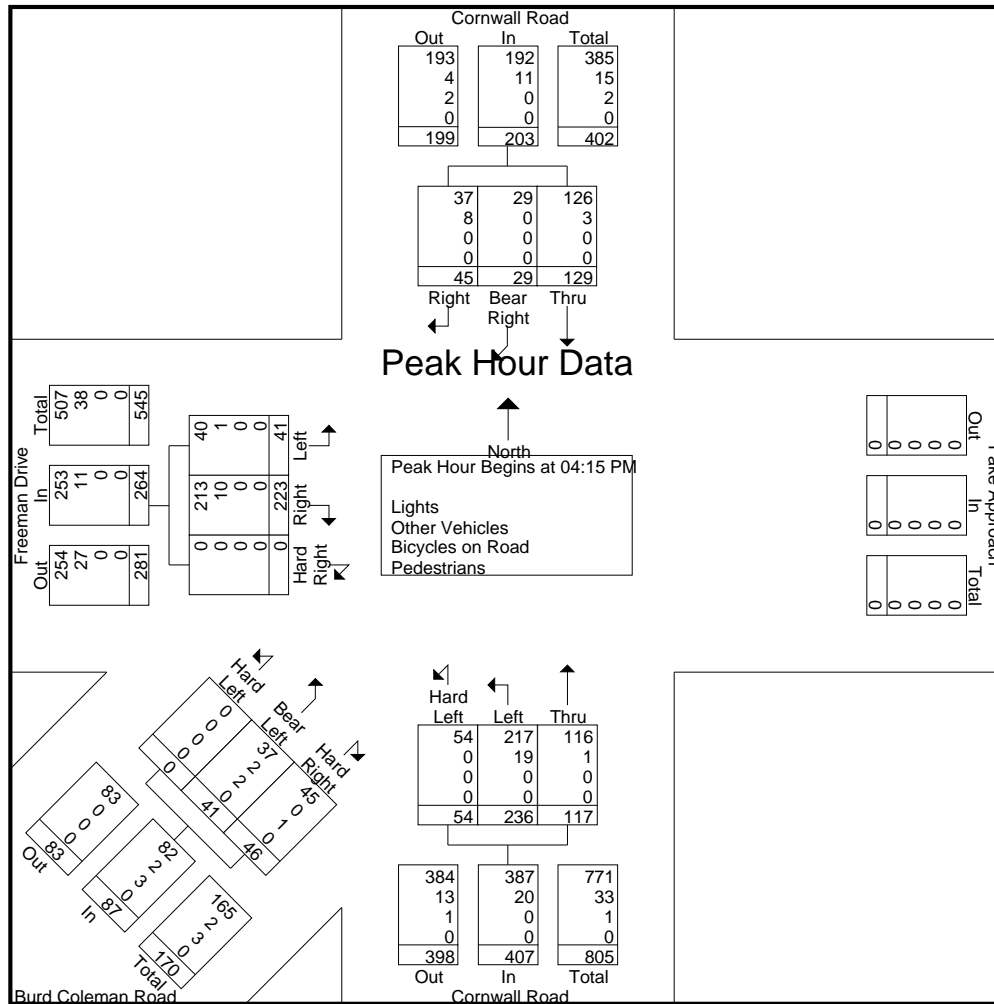
Start Time	Freeman Drive Eastbound				Cornwall Road Northbound				Cornwall Road Southbound				Burd Coleman Road Northeastbound				Int. Total
	Left	Right	Hard Right	App. Total	Hard Left	Left	Thru	App. Total	Thru	Bear Right	Right	App. Total	Hard Left	Bear Left	Hard Right	App. Total	
Peak Hour Analysis From 06:30 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	5	39	0	44	9	53	27	89	12	4	12	28	0	5	10	15	176
07:30 AM	13	50	0	63	8	55	44	107	13	0	7	20	0	11	15	26	216
07:45 AM	11	43	1	55	5	47	34	86	20	2	5	27	0	18	12	30	198
08:00 AM	6	34	0	40	6	39	16	61	10	8	14	32	0	7	16	23	156
Total Volume	35	166	1	202	28	194	121	343	55	14	38	107	0	41	53	94	746
% App. Total	17.3	82.2	0.5		8.2	56.6	35.3		51.4	13.1	35.5		0	43.6	56.4		
PHF	.673	.830	.250	.802	.778	.882	.688	.801	.688	.438	.679	.836	.000	.569	.828	.783	.863
Lights	34	142	0	176	28	175	120	323	55	14	34	103	0	38	53	91	693
% Lights	97.1	85.5	0	87.1	100	90.2	99.2	94.2	100	100	89.5	96.3	0	92.7	100	96.8	92.9
Other Vehicles	1	24	1	26	0	19	1	20	0	0	4	4	0	3	0	3	53
% Other Vehicles	2.9	14.5	100	12.9	0	9.8	0.8	5.8	0	0	10.5	3.7	0	7.3	0	3.2	7.1
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Cornwall Road & Freeman Drive/Burd Coleman Road

File Name : AM_PM_Cornwall_Freeman
 Site Code : AM_PM_Cornwall_Freeman
 Start Date : 5/14/2015
 Page No : 4

Start Time	Freeman Drive Eastbound				Cornwall Road Northbound				Cornwall Road Southbound				Burd Coleman Road Northeastbound				Int. Total
	Left	Right	Hard Right	App. Total	Hard Left	Left	Thru	App. Total	Thru	Bear Right	Right	App. Total	Hard Left	Bear Left	Hard Right	App. Total	
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	8	46	0	54	10	62	28	100	33	7	17	57	0	17	13	30	241
04:30 PM	9	64	0	73	20	66	27	113	25	10	10	45	0	9	13	22	253
04:45 PM	10	50	0	60	16	59	34	109	27	6	9	42	0	7	10	17	228
05:00 PM	14	63	0	77	8	49	28	85	44	6	9	59	0	8	10	18	239
Total Volume	41	223	0	264	54	236	117	407	129	29	45	203	0	41	46	87	961
% App. Total	15.5	84.5	0		13.3	58	28.7		63.5	14.3	22.2		0	47.1	52.9		
PHF	.732	.871	.000	.857	.675	.894	.860	.900	.733	.725	.662	.860	.000	.603	.885	.725	.950
Lights	40	213	0	253	54	217	116	387	126	29	37	192	0	37	45	82	914
% Lights	97.6	95.5	0	95.8	100	91.9	99.1	95.1	97.7	100	82.2	94.6	0	90.2	97.8	94.3	95.1
Other Vehicles	1	10	0	11	0	19	1	20	3	0	8	11	0	2	0	2	44
% Other Vehicles	2.4	4.5	0	4.2	0	8.1	0.9	4.9	2.3	0	17.8	5.4	0	4.9	0	2.3	4.6
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	3
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	4.9	2.2	3.4	0.3
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0





Counted #: Scout Unit:
 Counted By: MIO:
 Location: 40.2761892074643, -
 76.4117169141901

Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100

Count Name:
 AM_PM_Cornwall_Schaeffer
 Site Code:
 AM_PM_Cornwall_Schaeffer
 Start Date: 05/14/2015
 Page No: 1

Turning Movement Data

Start Time	Private Driveway Eastbound					Schaeffer Road Westbound					Boyd Street Northbound					Cornwall Road Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
6:30 AM	0	0	0	0	0	1	0	58	0	59	0	21	0	0	21	42	18	0	0	60	140
6:45 AM	0	0	0	0	0	12	0	58	0	70	0	22	2	0	24	30	20	0	0	50	144
Hourly Total	0	0	0	0	0	13	0	116	0	129	0	43	2	0	45	72	38	0	0	110	284
7:00 AM	0	0	0	0	0	4	0	51	0	55	0	26	1	0	27	35	12	0	0	47	129
7:15 AM	0	0	0	0	0	2	0	65	0	67	0	24	6	0	30	49	10	0	0	59	156
7:30 AM	0	0	0	0	0	10	0	74	0	84	0	33	2	0	35	63	16	0	0	79	198
7:45 AM	0	0	0	0	0	8	0	52	0	60	0	33	5	0	38	52	24	0	0	76	174
Hourly Total	0	0	0	0	0	24	0	242	0	266	0	116	14	0	130	199	62	0	0	261	657
8:00 AM	0	0	0	0	0	5	0	52	0	57	0	10	2	0	12	45	14	0	0	59	128
8:15 AM	0	0	0	0	0	6	0	52	0	58	0	22	4	0	26	24	25	0	0	49	133
8:30 AM	0	0	0	0	0	3	0	45	0	48	0	15	2	0	17	27	19	0	0	46	111
8:45 AM	0	0	0	0	0	1	0	49	0	50	0	28	3	0	31	47	17	0	0	64	145
Hourly Total	0	0	0	0	0	15	0	198	0	213	0	75	11	0	86	143	75	0	0	218	517
9:00 AM	0	0	0	0	0	3	0	36	0	39	0	15	2	0	17	29	15	0	0	44	100
9:15 AM	0	0	0	0	0	5	0	45	0	50	0	17	6	0	23	30	10	0	0	40	113
9:30 AM	0	0	0	0	0	6	0	36	0	42	0	24	2	0	26	41	19	0	0	60	128
9:45 AM	0	0	0	0	0	6	0	51	0	57	0	21	4	0	25	30	21	0	0	51	133
Hourly Total	0	0	0	0	0	20	0	168	0	188	0	77	14	0	91	130	65	0	0	195	474
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	0	0	0	0	0	9	1	47	0	57	0	22	5	0	27	26	28	0	0	54	138
2:45 PM	0	0	0	0	0	5	0	49	0	54	0	24	2	0	26	35	21	0	0	56	136
Hourly Total	0	0	0	0	0	14	1	96	0	111	0	46	7	0	53	61	49	0	0	110	274
3:00 PM	0	0	0	0	0	3	0	59	0	62	0	30	22	0	52	43	23	0	0	66	180
3:15 PM	0	0	0	0	0	7	0	65	0	72	0	34	2	0	36	49	35	0	0	84	192
3:30 PM	0	0	0	0	0	1	0	68	0	69	0	25	8	0	33	51	33	0	0	84	186
3:45 PM	0	0	0	0	0	6	0	56	0	62	0	27	6	0	33	54	33	0	0	87	182
Hourly Total	0	0	0	0	0	17	0	248	0	265	0	116	38	0	154	197	124	0	0	321	740
4:00 PM	0	0	0	0	0	1	0	66	0	67	0	42	8	0	50	56	26	0	0	82	199
4:15 PM	0	0	0	0	0	4	0	73	0	77	0	27	10	0	37	53	34	0	0	87	201
4:30 PM	0	0	0	1	0	6	0	83	0	89	0	27	13	0	40	73	29	0	0	102	231
4:45 PM	0	0	0	0	0	2	1	71	0	74	0	37	5	0	42	64	21	0	0	85	201
Hourly Total	0	0	0	1	0	13	1	293	0	307	0	133	36	0	169	246	110	0	0	356	832
5:00 PM	0	0	0	0	0	4	0	61	0	65	0	26	4	0	30	70	40	0	0	110	205
5:15 PM	0	0	0	0	0	5	0	63	0	68	0	29	4	0	33	58	39	0	0	97	198
5:30 PM	0	0	0	0	0	3	0	62	0	65	0	21	3	0	24	61	39	0	0	100	189
5:45 PM	0	0	0	2	0	3	0	42	0	45	0	20	1	0	21	62	19	0	0	81	147
Hourly Total	0	0	0	2	0	15	0	228	0	243	0	96	12	0	108	251	137	0	0	388	739
Grand Total	0	0	0	3	0	131	2	1589	0	1722	0	702	134	0	836	1299	660	0	0	1959	4517
Approach %	NaN	NaN	NaN	-	-	7.6	0.1	92.3	-	-	0.0	84.0	16.0	-	-	66.3	33.7	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	2.9	0.0	35.2	-	38.1	0.0	15.5	3.0	-	18.5	28.8	14.6	0.0	-	43.4	-
Lights	0	0	0	-	0	130	2	1433	-	1565	0	675	129	-	804	1159	633	0	-	1792	4161
% Lights	-	-	-	-	-	99.2	100.0	90.2	-	90.9	-	96.2	96.3	-	96.2	89.2	95.9	-	-	91.5	92.1
Other Vehicles	0	0	0	-	0	1	0	152	-	153	0	26	5	-	31	139	26	0	-	165	349
% Other Vehicles	-	-	-	-	-	0.8	0.0	9.6	-	8.9	-	3.7	3.7	-	3.7	10.7	3.9	-	-	8.4	7.7
Bicycles on Road	0	0	0	-	0	0	0	4	-	4	0	1	0	-	1	1	1	0	-	2	7
% Bicycles on Road	-	-	-	-	-	0.0	0.0	0.3	-	0.2	-	0.1	0.0	-	0.1	0.1	0.2	-	-	0.1	0.2
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Counted #: Scout Unit:
 Counted By: MIO:
 Location: 40.2761892074643, -
 76.4117169141901

Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100

Count Name:
 AM_PM_Cornwall_Schaeffer
 Site Code:
 AM_PM_Cornwall_Schaeffer
 Start Date: 05/14/2015
 Page No: 3

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Private Driveway Eastbound					Schaeffer Road Westbound					Boyd Street Northbound					Cornwall Road Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:00 AM	0	0	0	0	0	4	0	51	0	55	0	26	1	0	27	35	12	0	0	47	129
7:15 AM	0	0	0	0	0	2	0	65	0	67	0	24	6	0	30	49	10	0	0	59	156
7:30 AM	0	0	0	0	0	10	0	74	0	84	0	33	2	0	35	63	16	0	0	79	198
7:45 AM	0	0	0	0	0	8	0	52	0	60	0	33	5	0	38	52	24	0	0	76	174
Total	0	0	0	0	0	24	0	242	0	266	0	116	14	0	130	199	62	0	0	261	657
Approach %	NaN	NaN	NaN	-	-	9.0	0.0	91.0	-	-	0.0	89.2	10.8	-	-	76.2	23.8	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	3.7	0.0	36.8	-	40.5	0.0	17.7	2.1	-	19.8	30.3	9.4	0.0	-	39.7	-
PHF	0.000	0.000	0.000	-	0.000	0.600	0.000	0.818	-	0.792	0.000	0.879	0.583	-	0.855	0.790	0.646	0.000	-	0.826	0.830
Lights	0	0	0	-	0	24	0	225	-	249	0	113	13	-	126	180	61	0	-	241	616
% Lights	-	-	-	-	-	100.0	-	93.0	-	93.6	-	97.4	92.9	-	96.9	90.5	98.4	-	-	92.3	93.8
Other Vehicles	0	0	0	-	0	0	0	17	-	17	0	3	1	-	4	19	1	0	-	20	41
% Other Vehicles	-	-	-	-	-	0.0	-	7.0	-	6.4	-	2.6	7.1	-	3.1	9.5	1.6	-	-	7.7	6.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	-	-	-	-	0.0	-	0.0	-	0.0	-	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Counted #: Scout Unit:
 Counted By: MIO:
 Location: 40.2761892074643, -
 76.4117169141901

Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100

Count Name:
 AM_PM_Cornwall_Schaeffer
 Site Code:
 AM_PM_Cornwall_Schaeffer
 Start Date: 05/14/2015
 Page No: 5

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Private Driveway Eastbound					Schaeffer Road Westbound					Boyd Street Northbound					Cornwall Road Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
4:15 PM	0	0	0	0	0	4	0	73	0	77	0	27	10	0	37	53	34	0	0	87	201
4:30 PM	0	0	0	1	0	6	0	83	0	89	0	27	13	0	40	73	29	0	0	102	231
4:45 PM	0	0	0	0	0	2	1	71	0	74	0	37	5	0	42	64	21	0	0	85	201
5:00 PM	0	0	0	0	0	4	0	61	0	65	0	26	4	0	30	70	40	0	0	110	205
Total	0	0	0	1	0	16	1	288	0	305	0	117	32	0	149	260	124	0	0	384	838
Approach %	NaN	NaN	NaN	-	-	5.2	0.3	94.4	-	-	0.0	78.5	21.5	-	-	67.7	32.3	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	1.9	0.1	34.4	-	36.4	0.0	14.0	3.8	-	17.8	31.0	14.8	0.0	-	45.8	-
PHF	0.000	0.000	0.000	-	0.000	0.667	0.250	0.867	-	0.857	0.000	0.791	0.615	-	0.887	0.890	0.775	0.000	-	0.873	0.907
Lights	0	0	0	-	0	16	1	267	-	284	0	110	30	-	140	246	124	0	-	370	794
% Lights	-	-	-	-	-	100.0	100.0	92.7	-	93.1	-	94.0	93.8	-	94.0	94.6	100.0	-	-	96.4	94.7
Other Vehicles	0	0	0	-	0	0	0	20	-	20	0	7	2	-	9	14	0	0	-	14	43
% Other Vehicles	-	-	-	-	-	0.0	0.0	6.9	-	6.6	-	6.0	6.3	-	6.0	5.4	0.0	-	-	3.6	5.1
Bicycles on Road	0	0	0	-	0	0	0	1	-	1	0	0	0	-	0	0	0	0	-	0	1
% Bicycles on Road	-	-	-	-	-	0.0	0.0	0.3	-	0.3	-	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.1
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Counted #: Scout Unit:
 Counted By: MIO:
 Location: 40.2763356037402, -
 76.4120173215997

Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100

Count Name:
 AM_PM_Cornwall_Rail Trail
 Site Code: AM_PM_Cornwall_Rail
 Trail
 Start Date: 05/14/2015
 Page No: 1

Turning Movement Data

Start Time	Lebanon Valley Rail Trail Eastbound					Lebanon Valley Rail Trail Westbound					Cornwall Road Northbound					Cornwall Road Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
6:30 AM	0	1	0	0	1	0	0	0	0	0	0	80	0	0	80	0	60	0	0	60	141
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	77	0	0	77	0	49	0	0	49	126
Hourly Total	0	1	0	0	1	0	0	0	0	0	0	157	0	0	157	0	109	0	0	109	267
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	80	1	0	81	0	48	0	0	48	129
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	88	0	0	88	0	61	0	1	61	149
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	105	0	0	105	0	77	0	0	77	182
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	85	0	1	85	0	76	0	0	76	161
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	358	1	1	359	0	262	0	1	262	621
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	62	0	1	62	0	60	0	0	60	122
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	75	0	1	75	0	49	0	1	49	124
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	58	0	0	58	0	49	0	3	49	107
8:45 AM	0	0	0	1	0	0	1	0	0	1	0	76	0	0	76	0	61	0	1	61	138
Hourly Total	0	0	0	1	0	0	1	0	0	1	0	271	0	2	271	0	219	0	5	219	491
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	52	0	0	52	0	46	0	1	46	98
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	61	0	0	61	0	40	0	0	40	101
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	61	0	0	61	0	60	0	2	60	121
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	72	0	0	72	0	52	0	2	52	124
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	246	0	0	246	0	198	0	5	198	444
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:30 PM	0	4	0	0	4	0	5	0	0	5	0	69	0	0	69	0	58	0	3	58	136
2:45 PM	0	1	0	0	1	0	0	0	0	0	0	74	0	0	74	0	55	0	3	55	130
Hourly Total	0	5	0	0	5	0	5	0	0	5	0	143	0	0	143	0	113	0	6	113	266
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	87	0	0	87	0	70	0	4	70	157
3:15 PM	0	2	0	0	2	0	0	1	0	1	0	99	0	0	99	0	80	0	2	80	182
3:30 PM	0	11	0	0	11	0	1	0	0	1	0	96	0	1	96	0	84	0	0	84	192
3:45 PM	0	0	0	0	0	0	1	0	0	1	0	84	0	2	84	0	88	0	0	88	173
Hourly Total	0	13	0	0	13	0	2	1	0	3	0	366	0	3	366	0	322	0	6	322	704
4:00 PM	0	0	0	0	0	0	7	0	0	7	0	108	0	5	108	0	85	0	0	85	200
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100	0	95	0	0	95	195
4:30 PM	0	4	0	1	4	0	5	0	0	5	0	110	0	5	110	0	104	0	6	104	223
4:45 PM	0	1	0	0	1	0	9	0	0	9	0	109	0	4	109	0	85	0	4	85	204
Hourly Total	0	5	0	1	5	0	21	0	0	21	0	427	0	14	427	0	369	0	10	369	822
5:00 PM	0	3	0	0	3	0	2	0	0	2	0	89	0	8	89	0	111	0	3	111	205
5:15 PM	0	1	0	0	1	0	0	0	0	0	0	90	0	4	90	0	98	0	0	98	189
5:30 PM	0	6	0	0	6	0	2	0	0	2	0	85	0	0	85	0	99	0	3	99	192
5:45 PM	0	3	0	2	3	0	4	0	0	4	0	63	0	0	63	0	79	0	0	79	149
Hourly Total	0	13	0	2	13	0	8	0	0	8	0	327	0	12	327	0	387	0	6	387	735
Grand Total	0	37	0	4	37	0	37	1	0	38	0	2295	1	32	2296	0	1979	0	39	1979	4350
Approach %	0.0	100.0	0.0	-	-	0.0	97.4	2.6	-	-	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	0.0	0.9	0.0	-	0.9	0.0	0.9	0.0	-	0.9	0.0	52.8	0.0	-	52.8	0.0	45.5	0.0	-	45.5	-
Lights	0	10	0	-	10	0	0	0	-	0	0	2103	0	-	2103	0	1810	0	-	1810	3923
% Lights	-	27.0	-	-	27.0	-	0.0	0.0	-	0.0	-	91.6	0.0	-	91.6	-	91.5	-	-	91.5	90.2
Other Vehicles	0	1	0	-	1	0	0	0	-	0	0	187	0	-	187	0	168	0	-	168	356
% Other Vehicles	-	2.7	-	-	2.7	-	0.0	0.0	-	0.0	-	8.1	0.0	-	8.1	-	8.5	-	-	8.5	8.2
Bicycles on Road	0	26	0	-	26	0	37	1	-	38	0	5	1	-	6	0	1	0	-	1	71
% Bicycles on Road	-	70.3	-	-	70.3	-	100.0	100.0	-	100.0	-	0.2	100.0	-	0.3	-	0.1	-	-	0.1	1.6
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	5.1	-	-
Pedestrians	-	-	-	4	-	-	-	-	0	-	-	-	-	32	-	-	-	-	37	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	94.9	-	-



Counted #: Scout Unit:
 Counted By: MIO:
 Location: 40.2763356037402, -
 76.4120173215997

Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100

Count Name:
 AM_PM_Cornwall_Rail Trail
 Site Code: AM_PM_Cornwall_Rail
 Trail
 Start Date: 05/14/2015
 Page No: 3

