BOARD OF COMMISSIONERS

REVISED AGENDA

Monday, January 22, 2018 - 6:30 PM

Pledge of Allegiance

Notice of Executive Session preceding the Board of Commissioners meeting of January 22, 2018

1. Consent Agenda
   a) Staff Traffic Committee Meeting Minutes – December 20, 2017
   b) Acceptance of Department Monthly Reports
   c) HARB-2018-01 – 420 Meadowbrook Avenue - One car garage, accessory structure to be added to the southeast corner of the property
   d) Resolution #2018-12 – Authorizing the Township Manager to enter into an agreement with Environmental Systems Research Institute, Inc. (ESRI) for the Maintenance Renewal, Purchase, Installation, and Migration Assistance for ArcGIS Software
   e) Resolution #2018-15 – Approving the Purchase of Fifteen Watch Guard 4renista In-Car Cameras and Four Watch Guard 4rsnista Motorcycle Cameras for Use by The Radnor Township Police Department
   f) Resolution #2018-14 – Approving the Purchase of Thirteen Powerheart G5 Semi-Automatic Automated External Defibrillators for Use by The Radnor Township Police Department
   g) Resolution #2018-13 – Advising the Pennsylvania Department of Transportation, The Pennsylvania State Police, Amtrak And Septa That the King of Prussia Road Bridge in Radnor Township Constitutes A Continuing Traffic Safety Hazard
   h) Resolution #2018-05 - Award of the Evaluation and Permitting for Repairs to the Roberts Road Endwall
   i) Resolution #2018-10 - Award of the Design, Permitting, Engineering, and Bidding Documents Contract for the Rawles Run Sanitary Sewer Replacement & Repair and Valley Run Streambank Restoration Contract, to Gannett Fleming, Incorporated
   j) Resolution #2018-06 - Award of Contract #B-17-004, Custodial Services for the Radnor Township Municipal Building and Radnor Activity Center
   k) Resolution #2018-09- Authorizing a Multimodal Fund Transportation Fund (MTF) Grant Application for Improvements to the King of Prussia Road/Eagle Road/Pine Tree Road Intersection, in partnership with Cabrini and Eastern Universities
2. Recognition of the Passing of Charles Harper
3. Public Participation - *Individual comment shall be limited to not more than five (5) minutes per Board policy*
4. Appointments to Advisory Boards and Commissions
5. Reappointments to Advisory Boards and Commissions
6. Appointments to Chair and Members of Standing Committees ***Updated due to technical difficulties***
7. Discussion and Possible Appointment of Vacancy Board Chairperson
8. Interviews of Potential Ward 1 Interim Commissioner by the Vacancy Board ***Candidate Names Added***
9. Possible Appointment of Interim 1st Ward Commissioner by the Vacancy Board ***Candidate Names Added***
10. Committee Reports

PUBLIC WORKS & ENGINEERING

A. SALDO Application #2016-D-04 Penn Medicine – ***Caucus*** – Preliminary Land Development Plan

Additional Back-up Items Added

B. Ordinance #2018–01 – ***(Introduction)*** – An Ordinance of Radnor Township, Delaware County, Pennsylvania, Amending Chapter 235, Sewers, by Creating a New Article VI, "Adoption of PWD Wastewater Control Regulations by Reference", Which Formally Adopts the Philadelphia Water Department Sewer and Wastewater Control Regulations as Amended January 1, 2013, for that Portion of the Sanitary Sewer System of Radnor Township Which Flows into Lower Merion Township

C. Resolution #2018-16 - Authorizing Payment of Change Orders to the General Prime Contractor, Dolan Construction, Incorporated, for the Memorial Library of Radnor Renovation and Expansion Project ***BACK-UP ITEMS ADDED***

COMMUNITY DEVELOPMENT

D. Ordinance #2018-03 – ***(Introduction)*** - Amending the Code of The Township Of Radnor, Chapter 270, Vehicles And Traffic, Section 270-30, Time Limit Parking – Glenbrook Avenue

PERSONNEL & ADMINISTRATION

PUBLIC SAFETY

FINANCE & AUDIT

PARKS & RECREATION

LIBRARY

PUBLIC HEALTH

Old Business

New Business

Public Participation

Adjournment

RADNOR TOWNSHIP POLICE DEPARTMENT
301 Iven Avenue
Wayne, Pennsylvania 19087-5297
(610) 688-0503 ¤ Fax (610) 688-1238

William A. Colarulo
Police Superintendent

TO: Radnor Township Commissioners; Robert A. Zienkowski, Township Manager; William M. White, Director of Finance; Stephen F. Norcini, Township Engineer; Steve McNelis, Co-Interim Public Works Director; Mark Domenick, Co-Interim Public Works Director; Tammy Cohen, Director of Recreation and Community Programming; Kevin W. Kochanski, Director of Community Development; Bill Cassidy, Field Leader; Deputy Chief Chris Flanagan, Deputy Chief Andy Block, Officer Alex Janoski; Officer Pat Lacey, Officer Ken Piree, Traffic Safety Unit; William Gallagher, Supervisor of Parking; Amy Kaminski, Traffic Engineer for Gilmore and Associates; Vera DiMaio and Lori DeNicola

FR: William A. Colarulo

RE: **STAFF TRAFFIC COMMITTEE MEETING HELD IN THE POLICE ROLL CALL ROOM, WEDNESDAY, DECEMBER 20, 2017, 10:00 AM.**

NEW BUSINESS

1. Brian McGowan of 937 Glenbrook requests Permit Parking from 6pm-6am for the 900 Block of Glenbrook Avenue.

   Highway Patrol Officer Pat Lacey spoke regarding this matter. He stated that a Petition was executed and signed by all residents except one from the 900 block. Staff Traffic Committee would like to make the recommendation to the Board of Commissioners for approval of an Ordinance for permit parking on the 900 Block of Glenbrook Avenue from 6pm-6am. (Petition attached for review)

2. Commissioner Clark requests information on crosswalks and sidewalks regarding Conestoga/South Wayne/Brooke.

   Commissioner Lucas Clark spoke regarding this matter. He stated he would like some recommendations and guidance on how to make it safer for pedestrians to walk around this area and especially near the trail. Highway Patrol Officer Piree stated that this request was previously studied in the past. At that time, we requested grants which were available but were denied. Highway Patrol Janoski stated that whatever is to be recommended on Conestoga and South Wayne Avenue would have to be approved through PennDot as these are state roads. Highway Patrol Officer Piree did speak with PennDot and the list for grants in 2018 will be dispersed. Staff Traffic Committee states they will continue to search for grants. Deputy Chief Chris Flanagan recommends a pedestrian study count be conducted prior to taking any action. Staff Traffic will follow up with Melissa Conn and Tammy Cohen regarding trail and will present findings at the next Staff Traffic Meeting.

3. Commissioner Clark requests speed humps along the 400 Block of Midland Avenue.

   Commissioner Lucas Clark spoke regarding this matter. He wanted to understand the process to see if warranted for speed humps. Resident, Mr. Wilson, of Saint Davids Avenue spoke regarding his concerns regarding this matter. He believes speed bumps on Midland Avenue would cause more traffic problems on his street. Highway Patrol Officer Alex Janoski stated that a study at the end of 2015, beginning 2016, was performed regarding this matter and that Midland Avenue did not meet the requirements of speed bumps. In 2016, it was discussed that the possibility of the fact that because there is a park, a speed bump could be installed. A petition would need to be executed about this fact if pursued. Commissioner Clark will speak with the neighbors and advise whether they want to pursue further.

4. Commissioner Clark requests parking permits along the 200 Block of Midland Avenue.

   Commissioner Lucas Clark began a discussion on the process of this request. Deputy Superintendent Chris Flanagan stated that if residents have driveways a parking permit would not be permitted for street parking. If there are certain circumstances, ie: contractors working, visiting family, special permission would be accommodated through the Police Department. If any options are pursued, a Petition would need to be executed by neighbors. It was recommended that Commissioner Lucas Clark follow up with Parking Supervisor William Gallagher regarding this discussion.

5. Commissioner Nagle requests pedestrian crossing on Petrie Avenue at the park entrance.

   Commissioner John Nagle spoke regarding the neighbors' request of a pedestrian crossing because of high pedestrian traffic to the park in this neighborhood. Superintendent Chris Flanagan stated that Petrie Avenue does not meet the requirements for a crosswalk. He stated that he would bring this to the attention of Steve Norcini, Township Engineer, for costs and Board of Commissioner approval.

6. Gale Morrison has concerns about speeding in the 100 Block of Poplar Avenue.

   Ms. Morrison was not present at this meeting. Deputy Superintendent Chris Flanagan read her email with her concerns. Staff Traffic Committee will place a speed board at this location. Bill Cassidy, Field Leader, Public Works, stated he visited this location and said there are already two speed limit signs on the one side of this street and suggested posting two additional speed limit signs on the other.

7. Radnor Fire Company would like to recommend traffic flow improvements to North/South Wayne Avenue.

   Michael Maguire, Chief Engineer of Radnor Fire Company, spoke regarding recommendations proposed by the Radnor Fire Company to help with traffic flow in and around the North/South Wayne Avenue area (Letter attached). Deputy Superintendent Chris Flanagan stated per Township Engineer, Steve Norcini, a tentative TBA site

meeting in February is to be scheduled with PennDot and will be brought up for discussion and review of their request.

OLD BUSINESS

Review of 2017 open issues

1. Commissioner Richard Booker requested status of signed Petition (which he had in hand) and traffic calming regarding Upper Gulph Road and Oak Grove stop sign.