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Lebanon Valley Rail Trail Eastbound					Lebanon Valley Rail Trail Westbound					Cornwall Road Northbound					Cornwall Road Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	80	1	0	81	0	48	0	0	48	129
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	88	0	0	88	0	61	0	1	61	149
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	105	0	0	105	0	77	0	0	77	182
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	85	0	1	85	0	76	0	0	76	161
Total	0	0	0	0	0	0	0	0	0	0	0	358	1	1	359	0	262	0	1	262	621
Approach %	NaN	NaN	NaN	-	-	NaN	NaN	NaN	-	-	0.0	99.7	0.3	-	-	0.0	100.0	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	57.6	0.2	-	57.8	0.0	42.2	0.0	-	42.2	-
PHF	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	-	0.000	0.000	0.852	0.250	-	0.855	0.000	0.851	0.000	-	0.851	0.853
Lights	0	0	0	-	0	0	0	0	-	0	0	340	0	-	340	0	239	0	-	239	579
% Lights	-	-	-	-	-	-	-	-	-	-	-	95.0	0.0	-	94.7	-	91.2	-	-	91.2	93.2
Other Vehicles	0	0	0	-	0	0	0	0	-	0	0	18	0	-	18	0	23	0	-	23	41
% Other Vehicles	-	-	-	-	-	-	-	-	-	-	-	5.0	0.0	-	5.0	-	8.8	-	-	8.8	6.6
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	1	-	1	0	0	0	-	0	1
% Bicycles on Road	-	-	-	-	-	-	-	-	-	-	-	0.0	100.0	-	0.3	-	0.0	-	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Counted #: Scout Unit:
 Counted By: MIO:
 Location: 40.2763356037402, -
 76.4120173215997

Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100

Count Name:
 AM_PM_Cornwall_Rail Trail
 Site Code: AM_PM_Cornwall_Rail
 Trail
 Start Date: 05/14/2015
 Page No: 5

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Lebanon Valley Rail Trail Eastbound					Lebanon Valley Rail Trail Westbound					Cornwall Road Northbound					Cornwall Road Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100	0	95	0	0	95	195
4:30 PM	0	4	0	1	4	0	5	0	0	5	0	110	0	5	110	0	104	0	6	104	223
4:45 PM	0	1	0	0	1	0	9	0	0	9	0	109	0	4	109	0	85	0	4	85	204
5:00 PM	0	3	0	0	3	0	2	0	0	2	0	89	0	8	89	0	111	0	3	111	205
Total	0	8	0	1	8	0	16	0	0	16	0	408	0	17	408	0	395	0	13	395	827
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	0.0	1.0	0.0	-	1.0	0.0	1.9	0.0	-	1.9	0.0	49.3	0.0	-	49.3	0.0	47.8	0.0	-	47.8	-
PHF	0.000	0.500	0.000	-	0.500	0.000	0.444	0.000	-	0.444	0.000	0.927	0.000	-	0.927	0.000	0.890	0.000	-	0.890	0.927
Lights	0	0	0	-	0	0	0	0	-	0	0	380	0	-	380	0	382	0	-	382	762
% Lights	-	0.0	-	-	0.0	-	0.0	-	-	0.0	-	93.1	-	-	93.1	-	96.7	-	-	96.7	92.1
Other Vehicles	0	1	0	-	1	0	0	0	-	0	0	27	0	-	27	0	13	0	-	13	41
% Other Vehicles	-	12.5	-	-	12.5	-	0.0	-	-	0.0	-	6.6	-	-	6.6	-	3.3	-	-	3.3	5.0
Bicycles on Road	0	7	0	-	7	0	16	0	-	16	0	1	0	-	1	0	0	0	-	0	24
% Bicycles on Road	-	87.5	-	-	87.5	-	100.0	-	-	100.0	-	0.2	-	-	0.2	-	0.0	-	-	0.0	2.9
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	7.7	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	17	-	-	-	-	12	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	92.3	-	-



Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100 jwheeler@trafficpd.com

Count Name: SAT_Cornwall_LVRT
 Site Code: SAT_Cornwall_LVRT
 Start Date: 09/05/2015
 Page No: 1

Counted #: Scout Unit:
 Counted By: MIO:

Location: 40.2763263337666, -76.4120391011238

Lebanon Valley Rail Trail @ Cornwall Road (Westbound)

Start Time	Pedestrians	Bicycles on Road	Total
7:00 AM	0	0	0
7:15 AM	0	2	2
7:30 AM	1	4	5
7:45 AM	1	2	3
8:00 AM	4	2	6
8:15 AM	4	3	7
8:30 AM	2	5	7
8:45 AM	3	4	7
9:00 AM	2	8	10
9:15 AM	1	0	1
9:30 AM	2	3	5
9:45 AM	4	1	5
10:00 AM	5	1	6
10:15 AM	7	4	11
10:30 AM	1	4	5
10:45 AM	0	5	5
11:00 AM	2	12	14
11:15 AM	3	0	3
11:30 AM	2	9	11
11:45 AM	5	7	12
12:00 PM	2	34	36
12:15 PM	1	7	8
12:30 PM	1	8	9
12:45 PM	0	6	6
1:00 PM	2	4	6
1:15 PM	6	9	15
1:30 PM	0	7	7
1:45 PM	4	2	6
2:00 PM	1	5	6
2:15 PM	0	14	14
2:30 PM	3	4	7
2:45 PM	0	6	6
3:00 PM	0	5	5
3:15 PM	3	2	5
3:30 PM	0	9	9
3:45 PM	2	9	11
4:00 PM	0	5	5
4:15 PM	3	4	7
4:30 PM	3	4	7

4:45 PM	0	0	0
5:00 PM	2	5	7
5:15 PM	0	2	2
5:30 PM	2	3	5
5:45 PM	0	0	0
6:00 PM	1	0	1
6:15 PM	1	0	1
6:30 PM	3	0	3
6:45 PM	0	5	5
7:00 PM	0	2	2
7:15 PM	0	2	2
7:30 PM	0	0	0
7:45 PM	0	0	0
Total	89	239	328
Total %	27.1	72.9	100.0
AM Times	9:45 AM	10:15 AM	10:15 AM
AM Peaks	17	25	35
PM Times	1:45 PM	12:00 PM	12:00 PM
PM Peaks	8	55	59



Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100 jwheeler@trafficpd.com

Count Name: SAT_Cornwall_LVRT
 Site Code: SAT_Cornwall_LVRT
 Start Date: 09/05/2015
 Page No: 3

Counted #: Scout Unit:
 Counted By: MIO:

Location: 40.2763263337666, -76.4120391011238

Lebanon Valley Rail Trail @ Cornwall Road (Eastbound)

Start Time	Pedestrians	Bicycles on Road	Total
7:00 AM	0	0	0
7:15 AM	2	0	2
7:30 AM	4	0	4
7:45 AM	0	0	0
8:00 AM	2	2	4
8:15 AM	0	2	2
8:30 AM	0	6	6
8:45 AM	0	5	5
9:00 AM	3	4	7
9:15 AM	7	4	11
9:30 AM	4	2	6
9:45 AM	1	1	2
10:00 AM	1	1	2
10:15 AM	4	2	6
10:30 AM	6	7	13
10:45 AM	3	11	14
11:00 AM	5	7	12
11:15 AM	0	0	0
11:30 AM	0	6	6
11:45 AM	2	8	10
12:00 PM	2	7	9
12:15 PM	1	3	4
12:30 PM	3	9	12
12:45 PM	3	8	11
1:00 PM	2	4	6
1:15 PM	0	5	5
1:30 PM	0	7	7
1:45 PM	3	8	11
2:00 PM	2	4	6
2:15 PM	4	1	5
2:30 PM	6	4	10
2:45 PM	3	33	36
3:00 PM	0	3	3
3:15 PM	0	2	2
3:30 PM	1	4	5
3:45 PM	1	10	11
4:00 PM	0	1	1
4:15 PM	2	5	7
4:30 PM	1	1	2

4:45 PM	0	5	5
5:00 PM	3	16	19
5:15 PM	2	5	7
5:30 PM	1	6	7
5:45 PM	0	4	4
6:00 PM	0	2	2
6:15 PM	1	3	4
6:30 PM	0	0	0
6:45 PM	2	2	4
7:00 PM	0	5	5
7:15 PM	0	0	0
7:30 PM	2	4	6
7:45 PM	0	0	0
Total	89	239	328
Total %	27.1	72.9	100.0
AM Times	9:45 AM	10:15 AM	10:15 AM
AM Peaks	12	27	45
PM Times	1:45 PM	12:00 PM	12:00 PM
PM Peaks	15	27	36

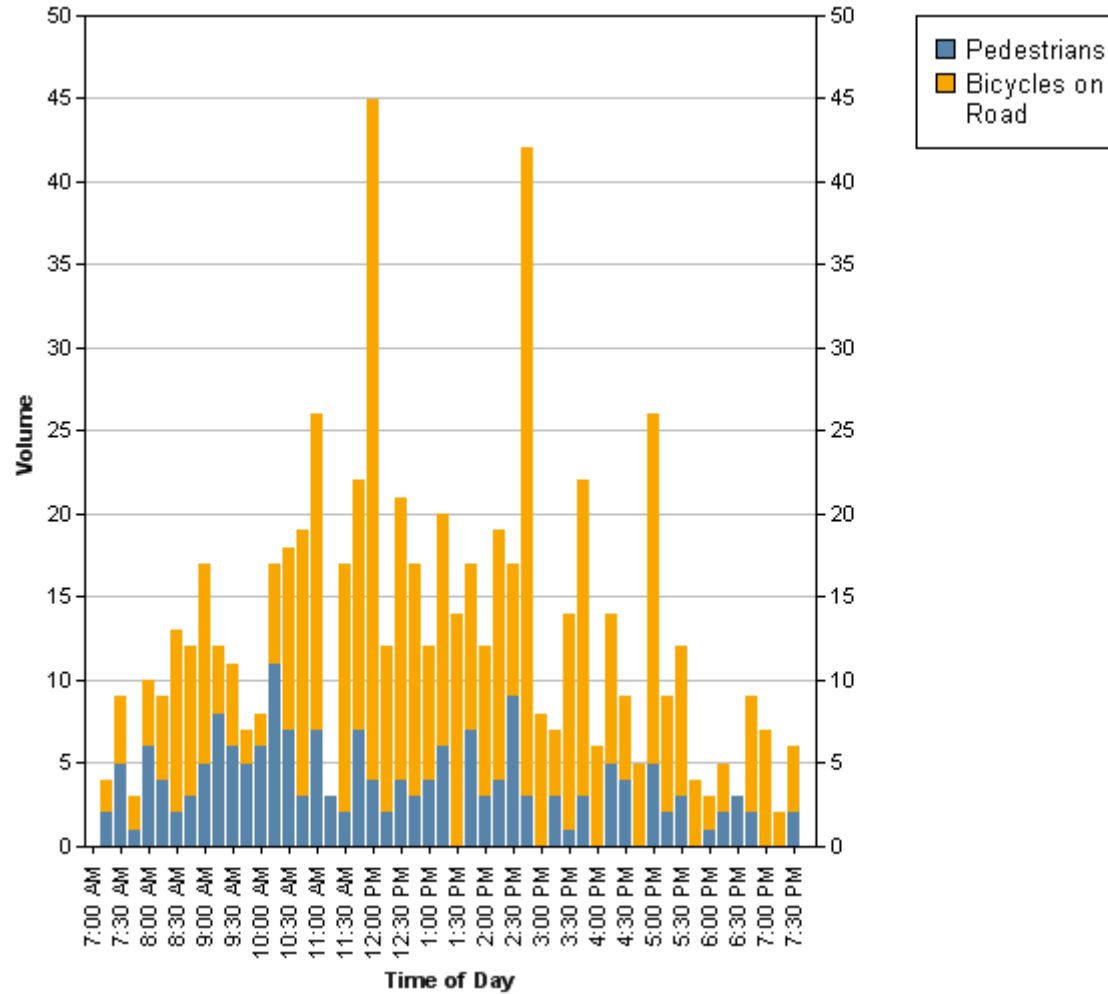


Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 jwheeler@trafficpd.com

Counted #: Scout Unit:
Counted By: MIO:

Location: 40.2763263337666, -76.4120391011238

Count Name: SAT_Cornwall_LVRT
Site Code: SAT_Cornwall_LVRT
Start Date: 09/05/2015
Page No: 5





Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100 jwheeler@trafficpd.com

Count Name: SUN_Cornwall_LVRT
 Site Code: SUN_Cornwall_LVRT
 Start Date: 09/06/2015
 Page No: 1

Counted #: Scout Unit:
 Counted By: MIO:

Location: 40.2763263337666, -76.4120391011238

Lebanon Valley Rail Trail @ Cornwall Road (Westbound)

Start Time	Pedestrians	Bicycles on Road	Total
7:00 AM	0	3	3
7:15 AM	7	2	9
7:30 AM	0	2	2
7:45 AM	0	2	2
8:00 AM	1	0	1
8:15 AM	3	0	3
8:30 AM	4	2	6
8:45 AM	15	5	20
9:00 AM	1	4	5
9:15 AM	1	4	5
9:30 AM	3	3	6
9:45 AM	1	5	6
10:00 AM	2	4	6
10:15 AM	3	11	14
10:30 AM	1	3	4
10:45 AM	4	12	16
11:00 AM	0	13	13
11:15 AM	6	10	16
11:30 AM	2	11	13
11:45 AM	4	4	8
12:00 PM	0	6	6
12:15 PM	0	2	2
12:30 PM	5	5	10
12:45 PM	2	5	7
1:00 PM	4	15	19
1:15 PM	4	12	16
1:30 PM	5	17	22
1:45 PM	0	7	7
2:00 PM	3	12	15
2:15 PM	6	14	20
2:30 PM	7	8	15
2:45 PM	5	7	12
3:00 PM	5	13	18
3:15 PM	10	3	13
3:30 PM	2	2	4
3:45 PM	0	5	5
4:00 PM	0	2	2
4:15 PM	0	5	5
4:30 PM	0	9	9

4:45 PM	0	3	3
5:00 PM	0	0	0
5:15 PM	0	1	1
5:30 PM	2	3	5
5:45 PM	3	8	11
6:00 PM	1	2	3
6:15 PM	0	6	6
6:30 PM	6	4	10
6:45 PM	2	5	7
7:00 PM	0	2	2
7:15 PM	3	0	3
7:30 PM	2	0	2
7:45 PM	0	0	0
Total	135	283	418
Total %	32.3	67.7	100.0
AM Times	8:45 AM	11:00 AM	11:00 AM
AM Peaks	20	38	50
PM Times	2:30 PM	1:00 PM	2:30 PM
PM Peaks	27	51	58



Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100 jwheeler@trafficpd.com

Count Name: SUN_Cornwall_LVRT
 Site Code: SUN_Cornwall_LVRT
 Start Date: 09/06/2015
 Page No: 3

Counted #: Scout Unit:
 Counted By: MIO:

Location: 40.2763263337666, -76.4120391011238

Lebanon Valley Rail Trail @ Cornwall Road (Eastbound)

Start Time	Pedestrians	Bicycles on Road	Total
7:00 AM	0	1	1
7:15 AM	1	0	1
7:30 AM	4	0	4
7:45 AM	0	6	6
8:00 AM	1	1	2
8:15 AM	1	2	3
8:30 AM	0	0	0
8:45 AM	4	1	5
9:00 AM	4	0	4
9:15 AM	0	3	3
9:30 AM	5	6	11
9:45 AM	4	1	5
10:00 AM	4	3	7
10:15 AM	7	16	23
10:30 AM	1	2	3
10:45 AM	1	2	3
11:00 AM	8	4	12
11:15 AM	0	11	11
11:30 AM	2	1	3
11:45 AM	1	13	14
12:00 PM	5	9	14
12:15 PM	4	3	7
12:30 PM	3	11	14
12:45 PM	1	6	7
1:00 PM	0	5	5
1:15 PM	4	6	10
1:30 PM	0	9	9
1:45 PM	0	11	11
2:00 PM	6	3	9
2:15 PM	2	6	8
2:30 PM	8	13	21
2:45 PM	3	9	12
3:00 PM	2	5	7
3:15 PM	11	7	18
3:30 PM	1	21	22
3:45 PM	0	7	7
4:00 PM	5	7	12
4:15 PM	4	10	14
4:30 PM	2	4	6

4:45 PM	0	7	7
5:00 PM	0	8	8
5:15 PM	0	5	5
5:30 PM	3	14	17
5:45 PM	0	3	3
6:00 PM	1	4	5
6:15 PM	0	3	3
6:30 PM	3	2	5
6:45 PM	0	3	3
7:00 PM	6	3	9
7:15 PM	4	8	12
7:30 PM	3	2	5
7:45 PM	0	2	2
Total	129	289	418
Total %	30.9	69.1	100.0
AM Times	8:45 AM	11:00 AM	11:00 AM
AM Peaks	13	29	40
PM Times	2:30 PM	1:00 PM	2:30 PM
PM Peaks	24	31	58

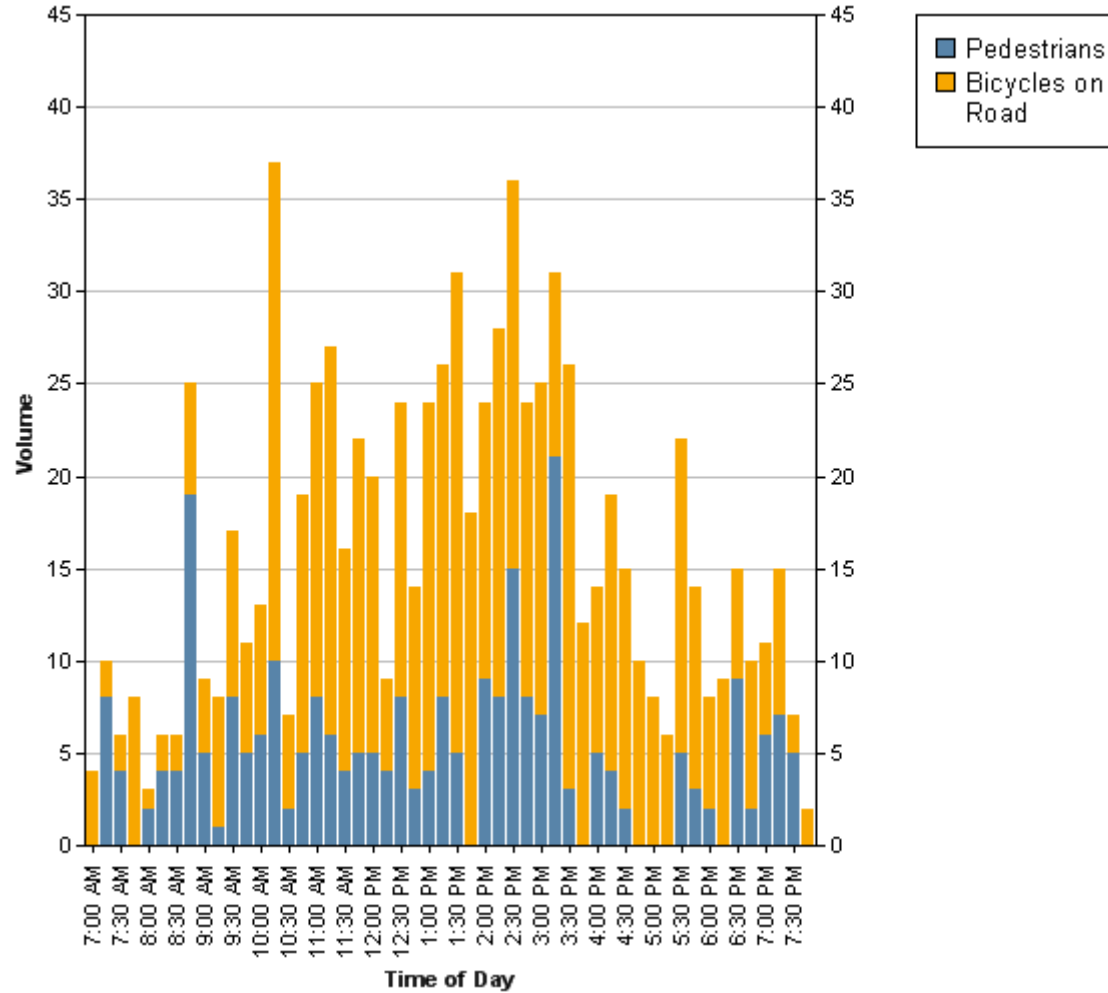


Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 jwheeler@trafficpd.com

Counted #: Scout Unit:
Counted By: MIO:

Location: 40.2763263337666, -76.4120391011238

Count Name: SUN_Cornwall_LVRT
Site Code: SUN_Cornwall_LVRT
Start Date: 09/06/2015
Page No: 5





Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100 jwheeler@trafficpd.com

Count Name: MON_Cornwall_LVRT
 Site Code: MON_Cornwall_LVRT
 Start Date: 09/07/2015
 Page No: 1

Counted #: Scout Unit:
 Counted By: MIO:

Location: 40.2763263337666, -76.4120391011238

Lebanon Valley Rail Trail @ Cornwall Road (Westbound)

Start Time	Pedestrians	Bicycles on Road	Total
7:00 AM	2	0	2
7:15 AM	4	2	6
7:30 AM	2	0	2
7:45 AM	0	3	3
8:00 AM	4	0	4
8:15 AM	4	3	7
8:30 AM	1	3	4
8:45 AM	4	7	11
9:00 AM	16	21	37
9:15 AM	5	6	11
9:30 AM	3	8	11
9:45 AM	5	10	15
10:00 AM	3	22	25
10:15 AM	1	7	8
10:30 AM	2	8	10
10:45 AM	0	18	18
11:00 AM	1	10	11
11:15 AM	3	16	19
11:30 AM	4	6	10
11:45 AM	5	25	30
12:00 PM	0	9	9
12:15 PM	8	16	24
12:30 PM	3	8	11
12:45 PM	1	7	8
1:00 PM	0	2	2
1:15 PM	4	14	18
1:30 PM	10	8	18
1:45 PM	1	10	11
2:00 PM	0	9	9
2:15 PM	0	3	3
2:30 PM	0	8	8
2:45 PM	1	6	7
3:00 PM	0	3	3
3:15 PM	0	0	0
3:30 PM	0	2	2
3:45 PM	2	6	8
4:00 PM	2	4	6
4:15 PM	0	2	2
4:30 PM	4	2	6

4:45 PM	0	2	2
5:00 PM	0	2	2
5:15 PM	2	4	6
5:30 PM	2	0	2
5:45 PM	3	0	3
6:00 PM	1	2	3
6:15 PM	2	0	2
6:30 PM	2	2	4
6:45 PM	1	0	1
7:00 PM	0	1	1
7:15 PM	1	0	1
7:30 PM	0	0	0
7:45 PM	0	0	0
Total	119	307	426
Total %	27.9	72.1	100.0
AM Times	9:00 AM	10:30 AM	10:00 AM
AM Peaks	29	52	61
PM Times	1:00 PM	12:00 PM	12:00 PM
PM Peaks	15	40	52



Traffic Planning and Design, Inc
 2500 East High Street
 Suite 650
 Pottstown, Pennsylvania, United States 19464
 610.326.3100 jwheeler@trafficpd.com

Count Name: MON_Cornwall_LVRT
 Site Code: MON_Cornwall_LVRT
 Start Date: 09/07/2015
 Page No: 3

Counted #: Scout Unit:
 Counted By: MIO:

Location: 40.2763263337666, -76.4120391011238

Lebanon Valley Rail Trail @ Cornwall Road (Eastbound)

Start Time	Pedestrians	Bicycles on Road	Total
7:00 AM	0	0	0
7:15 AM	0	0	0
7:30 AM	0	2	2
7:45 AM	1	1	2
8:00 AM	3	5	8
8:15 AM	1	0	1
8:30 AM	3	2	5
8:45 AM	2	3	5
9:00 AM	2	2	4
9:15 AM	3	2	5
9:30 AM	2	4	6
9:45 AM	8	6	14
10:00 AM	13	2	15
10:15 AM	2	6	8
10:30 AM	7	27	34
10:45 AM	4	8	12
11:00 AM	0	13	13
11:15 AM	0	7	7
11:30 AM	5	5	10
11:45 AM	3	23	26
12:00 PM	0	20	20
12:15 PM	4	12	16
12:30 PM	0	14	14
12:45 PM	0	13	13
1:00 PM	7	7	14
1:15 PM	2	20	22
1:30 PM	4	11	15
1:45 PM	3	5	8
2:00 PM	3	1	4
2:15 PM	1	16	17
2:30 PM	1	6	7
2:45 PM	3	14	17
3:00 PM	0	6	6
3:15 PM	0	2	2
3:30 PM	0	2	2
3:45 PM	1	3	4
4:00 PM	0	10	10
4:15 PM	0	7	7
4:30 PM	0	0	0

4:45 PM	0	1	1
5:00 PM	0	3	3
5:15 PM	0	5	5
5:30 PM	0	0	0
5:45 PM	3	6	9
6:00 PM	0	1	1
6:15 PM	2	1	3
6:30 PM	0	2	2
6:45 PM	7	0	7
7:00 PM	1	0	1
7:15 PM	0	0	0
7:30 PM	4	1	5
7:45 PM	0	0	0
Total	105	307	412
Total %	25.5	74.5	100.0
AM Times	9:00 AM	10:30 AM	10:00 AM
AM Peaks	15	55	69
PM Times	1:00 PM	12:00 PM	12:00 PM
PM Peaks	16	59	63

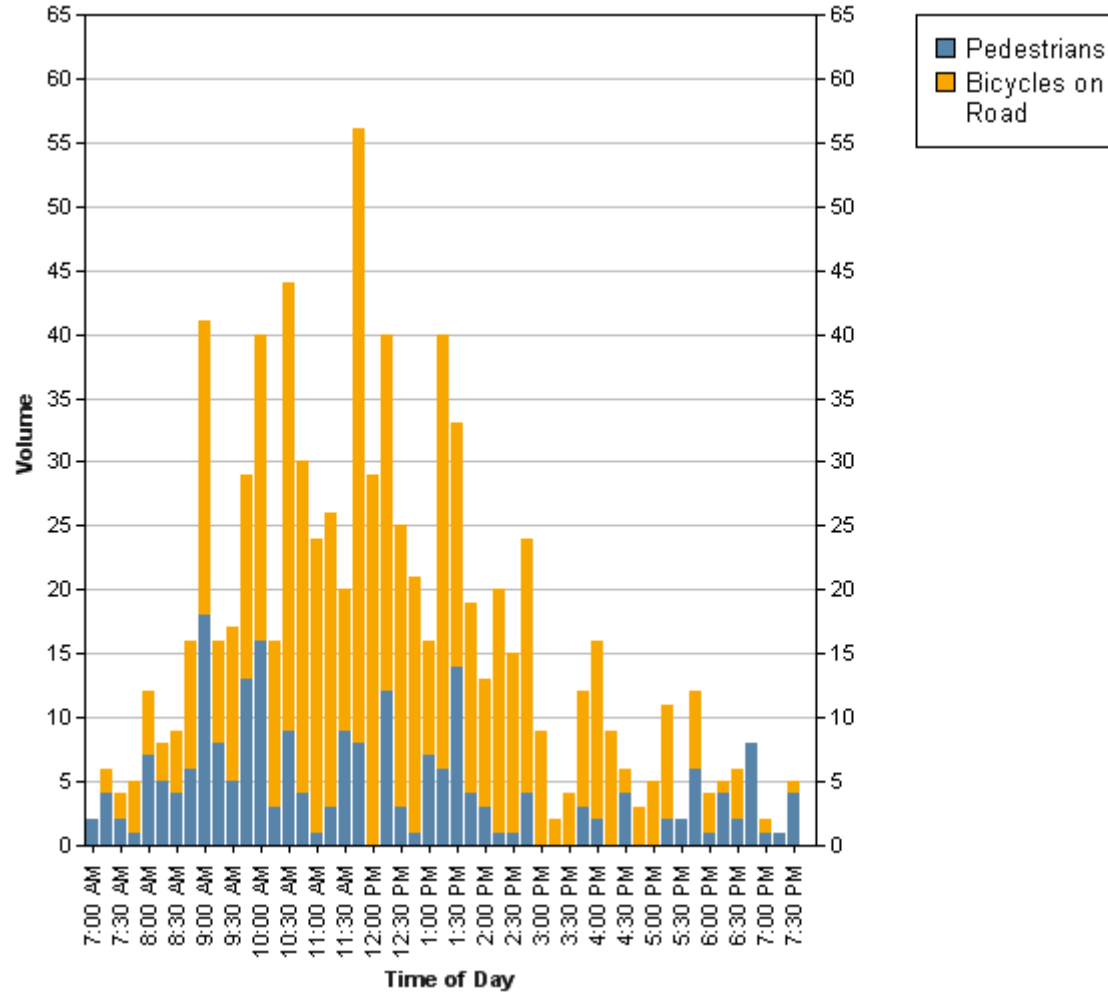


Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 jwheeler@trafficpd.com

Counted #: Scout Unit:
Counted By: MIO:

Location: 40.2763263337666, -76.4120391011238

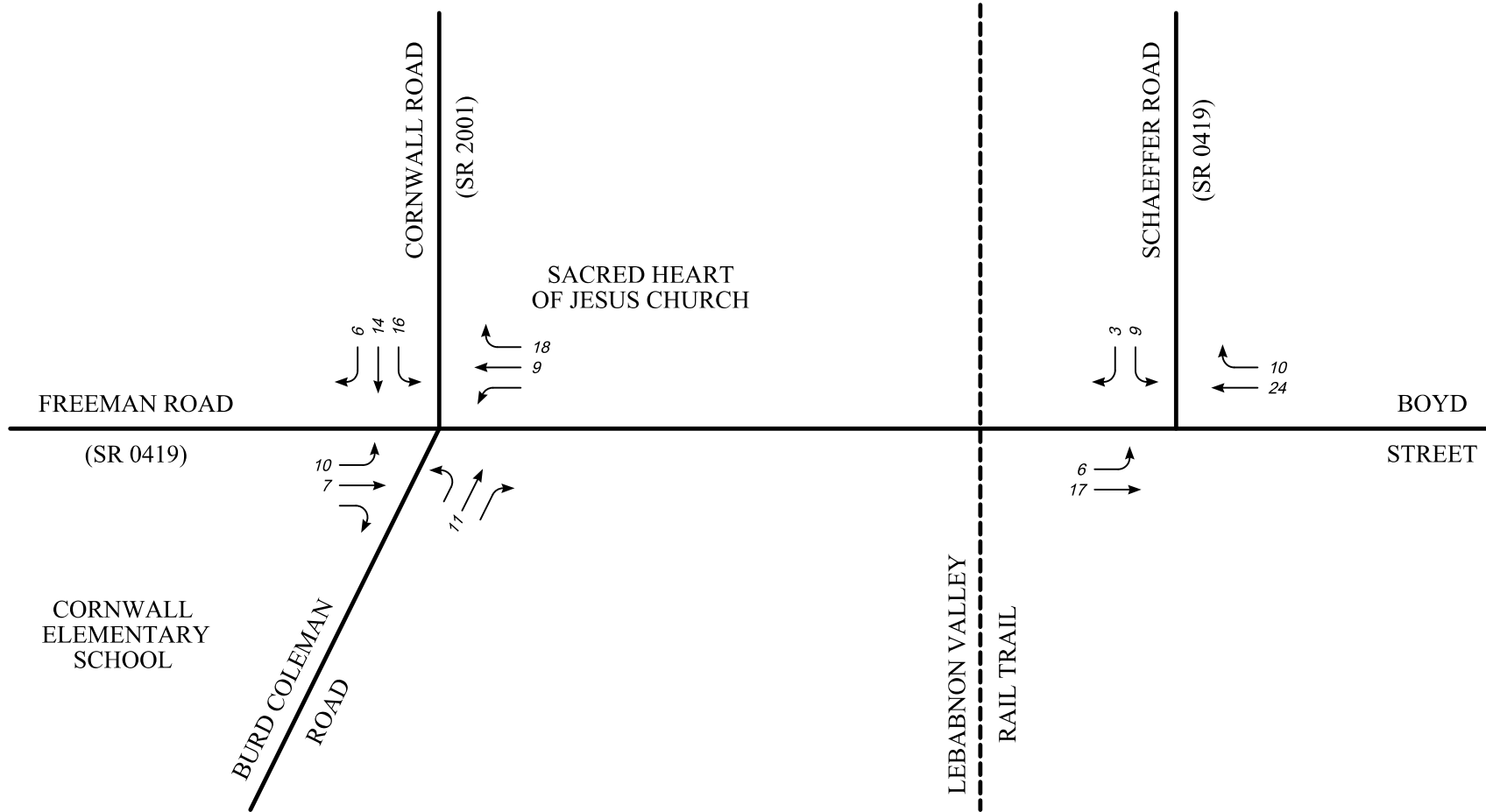
Count Name: MON_Cornwall_LVRT
Site Code: MON_Cornwall_LVRT
Start Date: 09/07/2015
Page No: 5



APPENDIX D

TRIP GENERATION/DISTRIBUTION INFORMATION: FOUR (4) AREA DEVELOPMENTS

THE PRESERVE AT CORNWALL VILLAGE



TRAFFIC PLANNING AND DESIGN, INC.

PITTSBURGH
(412)765-3717

POTTSTOWN
(610)326-3100

HARRISBURG
(717)234-1430

LEHIGH VALLEY
(610)625-4242

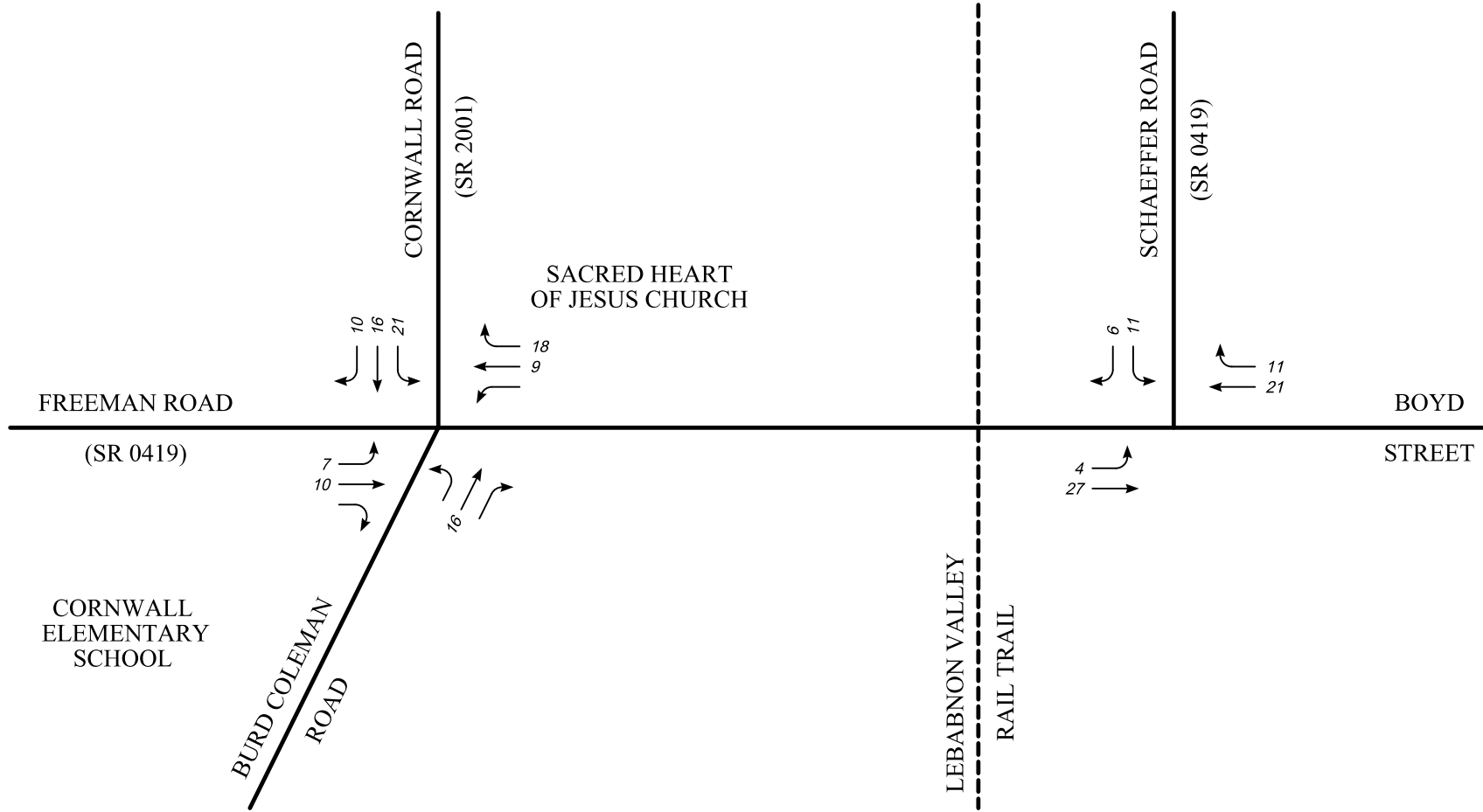
WWW.TRAFFICPD.COM

SOUTH JERSEY
(856)966-4242

FIGURE D-1

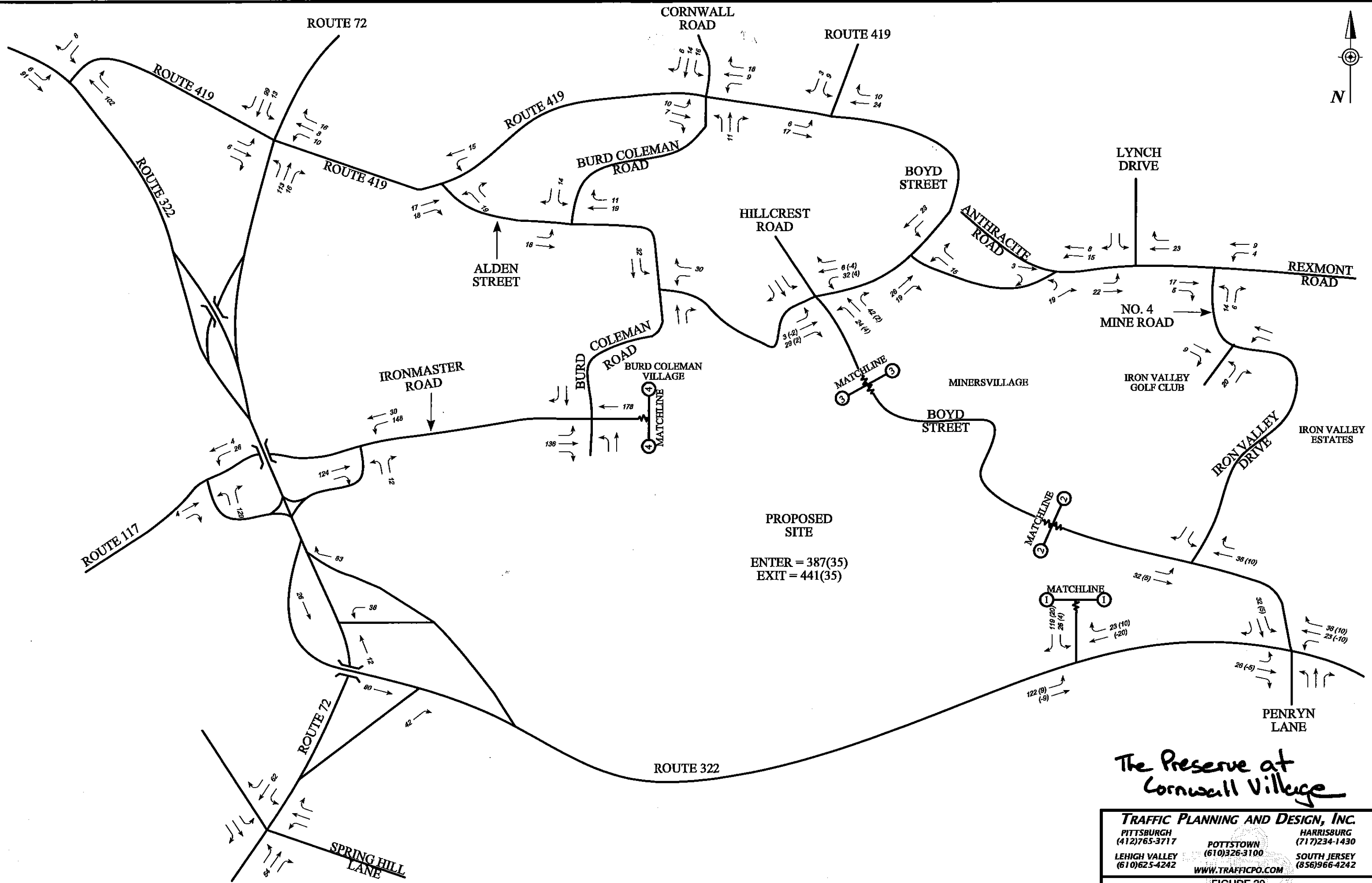
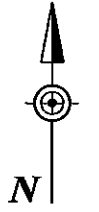
THE PRESERVE AT CORNWALL VILLAGE
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION

KEY:
SCHEMATIC DRAWING: NOT TO SCALE



KEY:
SCHEMATIC DRAWING: NOT TO SCALE

TRAFFIC PLANNING AND DESIGN, INC.		
PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	WWW.TRAFFICPD.COM	SOUTH JERSEY (856)966-4242
FIGURE D-2		
THE PRESERVE AT CORNWALL VILLAGE WEEKDAY PM PEAK HOUR TRIP DISTRIBUTION		



KEY:
 NEW(PASS-BY)TRIPS
 SCHEMATIC DRAWING:NOT TO SCALE OVERPASS

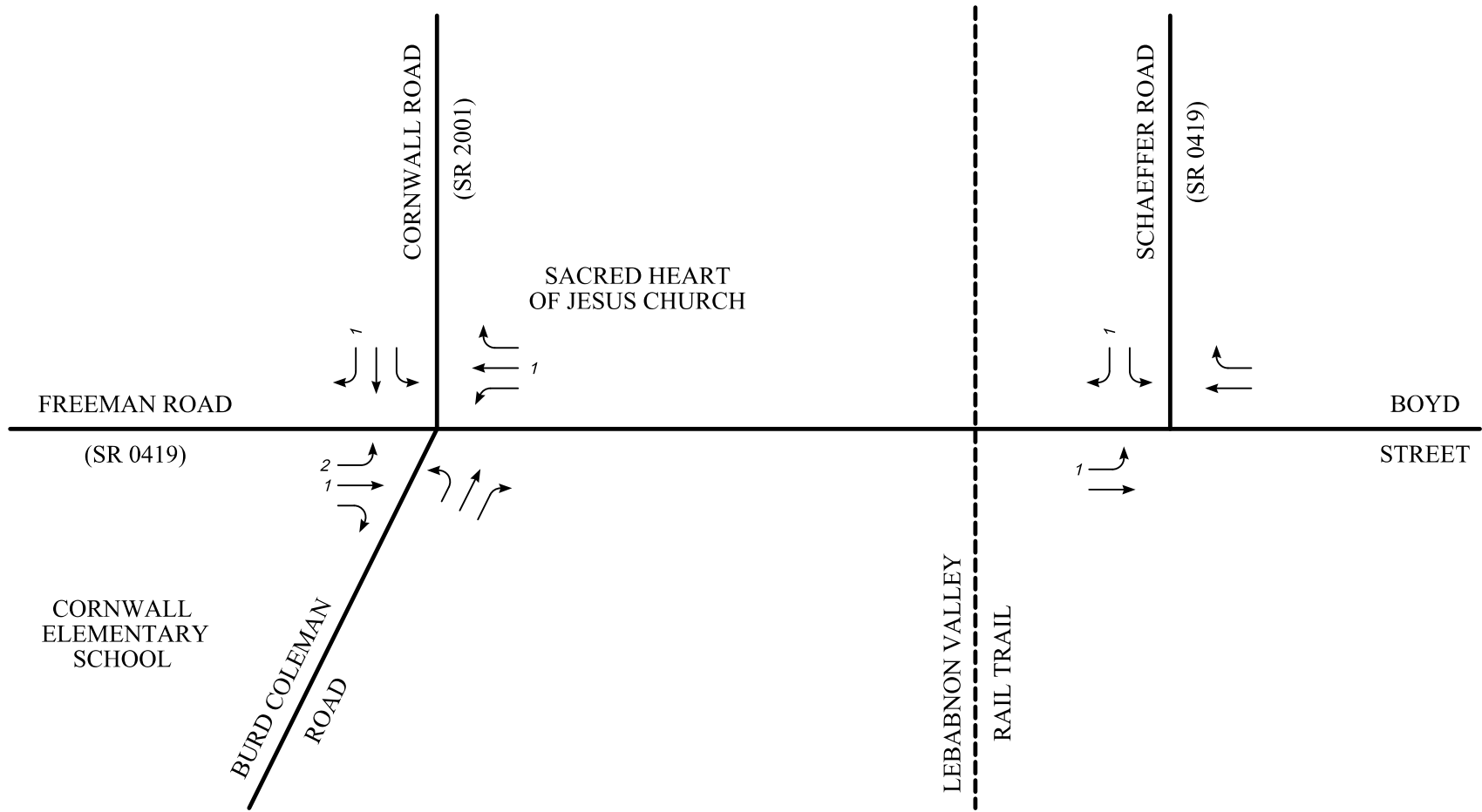
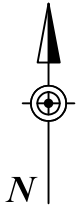
*The Preserve at
Cornwall Village*