- Deputy Superintendent Chris Flanagan stated that a signed Petition was never returned to the Township
- Highway Patrol Officer Alex Janoski stated that speed humps were not safe on Upper Gulph Road between Arden and County Line Road
- Highway Patrol Officer Alex Janoski further stated that study was done on Upper Gulph Road between Arden and County Line Road
- Gilmore and Associates Traffic Engineer, Amy Kaminski, stated her concerns regarding site line. She stated that a stop sign should be placed at that intersection for site line purposes
- Commissioner Richard Booker stated neighbors will not like the idea of a stop sign
- Township Manager requested Highway Patrol do a speed enforcement in the listed area. A speed detail was performed and only 1 vehicle was cited for speeding in the month of December
- This matter will be discussed again at the next Staff Traffic Meeting in January

2. Commissioner John Nagle requested status of the bridge at S. Ithan Avenue and Bryn Mawr Avenue.

- Commissioner John Nagle stated that because of the left turn lane that were put in at an earlier time, bicycle lanes were eliminated
- Deputy Superintendent Chris Flanagan stated that Staff Traffic Committee will follow up with Steve Norcini, Engineer, on this matter

3. Conestoga Village

- Bushes were cut down to resolve pedestrian/walking problems

4. Deputy Superintendent Chris Flanagan said going forward in 2018 all Old Business matters will
be displayed in an Excel spreadsheet so that it displays a timeline regarding long term issues

RADNOR TOWNSHIP POLICE DEPARTMENT

301 Iven Ave., Wayne, PA 19087

December 2017 Staff Traffic Status Report

Project Name	Project Information	Status Update
Skunk Hollow Pedestrian Improvements	10/18/2016 G&A redesign for pedestrian access on Sawmill Lane to be incorporated into Darby Paoli Multi-use Trail Project	On hold until Park improvements occur. (Possible inclusion in Darby, Paoli, Multi-use trail)
Conestoga/S. Wayne/Brooke crosswalks and sidewalks	12/20/2017 Commissioner Clark is interested in pursuing pedestrian improvements near intersection	Continue discussion in 2018
N. and S. Wayne Avenue at Lancaster Avenue improvements	12/20/2017 Radnor Fire Company is interested in: • Pursuing parking elimination along S. Wayne Avenue • Revising the intersection to reflect the most recent signed signal permit plan • Emergency pre-emption at the Fire Station on S. Wayne Avenue.	Continue discussion in 2018; intersection upgrades budgeted for 2021 Internal discussions with RTPD and RT Engineering on timing as well as details
400 Block Midland Avenue: Speed humps	Commissioner Clark requests a speed hump near Veterans Park; Discussed 12/20/2017, 2/15/2017, and 12/16/2015	12/16/2015: 32 MPH 85th%; 591 vehicles ADT Requires 80% petition in favor of speed humps on Midland Avenue.
Upper Gulph Road & Oak Grove Lane	• Staff Traffic Committee: Reviewed speed and volume data; performed sight distance evaluation.	Provided recommendation to install an all way stop control due to sight distance limitations that could not be resolved through trimming, etc.
Kinterra Road & Church Rd Sight Distance Evaluation	10/18/2017 Ms. Lemmon reported a line of sight issue for the intersection.	G&A provided a fixed fee proposal cost for the evaluation. • Requisition to be placed in January 2018
County Line Corridor Study (from Lancaster Avenue to Conestoga Road)	Staff Traffic Committee & Lower Merion Township discussions to expand study area to County Line Road corridor study	• Study approved for 2018 • LMT has been approached for cost sharing

King of Prussia Bridge	• Strike issues	2018 Discussion ongoing with Traffic Engineer and RT Staff
Sproul Road and Conestoga Road Left turn signal improvements	• RT 2017 Engineering Line Item Budget: $300,000 to evaluate, design and construct signal improvements to include intersection left turn lanes	Investigating equipment for this project
N. Wayne Ave/Poplar/West Avenue Pedestrian Improvement Signal project	• DCED MTF grant awarded; construct signal and pedestrian improvements at intersection	Grant award at reduced award; being analyzed by Township
Conestoga & County Line Road Evaluation	• Evaluate crash records, turning volumes, intersection layout to identify improvements	Study completed, some items being implemented, possible crossover with County Line Corridor study
Eagle & Wayne Pedestrian Improvements DCED MTF	Prepare DCED MTF grant for sidewalk, signal and curb ramp improvements; grant submission due late July, 2017	Grant not awarded.
Lancaster Ave Pedestrian Improvements	Completed grant submission to PennDOT MTF on 12/15/2016	Grant not awarded
Lancaster Ave & Garrett Avenue-Barleycone Lane Pedestrian Improvements DCED MTF	Submitted DCED MTF grant for sidewalk, signal and curb ramp improvements from Garrett to Barleycone Lane: application due 7/2017	Awaiting grant approval
Glenmary Road Pedestrian Improvements DCED MTF	Submit DCED MTF grant for sidewalk, pedestrian signal and curb ramp improvements on southside of Glenmary Road including upgrades to King of Prussia Road crosswalk at intersection	• Stakeholders intend on applying for PennDOT MTF grant
South Devon Ave Pedestrian Improvements	Prepare plans for pedestrian improvements on Devon Avenue from Liberty Lane to Morris Cir. South of Devon Avenue	Engineering Department completed sidewalk construction
King of Prussia Rd & Eagle Rd intersection improvements	• Submit joint application for DCED MTF grant with Cabrini & Eastern for left turn lanes on King of Prussia Road at Eagle Road/Pine Tree Rd	Report submitted to Township on 12/11/2017 • To be placed on Board of Commissioners agenda in the first quarter of 2018.

RADNOR FIRE COMPANY

121 S. WAYNE AVENUE • P.O. BOX 31
WAYNE, PENNSYLVANIA 19087-0031
BUSINESS: (610) 687-3245
FAX: (610) 687-8849
VOICE MAIL: (610) 687-9344

December 19, 2017

Christopher B. Flanagan, Deputy Superintendent
Radnor Township Police Department
301 Iven Avenue
Wayne, PA 19087

Re: Radnor Fire Company
North / South Wayne Avenue

Dear Deputy Superintendent Flanagan:

On behalf of our Chief and Chief Engineer, I am providing traffic flow improvement recommendations to North / South Wayne Avenue by removing parking places and realigning traffic ways. Due to our experience with congestion in front of the fire station at various points during the day, our ability to deploy to emergencies is negatively impacted.

In particular, the following is asked to be considered:

South Wayne Avenue

1. Remove parking spots in front of New Wayne Pizza (northbound). Allow no parking, including pick-ups in the same area.
2. Remove parking spots in front of the Wayne Post Office (southbound)
3. Realign South Wayne Avenue to allow two lanes northbound; one left turn lane for westbound US Route 30 with turning arrow and one full right turn and straight travel lane. Allow for a southbound travel lane closest to the Wayne Post Office. There would be a total of three dedicated traffic lanes.

North Wayne Avenue

1. Realign traffic ways to allow two lanes on North Wayne Avenue traveling southbound; one full left turn lane with arrow and one full right turn and straight travel lane. One northbound lane from US Route 30 on the east side of the roadway. There would be a total of three dedicated traffic lanes.

RADNOR FIRE COMPANY

121 S. WAYNE AVENUE • P.O. BOX 31
WAYNE, PENNSYLVANIA 19087-0031
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VOICE MAIL: (610) 687-9344

Fire Station Traffic Emitter

A traffic emitter is requested to be installed in the fire station on a 'plunger' system to allow traffic to clear out on South Wayne Avenue. This system would have two activation points; one located in the EMS bay and one in the Fire bay.

I also included a map provided by PennDOT to assist with the discussion of this matter (see attached). Please feel free to contact our Chiefs Office at 610-687-3245 ext. 222 if you have any questions.

Your time and consideration is greatly appreciated.

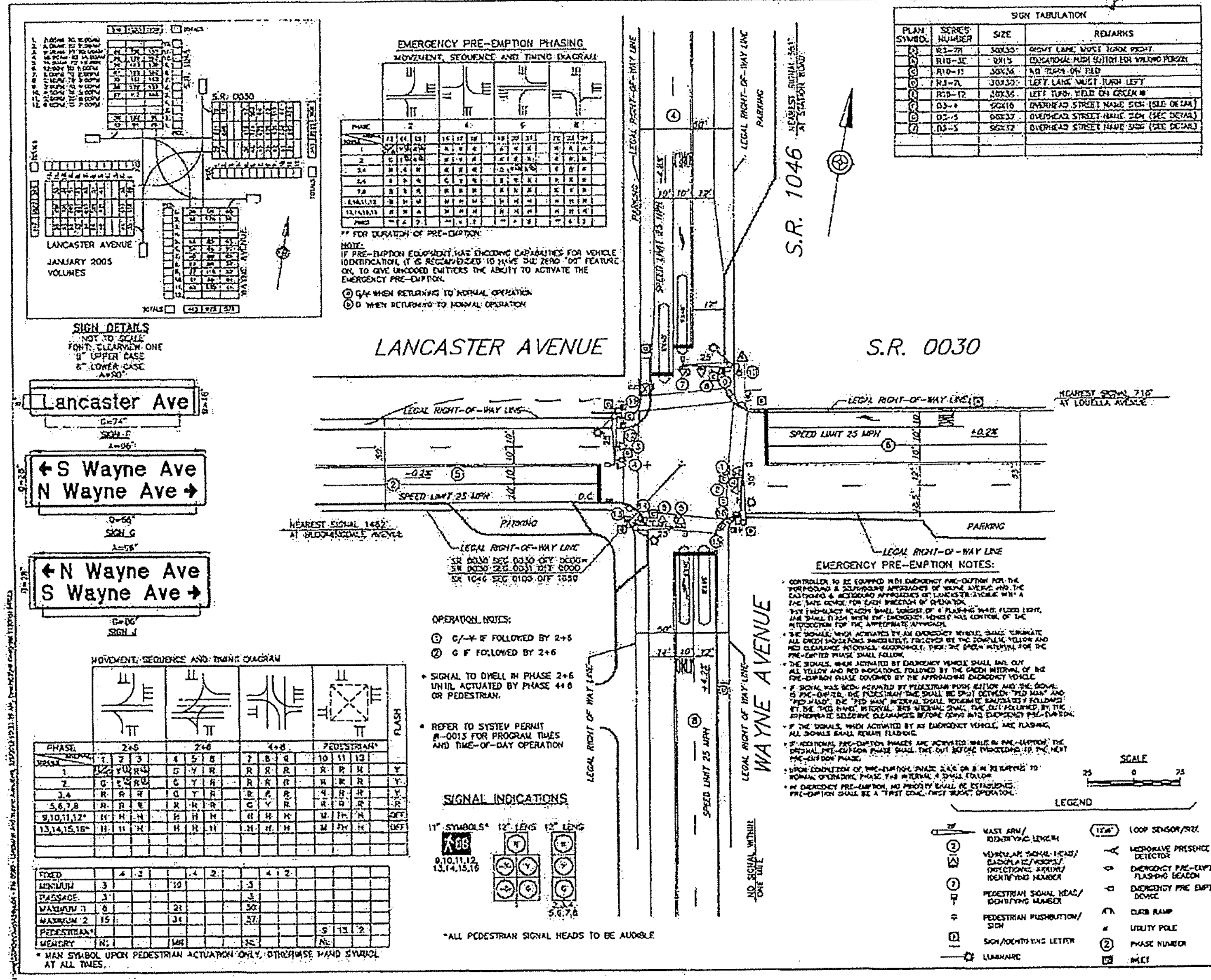
Sincerely,

Eamon C. Brazunas, EFO
Administrative Director
Radnor Fire Company

cc: Joseph Maguire, Fire Chief
cc: Michael Maguire, Chief Engineer

Attachment

* meeting clarify before the ST. – (L) tim phase N+S Wayne gys come in – Intent vertical lane widths
Paul Lutz 484. 557. 9533(c) – widening Rt. 30?



SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
(A)	R3-7R	30X30	RIGHT LANE MUST TURN RIGHT
(B)	R10-3E	9X15	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
(C)	R10-11	30X36	NO TURN ON RED
(D)	R3-7L	30X30	LEFT LANE MUST TURN LEFT
(E)	R10-12	30X36	LEFT TURN YIELD ON GREEN ●
(F)	D3-4	90X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
(G)	D3-5	90X32	OVERHEAD STREET NAME SIGN (SEE DETAIL)
(J)	D3-5	90X32	OVERHEAD STREET NAME SIGN (SEE DETAIL)

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS OBTAINED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND PERMITTEE, NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8000 SERIES.