TRAFFIC PLANNING AND DESIGN, INC.
 PITTSBURGH (412)765-3717 HARRISBURG (717)234-1430
 LEHIGH VALLEY (610)625-4242 POTTSTOWN (610)326-3100
 SOUTH JERSEY (856)966-4242
 WWW.TRAFFICPO.COM

FIGURE 20
 FULL BUILD-OUT
 WEEKDAY AM PEAK HOUR
 TRIP DISTRIBUTIONS

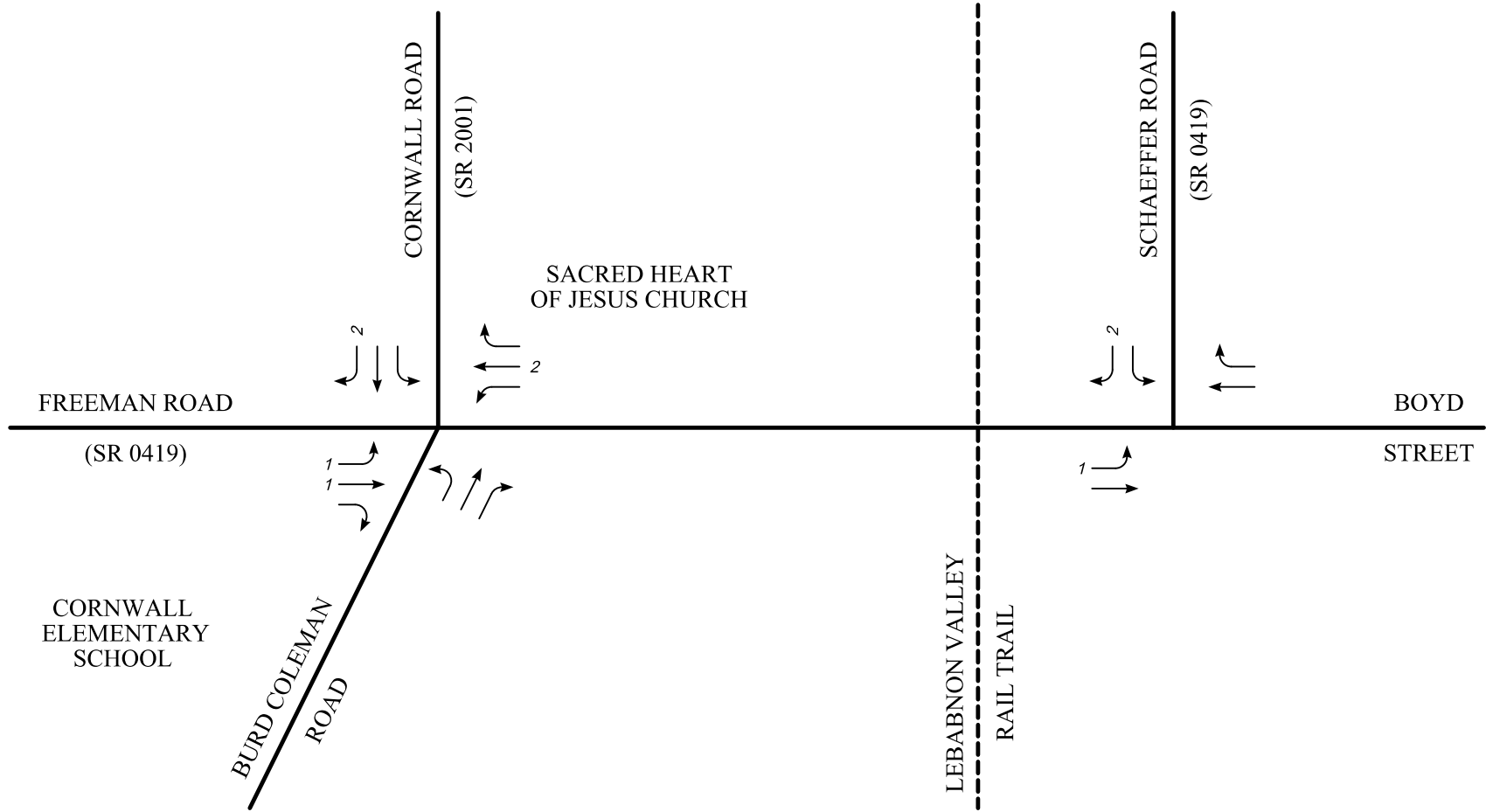
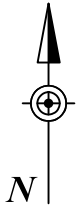
J:\WORK\0005 Cornwall_Village\VP\0005-18_Rev1.dwg TISVF\gav\figures.dgn
 12/23/05 10:58 AM

ALDEN PLACE



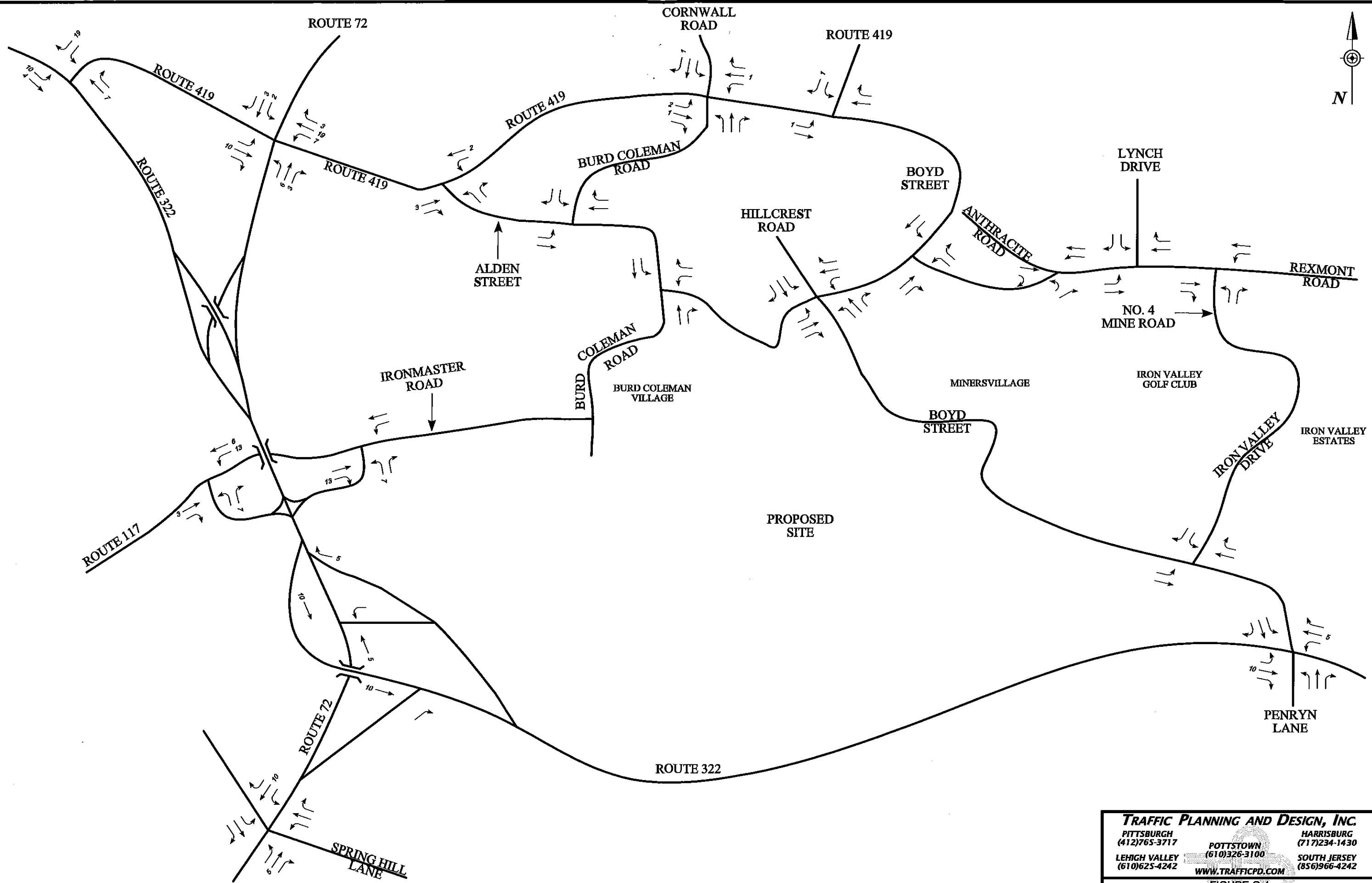
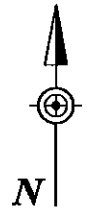
KEY:
SCHEMATIC DRAWING: NOT TO SCALE

TRAFFIC PLANNING AND DESIGN, INC.		
PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	SOUTH JERSEY (856)966-4242	
WWW.TRAFFICPD.COM		
FIGURE D-3		
ALDEN PLACE WEEKDAY AM PEAK HOUR TRIP DISTRIBUTION		



KEY:
SCHEMATIC DRAWING: NOT TO SCALE

TRAFFIC PLANNING AND DESIGN, INC.		
PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	WWW.TRAFFICPD.COM	SOUTH JERSEY (856)966-4242
FIGURE D-4		
ALDEN PLACE WEEKDAY PM PEAK HOUR TRIP DISTRIBUTION		

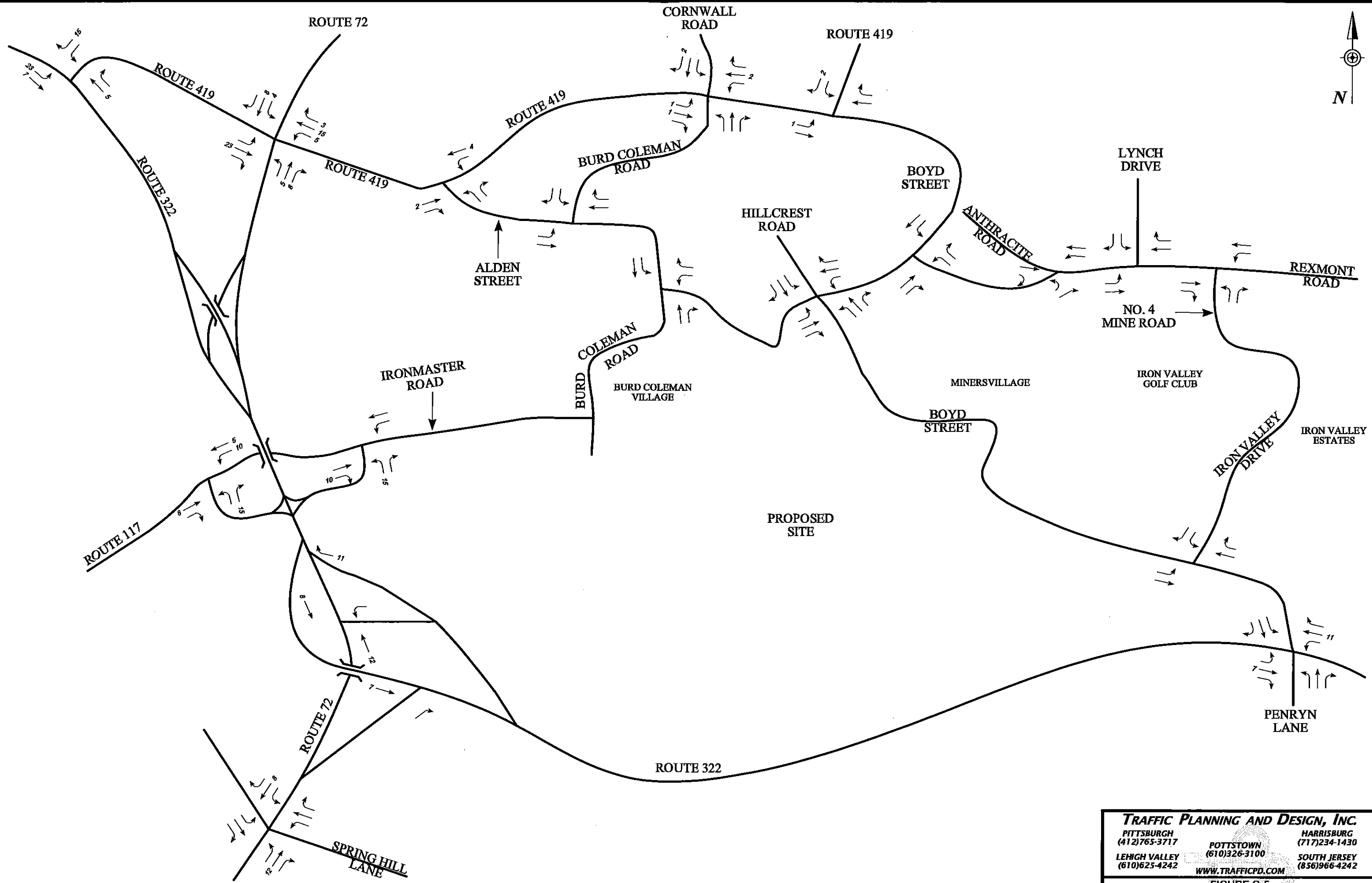
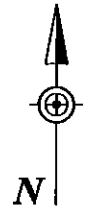


KEY:
 SCHEMATIC DRAWING: NOT TO SCALE OVERPASS

TRAFFIC PLANNING AND DESIGN, INC.
 PITTSBURGH (412)765-3717 HARRISBURG (717)234-1430
 LEHIGH VALLEY (610)625-4242 POTTS TOWN (610)326-3100 SOUTH JERSEY (856)966-4242
 WWW.TRAFFICPD.COM

FIGURE G-4
 ALDEN PLACE
 WEEKDAY AM PEAK HOUR
 TRIP DISTRIBUTIONS

J:\WORK\0005 (Cornwall) \111.dwg VP Iteming\2010-05-18_Rev\led TIS\F (e)Nearby Development Figures.dgn
 7/18/2010 12:22:26 PM bob.ellison



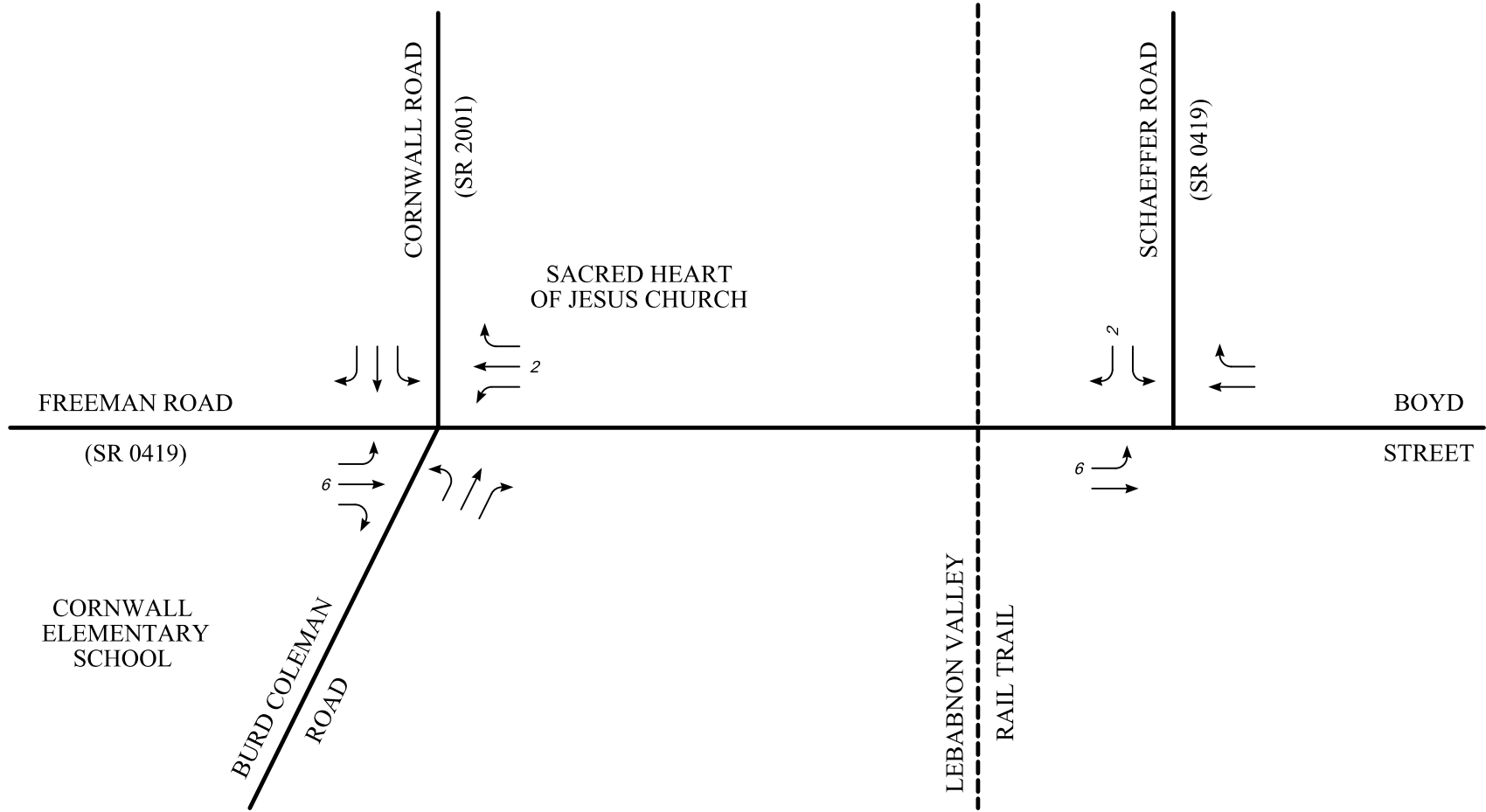
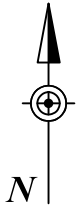
KEY:
 SCHEMATIC DRAWING: NOT TO SCALE OVERPASS

TRAFFIC PLANNING AND DESIGN, INC.
 PITTSBURGH (412) 765-3717 HARRISBURG (717) 234-1430
 LEHIGH VALLEY (610) 625-4242 POTTSWOWN (610) 326-3100
 SOUTH JERSEY (856) 966-4242
 WWW.TRAFFICPD.COM

FIGURE G-5
 ALDEN PLACE
 WEEKDAY PM PEAK HOUR
 TRIP DISTRIBUTIONS

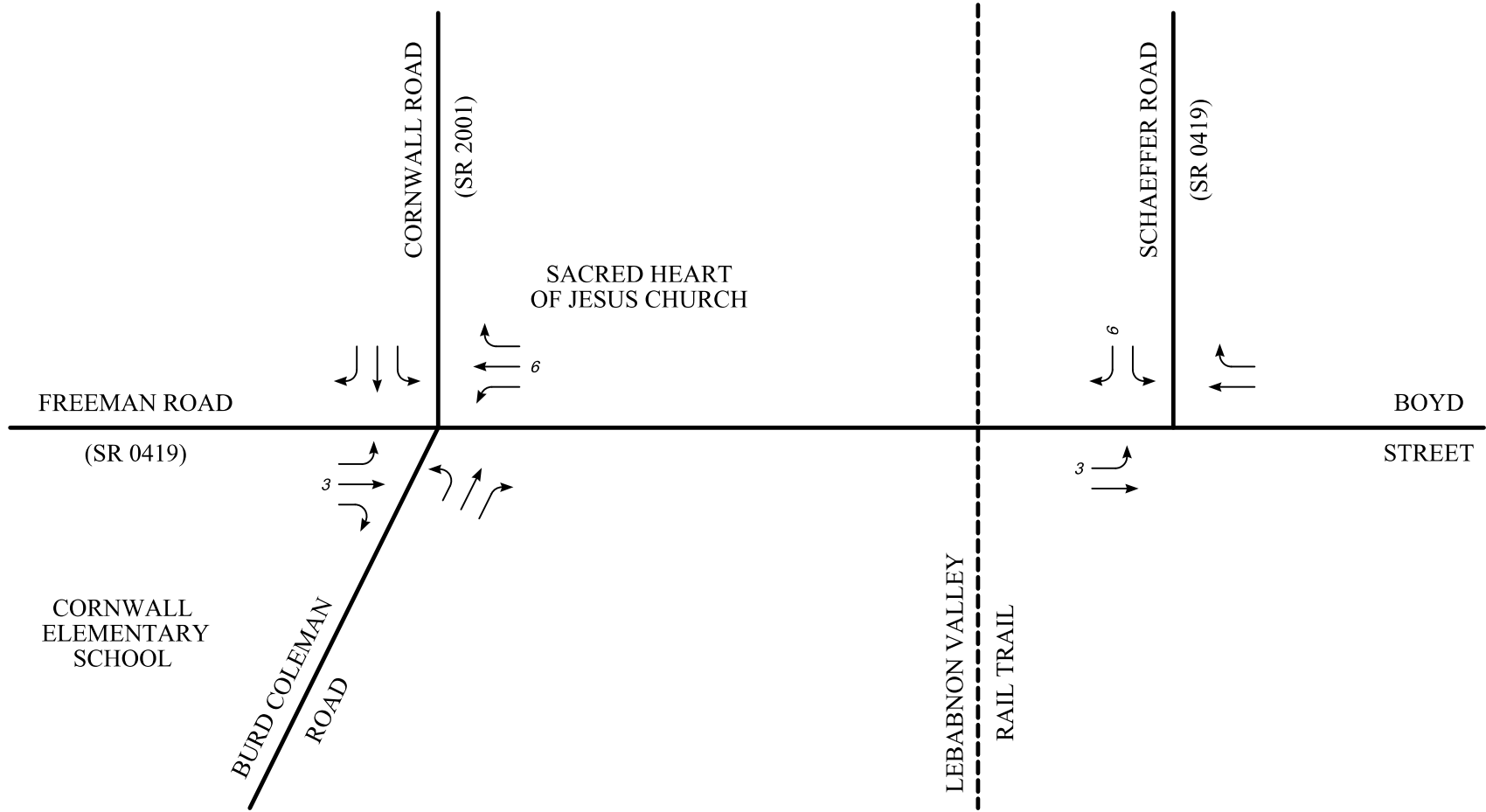
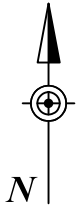
J:\MHRM\0005 (Cornwall_V11) Legal_VP\Term Ind\A2610-05-18_Rev12ed T15NF\ge\Nearby Development_Figures.dgn
 7/18/2010 12:12:47 PM