SYSTEM PERMIT #-0013

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) AND WAYNE AVENUE (S.R. 1046)

REVIEWED
RECOMMENDED
PAUL M. LUTZ 11/24/08
LOUIS R. BELMONTE, P.E. 11/24/08

NO	REVISION						
1	AS-BUILT DRAWING						
2							
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SHEET 2 OF 2 | PERMIT # 63-0580 | FILE # 0880

Radnor Township

RECREATION & COMMUNITY PROGRAMMING DEPARTMENT
DECEMBER 2017 REPORT

Programs/Excursions/Community Events

Programs/Excursions
- Men's Pickup Basketball (30 participants)
- Junior/Adult Tennis with David Broida at Radnor Racquet Club (23 participants)
- Radnor Steps Community Walking Program along the Trail – (participation varies each week)
- NEW - Fall Little Hoops Stars with Jump Start Sports at Radnor Activity Center (38 participants)
- Radnor Champions Basketball at Radnor Activity Center (15 participants)
- After School Chess Club at Ithan Elementary School (32 participants)
- After School Science Club at Ithan Elementary School (21 participants)
- Pickleball at Radnor Activity Center (30 participants)
- Bus Trip to New York City (35 participants)

PRPS Discount Ticket Program
- Regal Movie Discount Ticket Program (225 sold to date 2017)
- PRPS Amusement Park Tickets (234 sold to date 2017)
- Ski Destination Tickets (6 sold to date 2017)

Community Events:
- Santa's Delivery (1,102 gifts/414 households/236 gifts contributed to Toys for Tots)

Additional Programming Activity:
- Prepared season-end financial reporting and evaluation of programming, discount ticket program, community events, and projects.
- Met with winter/spring/summer programming and event vendors/instructors, developed program details, contractual agreements, coordinated facility schedules, program logistics, participant communications, and emergency/safety procedures.
- Met with representatives from the Radnor Youth Basketball League to discuss 2018 program logistics, facility coordination, and marketing.
- Began comprehensive planning for Radnor Day Camp and summer camps.
- Finalized development of Winter & Spring 2018 Recreation Activities Brochure; developed information for new Township Magazine, Radnor Life & Style.
- Developed promotional banner for Radnor Activity Center for partnership summer camps with World Cup Sports Academy.
- Continued working with our professional organization, the PA Recreation and Parks Society (PRPS), regarding the child care licensing requirements for preschool-age programming participants under the Pennsylvania Department of Human Services; a structured, operating protocol was developed and submitted to the DHS under which public recreation providers would operate – consideration and waiver request by the DHS has been denied; the PRPS group has continued to lobby for legislative support on this topic.
- Coordinated with Recreation/Public Works/Police/Fire Departments to prepare and plan for December events including Santa's Delivery; discussed logistics and set up, activities and entertainment, staffing, registration, promotions, and supplies relative events.
- Attended wrap up meeting with Radnor Run Committee at the Radnor Hotel.
- Continued sponsorship development by working with local businesses and organizations for current events and programs; conducted meetings with potential and current sponsors; continued soliciting sponsorship proceeds for 2017 for remaining events and programs.
- Continued event and programming collaboration development with various businesses and organizations within the community.

Administrative

- Processed daily phone and email communications in order to provide information on community sports, recreational activities, and events; coordinated registrations for programs; prepared purchase orders/invoices, deposited income; prepared program financial reports that include participation reconciliation, instructor payments, and performance analyses; distributed program evaluations to participants; coordinated locations and logistics for programming, scheduled facility reservations/submitted applications, maintained Outlook event calendars, met with instructors and vendors to develop program agreements and process background checks; continued utilization of PEN (Programmer's Exchange Network) listserv to obtain and share information to evaluate operations; updated all Department areas of the Township website and social media page and distributed seasonal e-newsletters; filmed monthly segment for the *Radnor 411* television show and prepared slides for the Radnor Cable Channel; coordinated marketing efforts; managed inventories and distributed supplies to programs; worked with Township solicitor on various Department items.
- Monitored Department budgetary line items and developed year-to-date performance analyses for program and service areas; closed out year-end payments for 2017.
- Continued to work with Program Supervisor and Program Coordinator on daily planning, programming, events, operations, and Department projects for 2017/2018.
- Solicited applications for part-time Recreation Assistant position that remains open – Genevieve Dixon will assist us in the role until further notice.
- Continued working at the direction of the Finance Department on the implementation of Tyler Munis Enterprise Resource Planning Project – worked through scheduling for upcoming implementation for the online registration modules for recreation programming.
- Attended weekly staff meetings with the Township Manager and Department Heads.
- Attended monthly Board of Commissioners Meetings; attended and prepared reports for monthly Parks Board Meeting.
- Met with Ward 7 Commissioner-candidates; met with appointed Ward 7 Commissioner.
- Attended monthly Staff Safety Committee Meeting.
- Attended monthly Radnor Committee for Special Education Meeting.
- Attended monthly Sports Legends of Delaware County Museum Board Meeting.

Parks & Facilities Usage

- **Athletic Fields:** Coordinated field scheduling and light schedules for remainder of 2017; began anticipating and setting up schedules for 2018.
- **Park Areas/Picnic Rentals:** Reservation activity for the 2017 season was as follows:
    - Bo Connor Park (1 rental)
    - Clem Macrone Park (8 rentals)
    - Cowan Park (2 rentals)
    - Dittmar Park (1 rental)
    - Fenimore Woods (37 rentals)
    - Willows Park (22 rentals)
- **Radnor Activity Center:** 9 rentals took place in December and many were for multiple days; included fall seasonal programming including Radnor Youth Basketball League; Radnor Soccer Club; Men's Basketball and Soccer, Champions Basketball; Pickleball; Radnor Raiders; and Radnor Middle School Basketball; worked with Township Engineer/reviewed bid specifications for building custodial services; coordinated roof analysis due to ongoing leaks.

Parks & Facilities Meetings/Projects

- **Eagle Scout Projects:**
  - Kiosk replacement at the Willows picnic area and at the Skunk Hollow Garden entrance – project at Willows finalized; Skunk Hollow continued.
  - Bike repair station along the Radnor Trail – discussed prospective project.
  - Radnor Trail overpass median painting – discussed prospective project.
- **Park Mapping/Site Survey:** Began to evaluate a project to identify park boundaries.
- **Park Signage Replacement:**
  - Saw Mill Park sign has been put on hold as we evaluate the park traffic flow and logistics.
  - Clem Macrone Park, Fenimore Woods, Ithan Valley Park sign development is underway.
  - Radnor Skatepark informational signage development is underway.
- **Park and Trail Improvements** – a bond ordinance was voted at the October 26, 2015 Board of Commissioners Meeting for the following parks and trails ($5.75M - $4.3M Parks/$1.45M Trails); met with staff and continued working towards completion of the various park projects outlined –

Bo Connor Park (underway)
Cappelli Golf Range (underway)
Clem Macrone Park (complete)
Emlen Tunnel Park (underway)
Encke Park (complete)
Fenimore Woods (underway)
Ithan Valley Park (underway)
Petrie Park (complete)
Radnor Trail (underway)
Skunk Hollow Park (underway)
Warren Filipone Park (underway)
Ardrossan Trail
West Wayne Segment (8A-E, 1C, 1D)
Marth Brown Segment
Villanova – Chew Segment (16A, 9C, ½) - omitted
Radnor Station to Harford Park (9F)

- **Bo Connor Park Improvements:** Coordinated engineering site survey and scope of work development for site improvements/continued working with Gannett Fleming to finalize bid documentation.
- **Clem Macrone Park Master Planning/Renovation Project:** Attended project meeting; met with DCNR representative to discuss potential submission for DCNR Green Park Award.
- **Cowan Park Improvements:** Worked with Gannett Fleming to finalize bid documentation basketball court reconstruction/equipment replacement.
- **Emlen Tunnell Park:** Worked on comfort station design options (discussed with RWLL) and coordinated site layout with Gannett Fleming to prepare bid documentation.
- **Fenimore Woods Rehabilitation Project:** Comprehensive park renovation project planning underway; park outbound site and topographical surveys have been prepared; preliminary/ conceptual park improvement plan #2 was reviewed with the Parks Board in March, preliminary review of this plan occurred with Township traffic engineer; working to further identify the improvement details and corresponding project budget; coordinated pond study; worked on comfort station and pavilion design options with various vendors.
- **Odorisio Park Bench Replacement:** Coordinated resident bench recognition/memorial plaque.
- **Petrie Park Improvements:** Coordinated park improvements that include park seating, trash receptacle, and playground equipment replacement; continue to evaluate park ingress/egress and traffic safety improvements.

- **Radnor Skatepark Improvements:** 2015 improvements to the skatepark entailed replacement and upgrades to structures along with resurfacing by utilizing funds received as part of the Township Building cell tower contract renegotiation. Due to a lack of adherence of the top color coating to the surface, the asphalt was milled and redone – this process was completed and the skatepark reopened in mid-June 2016 - subsequent to the recent process, surface delamination has occurred once again and the park was closed due to safety concerns in early August; after park structure modification and movement, the park reopened in mid-August; staff and council are pursuing a bond claim for the deficiencies that have occurred with a goal to repair the park commensurate to the expectations of the original scope of work.
- **Radnor Trail - Brookside Parking Lot Restroom:** worked on restroom design options with various vendors; coordinated site layout with Gannett Fleming to prepare bid documentation.
- **Veterans Park Planning:** (formerly St. Davids Community Park) – a planning project is underway to honor Veterans, educate visitors, and improve various features of the site with the conceptual plan prepared by Simone Collins Landscape Architecture; fundraising is underway by the Township Manager for the project.
- **Warren Filipone Park Improvement:** Coordinated engineering site survey and scope of work development for site improvements/continued working with Gannett Fleming to finalize bid documentation.
- **The Willows:** There is continued evaluation by the Board of Commissioners to find a viable use for the Mansion that will allow for its continued public use, public usage of the park with minimal impacts, building improvements to ensure code compliance consistent with intended use, and building updates – the BOC has budgeted for the building renovations that have been presented by the Willows Park Preserve/Barton Partners; there is continued evaluation of the operability of the Mansion/corresponding MOU with the Willows Park Preserve.

Respectfully Submitted,

Tammy S. Cohen
Director of Recreation & Community Programming

CERTIFICATE OF APPROPRIATENESS

Radnor Township Historical and Architectural Review Board
Radnor Township, Pennsylvania

NAME OF OWNER:	BUCKLEY MORTIMER J III & NORRIS ELIZABE
OWNER ADDRESS:	420 MEADOWBROOK AVE, ST DAVIDS, PA 190
ADDRESS OF PROPERTY:	420 MEADOWBROOK AV , ST DAVIDS PA 1908
APPLICATION NUMBER:	HARB-2018-01

Subject to the conditions below the above owner, having complied with the Radnor Township Historical and Architectural Review Board (HARB) process, is hereby granted this permit for the

One car garage, accessory structure to be added to the southeast corner of the property.

at the address specified and may proceed with the building permit process. If not completed within one year of the date hereof, this permit is void and new application must be made. This Approval is subject to the Applicant applying for and receiving all necessary permits and approvals; and complying with all applicable Municipal regulations. Owner specifically gives the building inspector or designated official the right to inspect the work during progress and at completion.