VA MEDICAL CENTER EXPANSION



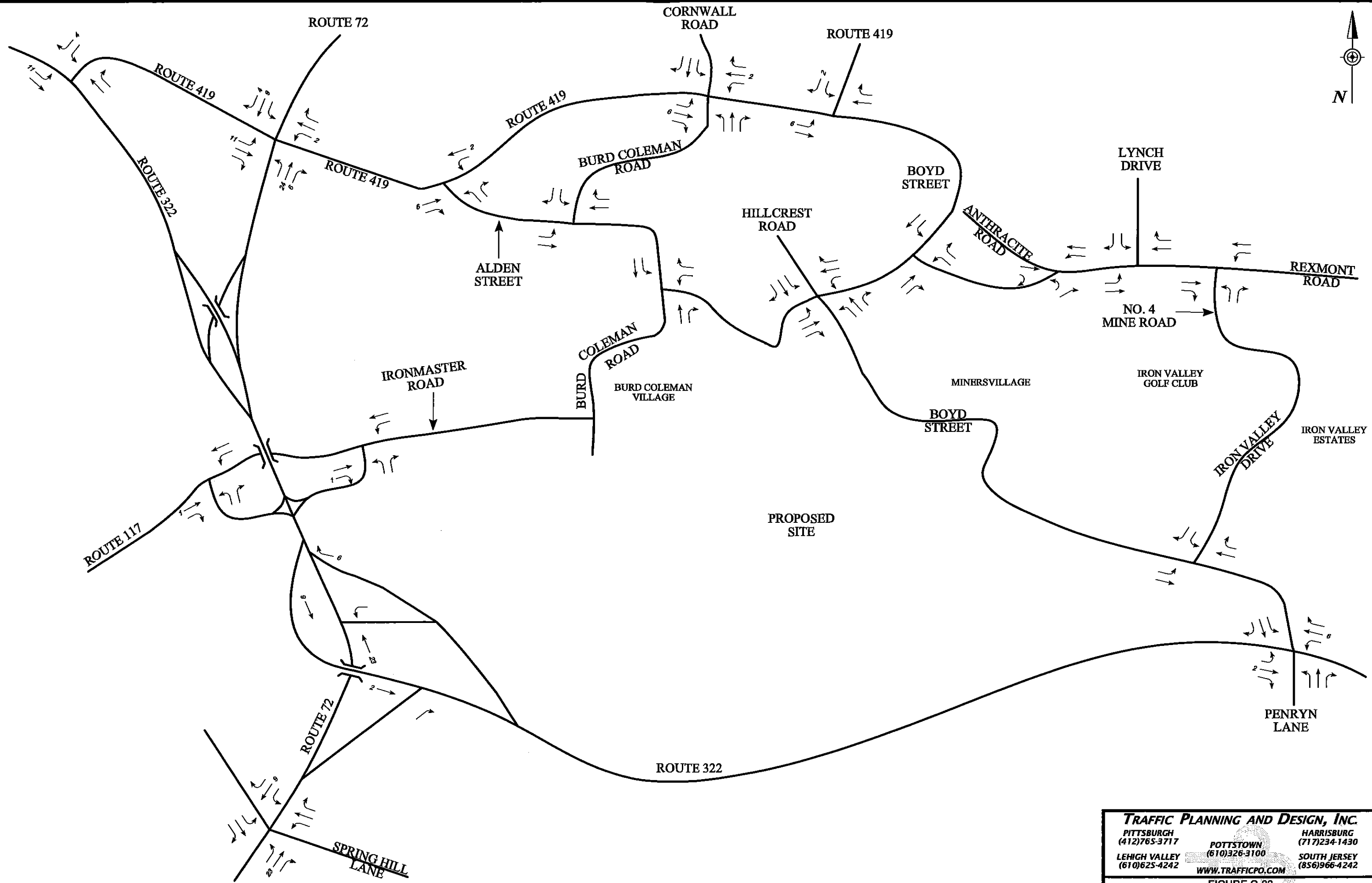
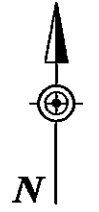
KEY:
SCHEMATIC DRAWING: NOT TO SCALE

TRAFFIC PLANNING AND DESIGN, INC.		
PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	SOUTH JERSEY (856)966-4242	
WWW.TRAFFICPD.COM		
FIGURE D-5		
VA MEDICAL CENTER EXPANSION WEEKDAY AM PEAK HOUR TRIP DISTRIBUTION		



KEY:
SCHEMATIC DRAWING: NOT TO SCALE

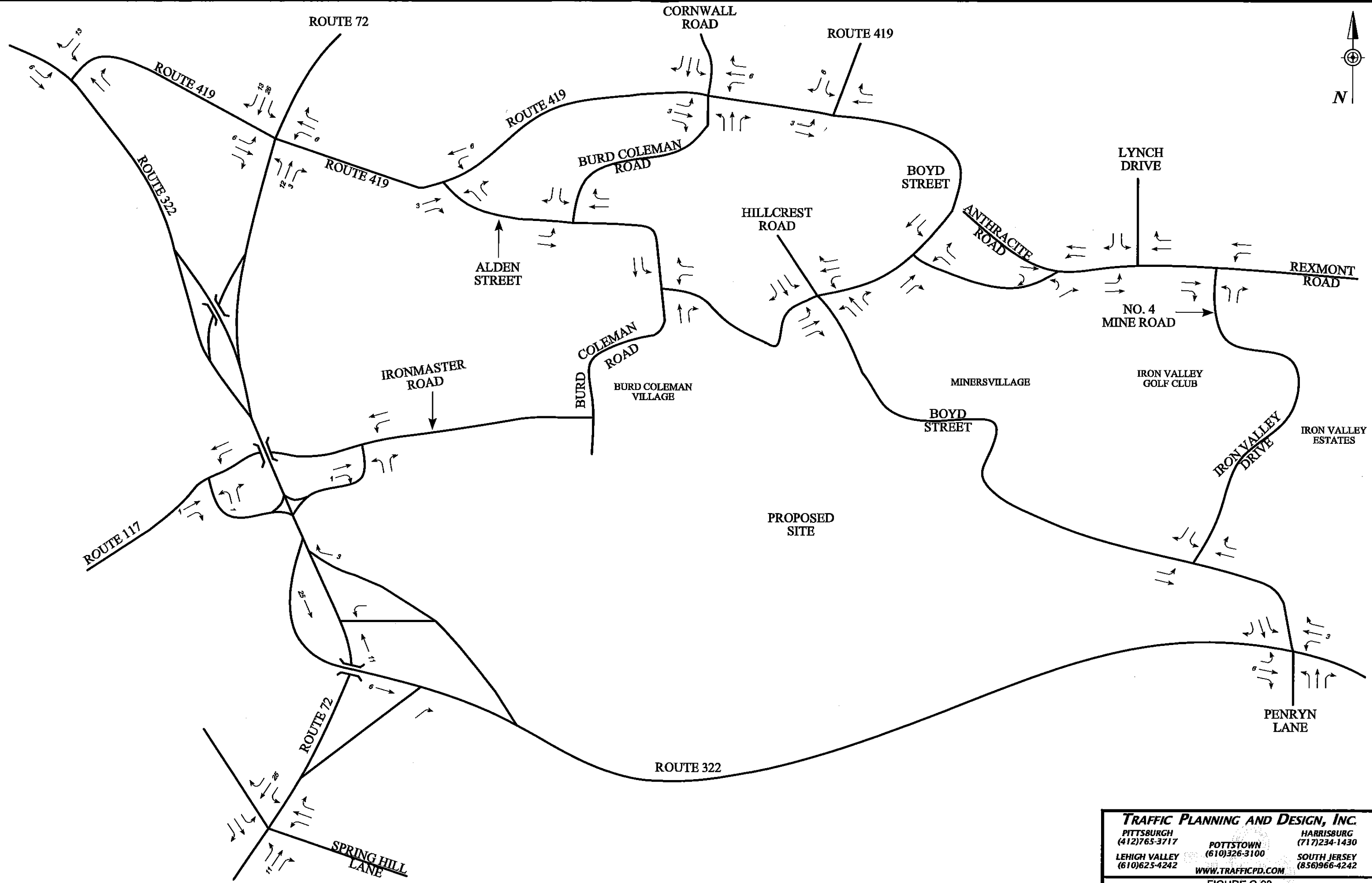
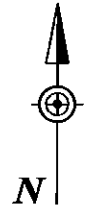
TRAFFIC PLANNING AND DESIGN, INC.		
PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	WWW.TRAFFICPD.COM	SOUTH JERSEY (856)966-4242
FIGURE D-6		
VA MEDICAL CENTER EXPANSION WEEKDAY PM PEAK HOUR TRIP DISTRIBUTION		



KEY:
 SCHEMATIC DRAWING: NOT TO SCALE OVERPASS

TRAFFIC PLANNING AND DESIGN, INC.		
PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	WWW.TRAFFICPO.COM	
SOUTH JERSEY (856)966-4242		
FIGURE G-22		
VA MEDICAL CENTER EXPANSION WEEKDAY AM PEAK HOUR TRIP DISTRIBUTIONS		

J:\HRM\0005 (cornwall) AP (am) 10-03-18, Revised TISAF Ica\Nearby Development Figure.dgn
 7/15/2010 12:16:48 PM



KEY:
 SCHEMATIC DRAWING: NOT TO SCALE OVERPASS

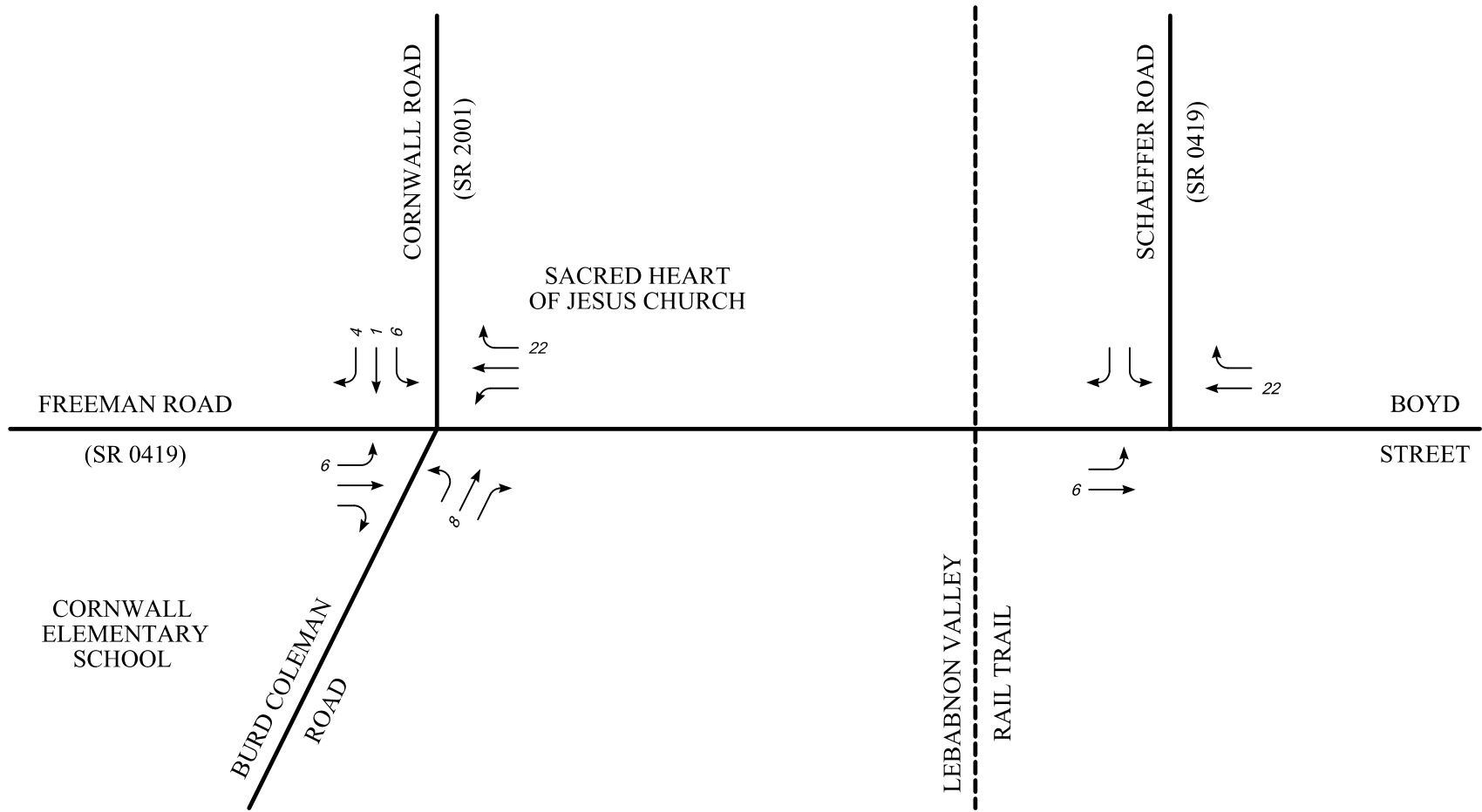
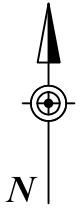
TRAFFIC PLANNING AND DESIGN, INC.
 PITTSBURGH (412)765-3717 HARRISBURG (717)234-1430
 LEHIGH VALLEY (610)625-4242 POTTSWOWN (610)326-3100 SOUTH JERSEY (856)966-4242
 WWW.TRAFFICPD.COM

FIGURE G-23

VA MEDICAL CENTER EXPANSION
 WEEKDAY PM PEAK HOUR
 TRIP DISTRIBUTIONS

J:\MIRMA\00005 (Cornwall) VTI\Legal\AP\Cornwall\2010-03-18_Rev\Lead TISNF\igs\lecorby\development\Figuras.dgn
 7/16/2010 12:17:00 PM

NORTH CORNWALL COMMONS



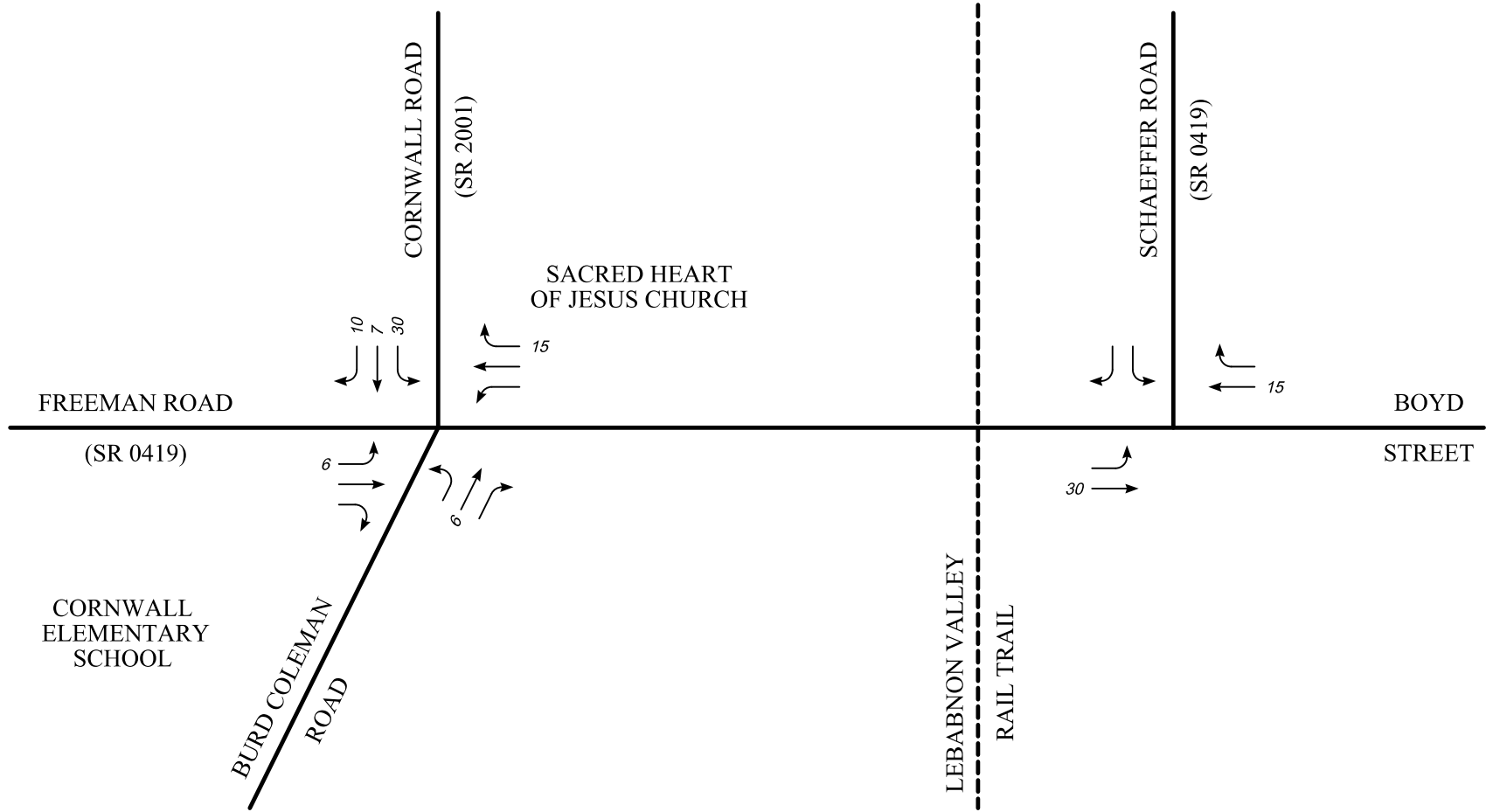
KEY:
SCHEMATIC DRAWING: NOT TO SCALE

TRAFFIC PLANNING AND DESIGN, INC.

PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	WWW.TRAFFICPD.COM	
SOUTH JERSEY (856)966-4242		

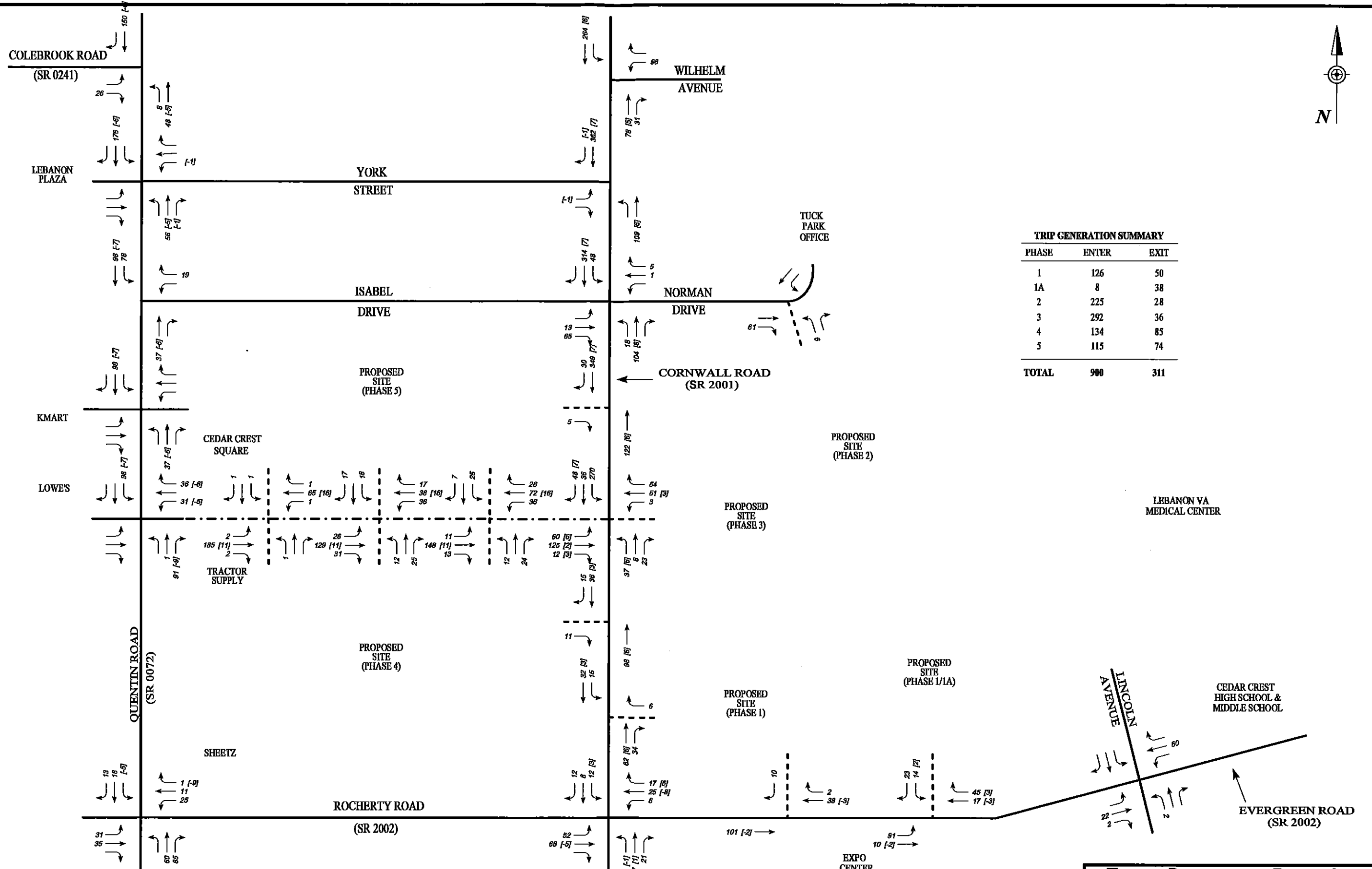
FIGURE D-7

NORTH CORNWALL COMMONS
WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION



KEY:
SCHEMATIC DRAWING: NOT TO SCALE

TRAFFIC PLANNING AND DESIGN, INC.		
PITTSBURGH (412)765-3717	POTTSTOWN (610)326-3100	HARRISBURG (717)234-1430
LEHIGH VALLEY (610)625-4242	WWW.TRAFFICPD.COM	SOUTH JERSEY (856)966-4242
FIGURE D-7		
NORTH CORNWALL COMMONS WEEKDAY AM PEAK HOUR TRIP DISTRIBUTION		