NOTES AND/OR CONDITIONS OF APPROVAL:

Approved as submitted.

ISSUED: Monday, January 22, 2018

TOWNSHIP OFFICIAL **ACCEPTED BY APPLICANT**

_____ _____

RESOLUTION NO. 2018-12
RADNOR TOWNSHIP

A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AUTHORIZING THE TOWNSHIP MANAGER TO ENTER INTO AN AGREEMENT WITH ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE, INC. (ESRI) FOR THE MAINTENANCE RENEWAL, PURCHASE, INSTALLATION, AND MIGRATION ASSISTANCE FOR ARCGIS SOFTWARE.

WHEREAS, Radnor Township purchased and started implementing a Township Department wide Enterprise Resource Planning (ERP) system (Munis) through Tyler Technologies; and

WHEREAS, GIS mapping software is a critical component of the Munis Software program; and

WHEREAS, the current GIS mapping software (MapInfo) is outdated and not compatible with the Munis software; and

WHEREAS, Esri ArcGIS is an industry leading GIS software manufacturer that is compatible and can be seamlessly integrated with the Township's Munis upgrade; and

WHEREAS, cost proposals for the maintenance renewal, purchase, installation and migration assistance for ArcGIS has been submitted from Environmental Systems Research Institute, Inc. (Esri)

NOW, THEREFORE, be it ***RESOLVED*** by the Board of Commissioners of Radnor Township authorizes the Township Manager to execute an agreement with Environmental Systems Research Institute, Inc. (Esri) for the maintenance renewal, purchase, installation and migration assistance for ArcGIS software at a one-time price not-to-exceed $44,659.

SO RESOLVED, at a duly convened meeting of the Board of Commissioners of Radnor Township conducted on this 22nd day of January, A.D., 2018

RADNOR TOWNSHIP

By: _____
Name: Lisa Borowski
Title: President

ATTEST: _____
Robert A. Zienkowski
Manager/Secretary

Radnor Township

PROPOSED LEGISLATION

DATE: January 16, 2018

TO: Radnor Township Board of Commissioners

FROM: Kevin W. Kochanski, RLA, CZO,
Director of Community Development

CC: Robert A. Zienkowski, Township Manager
William M. White, Assistant Township Manager & Finance Director

LEGISLATION: **Resolution #2018-12 -** Authorizing the Township Manager to enter into an agreement with Environmental Systems Research Institute, Inc. (Esri) for the Maintenance Renewal, Purchase, Installation, and Migration Assistance for ArcGIS Software.

LEGISLATIVE HISTORY: None.

PURPOSE AND EXPLANATION: The Township's current GIS software is outdated and is not compatible with the Munis system that the Board authorized on May 9th, 2016. GIS software is primarily used by the Public Works, Engineering, and Community Development Departments for parcel identification, mapping, and infrastructure management. Upgrading to the Esri ArcGIS software platform will provide a modern system that can be integrated with the Munis software. In addition, ArcGIS has many features that can be used by the Recreation and Community Programming Department, the Police Department, and Emergency Management.

IMPLEMENTATION SCHEDULE: Once approved and the agreement executed, Township Administration will coordinate with Esri to discuss staff assignment and implementation schedule. It is anticipated that the ArcGIS software will be up and running in the Spring of 2018

FISCAL IMPACT: The cost proposals (please see attached) from Esri is not-to-exceed $44,659. The 2018 Capital Plan budgeted $60,000 for this upgrade.

Recommendation: Staff respectfully recommends that the Board of Commissioners approve this Resolution

Esri Inc
380 New York Street
Redlands CA 92373

Subject: Renewal Quotation

Date: 01/03/2018
To:
Organization: Township of Radnor
Community Planning
Fax #: 610-971-0450 **Phone #:** 610-688-5600

From: Maria Perez
Fax #: 909-307-3083 **Phone #:** 909-793-2853 Ext. 6114
Email: maria_perez@esri.com

Number of pages transmitted (including this cover sheet): 3

Quotation #25826098
Document Date: 01/03/2018

Please find the attached quotation for your forthcoming term. Keeping your term current may entitle you to exclusive benefits, and if you choose to discontinue your coverage, you will become ineligible for these valuable benefits and services.

If your quote is regarding software maintenance renewal, visit the following website for details regarding the maintenance program benefits at your licensing level
http://www. esri.com/apps/products/maintenance/qualifying.cfm

All maintenance fees from the date of discontinuation will be due and payable if you decide to reactivate your coverage at a later date.

Please note: Certain programs and license types may have varying benefits. Complimentary User Conference registrations, software support, and software and data updates are not included in all programs.

Customers who have multiple copies of certain Esri licenses may have the option of supporting some of their licenses with secondary maintenance.

For information about the terms of use for Esri products as well as purchase order terms and conditions, please visit
http://www. esri.com/legal/licensing/software-license.html

If you have any questions or need additional information, please contact Customer Service at 888-377-4575 option 5.

380 New York Street
Redlands, CA 92373
Phone: 909-793-28536114
Fax #: 909-307-3083

Quotation

Date: 01/03/2018 **Quotation Number:** 25826098 **Contract Number:** 2008MPA1177

Send Purchase Orders To:
Environmental Systems Research Institute, Inc.
380 New York Street
Redlands, CA 92373-8100
Attn: Maria Perez

Township of Radnor
Community Planning
301 Ivan Ave
Wayne PA 19087-5297

Please include the following remittance address on your Purchase Order:
Environmental Systems Research Institute, Inc.
P.O. Box 741076
Los Angeles, CA 90074-1076

Customer Number: 297420
For questions regarding this document, please contact Customer Service at 888-377-4575.

Item	Qty	Material#	Unit Price	Extended Price
1010	1	87192 ArcGIS Desktop Basic Single Use Primary Maintenance Start Date: 04/01/2017 End Date: 03/31/2018	400.00	400.00
1020	2	87193 ArcGIS Desktop Basic Single Use Secondary Maintenance Start Date: 04/01/2017 End Date: 03/31/2018	300.00	600.00

Item Subtotal		1,000.00
Estimated Tax		0.00
Total	**USD**	**1,000.00**

DUNS/CEC: 06-313-4175 CAGE: 0AMS3

Quotation is valid for 90 days from document date.

Any estimated sales and/or use tax has been calculated as of the date of this quotation and is merely provided as a convenience for your organization's budgetary purposes. Esri reserves the right to adjust and collect sales and/or use tax at the actual date of invoicing. If your organization is tax exempt or pays state taxes directly, then prior to invoicing, your organization must provide Esri with a copy of a current tax exemption certificate issued by your state's taxing authority for the given jurisdiction.

Esri may charge a fee to cover expenses related to any customer requirement to use a proprietary vendor management, procurement, or invoice program.

Issued By: Maria Perez **Ext:** 6114

[PEREZMARIA]

To expedite your order, please reference your customer number and this quotation number on your purchase order.

380 New York Street
Redlands, CA 92373
Phone: 909-793-28536114
Fax #: 909-307-3083

Quotation

Date: 01/03/2018 **Quotation No:** 25826098 **Customer No:** 297420 **Contract No:** 2008MPA1177

Item	Qty	Material#	Unit Price	Extended Price

If there are any changes required to your quotation please respond to this email and indicate any changes in your invoice authorization.

If you choose to discontinue your support, you will become ineligible for support benefits and services. All maintenance fees from the date of discontinuation will be due and payable if you decide to reactivate your support coverage at a later date.

The items on this quotation are subject to and governed by the terms of this quotation, the most current product specific scope of use document found at http://www.esri.com/~ /media/Files/Pdfs/legal/pdfs/e300.pdf and your signed agreement with Esri, if applicable. If no such agreement covers any item, then Esri's standard terms and conditions and product specific scope of use, found at http://www.esri.com/legal/software-license apply to your purchase of that item. Federal government entities and government prime contractors authorized under FAR 51.1 may purchase under the terms of Esri's GSA Federal Supply Schedule. Acceptance of this quotation is limited to the terms of this Quotation. State and local government entities in California or Maryland buying under the State Contract are also subject to the terms and conditions found at http://www.esri.com/legal/supplemental-terms-and-conditions. Esri objects to and expressly rejects any different or additional terms contained in any purchase order, offer, or confirmation sent to or to be sent by buyer. All terms of this quotation will be incorporated into and become part of any additional agreement regarding Esri's offerings.

In order to expedite processing, please reference the quotation number and any/all applicable Esri contract number(s) (e.g. MPA, ELA, SmartBuy ,GSA, BPA) on your ordering document.

By signing below, you are authorizing Esri to issue a software support invoice in the amount of USD_____ plus sales tax, if applicable.

Please check one of the following:

_____ I agree to pay any applicable sales tax.

_____ I am tax exempt. Please contact me if Esri does not have my current exempt information on file.

_____ _____
Signature of Authorized Representative Date

_____ _____
Name (Please Print) Title

[PEREZMARIA]

Quotation # 20521057

Date: January 2, 2018

Customer # 297420 **Contract # 2008MPA1177**

Environmental Systems Research Institute, Inc.
380 New York St
Redlands, CA 92373-8100
Phone: 909-793-2853 **Fax: 909-307-3049**
DUNS Number: 06-313-4175 **CAGE Code: 0AMS3**

To expedite your order, please attach a copy of this quotation to your purchase order.
Quote is valid from: 01/02/2018 To: 04/02/2018

Township of Radnor
Community Planning
301 Ivan Ave
Wayne, PA 19087-5297

ATTENTION: Kevin Kochanski
PHONE: (610) 688-5600
FAX: (610) 971-0450

Material	Qty	Description	Unit Price	Total
160463	1	ArcGIS Enterprise Standard (Windows) Up to Four Cores License	16,485.00	16,485.00
154252	2	ArcGIS Enterprise Standard or Advanced Named Users Level 2 Term License	489.00	978.00
122496	1	ArcGIS Desktop Standard Single Use Upgrade from ArcGIS Desktop Basic Single Use	4,534.00	4,534.00

Item Total:	21,997.00
Subtotal:	21,997.00
Sales Tax:	0.00
Estimated Shipping & Handling(2 Day Delivery) :	0.00
Contract Pricing Adjust:	0.00
Total:	$21,997.00

Esri may charge a fee to cover expenses related to any customer requirement to use a proprietary vendor management, procurement, or invoice program.

For questions contact: Andrew Falker **Email:** afalker@esri.com **Phone:** 610-644-3374 x5909

If sending remittance, please address to: Esri, P.O. Box 741076, Los Angeles, CA 90074-1076

FALKERA

Environmental Systems Research Institute, Inc.
380 New York St
Redlands, CA 92373-8100
Phone: 909-793-2853 Fax: 909-307-3049
DUNS Number: 06-313-4175 CAGE Code: 0AMS3

To expedite your order, please attach a copy of this quotation to your purchase order.
Quote is valid from: 01/02/2018 To: 04/02/2018

Quotation # 20521057

Date: January 2, 2018

Customer # 297420 Contract # 2008MPA1177

Township of Radnor
Community Planning
301 Ivan Ave
Wayne, PA 19087-5297

ATTENTION: Kevin Kochanski
PHONE: (610) 688-5600
FAX: (610) 971-0450

If you have made ANY alterations to the line items included in this quote and have chosen to sign the quote to indicate your acceptance, you must fax Esri the signed quote in its entirety in order for the quote to be accepted. You will be contacted by your Customer Service Representative if additional information is required to complete your request.

If your organization is a US Federal, state, or local government agency; an educational facility; or a company that will not pay an invoice without having issued a formal purchase order, a signed quotation will not be accepted unless it is accompanied by your purchase order.

In order to expedite processing, please reference the quotation number and any/all applicable Esri contract number(s) (e.g. MPA, ELA, SmartBuy, GSA, BPA) on your ordering document.

BY SIGNING BELOW, YOU CONFIRM THAT YOU ARE AUTHORIZED TO OBLIGATE FUNDS FOR YOUR ORGANIZATION, AND YOU ARE AUTHORIZING ESRI TO ISSUE AN INVOICE FOR THE ITEMS INCLUDED IN THE ABOVE QUOTE IN THE AMOUNT OF $_____, PLUS SALES TAXES IF APPLICABLE. DO NOT USE THIS FORM IF YOUR ORGANIZATION WILL NOT HONOR AND PAY ESRI'S INVOICE WITHOUT ADDITIONAL AUTHORIZING PAPERWORK.

Please check one of the following:

___ I agree to pay any applicable sales tax.

___ I am tax exempt, please contact me if exempt information is not currently on file with Esri.

Signature of Authorized Representative **Date**

Name (Please Print)

Title

Any estimated sales and/or use tax reflected on this quote has been calculated as of the date of this quotation and is merely provided as a convenience for your organization's budgetary purposes. Esri reserves the right to adjust and collect sales and/or use tax at the actual date of invoicing. If your organization is tax exempt or pays state tax directly, then prior to invoicing, your organization must provide Esri with a copy of a current tax exemption certificate issued by your state's taxing authority for the given jurisdiction.

Esri may charge a fee to cover expenses related to any customer requirement to use a proprietary vendor management, procurement, or invoice program.

For questions contact: Andrew Falker **Email:** afalker@esri.com **Phone:** 610-644-3374 x5909

The items on this quotation are subject to and governed by the terms of this quotation and of your signed agreement with Esri, if applicable, and the most current product specific scope of use document found at http://www.esri.com/~/media/Files/Pdfs/legal/pdfs/e300.pdf. If no such agreement covers any item, then Esri's standard terms and conditions, and current product specific scope of use, found at http://www.esri.com/legal/software-license apply to your purchase of that item. Federal government entities and government prime contractors authorized under FAR 51.1 may purchase under the terms of Esri's GSA Federal Supply Schedule. Acceptance of this quotation is limited to the terms of this quotation. State and local government entities in California or Maryland buying under the State Contract are also subject to the terms and conditions found at http://www.esri.com/legal/supplemental-terms-and-conditions. Esri objects to and expressly rejects any different or additional terms contained in any purchase order, offer, or confirmation sent to or to be sent by buyer. All terms of this quotation will be incorporated into and become part of any additional agreement regarding Esri's offerings. The quotation information is confidential and may not be copied or released other than for the express purpose of system selection and purchase/license. The information may not be given to outside parties or used for any other purpose without consent from Environmental Systems Research Institute, Inc. (Esri). Delivery is FOB Origin.

If sending remittance, please address to: Esri, P.O. Box 741076, Los Angeles, CA 90074-1076

FALKERA

AN ESRI
PROPOSAL

January 4, 2018

ArcGIS Enterprise Installation and Migration Assistance

Prepared for:

Mr. Kevin Kochanski
Director of Community Development
Township of Radnor, PA
301 Ivan Ave
Wayne, PA 19087

Esri Quote Number: P17-21764

380 New York Street
Redlands, California 92373-8100 USA
909 793 2853
info@esri.com
esri.com

esri | THE SCIENCE OF WHERE™

Introduction:

The **Township of Radnor, PA (Radnor)** has requested **Environmental Systems Research Institute, Inc. (Esri)** Professional Services to provide consulting services to assist with the installation and configuration of ArcGIS Enterprise. When ArcGIS Enterprise is configured, Esri will assist with the migration of MapInfo data into Esri format in preparation for a Tyler Technologies implementation. The quote below describes the scope of services, schedule, pricing, terms and conditions, and purchasing instructions.

Scope of Services:

Activity 1 Installation and Configuration of ArcGIS Enterprise

Esri will provide up to 34 hours of consulting services to assist Radnor with ArcGIS Enterprise implementation. It is anticipated that consulting services will include the following topics:

- Assist Radnor with the installation and configuration of ArcGIS Enterprise
    - Consists of Portal for ArcGIS, one ArcGIS Server site, and the ArcGIS Data store
- Assist Radnor with the configuration of user authentication settings
- Knowledge transfer on:
    - ArcGIS Enterprise Administration
    - Creating, updating, configuring and administering Geodatabases
    - Creating and Working with Services
    - Sharing Imagery and Caching
    - Disaster Recovery
    - Configuring and using your ArcGIS Organization

Radnor will first be provided with a questionnaire to review user requirements, collect inputs for server sizing, and determine any network, security, or environmental changes to be addressed. Following receipt of the completed questionnaire, the Esri Consultant will arrange a follow-up call or webcast to answer questions and review additional information pertinent to the implementation. Using the information gathered up to this point, the Esri consultant will develop a basic implementation and design plan and an implementation agenda to direct the onsite activities.

Esri anticipates that one consultant will support this activity for up to three consecutive business days on-site at Radnor's facilities in Radnor, PA. The Esri consultant will work with direction from Radnor's technical staff and management. Following the onsite visit, remaining hours will be used for remote, ad-hoc services via telephone, e-mail, and/or webcast.

Activity 2 Data Migration Assistance

Esri will provide up to 55 hours of remote consulting services to assist Radnor with migrating their existing MapInfo data into Esri format. It is anticipated that consulting services will include the following topics:

- Reviewing workflows to migrate data
- Reviewing workflows to Extract, Transform, and Load data into Esri Geodatabases
- Assistance migrating the existing data into Esri Geodatabases

This activity will be supported remotely from Esri's offices. The Esri consultant will work with direction from Radnor's technical staff and management.

Esri Responsibilities

- Provide up to 89 hours of consulting services as described above

Radnor Responsibilities

- Communicate consulting needs and priorities to the Esri consultant
- Provide the Esri consultant with access to Radnor's data and system environment, as necessary

Assumptions

- Activity 1
    - Pricing assumes one trip covering three consecutive business days for one Esri consultant from Esri's offices in Vienna, VA to Radnor's offices in Radnor, PA.
- Activity 2
    - Pricing assumes all consulting services will be provided remotely from Esri's offices during Esri's normal business hours and no travel will be required of the Esri consultant.
- Esri will not be responsible for data clean-up, if needed.
- Esri will support migration tasks until the NTE price has been reached, or Radnor directs Esri to stop work.
- Esri will provide staff from its local PA Esri offices if resources are available at the time frame needed by Radnor.

Schedule:

The schedule will be mutually agreed upon between Radnor and Esri within 10 days after contract award. Esri understands the importance and timeliness of this effort, and will endeavor to meet Radnor's schedule goals.

Pricing:

The pricing provided below has been estimated based upon an anticipated award of a Time-and-Materials (T&M) Task Order. The required labor hours, and other direct cost (ODC) items have been estimated based upon prior experience with work of a similar nature. The total not-to-exceed (NTE) price for the quoted Scope of Services is **$21,662**, and is based on the terms and conditions contained in the Master Purchase Agreement, Commonwealth of PA Agreement No. 4400004760, Esri MPA No. 302411 (formerly 2008MPA1177) (hereinafter referred to as the "Agreement"). Pricing is provided exclusive of any applicable state and/or local taxes for which the client shall remain responsible.

Esri anticipates using staff from the GIS Technical Specialist/Engineer (S1) labor category. Depending on the level of expertise required to perform certain activities during this engagement, Esri may be required to utilize other Esri staff members with a different skill-set and labor category. The following table shows the proposed NTE pricing for this work.

Pricing Build-Up

Cost Description	CY 2018 Hourly Rate	Estimated Hours	Price (USD)
GIS Technical Specialist/Engineer (S1)	$233	89	$20,737
GIS System/Software Developer (S2)	$302	0	$0
Senior GIS System/Software Architect (S3)	$371	0	$0
GIS Consultant/Project Manager (M1)	$287	0	$0
Sr. GIS Consultant/Project Manager (M2)	$361	0	$0
Principal/GIS Consultant/Prog. Manager (M3)	$475	0	$0
GIS Database Specialist/Analyst (DB)	$198	0	$0
Estimated Travel Expenses			$738
Background Check			$187
Total Not-to-Exceed Price			**$21,662**

T&M consulting services will be conducted under the following conditions:

- In the event Esri completes the Scope of Services for less than the NTE budget, Radnor will only be invoiced for the actual hours expended plus ODCs.

- In the event Esri reaches the NTE budget limit before the Scope of Services is completed, Radnor will have the option to either (a) increase the contract funding in order to allow the work to continue; or (b) instruct Esri to stop work. If Radnor chooses to stop work, Esri will do so without liability.
- Esri reserves the right to reallocate the project funding between Scope of Services activities and/or ODC items, as necessary to facilitate the work effort, provided the overall contract price is not exceeded.

All work will be accomplished in accordance with the Scope of Services with the deliverable being consulting time. If additional work is requested by Radnor in writing beyond the scope of this quote, Esri will provide an updated quote. Radnor will be invoiced monthly for the services provided by Esri during the previous 30-day period. Monthly invoices for services shall be calculated based on actual hours expended during the previous month, multiplied by the appropriate labor rate, plus the actual cost for any ODC items expended. Invoices are to be paid within 45 days of receipt. This quote is valid for a period of 90 days from the submittal date above.

Terms and Conditions:

By purchasing these services, the customer agrees to the terms and conditions contained in the existing Master Purchase Agreement, Commonwealth of PA Contract No. 4400004760, Esri MPA No. 302411 (formerly 2008MPA1177) ("Agreement").

Purchasing:

To order these services as quoted, please notify Jesse Smith of the contract award using the information provided below. Thereafter, Jesse will engage Esri's Contract Administrator, Jasmine Deo to draft the necessary T&M Task Order issued under the existing Agreement, in accordance with the details of this quote.

When we receive these completed documents, Esri will contact you to discuss staff assignment and schedule. We look forward to supporting you.

Contact:

Jesse Smith, Project Manager
Esri Professional Services
8615 Westwood Center drive
Vienna, VA 22182
(703) 506-9515 x3938
jsmith@esri.com / www.esri.com

Notice of Proprietary Information:

The information in the attached document is proprietary to Esri and contains commercial or financial information or trade secrets that are confidential and exempt from disclosure to the public under the Freedom of Information Act. This information shall not be disclosed outside of Customer's organization (except for consultants under a confidentiality obligation who are involved in the proposal evaluation process) without Esri's prior permission, and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate this proposal. If, however, a contract is awarded to Esri as a result of this information, the Customer shall have the right to duplicate, use, or disclose the data to the extent provided in the contract. This restriction does not limit the Customer's right to use information contained in this data if it is obtained from another source without restriction.