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

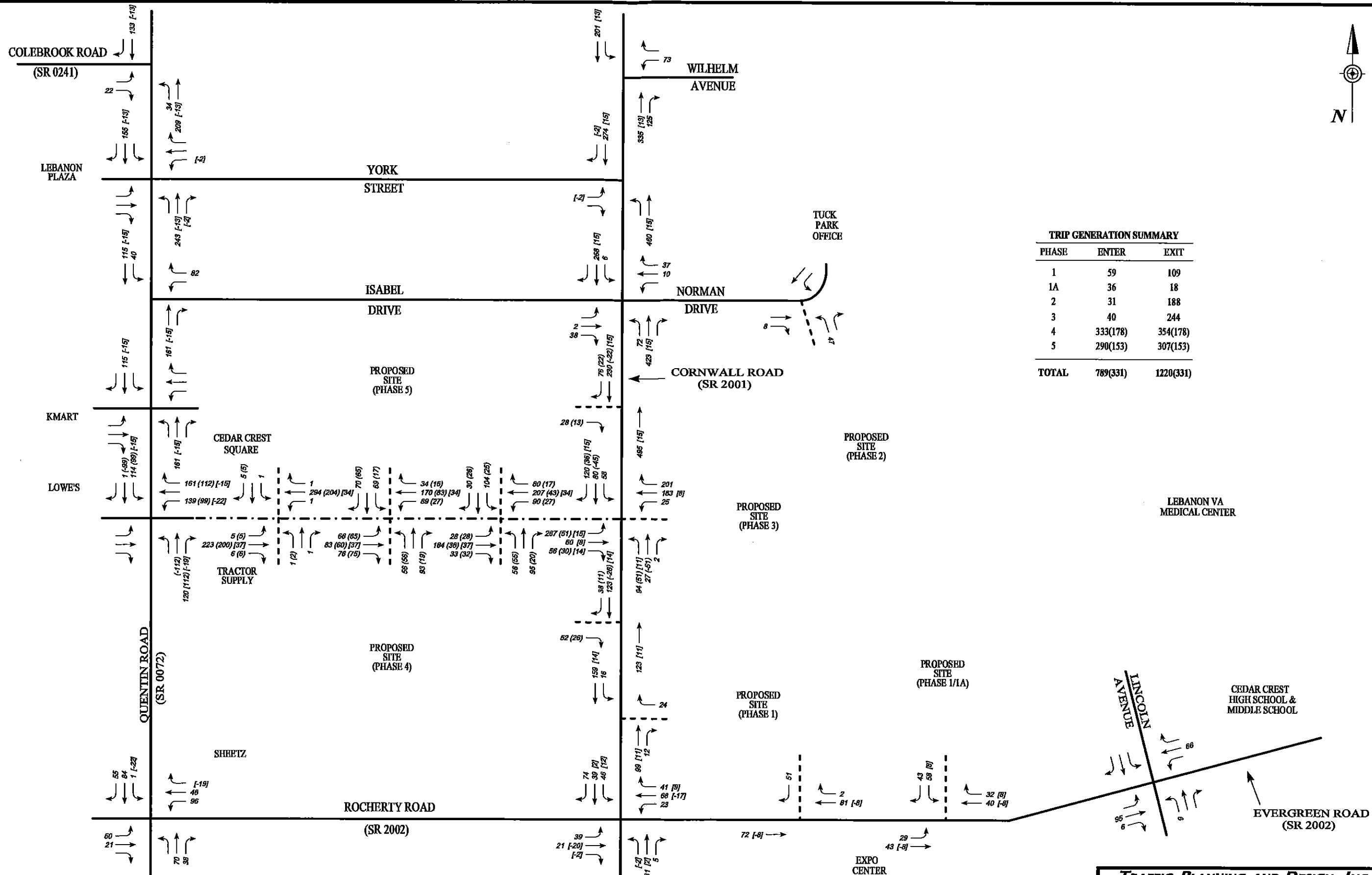
KEY:
 - - - - - PROPOSED ROADWAY
 - - - - - PROPOSED DRIVEWAY
SCHEMATIC DRAWING: NOT TO SCALE
NEW (PASS-BY) [REDISTRIBUTED] TRIPS

North Cornwall Commons

TRAFFIC PLANNING AND DESIGN, INC.
 PITTSBURGH (412)765-3717
 HARRISBURG (717)234-1430
 POTTSTOWN (610)326-3100
 LEHIGH VALLEY (610)625-4242
 SOUTH JERSEY (856)966-4242
 WWW.TRAFFICPD.COM

FIGURE 20
 SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
 TRIP DISTRIBUTION - 2035 CONDITIONS (PHASES 1-5)
 WEEKDAY AM PEAK HOUR

J:\BLAC\00001\North Cornwall Commons\VP\Traffic\Sub-DIV\Figures\2012-02-22 - Figures.dgn
 2/2/2012 10:51:02 AM



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
SCHEMATIC DRAWING: NOT TO SCALE
NEW (PASS-BY) [REDISTRIBUTED] TRIPS

North Cornwall Commons

TRAFFIC PLANNING AND DESIGN, INC.
 PITTSBURGH (412)765-3717
 LEHIGH VALLEY (610)625-4242
 HARRISBURG (717)234-1430
 POTTSTOWN (610)326-3100
 WWW.TRAFFICPD.COM
 SOUTH JERSEY (856)966-4242

FIGURE 21
 SPRINGWOOD DEVELOPMENT PARTNERS, L.P.
 TRIP DISTRIBUTION - 2035 CONDITIONS (PHASES 1-5)
 WEEKDAY PM PEAK HOUR

J:\BLG\00001 (North Cornwall Commons) \P\om\ing\Sub 01\Figures\2015-02-22_Figures.dgn
 2/2/2015 10:05 AM

APPENDIX E

VOLUME DEVELOPMENT SPREADSHEETS

TPD# LBCO.A.04
 6/23/2016
 Traffic Volumes Worksheet
 Intersection:
 Synchro Node:

Route 419 & Cornwall Road/Burd Coleman Road									
1	Adjacent intersections:	West	0	East	0	North	0	South	0

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2015 Existing Counts	35	166	1	28	194	121	0	41	53	55	14	38	746
Balancing													0
Existing Volumes (Balanced)	35	166	1	28	194	121	0	41	53	55	14	38	746
Base growth (0.98% compounded for 20 yrs)	8	36	0	6	42	26	0	9	11	12	3	8	161
The Preserve at Cornwall Village	10	7	0	0	9	18	0	11	0	16	14	6	91
Alden Place	2	1	0	0	1	0	0	0	0	0	0	1	5
VA Medical Center Expansion	0	6	0	0	2	0	0	0	0	0	0	0	8
North Cornwall Commons	6	0	0	0	0	22	0	8	0	6	1	4	47
2035 Future Volumes	61	216	1	34	248	187	0	69	64	89	32	57	1058

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2015 Existing Counts	41	223	0	54	236	117	0	41	46	129	29	45	961
Balancing													0
Existing Volumes (Balanced)	41	223	0	54	236	117	0	41	46	129	29	45	961
Base growth (0.98% compounded for 20 yrs)	9	48	0	12	51	25	0	9	10	28	6	10	208
The Preserve at Cornwall Village	7	10	0	0	9	18	0	16	0	21	16	10	107
Alden Place	1	1	0	0	2	0	0	0	0	0	0	2	6
VA Medical Center Expansion	0	3	0	0	6	0	0	0	0	0	0	0	9
North Cornwall Commons	6	0	0	0	0	15	0	6	0	30	7	10	74
2035 Future Volumes	64	285	0	66	304	175	0	72	56	208	58	77	1365

TPD# LBCO.A.04
 6/23/2016
 Traffic Volumes Worksheet

Intersection:

Route 419 & Boyd Street									
------------------------------------	--	--	--	--	--	--	--	--	--

Synchro Node:

2	Adjacent intersections:	West	0	East	0	North	0	South	0
---	-------------------------	------	---	------	---	-------	---	-------	---

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2015 Existing Counts	199	62	0	0	116	14	0	0	0	24	0	242	657
Balancing													0
Existing Volumes (Balanced)	199	62	0	0	116	14	0	0	0	24	0	242	657
Base growth (0.98% compounded for 20 yrs)	43	13	0	0	25	3	0	0	0	5	0	52	141
The Preserve at Cornwall Village	6	17	0	0	24	10	0	0	0	9	0	3	69
Alden Place	1	0	0	0	0	0	0	0	0	0	0	1	2
VA Medical Center Expansion	6	0	0	0	0	0	0	0	0	0	0	2	8
North Cornwall Commons	0	6	0	0	22	0	0	0	0	0	0	0	28
2035 Future Volumes	255	98	0	0	187	27	0	0	0	38	0	300	905

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection Volume
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	
2015 Existing Counts	260	124	0	0	117	32	0	0	0	16	1	288	838
Balancing													0
Existing Volumes (Balanced)	260	124	0	0	117	32	0	0	0	16	1	288	838
Base growth (0.98% compounded for 20 yrs)	56	27	0	0	25	7	0	0	0	3	0	62	180
The Preserve at Cornwall Village	4	27	0	0	21	11	0	0	0	11	0	6	80
Alden Place	1	0	0	0	0	0	0	0	0	0	0	2	3
VA Medical Center Expansion	3	0	0	0	0	0	0	0	0	0	0	6	9
North Cornwall Commons	0	30	0	0	15	0	0	0	0	0	0	0	45
2035 Future Volumes	324	208	0	0	178	50	0	0	0	30	1	364	1155

APPENDIX F

CAPACITY ANALYSIS WORKSHEETS

TABLE F-1
LEVEL OF SERVICE SUMMARY (DELAY): WEEKDAY A.M. PEAK HOUR

Intersection	Approach/ Movement	2015 Existing	Future Year 2035		
			Without Improvements	With Roundabout	With Signalization
Freeman Drive (Route 419) & Burd Coleman Road/ Cornwall Road	EB	A	C	A	A
	WB	A	A	B	B
	NB	A	C	A	C
	SB	A	C	A	D
	ILOS	A (4.4)	A (9.8)	B (10.2)	B (17.8)
Schaeffer Road (Route 419) & Boyd Street/Cornwall Road	EB	A	A	A	A
	WB	A	A	B	A
	SB L	A	A	A	D
	SB R				A
	ILOS	A (4.3)	A (6.3)	A (6.0)	A (8.6)

ILOS = Overall Intersection Level of Service

TABLE F-2
LEVEL OF SERVICE SUMMARY (DELAY): WEEKDAY P.M. PEAK HOUR

Intersection	Approach/ Movement	2015 Existing	Future Year 2035		
			Without Improvements	With Roundabout	With Signalization
Freeman Drive (Route 419) & Burd Coleman Road/ Cornwall Road	EB	B	F(153.6)	B	B
	WB	A	A	B	C
	NB	B	F(50.1)	A	C
	SB	C	F(259.1)	B	D
	ILOS	A (9.0)	F(102.9)	B (12.2)	C (30.5)
Schaeffer Road (Route 419) & Boyd Street/Cornwall Road	EB	A	A	A	E
	WB	A	B	B	C
	SB L	A	B	B	D
	SB R				A
	ILOS	A (4.5)	A (7.0)	A (6.9)	D (41.7)

ILOS = Overall Intersection Level of Service

**TABLE F-3
95TH PERCENTILE QUEUE SUMMARY (FEET): WEEKDAY A.M. PEAK HOUR**

Intersection	Approach/ Movement	Existing Conditions	2035 Future Conditions		
			Without Improvements	With Roundabout	With Signalization
Freeman Drive (Route 419) & Burd Coleman Road/ Cornwall Road	EB	88	179	50	195
	WB	5	10	100	328
	NB	60	96	25	163
	SB	54	109	25	240
Schaeffer Road (Route 419) & Boyd Street/Cornwall Road	EB	0	3	3	110
	WB	73	99	106	99
	SB L	86	124	120	53
	SB R				46

**TABLE F-4
95TH PERCENTILE QUEUE SUMMARY (FEET): WEEKDAY P.M. PEAK HOUR**

Intersection	Approach/ Movement	Existing Conditions	2035 Future Conditions		
			Without Improvements	With Roundabout	With Signalization
Freeman Drive (Route 419) & Burd Coleman Road/ Cornwall Road	EB	137	794	75	275
	WB	5	10	100	540
	NB	68	192	25	118
	SB	128	797	75	405
Schaeffer Road (Route 419) & Boyd Street/Cornwall Road	EB	9	3	9	696
	WB	85	123	125	228
	SB L	97	174	164	48
	SB R				36

EXISTING CONDITIONS

1: Burd Coleman Road/Cornwall Road & Route 419 Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	7.5	1.3	7.1	6.9	4.4

2: Route 419 & Boyd Street Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	1.7	7.0	5.5	4.3

Total Network Performance

Denied Del/Veh (s)			0.2
Total Del/Veh (s)			8.1

Intersection: 1: Burd Coleman Road/Cornwall Road & Route 419

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	117	10	68	65
Average Queue (ft)	52	0	36	32
95th Queue (ft)	88	5	60	54
Link Distance (ft)	672	342	266	596
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Route 419 & Boyd Street

Movement	WB	SB
Directions Served	TR	LR
Maximum Queue (ft)	84	109
Average Queue (ft)	43	52
95th Queue (ft)	73	86
Link Distance (ft)	246	644
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

1: Burd Coleman Road/Cornwall Road & Route 419 Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	14.1	1.3	11.9	16.6	9.0

2: Route 419 & Boyd Street Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	1.8	7.8	6.2	4.5

Total Network Performance

Denied Del/Veh (s)		0.2
Total Del/Veh (s)		12.6

Intersection: 1: Burd Coleman Road/Cornwall Road & Route 419

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	194	13	89	169
Average Queue (ft)	71	1	39	63
95th Queue (ft)	137	5	68	128
Link Distance (ft)	672	342	266	596
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Route 419 & Boyd Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	19	110	114
Average Queue (ft)	1	51	58
95th Queue (ft)	9	85	97
Link Distance (ft)	342	246	644
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

2035 FUTURE CONDITIONS

Without Improvements

1: Burd Coleman Road/Cornwall Road & Route 419 Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	17.8	1.9	15.1	16.1	9.8

2: Route 419 & Boyd Street Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Del/Veh (s)				0.2
Total Del/Veh (s)	1.9	9.6	8.8	6.3

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	14.8

Without Improvements

Intersection: 1: Burd Coleman Road/Cornwall Road & Route 419

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	249	26	130	141
Average Queue (ft)	92	1	53	58
95th Queue (ft)	179	10	96	109
Link Distance (ft)	672	342	266	596
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Route 419 & Boyd Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	4	128	147
Average Queue (ft)	0	61	73
95th Queue (ft)	3	99	124
Link Distance (ft)	342	246	644
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

Without Improvements

1: Burd Coleman Road/Cornwall Road & Route 419 Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					63.3
Total Del/Veh (s)	153.6	1.9	50.1	259.1	102.9

2: Route 419 & Boyd Street Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Del/Veh (s)				0.2
Total Del/Veh (s)	2.0	11.2	10.8	7.0

Total Network Performance

Denied Del/Veh (s)	59.7
Total Del/Veh (s)	102.3

Without Improvements

Intersection: 1: Burd Coleman Road/Cornwall Road & Route 419

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	643	19	224	645
Average Queue (ft)	428	1	90	540
95th Queue (ft)	794	10	192	797
Link Distance (ft)	672	342	266	596
Upstream Blk Time (%)	18		2	70
Queuing Penalty (veh)	0		0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Route 419 & Boyd Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	4	161	235
Average Queue (ft)	0	71	90
95th Queue (ft)	3	123	174
Link Distance (ft)	342	246	644
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

**2035 FUTURE CONDITIONS
WITH ROUNDABOUT**

Intersection				
Intersection Delay, s/veh	10.2			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	323	545	154	206
Demand Flow Rate, veh/h	364	576	160	213
Vehicles Circulating, veh/h	180	159	465	357
Vehicles Exiting, veh/h	390	466	79	378
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.9	12.6	7.9	7.8
Approach LOS	A	B	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	364	576	160	213
Cap Entry Lane, veh/h	944	964	710	791
Entry HV Adj Factor	0.888	0.946	0.965	0.967
Flow Entry, veh/h	323	545	154	206
Cap Entry, veh/h	838	912	685	765
V/C Ratio	0.386	0.598	0.225	0.269
Control Delay, s/veh	8.9	12.6	7.9	7.8
LOS	A	B	A	A
95th %tile Queue, veh	2	4	1	1

Roundabout

2: Route 419 & Boyd Street Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Del/Veh (s)				0.2
Total Del/Veh (s)	0.7	10.3	8.9	6.0

Roundabout

Intersection: 2: Route 419 & Boyd Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	4	140	150
Average Queue (ft)	0	64	71
95th Queue (ft)	3	106	120
Link Distance (ft)	303	246	644
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection				
Intersection Delay, s/veh	12.2			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	367	573	135	361
Demand Flow Rate, veh/h	383	601	139	380
Vehicles Circulating, veh/h	353	148	606	415
Vehicles Exiting, veh/h	442	597	130	334
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.5	13.0	8.9	12.8
Approach LOS	B	B	A	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	383	601	139	380
Cap Entry Lane, veh/h	794	974	616	746
Entry HV Adj Factor	0.958	0.954	0.973	0.950
Flow Entry, veh/h	367	573	135	361
Cap Entry, veh/h	761	930	600	709
V/C Ratio	0.482	0.617	0.225	0.509
Control Delay, s/veh	11.5	13.0	8.9	12.8
LOS	B	B	A	B
95th %tile Queue, veh	3	4	1	3

Roundabout

2: Route 419 & Boyd Street Performance by lane

Lane	EB	WB	SB	All
Movements Served	LT	TR	LR	
Denied Del/Veh (s)				0.2
Total Del/Veh (s)	1.2	12.3	11.7	6.9

Roundabout

















Intersection: 2: Route 419 & Boyd Street

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	19	158	205
Average Queue (ft)	1	72	92
95th Queue (ft)	9	125	164
Link Distance (ft)	303	246	644
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

**2035 FUTURE CONDITIONS
WITH SIGNALIZATION**

1: Burd Coleman Road/Cornwall Road & Route 419
Signalization

2035 Future Conditions
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	61	216	1	34	248	187	0	69	64	89	32	57
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1654	1863	1881	1780	1881	1891	1824	1891	1791	1730	1791
Adj Flow Rate, veh/h	71	251	1	40	288	217	0	80	74	103	37	66
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	15	15	15	10	10	10	7	7	7	0	0	0
Cap, veh/h	213	717	3	87	586	420	0	219	202	170	65	85
Arrive On Green	0.64	0.65	0.64	0.64	0.65	0.64	0.00	0.25	0.24	0.24	0.25	0.24
Sat Flow, veh/h	260	1104	4	75	902	646	0	874	808	464	259	341
Grp Volume(v), veh/h	323	0	0	545	0	0	0	0	154	206	0	0
Grp Sat Flow(s),veh/h/ln	1368	0	0	1623	0	0	0	0	1682	1064	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	12.1	0.0	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.0	17.4	0.0	0.0	0.0	0.0	7.6	19.7	0.0	0.0
Prop In Lane	0.22		0.00	0.07		0.40	0.00		0.48	0.50		0.32
Lane Grp Cap(c), veh/h	919	0	0	1077	0	0	0	0	421	310	0	0
V/C Ratio(X)	0.35	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.37	0.67	0.00	0.00
Avail Cap(c_a), veh/h	919	0	0	1077	0	0	0	0	807	621	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.89	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.7	0.0	0.0	9.3	0.0	0.0	0.0	0.0	31.2	37.5	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.5	2.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.8	0.0	0.0	13.1	0.0	0.0	0.0	0.0	6.5	9.6	0.0	0.0
LnGrp Delay(d),s/veh	8.8	0.0	0.0	10.8	0.0	0.0	0.0	0.0	31.7	40.0	0.0	0.0
LnGrp LOS	A			B					C	D		
Approach Vol, veh/h		323			545			154			206	
Approach Delay, s/veh		8.8			10.8			31.7			40.0	
Approach LOS		A			B			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		70.0		30.0		70.0		30.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		41.0		47.0		41.0		47.0				
Max Q Clear Time (g_c+I1), s		11.3		9.6		19.4		21.7				
Green Ext Time (p_c), s		7.5		2.5		6.7		2.3				
Intersection Summary												
HCM 2010 Ctrl Delay				17.8								
HCM 2010 LOS				B								

1: Burd Coleman Road/Cornwall Road & Route 419
Signalization

2035 Future Conditions
Timing Plan: AM Peak Hour



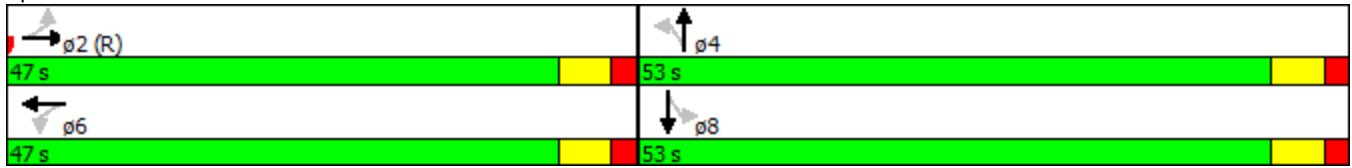
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	61	216	1	34	248	187	0	69	64	89	32	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	13	14	14	14	14	14	14	11	11	11
Grade (%)		1%			-1%			-2%			1%	
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			35	
Link Distance (ft)		720			397			301			650	
Travel Time (s)		19.6			10.8			8.2			12.7	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	3%	15%	100%	0%	10%	1%	0%	7%	0%	0%	0%	11%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	323	0	0	545	0	0	154	0	0	206	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	22.0	22.0		13.0	13.0		22.0	22.0		13.0	13.0	
Total Split (s)	47.0	47.0		47.0	47.0		53.0	53.0		53.0	53.0	
Total Split (%)	47.0%	47.0%		47.0%	47.0%		53.0%	53.0%		53.0%	53.0%	
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)		-1.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
v/c Ratio		0.35			0.47			0.37			0.81	
Control Delay		9.0			8.7			20.3			54.2	
Queue Delay		0.0			0.6			0.0			0.0	
Total Delay		9.0			9.3			20.3			54.2	
Queue Length 50th (ft)		74			78			48			107	
Queue Length 95th (ft)		153			304			85			160	
Internal Link Dist (ft)		640			317			221			570	
Turn Bay Length (ft)												
Base Capacity (vph)		916			1152			873			537	
Starvation Cap Reductn		0			283			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.35			0.63			0.18			0.38	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green, Master Intersection
 Natural Cycle: 50

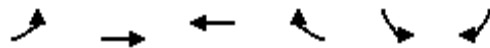
Control Type: Actuated-Coordinated

Splits and Phases: 1: Burd Coleman Road/Cornwall Road & Route 419



2: Route 419 & Boyd Street
Signalization

2035 Future Conditions
Timing Plan: AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø11
Lane Configurations		↕	↕		↕	↕	
Volume (vph)	255	93	187	27	38	300	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Width (ft)	11	11	11	11	11	11	
Grade (%)		1%	-1%		0%		
Storage Length (ft)	0			0	100	0	
Storage Lanes	0			0	1	1	
Taper Length (ft)	75				75		
Satd. Flow (prot)	0	1549	1661	0	1653	1382	
Flt Permitted		0.583			0.950		
Satd. Flow (perm)	0	936	1661	0	1653	1382	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			6			361	
Link Speed (mph)		25	25		40		
Link Distance (ft)		397	284		676		
Travel Time (s)		10.8	7.7		11.5		
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	
Heavy Vehicles (%)	10%	2%	3%	7%	0%	7%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	419	258	0	46	361	
Turn Type	pm+pt	NA	NA		Prot	pt+ov	
Protected Phases	5	2	6		4	4 5	11
Permitted Phases	2						
Detector Phase	5	2	6		4	4 5	
Switch Phase							
Minimum Initial (s)	3.0	3.0	3.0		3.0		3.0
Minimum Split (s)	13.0	22.0	13.0		22.0		34.0
Total Split (s)	24.0	44.0	20.0		22.0		34.0
Total Split (%)	24.0%	44.0%	20.0%		22.0%		34%
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0		2.0
Lost Time Adjust (s)		-1.0	-1.0		-1.0		
Total Lost Time (s)		5.0	5.0		5.0		
Lead/Lag	Lead		Lag				
Lead-Lag Optimize?							
Recall Mode	None	C-Max	Max		None		None
Act Effct Green (s)		79.6	67.9		10.4	22.1	
Actuated g/C Ratio		0.80	0.68		0.10	0.22	
v/c Ratio		0.53	0.23		0.27	0.62	
Control Delay		5.6	7.2		43.5	8.2	
Queue Delay		0.3	0.0		0.0	0.0	
Total Delay		6.0	7.2		43.5	8.2	
LOS		A	A		D	A	
Approach Delay		6.0	7.2		12.2		
Approach LOS		A	A		B		
Queue Length 50th (ft)		29	51		28	0	
Queue Length 95th (ft)		110	99		53	46	
Internal Link Dist (ft)		317	204		596		
Turn Bay Length (ft)					100		

2: Route 419 & Boyd Street
Signalization

2035 Future Conditions
Timing Plan: AM Peak Hour

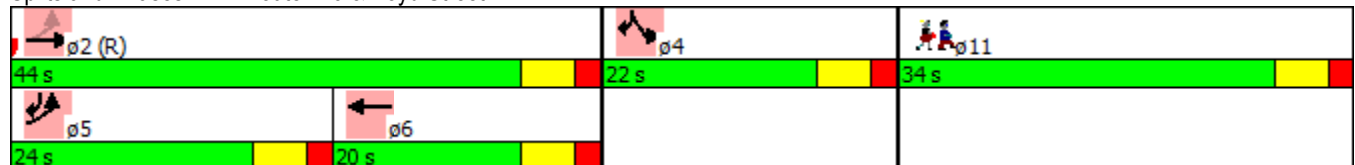


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø11
Base Capacity (vph)		786	1129		281	711	
Starvation Cap Reductn		82	0		0	0	
Spillback Cap Reductn		0	55		0	12	
Storage Cap Reductn		0	0		0	0	
Reduced v/c Ratio		0.60	0.24		0.16	0.52	

Intersection Summary

















Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	115
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	8.6
Intersection LOS:	A
Intersection Capacity Utilization	48.0%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 2: Route 419 & Boyd Street



1: Burd Coleman Road/Cornwall Road & Route 419
Signalization

2035 Future Conditions
Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	64	285	0	66	304	175	0	72	56	208	58	77
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1783	1863	1881	1795	1881	1891	1839	1891	1791	1702	1791
Adj Flow Rate, veh/h	67	300	0	69	320	184	0	76	59	219	61	81
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	8	8	8	5	5	5	0	0	0
Cap, veh/h	147	632	0	120	517	282	0	344	267	299	72	91
Arrive On Green	0.53	0.54	0.00	0.18	0.18	0.18	0.00	0.36	0.35	0.35	0.36	0.35
Sat Flow, veh/h	194	1165	0	147	953	520	0	961	746	673	202	253
Grp Volume(v), veh/h	367	0	0	573	0	0	0	0	135	361	0	0
Grp Sat Flow(s),veh/h/ln	1359	0	0	1620	0	0	0	0	1707	1127	0	0
Q Serve(g_s), s	0.0	0.0	0.0	17.3	0.0	0.0	0.0	0.0	5.5	26.0	0.0	0.0
Cycle Q Clear(g_c), s	15.1	0.0	0.0	32.4	0.0	0.0	0.0	0.0	5.5	31.5	0.0	0.0
Prop In Lane	0.18		0.00	0.12		0.32	0.00		0.44	0.61		0.22
Lane Grp Cap(c), veh/h	766	0	0	902	0	0	0	0	611	450	0	0
V/C Ratio(X)	0.48	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.22	0.80	0.00	0.00
Avail Cap(c_a), veh/h	766	0	0	902	0	0	0	0	666	492	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.81	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.5	0.0	0.0	31.9	0.0	0.0	0.0	0.0	22.5	33.5	0.0	0.0
Incr Delay (d2), s/veh	2.1	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.2	8.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.0	0.0	0.0	21.6	0.0	0.0	0.0	0.0	4.7	16.2	0.0	0.0
LnGrp Delay(d),s/veh	15.6	0.0	0.0	34.7	0.0	0.0	0.0	0.0	22.7	42.1	0.0	0.0
LnGrp LOS	B			C					C	D		
Approach Vol, veh/h		367			573			135			361	
Approach Delay, s/veh		15.6			34.7			22.7			42.1	
Approach LOS		B			C			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.2		40.8		59.2		40.8				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		50.0		38.0		50.0		38.0				
Max Q Clear Time (g_c+I1), s		17.1		7.5		34.4		33.5				
Green Ext Time (p_c), s		8.5		3.5		6.3		1.3				
Intersection Summary												
HCM 2010 Ctrl Delay				30.5								
HCM 2010 LOS				C								

1: Burd Coleman Road/Cornwall Road & Route 419
Signalization

2035 Future Conditions
Timing Plan: PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	64	285	0	66	304	175	0	72	56	208	58	77
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	13	14	14	14	14	14	14	11	11	11
Grade (%)		1%			-1%			-2%			1%	
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					0.957			0.941				0.970
Flt Protected		0.991			0.994						0.971	
Satd. Flow (prot)	0	1756	0	0	1752	0	0	1775	0	0	1549	0
Flt Permitted		0.835			0.911						0.730	
Satd. Flow (perm)	0	1479	0	0	1605	0	0	1775	0	0	1165	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					35			46				17
Link Speed (mph)		25			25			25				35
Link Distance (ft)		720			397			301				650
Travel Time (s)		19.6			10.8			8.2				12.7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	0%	0%	8%	1%	0%	5%	0%	2%	0%	18%
Adj. Flow (vph)	67	300	0	69	320	184	0	76	59	219	61	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	367	0	0	573	0	0	135	0	0	361	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	1.03	1.03	1.03	0.98	0.98	0.98	0.97	0.97	0.97	1.13	1.13	1.13
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	56.0	56.0		56.0	56.0		44.0	44.0		44.0	44.0	
Total Split (%)	56.0%	56.0%		56.0%	56.0%		44.0%	44.0%		44.0%	44.0%	
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)		-1.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
v/c Ratio		0.44			0.63			0.21			0.88	
Control Delay		16.4			18.9			14.6			52.5	
Queue Delay		0.0			3.0			0.4			56.6	
Total Delay		16.4			21.9			15.0			109.0	

1: Burd Coleman Road/Cornwall Road & Route 419
Signalization

2035 Future Conditions
Timing Plan: PM Peak Hour

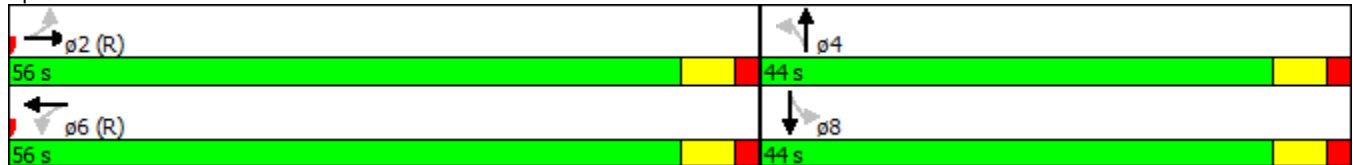


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		138			295			37			198	
Queue Length 95th (ft)		226			448			76			#343	
Internal Link Dist (ft)		640			317			221			570	
Turn Bay Length (ft)												
Base Capacity (vph)		825			911			720			464	
Starvation Cap Reductn		0			231			0			0	
Spillback Cap Reductn		0			0			273			179	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.44			0.84			0.30			1.27	

Intersection Summary

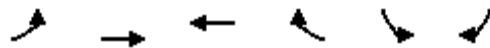
Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Burd Coleman Road/Cornwall Road & Route 419



2: Route 419 & Boyd Street
Signalization

2035 Future Conditions
Timing Plan: PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø11
Lane Configurations							
Volume (vph)	324	208	178	50	30	364	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Lane Width (ft)	11	11	11	11	11	11	
Grade (%)		1%	-1%		0%		
Storage Length (ft)	0			0	100	0	
Storage Lanes	0			0	1	1	
Taper Length (ft)	75				75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt			0.970			0.850	
Flt Protected		0.970			0.950		
Satd. Flow (prot)	0	1630	1600	0	1653	1382	
Flt Permitted		0.555			0.950		
Satd. Flow (perm)	0	932	1600	0	1653	1382	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			11			400	
Link Speed (mph)		25	25		40		
Link Distance (ft)		397	284		676		
Travel Time (s)		10.8	7.7		11.5		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Heavy Vehicles (%)	5%	0%	6%	6%	0%	7%	
Adj. Flow (vph)	356	229	196	55	33	400	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	585	251	0	33	400	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(ft)		0	0		11		
Link Offset(ft)		0	0		0		
Crosswalk Width(ft)		16	16		16		
Two way Left Turn Lane							
Headway Factor	1.13	1.13	1.11	1.11	1.12	1.12	
Turning Speed (mph)	15			9	15	9	
Turn Type	pm+pt	NA	NA		Prot	pt+ov	
Protected Phases	5	2	6		4	4 5	11
Permitted Phases	2						
Detector Phase	5	2	6		4	4 5	
Switch Phase							
Minimum Initial (s)	3.0	3.0	3.0		3.0	3.0	
Minimum Split (s)	13.0	13.0	13.0		13.0	34.0	
Total Split (s)	30.0	45.0	15.0		21.0	34.0	
Total Split (%)	30.0%	45.0%	15.0%		21.0%	34%	
Yellow Time (s)	4.0	4.0	4.0		4.0	2.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		6.0	6.0		6.0		
Lead/Lag	Lead		Lag				
Lead-Lag Optimize?							
Recall Mode	None	C-Max	C-Max		None	None	
Act Effect Green (s)		59.5	46.0		8.1	18.0	

2: Route 419 & Boyd Street
Signalization

2035 Future Conditions
Timing Plan: PM Peak Hour

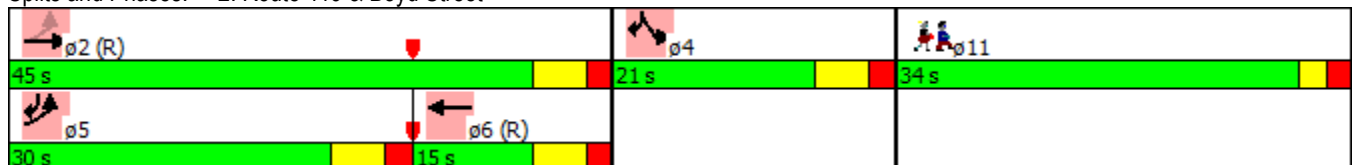


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø11
Actuated g/C Ratio		0.60	0.46		0.08	0.18	
v/c Ratio		0.96	0.34		0.25	0.69	
Control Delay		54.2	25.1		46.4	8.6	
Queue Delay		16.8	0.1		0.0	0.1	
Total Delay		71.0	25.2		46.4	8.8	
LOS		E	C		D	A	
Approach Delay		71.0	25.2		11.6		
Approach LOS		E	C		B		
Queue Length 50th (ft)		~467	116		20	0	
Queue Length 95th (ft)		#696	228		48	36	
Internal Link Dist (ft)		317	204		596		
Turn Bay Length (ft)					100		
Base Capacity (vph)		607	742		247	770	
Starvation Cap Reductn		41	0		0	0	
Spillback Cap Reductn		0	50		0	37	
Storage Cap Reductn		0	0		0	0	
Reduced v/c Ratio		1.03	0.36		0.13	0.55	

Intersection Summary

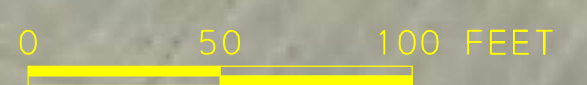
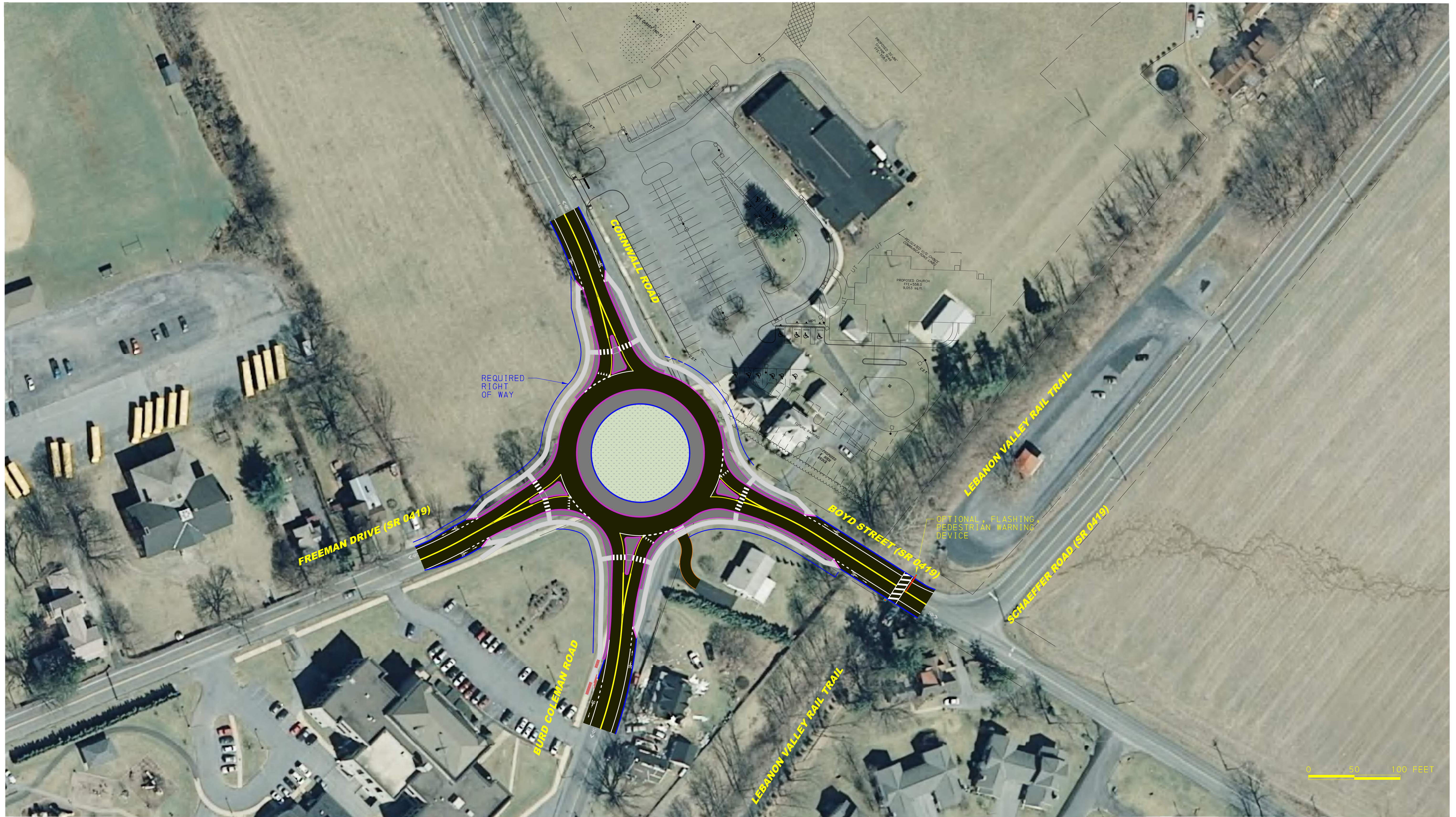
Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 41.7
 Intersection LOS: D
 Intersection Capacity Utilization 61.9%
 ICU Level of Service B
 Analysis Period (min) 15
 ~ 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: 2: Route 419 & Boyd Street



APPENDIX G

CONCEPTUAL IMPROVEMENT PLANS AND COST ESTIMATES



6/27/2016 4:17:32 PM 1:50.0001

CONCEPT PLAN NOTES

- THESE NOTES ARE AN INTEGRAL PART OF THIS CONCEPT PLAN. THIS CONCEPT PLAN HAS BEEN PREPARED AT CLIENT'S REQUEST, IS CONCEPTUAL AND PRELIMINARY IN NATURE, AND SHALL NOT BE USED FOR PURPOSES OF CONSTRUCTION OR ANY OTHER USE. THIS PLAN IS SUBJECT TO CHANGE AND REFINEMENT AS THE DESIGN IS FURTHER DEVELOPED AND REVIEWED BY MUNICIPALITIES, AGENCIES, AND OTHERS.
- ENGINEER DOES NOT MAKE ANY REPRESENTATION REGARDING THE ACCURACY OF THE INFORMATION CONTAINED HEREIN AND ACCEPTS NO LIABILITY FOR THE INFORMATION CONTAINED HEREIN.
- CLIENT MUST OBTAIN WRITTEN APPROVAL FROM PREPARER PRIOR TO RELEASE OF THIS PLAN TO ANY THIRD PARTY.
- THIS CONCEPT PLAN IS BASED ON UNVERIFIED SURVEY/MAPPING INFORMATION PROVIDED TO PREPARER BY OTHERS. FINAL PROJECT DESIGN SHALL BE BASED ON ACTUAL SURVEY PREPARED UNDER THE SUPERVISION AND CONTROL OF A PROFESSIONAL LICENSED SURVEYOR.
- ANY RIGHT-OF-WAY LINES OR PROPERTY LINES DEPICTED ON THIS PLAN ARE UNVERIFIED AND MUST BE CONFIRMED BY A PROFESSIONAL LICENSED SURVEYOR. EVEN IF NOT DEPICTED HEREIN, RIGHT-OF-WAY OR EASEMENT ACQUISITIONS MAY BE NECESSARY AS PART OF THIS PROJECT. FINAL RIGHT-OF-WAY OR EASEMENT ACQUISITIONS SHALL BE BASED ON ENGINEERED AND APPROVED PLANS.

- ANY UTILITY FACILITIES DEPICTED ON THIS PLAN ARE UNVERIFIED AND MUST BE CONFIRMED THROUGH SURVEY AND UTILITY RESEARCH. SUBSURFACE UTILITY ENGINEERING MAY BE NECESSARY TO ACCURATELY LOCATE UNDERGROUND UTILITY FACILITIES. EVEN IF NOT DEPICTED HEREIN, UTILITY RELOCATIONS MAY BE NECESSARY AS PART OF THIS PROJECT. UTILITY RELOCATIONS SHALL BE BASED ON ENGINEERED AND APPROVED PLANS.
- ANY ENVIRONMENTAL RESOURCES DEPICTED ON THIS PLAN ARE UNVERIFIED AND MUST BE CONFIRMED THROUGH RESEARCH, FIELD SURVEYS, AND STUDIES. EVEN IF NOT DEPICTED HEREIN, ENVIRONMENTAL RESOURCES MAY BE IMPACTED AS PART OF THIS PROJECT. THIS CONCEPT PLAN DOES NOT PURPORT TO CONSIDER ALL ENVIRONMENTAL RESOURCE IMPACTS THAT MAY BE REQUIRED DUE TO ANY PROPOSED IMPROVEMENTS.
- ANY ROADWAY STRUCTURES (E.G. BRIDGES, CULVERTS, RETAINING WALLS) DEPICTED ON THIS PLAN ARE UNVERIFIED AND MUST BE CONFIRMED THROUGH RESEARCH, FIELD SURVEYS, AND STUDIES. EVEN IF NOT DEPICTED HEREIN, ROADWAY STRUCTURES MAY BE IMPACTED AS PART OF THIS PROJECT. THIS CONCEPT PLAN DOES NOT PURPORT TO CONSIDER ALL IMPACTS TO ROADWAY STRUCTURES THAT MAY BE REQUIRED DUE TO ANY PROPOSED IMPROVEMENTS.

- ALTHOUGH NOT NECESSARILY DEPICTED ON THIS CONCEPT PLAN, DRAINAGE AND STORMWATER MANAGEMENT IMPROVEMENTS MAY BE NECESSARY IN ORDER TO IMPLEMENT ANY PROPOSED IMPROVEMENTS.
- ALL DOCUMENTS, DESIGNS, DRAWINGS AND SPECIFICATIONS ("INSTRUMENTS OF SERVICE") PREPARED SPECIFICALLY FOR THIS PROJECT BY PREPARER ("ENGINEER") ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR USE BY CLIENT OR ANYONE ELSE ON FURTHER DEVELOPMENT OF THE PROJECT OR ON ANY OTHER PROJECT. IN ACCEPTING AND UTILIZING INSTRUMENTS OF SERVICE, OR ANY FORM OF ELECTRONIC MEDIA GENERATED AND PROVIDED BY ENGINEER WITH RESPECT TO THIS PROJECT, ANY REUSE OR MODIFICATION OF INSTRUMENTS OF SERVICE WITHOUT WRITTEN CONSENT BY ENGINEER FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT CLIENT'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO ENGINEER. CLIENT AGREES TO WAIVE ALL CLAIMS AGAINST ENGINEER RESULTING IN ANY WAY FROM ANY UNAUTHORIZED CHANGES OR REUSE OF INSTRUMENTS OF SERVICE BY ANYONE OTHER THAN ENGINEER. IN ADDITION, CLIENT AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY, DEFEND AND HOLD ENGINEER HARMLESS FROM ANY DAMAGE, LIABILITY, OR COST, INCLUDING REASONABLE ATTORNEYS' FEES AND COSTS OF DEFENSE, ARISING FROM ANY UNAUTHORIZED REUSE OR CHANGES TO INSTRUMENTS OF SERVICE.