RESOLUTION NO. 2018-15

A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, APPROVING THE PURCHASE OF FIFTEEN WATCH GUARD 4RE/VISTA IN-CAR CAMERAS AND FOUR WATCH GUARD 4RS/VISTA MOTORCYCLE CAMERAS FOR USE BY THE RADNOR TOWNSHIP POLICE DEPARTMENT.

WHEREAS, the Radnor Township Police Department is seeking to purchase fifteen (15) Watch Guard 4RE/Vista in-car cameras and four (4) Watch Guard 4RS/Vista motorcycle cameras, along with various software to be installed in the patrol vehicles; and

WHEREAS, the cost of the cameras and installation shall not exceed $118,887.00.

NOW, THEREFORE, be it hereby ***RESOLVED*** that the Radnor Township Board of Commissioners does approve the purchase of fifteen (15) Watch Guard 4RE/Vista in-car cameras and four (4) Watch Guard 4RS/Vista motorcycle cameras for use by the Radnor Township Police Department in an amount not to exceed $118,887.00.

SO RESOLVED, this 22nd day of January, 2018.

RADNOR TOWNSHIP

By: _____
Name: Lisa Borowski
Title: President

ATTEST:_____
Robert A. Zienkowski, Township Manager/Secretary

Radnor Township

PROPOSED LEGISLATION

DATE: 01/22/18

TO: Robert A. Zienkowski, Township Manager

FROM: Lieutenant Shawn Dietrich #403

LEGISLATION: **Resolution to purchase fifteen (15) Watch Guard 4RE/Vista in-car cameras, four (4) Watch Guard 4RS/Vista motorcycle cameras, wireless video transfer and networking options, along with necessary software and licensing, redaction software and camera installations.**

LEGISLATIVE HISTORY: Request for legislation/new

PURPOSE AND EXPLANATION: The Radnor Township Police Department requests the purchase of fifteen (15) in-car cameras and four (4) motorcycle cameras, along with various software to be installed in the patrol vehicles for the purpose of documenting police interaction with the public during traffic stops, pedestrian stops, high liability incidents and other police related activities.

FISCAL IMPACT: $118,887.00 The purchase will be made through the 2018 Pennsylvania COSTARS Program. The funds for this purchase requisition will come from the 2018 Capital Improvement Fund.

The cost for the purchase / installation of the Watch Guard system is as follows:

Fifteen (15) Watch Guard 4RE/Vista car cameras	$ 74,730.00
Four (4) Watch Guard 4RE/Vista motorcycle cameras	$ 21,180.00
Wireless video transfer and networking	$ 4,247.00
Redaction Software, licenses, installations and training	$ 18,730.00
Total cost	$118,887.00

RECOMMENDED ACTION: I recommend the Legislation be passed to purchase nineteen Watch Guard cameras and related equipment to be utilized by the Radnor Township Police Department.

MOVEMENT OF LEGISLATION: Adoption at the January 22, 2018 Board of Commissioners Meeting.

RESOLUTION NO. 2018-14

A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, APPROVING THE PURCHASE OF THIRTEEN POWERHEART G5 SEMI-AUTOMATIC AUTOMATED EXTERNAL DEFIBRILLATORS FOR USE BY THE RADNOR TOWNSHIP POLICE DEPARTMENT

WHEREAS, the Radnor Township Police Department is seeking to purchase thirteen (13) Powerheart G5 Semi-Automatic Automated External Defibrillators (AED's) and Pediatric Defibrillator Pads to replace the current units purchased in 2008 that are no longer supported or able to be maintained; and

WHEREAS, the cost of the AED's and Pediatric Defibrillator Pads shall not exceed $21,999.65.

NOW, THEREFORE, be it ***RESOLVED*** that the Radnor Township Board of Commissioners does hereby approve the purchase of thirteen (13) AED's and Pediatric Defibrillator Pads for use by the Radnor Township Police Department in an amount not to exceed $21,999.65.

SO RESOLVED, this 22nd day of January, 2018.

RADNOR TOWNSHIP

By: _____
Name: Lisa Borowski
Title: President

ATTEST:_____
Robert A. Zienkowski, Township Manager/Secretary

Radnor Township

PROPOSED LEGISLATION

DATE: 01/22/18

TO: Robert A. Zienkowski, Township Manager

FROM: Lieutenant Shawn Dietrich

LEGISLATION: **Resolution to purchase the Thirteen (13) new Powerheart G5 Semi-Automatic Automated External Defibrillators (AEDs)**

LEGISLATIVE HISTORY: Request for legislation/new

PURPOSE AND EXPLANATION: The Radnor Township Police Department requests to purchase thirteen (13) new AEDs and Pediatric Defib Pads to replace the current units purchased in 2008 that are no longer supported or able to be maintained.

FISCAL IMPACT: $21,999.65. The purchase will be made through the 2018 Pennsylvania COSTARS Program. The funds for this purchase requisition will come from the 2018 Capital Improvement Fund.

The cost for the purchase of the vehicles is as follows:

Powerheart G5 Semi-Automatic AEDs	$20,959.25
Powerheart G5 Intellisense Pediatric Defib Pads	$ 1,040.40
	$21,999.65

RECOMMENDED ACTION: I recommend the Legislation be passed to purchase thirteen (13) Powerheart G5 Semi-Automatic Automated External Defibrillators to be utilized by the Radnor Township Police Department.

MOVEMENT OF LEGISLATION: Adoption at the January 22, 2018 Board of Commissioners Meeting.

RESOLUTION NO. 2018-13

A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, ADVISING THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, THE PENNSYLVANIA STATE POLICE, AMTRAK AND SEPTA THAT THE KING OF PRUSSIA ROAD BRIDGE IN RADNOR TOWNSHIP CONSTITUTES A CONTINUING TRAFFIC SAFETY HAZARD

WHEREAS, King of Prussia Road runs under a rail line owned by Amtrak upon which Septa operates commuter services; and

WHEREAS, King of Prussia Road is a state road subject to the jurisdiction of the Pennsylvania Department of Transportation and the Pennsylvania State Police; and

WHEREAS, the King of Prussia Road Bridge has been struck and damaged by oversized trucks and other vehicles on multiple occasions over the past five years; and

WHEREAS, the Board of Commissioners of Radnor Township wishes to formally advise the foregoing responsible agencies of the immediate need on their part to immediately address this ongoing hazardous safety condition.

NOW, THEREFORE, be it ***RESOLVED*** that the Radnor Township Board of Commissioners does hereby provide this notice to the Pennsylvania Department of Transportation, the Pennsylvania State Police, Amtrak and the Southeast Pennsylvania Transportation Authority of the above described hazardous condition and request that they each take immediate steps to address the dangers to the traveling public and the residents and taxpayers of Radnor Township.

SO RESOLVED, this 22nd day of January, 2018.

RADNOR TOWNSHIP

By: _____
Name: Lisa Borowski
Title: President

ATTEST: _____
Robert A. Zienkowski, Township Manager/Secretary

RESOLUTION NO. 2018-05
A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AUTHORIZING GANNETT FLEMING, INCORPORATED, TO PERFORM A STRUCTURAL EVALUATION OF THE ROBERTS ROAD CULVERT ENDWALL

WHEREAS, as a precursor to the design of the repair of the Roberts Road Culvert Endwall, a structural evaluation is necessitated.

WHEREAS, Gannett Fleming, Incorporated has provided a cost proposal to provide the evaluation of the pedestrian bridge, in the amount of $50,178

NOW, THEREFORE, be it ***RESOLVED*** by the Board of Commissioners of Radnor Township does hereby Authorize Gannett Fleming, Incorporated, to Perform a Structural Evaluation of the Roberts Road Culvert Endwall for the cost of $50,178

SO RESOLVED this 22nd day of January, A.D., 2018

RADNOR TOWNSHIP

By: _____
Name: Lisa Borowski
Title: President

ATTEST: _____
Robert A. Zienkowski
Manager/Secretary

Radnor Township

PROPOSED LEGISLATION

DATE: January 17, 2018

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer

CC: Robert A. Zienkowski, Township Manager
William M. White, Assistant Township Manager/Finance Director
Roger Phillips, PE, Gannett Fleming, Incorporated

LEGISLATION: **Resolution #2018-05**: Award of the Evaluation and Permitting for Repairs to the Roberts Road Endwall

LEGISLATIVE HISTORY: This item has not been before the Board of Commissioners previously.

PURPOSE AND EXPLANATION: The Township was alerted to a deteriorating headwall on Roberts Road, just south of Robinhood Road. This endwall, on the east side of the road, supports Roberts Road at the location of a culvert, which conveys Valley Run. The endwall is of masonry construction and exhibits cracking, loose stones, and in one area, a storm sewer pipe has undermined and separated from the other pipes. If this situation is not addressed, eventually the endwall will give way, and Roberts Road will be compromised. The storm sewer will continue to undermine, and pipes will continue to separate.

Gannet Fleming, Incorporated, has submitted a cost proposal to perform: 1) a Structural Evaluation, 2) Survey, and 3) Permitting. The structural evaluation will be the basis for the design, and the permitting with DEP is a long lead item, which should be started up front in the project. Upon further evaluation, the noted optional survey will be required to fully complete the DEP permit application. Upon completion of the structural evaluation, I will request a cost proposal from Gannett Fleming for design and bidding documents. The proposal before the Board of Commissioners will be the foundation for design and bidding documents proposal. Once received and reviewed, this design proposal will be before the Board of Commissioners.

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners authorization, a requisition would be entered into our financial system. Upon receipt of a purchase order number, Gannett Fleming would begin work immediately. It is anticipated that the permitting process could take six months due to the permitting. I would anticipate being back before the Commissioners in the summer to request award of the design and bidding documents proposal.

FISCAL IMPACT: This project will be funded from the "04" Stormwater Fund. The cost proposal for the Structural Inspection, survey, and permitting is $50,178.

Recommendation: I respectfully request that the Board of Commissioners Award of the Evaluation and Permitting for Repairs to the Roberts Road Endwall to Gannett Fleming, Incorporated, in the amount of $50,178.

Enclosure: Gannett Fleming Cost Proposal

Gannett Fleming

Excellence Delivered ***As Promised***

October 25, 2017

Stephen Norcini, P.E.
Township Engineer
Radnor Township
301 Iven Avenue
Radnor, PA 19087

Dear Steve:

RE: Roberts Road Endwall

Gannett Fleming, Inc. is pleased to submit the following technical and price proposal for providing engineering services for the structural inspection of the stone arch culvert at Roberts Road.

I. PROJECT UNDERSTANDING

The project involves an investigation of the existing stone arch culvert in South Roberts Road over Valley Run Creek.

Gannett Fleming will complete the structural inspection as part of the base scope of work. Additional optional scope items for site survey and permitting have been included at the request of the Township. If the survey is desired, Gannett Fleming has selected Hunt Engineering to perform the survey work on this project. The proposal from the sub-consultant is attached at the end of this document.

II. SCOPE OF WORK

Gannett Fleming, Inc. and their sub-consultants will perform the following services:

1. Structural Inspection (BASE SCOPE)
    a. GF will perform a general, visual structural inspection of the culvert to approximate the extent of deterioration/remaining section of the accessible elements towards a recommendation to repair/rehabilitate the culvert and its budgetary/planning estimate. Inspection access will use ladders, if needed. Inspection is expected to be performed during normal daytime hours M-F; nighttime or weekend work is not expected. Due to the nature and purpose of the work, inspection of portions that are not easily accessible by ladder will be visual.

b. The visibly accessible areas of the culvert and walls will be examined for missing, loose, or cracked stones/brick, bulging, rotation, and settlement, as well as deteriorated or missing mortar/pointing. Nondestructive testing or material sampling and testing will not be performed. Inspection and evaluation of the channel and embankments will be limited to the rock ledges upstream and downstream.

c. Upon completion of the inspection, our findings will be summarized in a letter report, and include a summary of inspection findings, conclusions/recommendations for repairs and an associated construction cost estimate, and color photos of typical conditions and deficiencies. The letter report will also consider access issues in performing the recommended repairs.

d. A draft letter report will be submitted to the Township for review and comment. Upon receipt of the Township's comments, the final letter report will be prepared, addressing the comments, and submitted to the Township for approval. At that time an estimated cost of design will be provided based on the recommendations in the report.

2. Survey of the project site. (OPTIONAL SCOPE)
   a. See attached proposal from Hunt Engineering for assumptions.

3. Preparation of Permits (OPTIONAL SCOPE)
   a. Gannett Fleming assumes that a General Permit #11 (GP-11) will be required for this project. The permit package will include the application forms required for all GP's, plus the information necessary for the GP-11 including, an E&SC Plan, Project Inventory Worksheet and the Bridge and/or Culvert Replacement Projects or Projects That Change the Waterway Opening Worksheet. We assume that a paper copy of the GP-11 will be prepared and submitted for processing by PADEP. Gannett Fleming will address one rounds of comments one from PADEP. We assume that PADEP will issue a PASPGP-5 Permit on behalf of USACE for the project. In the event that the Township approved repair alternative selected will include alterations to the cross sectional area of the culvert, an H&H study may be required. At this time, we are assuming that there will be no change to the cross sectional area of the culvert and therefore no H&H study is proposed as part of this scope. This approach will be verified with the agencies at a preapplication meeting. We will seek advance authorization for any additional services prior to proceeding with the work.

   b. We assume that there are no cultural or archaeological resources present. We assume that there will be no work required to obtained agency clearance for involvement with state or federal threatened or endangered species. A wetland presence/absence investigation will be conducted to

verify that wetlands are not present onsite. If wetlands are present then a wetland delineation can be conducted as an amendment to the scope of work. At this time we assume that, if wetlands are present, the impacts will not exceed 0.05 acres.

Radnor Township will provide the following to assist Gannett Fleming, Inc. in the prosecution of the work:

- Provide access to the site and provide any plans, documents, and reports associated the project.

II. COST

Based on the above scope of work, we will perform the services for the following estimated costs. Costs are estimates only due to the nature of the work. **Total billings will not be exceeded without written notification:**

Structural Inspection (Base Scope)	
Report	**$10,860.00**
Survey (Optional Scope)	
Survey	**$30,000.00**
Permitting (Optional Scope)	
GP-11	**$9,318.00**

We are prepared to begin this assignment upon your authorization to proceed.

We appreciate this opportunity to offer our services. If you have any questions concerning our proposal please contact me.

Very truly yours,

GANNETT FLEMING, INC.

Roger A. Phillips, P.E.
Senior Project Manager

HUNT ENGINEERING COMPANY

October 16, 2017

Mr. Matthew J. Prusko
Project Designer/Specialist
Gannett Fleming, Inc.
1010 Adams Avenue
Audubon, PA 19403-2402

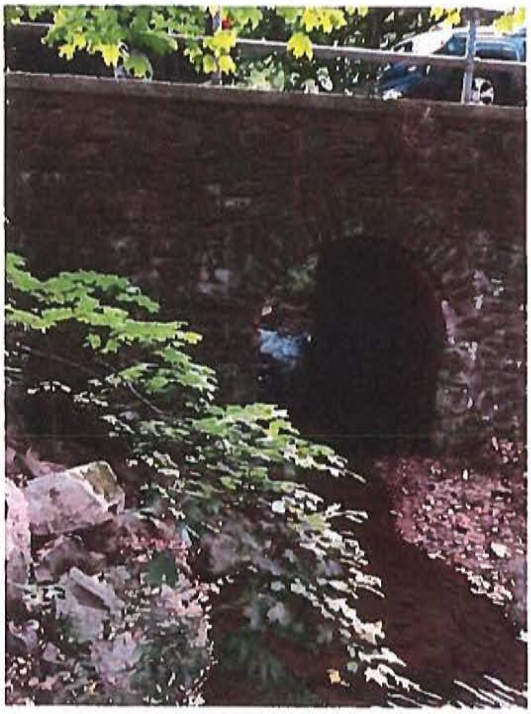
RE: Roberts Road Culvert
S. Roberts Road over Valley Run, Radnor, PA
Land Surveying Services

Dear Mr. Prusko:

Hunt Engineering Company is pleased to submit this proposal to provide professional land surveying services for the Roberts Road culvert repair/stabilization project.

Project Understanding

The project involves repairs to an existing stone arch bridge/culvert in South Roberts Road over Valley Run creek, guiderail improvements and associated stream bank stabilization upstream and downstream of the culvert. The structure is located between 354 and 400 Roberts Road. The structure is showing signs of deterioration and possible displacement.



The site is identified on FEMA flood insurance rate map number 42045C0039F, last revised 11/18/2009 as being within Zone A. Zone A is identified as having an undetermined base flood elevation.

Scope of Services

- Attend a project kick-off meeting at the site with Gannet Fleming to review the survey scope and site conditions.
- Prepare and mail Notice of Intent to Enter letters to the owners of tax parcels 079, 080, 142 and 175
- Place a design phase PA One-Call to request utility plans of the area to be surveyed.
- Conduct research to obtain the following information:

P.O. Box 537 | 22 East King Street | Malvern | PA | 19355 | p: 610-644-4600 | f: 610-644-2466 | www.huntengineering.com

  - Delaware County Tax map 36-07
  - Owner names and copies of deeds for tax parcels 079, 080, 142 and 175
  - Right-of-way information for Roberts Road
  - FEMA Flood Insurance Rate Map 42045C0039F
- Establish survey control points that will be referenced horizontally to the PA State Plane Coordinate System (NAD83) and vertically to North American Vertical Datum (NAVD 1988).
- Establish a site benchmark and one set of reference circles near the bridge.
- Conduct topographic surveys of S. Roberts Road extending 100 feet from either side of the bridge, and 15 feet beyond the back of curb, to obtain the location and elevation of the edge of pavement, top and bottom of curb, depressed curb locations, driveways, mail boxes, utility poles, fences, walls, lights, bridge railing, pavement striping, signs, tree masses, individual trees greater than 6" caliper, and surface utility features (such as inlets, manholes, junction boxes, valves, overhead power lines), utility mark-outs resulting from the PA One-Call and other significant existing features.
- Obtain the locations of wetland and watercourse flags within the 150 feet of the culvert, as set by others prior to the field survey.
- Perform conventional field surveys to search for and locate existing property boundary evidence such as concrete monuments, iron pins, and use lines (such as fences).
- Obtain the rim and invert elevation of existing sanitary sewer manholes.
- Obtain the inlet grate and invert elevation of existing stormwater inlets. Obtain the pipe sizes and directions if able.
- Conduct a detailed survey of the face of culvert on the upstream and downstream sides. Obtain elevations and measurements of the arch opening, top and bottom of wall, railing, and bridge deck.
- Perform stream surveys to obtain overbank topography and stream cross sections to locate and obtain the elevation of the top of bank, grade breaks, water's edge, and thalweg. The stream cross sections will begin at the upstream and downstream face of bridge and will be surveyed at approximately 25-foot intervals for 150 feet from the bridge face (both upstream and downstream of the structure), and approximately 10 feet beyond the top of bank on either side of the stream. Locate trees of 6" caliper or greater within this area.
- Obtain the locations of wetland and watercourse flags within 150 feet of the bridge, as set by others prior to the field survey.
- Obtain the location and elevation of exterior building corners closest to the stream on tax parcels, 079, 080, 142 and 175.
- Prepare field sketches showing the dimensions of the bridge and dam structures.
- Prepare an Existing Conditions Plan in AutoCAD 2014 (.DWG) format depicting the information obtained from the tasks above and with contours plotted at one-foot intervals. Underground utilities will be plotted from PA One-Call information provided by the responding utility service providers and field observations and measurements of visible utilities. The property boundaries will be plotted from deeds of record, plans made available to Hunt Engineering Company and boundary evidence obtained from the field surveys. The approximate 100-year floodplain will be sketched onto the Existing Conditions Plan from FEMA map 42045C0039F last revised November 18, 2009.
- Provide Gannett Fleming with the following:
  - Copies of the utility plans received through the PA One-Call system
  - Copies of the deeds for Tax Parcels 079, 080, 142 and 175
  - A copy of the Existing Conditions Plan in portable digital file (.PDF) format
  - A copy of the Existing Conditions Plan in AutoCAD 2014 (.DWG) format
  - A copy of the DTM surface created to generate the contours shown on the Existing Conditions Plan

Assumptions

The foregoing scope is based on the following assumptions:

1. Acceptance of this proposal constitutes agreement with Hunt Engineering Company's General Terms and Conditions of Service as attached.
2. Gannett Fleming will:
   - Provide any available plans of the bridge structure and of S. Roberts Road
   - Provide Radnor Township letterhead upon which the NOITE letters will be prepared and obtain the appropriate signature of a representative from Radnor Township
   - Provide copies of field sketches from the wetland delineation efforts
3. The following are not included in this proposal:
   - ALTA, construction and as-built surveys
   - Boundary resolution
   - Wetland delineations
   - Remobilization to locate wetland flags
   - Tree identification
   - Setting property corner or right-of-way monumentation
   - CAD drawings of the elevation and section of the existing bridge structures
   - Preparation of drawn roadway and stream cross sections
   - Preparation of right-of-way plans
   - Preparation of wetlands delineation plans, wetlands (if applicable) will be plotted on the Existing Conditions Plan
   - Preparation of plans or legal descriptions for the purposes of right-of-way vacation, subdivision, or establishment of easements
   - Subsurface explorations to expose existing underground utilities and/or identification through geo-physical means such as ground penetrating radar
   - Utility exploration including confined space-entry, vacuum truck excavation or open-pit excavation
   - Invert elevations of storm water, sanitary sewer and other utility pipes or structures that are inaccessible

   In the event that the level of effort changes, we will seek advance authorization for any additional services prior to proceeding with work.
4. Utility plans received through the One-Call system typically show only utilities along public roads and not on private and/or municipal properties. Therefore, we expect to receive only limited information through the PA One-Call system for areas outside the road right-of-way.
5. Underground utility lines will be plotted to the best of our ability from field observations/ measurements and plans provided by the County and the utility companies responding through the PA One-Call Process. As a result, some underground utility locations may be approximate and other utilities may exist that are not shown on plans made available to us.
6. This proposal is predicated on the assumption that the effected property owners will allow Hunt Engineering Company's field staff entry to their premises. If such permission is not granted the requested work may not be completed as scoped
7. This proposal assumes the wetland delineation will be performed prior to the start of field survey. Re-mobilization to locate wetland delineations may incur additional charges not included in this proposal.