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
8-0	LEBANON	0419	--	1 of 1
CORNWALL TOWNSHIP				
CORNWALL CENTER - CONCEPTUAL ROUNDABOUT				
1/12/2016				

TRAFFIC PLANNING AND DESIGN

CONCEPTUAL COST ESTIMATE

TYPE OF ESTIMATE: PRELIMINARY

PROJECT: CORNWALL CENTER
MUNICIPALITY: Cornwall Borough, Lebanon County, PA
TPD JOB #: LBCO.00004

PLAN TITLE: Cornwall Center: Conceptual Roundabout
PLAN DATE: 1/12/2016
ROAD(S): Freeman Drive-Shaeffer Road (Route 419)/Cornwall Road/Burd Coleman Road/Boyd Street
DESCRIPTION OF WORK: Roundabout Concept

ESTIMATE DATE: 3/22/2016
PREPARED BY: MAE
CHECKED BY: J Todd
SOURCE FOR UNIT COSTS: Penn DOT Publication 287, Bulletin 50 Construction Cost Catalog (ECMS)
 OR: Web Site: www.BidHistory.com

NOTES: Unit prices last revised 03/02/2015
 Construction Year of 2016

DISCLAIMER: TPD IS FURNISHING THIS COST ESTIMATE AS REQUESTED BY THE CLIENT. PLEASE NOTE THAT ESTIMATED COSTS ARE SUBJECT TO CHANGE BASED ON FIELD CONDITIONS, LOCAL OR REGIONAL DIFFERENCES, CHANGES TO THE PLANS, AND/ OR CHANGES IN UNIT COSTS. COST ESTIMATES ARE PROVIDED FOR USE IN BUDGETING, BUT IN NO WAY SHOULD THIS ESTIMATE BE CONSTRUED AS A FINAL COST FOR THE PROJECT. FINAL COSTS ARE CONTINGENT ON ACTUAL BIDS FROM CONTRACTORS. TPD WILL NOT BE HELD RESPONSIBLE FOR DIFFERENCES BETWEEN THIS COST ESTIMATE AND BID COSTS.

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
GRADING AND PREPARATION				
CLEARING & GRUBBING	LS	1	\$10,000.00	\$10,000
CLASS 1 EXCAVATION	CY	2,629	\$24.00	\$63,088
SAWCUT	LF	142	\$5.00	\$710
SUBTOTAL GRADING AND PREPARATION				\$73,798
PAVEMENT ITEMS				
SUPERPAVE WEARING COURSE, 2" DEPTH, WMA, 12.5MM	SY	3,971	\$11.50	\$45,668
SUPERPAVE BINDER COURSE, 2.5" DEPTH, WMA	SY	3,877	\$13.50	\$52,342
SUPERPAVE BASE COURSE, 6" DEPTH, WMA	SY	3,877	\$26.50	\$102,745
SUBBASE 6" DEPTH (NO. 2A)	SY	5,027	\$30.00	\$150,808
MILLING OF BITUMINOUS PAVEMENT SURFACE, 2" DEPTH	SY	15	\$2.07	\$31
BITUMINOUS TACK COAT	SY	94	\$2.00	\$188
SUBTOTAL PAVEMENT ITEMS				\$351,781

<i>CURBING ITEMS</i>				
PLAIN CEMENT CONCRETE CURB	LF	981	\$45.00	\$44,160
CONCRETE MOUNTABLE CURB	LF	2,171	\$18.50	\$40,161
PLAIN CEMENT CONCRETE PAVEMENT, 4" DEPTH	SY	97	\$75.00	\$7,258
PLAIN CEMENT CONCRETE PAVEMENT, 10" DEPTH	SY	1,053	\$110.00	\$115,829
CONCRETE SIDEWALK	SY	682	\$79.00	\$53,843
CONCRETE SIDEWALK FOR CURB RAMPS	SY	119	\$79.00	\$9,421
DETECTABLE WARNING SURFACE	SF	140	\$42.50	\$5,950
SUBTOTAL CURBING ITEMS				\$276,622
<i>SIGNS AND LANE MARKINGS</i>				
LUMP SUM FOR SIGNS	LS	1	\$7,500.00	\$7,500
TRAFFIC SIGNAL SUPPORT, 14' PEDESTAL	EA	1	\$3,000.00	\$0
MAST ARM FOR OVERHEAD SIGN (25')	EA	1	\$10,000.00	\$10,000
4" WHITE EPOXY PAVEMENT MARKINGS	LF	798	\$0.65	\$519
6" YELLOW EPOXY PAVEMENT MARKINGS	LF	1,948	\$1.50	\$2,922
WHITE EPOXY LEGEND, "STRAIGHT ARROW", 12'-0" X 1'-8"	EA	8	\$185.00	\$1,480
WHITE EPOXY LEGEND, BICYCLE WITH RIDER, 8'-0 X 4'-0	EA	8	\$137.50	\$1,100
WHITE EPOXY LEGEND, "YIELD LINE" , 24" X 36" TRIANGLE, (MIN 4 TRIANGLES PER LINE)	LF	38	\$40.00	\$1,520
24" WHITE THERMOPLASTIC PAVEMENT MARKINGS	LF	248	\$15.00	\$3,725
SUBTOTAL SIGNS AND LANE MARKINGS				\$28,766
<i>LANDSCAPING ITEMS</i>				
TOPSOIL, 4" DEPTH	CY	110	\$55.00	\$6,067
SEEDING & SOIL SUPPLEMENTS, FORMULA B, MODIFIED (INCLUDING MULCHING)	LB	42	\$35.00	\$1,459
SUBTOTAL LANDSCAPING ITEMS				\$7,526
<i>LIGHTING ITEMS</i>				
ALUMINUM LIGHT POLE, 12' ARM, 30' MH, TYPE A	EACH	12	\$1,650.00	\$19,800
250-WATT HIGH PRESSURE SODIUM LUMINAIRE, ARM MOUNT	EACH	12	\$435.00	\$5,220
POLE FOUNDATION, TYPE FC	EACH	12	\$1,400.00	\$16,800
SUBTOTAL LIGHTING ITEMS				\$41,820
<i>MISCELLANEOUS CONSTRUCTION ITEMS</i>				
BUS SHELTER	EA	1	\$10,000	\$10,000
SUBTOTAL MISCELLANEOUS ITEMS				\$10,000

SUBTOTAL PAY ITEMS				\$790,313
OTHER ITEMS				
ROW ACQUISITION	AC	0.61	\$250,000	\$153,594
SURVEY & ENGINEERING (20%)	LS	1	\$158,063	\$158,063
CONSTRUCTION INSPECTION (12%)	LS	1	\$94,838	\$94,838
UTILITY POLE RELOCATION	EA	12	\$12,000	\$144,000
MOBILIZATION (4%)	LS	1	\$31,613	\$31,613
MAINTENANCE AND PROTECTION OF TRAFFIC (3%)	LS	1	\$23,709	\$23,709
CONSTRUCTION SURVEY & STAKEOUT (3%)	LS	1	\$23,709	\$23,709
EROSION AND SEDIMENTATION CONTROL (4%)	LS	1	\$31,613	\$31,613
SUBTOTAL OTHER ITEMS				\$661,138
TOTAL: PAY ITEMS + OTHER ITEMS				\$1,451,451
CONTINGENCY (25%)				\$362,863
TOTAL ESTIMATE FOR CONSTRUCTION*				\$1,814,314

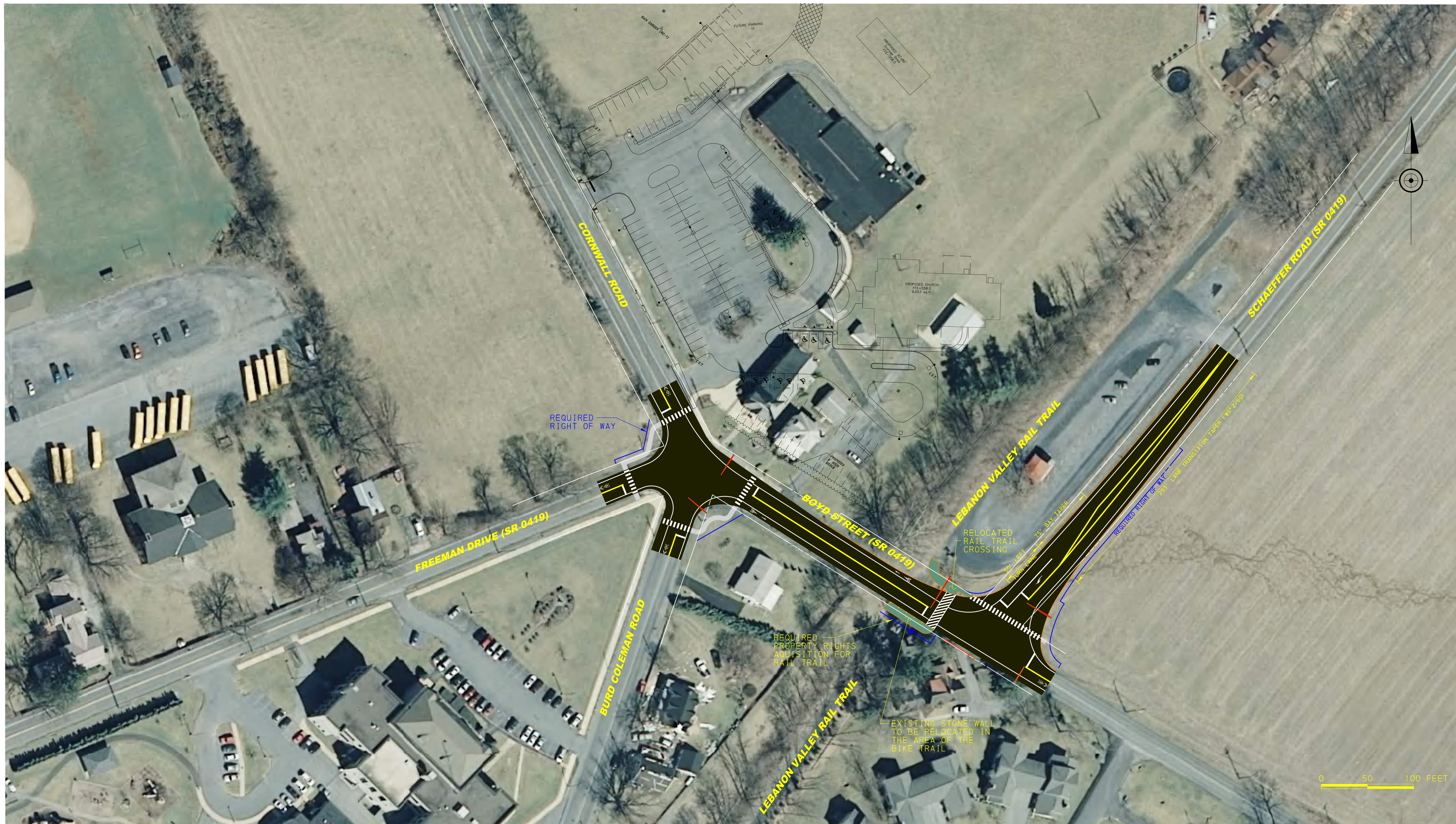
* Does not include:

Permitting/Legal Fees

Underground utility relocation/exploration

Construction Management

or any other items not specifically listed above.



CONCEPT PLAN NOTES

- THESE NOTES ARE AN INTEGRAL PART OF THIS CONCEPT PLAN. THIS CONCEPT PLAN HAS BEEN PREPARED AT CLIENT'S REQUEST, IS CONCEPTUAL AND PRELIMINARY IN NATURE, AND SHALL NOT BE USED FOR PURPOSES OF CONSTRUCTION OR ANY OTHER USE. THIS PLAN IS SUBJECT TO CHANGE AND REFINEMENT AS THE DESIGN IS FURTHER DEVELOPED AND REVIEWED BY MUNICIPALITIES, AGENCIES, AND OTHERS.
- ENGINEER DOES NOT MAKE ANY REPRESENTATION REGARDING THE ACCURACY OF THE INFORMATION CONTAINED HEREIN AND ACCEPTS NO LIABILITY FOR THE INFORMATION CONTAINED HEREIN.
- CLIENT MUST OBTAIN WRITTEN APPROVAL FROM PREPARER PRIOR TO RELEASE OF THIS PLAN TO ANY THIRD PARTY.
- THIS CONCEPT PLAN IS BASED ON UNVERIFIED SURVEY/MAPPING INFORMATION PROVIDED TO PREPARER BY OTHERS. FINAL PROJECT DESIGN SHALL BE BASED ON ACTUAL SURVEY PREPARED UNDER THE SUPERVISION AND CONTROL OF A PROFESSIONAL LICENSED SURVEYOR.
- ANY RIGHT-OF-WAY LINES OR PROPERTY LINES DEPICTED ON THIS PLAN ARE UNVERIFIED AND MUST BE CONFIRMED BY A PROFESSIONAL LICENSED SURVEYOR. EVEN IF NOT DEPICTED HEREIN, RIGHT-OF-WAY OR EASEMENT ACQUISITIONS MAY BE NECESSARY AS PART OF THIS PROJECT. FINAL RIGHT-OF-WAY OR EASEMENT ACQUISITIONS SHALL BE BASED ON ENGINEERED AND APPROVED PLANS.

- ANY UTILITY FACILITIES DEPICTED ON THIS PLAN ARE UNVERIFIED AND MUST BE CONFIRMED THROUGH SURVEY AND UTILITY RESEARCH. SUBSURFACE UTILITY ENGINEERING MAY BE NECESSARY TO ACCURATELY LOCATE UNDERGROUND UTILITY FACILITIES. EVEN IF NOT DEPICTED HEREIN, UTILITY RELOCATIONS MAY BE NECESSARY AS PART OF THIS PROJECT. UTILITY RELOCATIONS SHALL BE BASED ON ENGINEERED AND APPROVED PLANS.
- ANY ENVIRONMENTAL RESOURCES DEPICTED ON THIS PLAN ARE UNVERIFIED AND MUST BE CONFIRMED THROUGH RESEARCH, FIELD SURVEYS, AND STUDIES. EVEN IF NOT DEPICTED HEREIN, ENVIRONMENTAL RESOURCES MAY BE IMPACTED AS PART OF THIS PROJECT. THIS CONCEPT PLAN DOES NOT PURPORT TO CONSIDER ALL ENVIRONMENTAL RESOURCE IMPACTS THAT MAY BE REQUIRED DUE TO ANY PROPOSED IMPROVEMENTS.
- ANY ROADWAY STRUCTURES (E.G. BRIDGES, CULVERTS, RETAINING WALLS) DEPICTED ON THIS PLAN ARE UNVERIFIED AND MUST BE CONFIRMED THROUGH RESEARCH, FIELD SURVEYS, AND STUDIES. EVEN IF NOT DEPICTED HEREIN, ROADWAY STRUCTURES MAY BE IMPACTED AS PART OF THIS PROJECT. THIS CONCEPT PLAN DOES NOT PURPORT TO CONSIDER ALL IMPACTS TO ROADWAY STRUCTURES THAT MAY BE REQUIRED DUE TO ANY PROPOSED IMPROVEMENTS.

- ALTHOUGH NOT NECESSARILY DEPICTED ON THIS CONCEPT PLAN, DRAINAGE AND STORMWATER MANAGEMENT IMPROVEMENTS MAY BE NECESSARY IN ORDER TO IMPLEMENT ANY PROPOSED IMPROVEMENTS.
- ALL DOCUMENTS, DESIGNS, DRAWINGS AND SPECIFICATIONS ("INSTRUMENTS OF SERVICE") PREPARED SPECIFICALLY FOR THIS PROJECT BY PREPARER ("ENGINEER") ARE NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR USE BY CLIENT OR ANYONE ELSE ON FURTHER DEVELOPMENT OF THE PROJECT OR ON ANY OTHER PROJECT. IN ACCEPTING AND UTILIZING INSTRUMENTS OF SERVICE, OR ANY FORM OF ELECTRONIC MEDIA GENERATED AND PROVIDED BY ENGINEER WITH RESPECT TO THIS PROJECT, CLIENT AGREES TO THE INSTRUMENTS OF SERVICE WITHOUT WRITTEN CONSENT BY ENGINEER FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT CLIENT'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO ENGINEER. CLIENT AGREES TO WAIVE ALL CLAIMS AGAINST ENGINEER RESULTING IN ANY WAY FROM ANY UNAUTHORIZED CHANGES OR REUSE OF INSTRUMENTS OF SERVICE BY ANYONE OTHER THAN ENGINEER. IN ADDITION, CLIENT AGREES TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY, DEFEND AND HOLD ENGINEER HARMLESS FROM ANY DAMAGE, LIABILITY, OR COST, INCLUDING REASONABLE ATTORNEYS' FEES AND COSTS OF DEFENSE, ARISING FROM ANY UNAUTHORIZED REUSE OR CHANGES TO INSTRUMENTS OF SERVICE.

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
8-0	LEBANON	0419	--	1 of 1
CORNWALL TOWNSHIP				
CORNWALL CENTER - CONCEPTUAL TRAFFIC SIGNALS				
1/12/2016				

6/27/2016 4:19:48 PM 1:50.0001

**TRAFFIC PLANNING AND DESIGN
CONCEPTUAL COST ESTIMATE**

TYPE OF ESTIMATE: PRELIMINARY

PROJECT: CORNWALL CENTER
MUNICIPALITY: Cornwall Borough, Lebanon County, PA
TPD JOB #: LBCO.00004

PLAN TITLE: Cornwall Center - Conceptual Traffic Signals
PLAN DATE: 1/12/2016
ROAD(S): Freeman Drive-Shaeffer Road (Route 419)/Cornwall Road/Burd Coleman Road/Boyd Street
DESCRIPTION OF WORK: Signalization Concept

ESTIMATE DATE: 3/25/2016
PREPARED BY: SAS
CHECKED BY: JP
SOURCE FOR UNIT COSTS: Penn DOT Publication 287, Bulletin 50 Construction Cost Catalog (ECMS)

NOTES: Unit prices last revised 03/02/2015
 Construction Year of 2016

DISCLAIMER: TPD IS FURNISHING THIS COST ESTIMATE AS REQUESTED BY THE CLIENT. PLEASE NOTE THAT ESTIMATED COSTS ARE SUBJECT TO CHANGE BASED ON FIELD CONDITIONS, LOCAL OR REGIONAL DIFFERENCES, CHANGES TO THE PLANS, AND/ OR CHANGES IN UNIT COSTS. COST ESTIMATES ARE PROVIDED FOR USE IN BUDGETING, BUT IN NO WAY SHOULD THIS ESTIMATE BE CONSTRUED AS A FINAL COST FOR THE PROJECT. FINAL COSTS ARE CONTINGENT ON ACTUAL BIDS FROM CONTRACTORS. TPD WILL NOT BE HELD RESPONSIBLE FOR DIFFERENCES BETWEEN THIS COST ESTIMATE AND BID COSTS.

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
PAVEMENT ITEMS				
SUPERPAVE WEARING COURSE, 2" DEPTH, WMA, 12.5MM	SY	633	\$11.50	\$7,280
SUPERPAVE BINDER COURSE, 2.5" DEPTH, WMA	SY	633	\$13.50	\$8,546
SUPERPAVE BASE COURSE, 6" DEPTH, WMA	SY	124	\$26.50	\$3,286
SUBBASE 6" DEPTH (NO. 2A)	SY	633	\$30.00	\$18,990
SUBTOTAL PAVEMENT ITEMS				\$38,101
CURBING ITEMS				
CONCRETE SIDEWALK FOR CURB RAMPS	SY	81	\$79.00	\$6,399
DETECTABLE WARNING SURFACE	SF	120	\$40.00	\$4,800
SUBTOTAL CURBING ITEMS				\$11,199
SIGNS AND LANE MARKINGS				
LUMP SUM FOR SIGNS	LS	1	\$2,500.00	\$2,500
4" WHITE EPOXY PAVEMENT MARKINGS	LF	2,132	\$0.65	\$1,386
6" YELLOW EPOXY PAVEMENT MARINGS	LF	1,902	\$1.50	\$2,853
WHITE EPOXY LEGEND	EA	7	\$200.00	\$1,400

24" WHITE THERMOPLASTIC PAVEMENT MARKINGS	LF	527	\$8.81	\$4,643
SUBTOTAL SIGNS AND LANE MARKINGS				\$12,782
MISCELLANEOUS CONSTRUCTION ITEMS				
SIGNALIZATION *****FROM SEPARATE ESTIMATE*****	LS	1	\$400,000	\$400,000
BUS SHELTER	EA	1	\$10,000	\$10,000
RELOCATE STONE WALL	LS	1	\$7,500	\$7,500
SUBTOTAL MISCELLANEOUS ITEMS				\$410,000
SUBTOTAL PAY ITEMS				\$472,082
OTHER ITEMS				
ROW ACQUISITION	AC	0.11	\$250,000	\$26,573
SURVEY & ENGINEERING (20%)	LS	1	\$94,416	\$94,416
CONSTRUCTION INSPECTION (12%)	LS	1	\$56,650	\$56,650
UTILITY POLE RELOCATION	EA	3	\$12,000	\$36,000
MOBILIZATION (4%)	LS	1	\$18,883	\$18,883
MAINTENANCE AND PROTECTION OF TRAFFIC (3%)	LS	1	\$14,162	\$14,162
CONSTRUCTION SURVEY & STAKEOUT (3%)	LS	1	\$14,162	\$14,162
EROSION AND SEDIMENTATION CONTROL (4%)	LS	1	\$18,883	\$18,883
SUBTOTAL OTHER ITEMS				\$279,730
TOTAL: PAY ITEMS + OTHER ITEMS				\$751,812
CONTINGENCY (25%)				\$187,953
TOTAL ESTIMATE FOR CONSTRUCTION*				\$939,765

* Does not include:

Permitting/Legal Fees

Underground utility relocation/exploration

Construction Management

or any other items not specifically listed above.