Cost of Services

The fees for the services described above are as follows:

Classification	Hours	Hourly Rate	Subtotal
Project Manager	4	$175.00	$700.00
Project Surveyor	8	$160.00	$1,280.00
Registered Surveyor	42	$130.00	$5,460.00
2-Person Survey Crew	80	$145.00	$11,600.00
CADD Supervisor	36	$100.00	$3,600.00
Survey Technician	64	$80.00	$5,120.00
Total			**$27,760.00**

Additional services will be provided by Hunt Engineering Company on a time and expenses basis will be billed monthly in accordance with the following rates:

Classification	Hourly Rate
Principal	$175
Project Manager	$165
Project Engineer	$145
Sr. Engineer	$130
Engineer	$120
Landscape Architect	$105
Designer	$90
Project Surveyor	$160
Registered Surveyor	$130
Survey Crew	$145
Technician	$80
CADD Supervisor	$100
CADD	$60

Mileage, postage and printing charges will be billed on a per unit price as follows:

Mileage Rate:	$0.535 / mile
Overnight Postage:	$13/standard size package
Plan Sheets Reproduction/ Printing:	$0.25 / Square Foot

We appreciate the opportunity to provide this proposal to you. We trust that this proposal is in keeping with your expectations; if otherwise, please let us know. If you have any questions, please do not hesitate to call.

Sincerely,
HUNT ENGINEERING COMPANY

Susan D. Menno, RLA
Principal

Please complete the following and return to Hunt Engineering Company as Authorization to Proceed with the scope of services outlined herein in accordance with Hunt Engineering Company's General Terms and Conditions of Service.

Accepted by: _____ Company: _____
(Signature of Authorized Individual)

_____ Date: _____
(Printed Name and Title)

Hunt Engineering Company
General Terms and Conditions of Service

Client: Gannett Fleming
Project Name: Roberts Road Endwall
Project Location: Radnor Township, Delaware County, PA
Date: October 16, 2017

The terms and conditions which shall govern the performance of services pursuant to this agreement are set forth below.

1.0 SCOPE OF SERVICES AND ADDITIONAL SERVICES: Hunt Engineering Company (HEC) will be covered by this Agreement regardless of commencement date. Unless modified in writing by the parties, the duties of HEC shall not be construed to exceed those Services specifically set forth in the proposal. However, if requested by the CLIENT and agreed to by HEC, HEC will perform additional services ("additional Services"), and such Additional Services shall be governed by these provisions. Unless otherwise agreed to in writing, the CLIENT shall pay HEC for the performance of any Additional Services based upon HEC's then-current hourly rates.

2.0 STANDARD OF CARE: The standard of care for services performed or furnished by HEC under this Agreement will be the level of care and skill ordinarily exercised by members of the same profession practicing under similar conditions at the same time and in the same locality based on facts and information available at the time services are provided.

3.0 CLIENT RESPONSIBILITIES: In addition to other responsibilities described herein, The CLIENT shall (i) provide all information criteria as to the CLIENT's requirements, objectives, and expectations for the project, including numerical criteria that are to be met and all standards of development, design and construction; (ii) provide to HEC all previous studies, plans, or other documents pertaining to the project and all new data reasonably necessary in HEC's opinion, such as site survey and engineering data, environmental impact assessments or statements, zoning or other land-use regulations, upon all of which HEC may rely; (iii) furnish approvals and permits from governmental authorities having jurisdiction over the project and approvals and consents from other parties as may be necessary for completion of HEC's services; (iv) give prompt written notice to HEC whenever the CLIENT becomes aware of any development that affects the scope and timing of HEC's services or any defect or noncompliance in any aspect of the project; (v) provide all necessary escrow, permit, application and agency review fees, payable to the respective agency/agencies for the review, entitlement and construction of the subject project and (vi) bear all costs incident to the responsibilities of CLIENT.

3.1 RELIABILITY OF INFORMATION: HEC shall have the right to rely on the accuracy and completeness of all information furnished to it by the Client.

3.2 RIGHTS OF ENTRY, DAMAGES TO PROPERTY: Client will provide for the right of entry for HEC, its subcontractors, and all necessary equipment in order to complete the Services under the Agreement. While HEC will take all reasonable precautions to minimize any damage to the property, it is understood by Client that in the normal course of work some limited incidental damage such as localized disturbance of soil and vegetation may occur, the correction of which is not part of the Agreement.

4.0 COMPENSATION: HEC will be compensated according to the fees stipulated in the proposal. HEC shall submit monthly invoices to the CLIENT and a final bill upon completion of Services. Payment of undisputed invoice amounts is due upon receipt of invoice by CLIENT. Any invoices past-due thirty (30) days from the date of the invoice will be subject to interest.

4.1 REIMBURSABLE EXPENSES: Client shall pay HEC for reimbursable expenses, including printing and reproduction, courier and express delivery service, bulk/special mailings, facsimile transmissions, specialized equipment and laboratory charges, their costs of acquiring materials specifically for CLIENT and related charges. The reimbursable expenses will be added to each monthly invoice. HEC is not responsible for the posting or payment of escrow, permit, application and agency review fees. See 'Client Responsibilities'.

4.2 DISPUTE OF INVOICE: CLIENT shall notify HEC within two weeks of receipt of invoice of any dispute with the invoice. CLIENT and HEC will promptly resolve any disputed items.

4.3 INTEREST: If any invoice is not paid in full, the CLIENT shall pay as interest an additional charge of one-and-one-half percent (1.5%), or the maximum allowable by law, whichever is lower, per month of the Past Due amount. Payment after that shall first be applied to accrued interest and then to unpaid principal.

4.4 SUSPENSION OF SERVICE: If the CLIENT fails to make payment when due or otherwise is in breach of this Agreement, or in breach of any other agreement between client and HEC, then HEC may suspend performance of services at any time.

In the event of a suspension of services or termination of the Agreement by HEC in accordance with Section 5.0 of these General Terms and Conditions, HEC shall have no liability for any delay or damage of any kind actually or allegedly caused by such suspension of services or termination. The Client shall have no right of setoff against the amounts due to HEC and no deductions shall be made from HEC's compensation on account of any actual or alleged claim, action, breach, error, omission, tort, fault, wrong, liability, penalty or damage actually or allegedly caused by, arising from or relating to HEC, HEC's services on the Project, or this Agreement.

If HEC files a claim against the Client arising out of the Client's failure to make payments in accordance with this Agreement and Client subsequently asserts any claim or claims against HEC relating to allegations of professional negligence in performance of HEC'S services under this Agreement, HEC shall be entitled to reimbursement of any costs incurred by HEC in the defense of the professional negligence claim(s), including any expenses incurred as part of HEC'S professional liability insurance deductible, to the extent HEC is successful in its compensation claim or negligence defense.

5.0 TERMINATION: Except as otherwise provided in this Agreement, this Agreement may be terminated by either party upon not less than fourteen (14) calendar days' written notice should the other party fail substantially to perform in accordance with the terms and conditions of this Agreement through no fault of the party initiating the termination. If the defaulting party fails to cure its default within the fourteen (14) calendar day notice period or fails to commence action to cure its default if the cure cannot reasonably be completed within the fourteen (14) days, the nondefaulting party may terminate the Agreement. Failure of the Client to make payments to HEC in accordance with this Agreement shall be considered substantial non-performance and grounds for termination or suspension of services at HEC's option after such fourteen (14) day notice period or anytime thereafter. In the event of termination, HEC shall be compensated for all services performed and reimbursable expenses incurred prior to such termination and all termination expenses.

6.0 INDEMNIFICATION: The Client agrees to indemnify and hold HEC harmless from any damage, liability or cost (including reasonable attorneys' fees and costs of defense) to the extent caused by the Client's negligent acts, errors or omissions and those of his or her contractors, subcontractors or consultants or anyone for whom the Client is legally liable. HEC is not obligated to indemnify the Client for the Client's own negligence.

7.0 LIMITATION OF LIABILITY: Upon the review and advice of their respective attorneys or authorized agents, Client and HEC recognize and agree that HEC's liability for any and all claims or actions, regardless of how arising, shall be limited to the total sum of $50,000.00, or HEC's total fee for services rendered on this project, whichever is less. Client hereby releases HEC from any liability above such amount. Such claims and causes include, but are not limited to

negligence, professional errors or omissions, strict liability, breach of contract or breach of warranty.

In no event shall HEC be liable for any incidental, indirect or consequential damages, including commercial loss, liquidated damages, or lost profits resulting from any Service furnished under this agreement.

8.0 INSURANCE: HEC maintains general and professional liability insurance, and workman's compensation insurance. Certificates will be issued to the Client upon written request.

9.0 FORCE MAJEURE: HEC shall not be responsible or liable for any delays in performance or failure of performance related to any force majeure event, including but not limited to fire, flood, explosion, the elements, or other catastrophe, acts of God, war, riot, civil disturbances, terrorist act, strike, lock-out, refusal of employees to work, labor disputes, inability to obtain materials or services, or delays caused by the Client, its agents, contractors, subcontractors, consultants, subconsultants or employees, or any governmental regulation or agency, or for any other reason beyond the control of HEC.

10.0 OPINION OF COST: Consistent with the Standard of Care in Section 2.0 of this Agreement, any opinions rendered by HEC as to costs, including, but not limited to, opinions as to the costs of construction, remediation and materials, shall be made on the basis of its experience and represent its judgment as an experienced and qualified professional familiar with the industry. HEC cannot and does not guarantee that proposals, bids, or actual costs will not vary from its opinions of cost. HEC's services required to bring costs within any limitation established by the CLIENT will be paid for as Additional Services.

11.0 EARTHWORK ANALYSIS: If the Scope of Services includes earthwork analysis, then the following provisions shall apply:

11.1 In reviewing HEC's earthwork analysis, calculations, reports or opinions, the client understands that HEC's data is based on the topographic mapping used as a Base Map for plan preparation and that such topographic mapping has certain standard tolerances and accuracy limits. The client further understands that due to earthwork differences that result from topographic map accuracy limitations, construction changes, topsoil depth, replacement of unsuitable soils, weather conditions, construction methods, soil conditions, earthwork calculation methods, soil volume calculation methods and other factors, some of which are unique to each contractor and construction site, it is not possible to definitively predict quantities that will ultimately be determined to be associated with a particular project. Earthwork data provided by HEC is provided to assist the client in understanding the general earthwork requirements. Since some degree of uncertainty may still exist, HEC's sole responsibility and liability with regard to the accuracy or completeness of the earthwork analysis is limited to the correction of any inaccurate information. To determine actual quantities and costs associated with required earthwork, the client must solicit actual construction bids from qualified contractors and must require such contractors to determine existing topographic conditions, subgrade conditions, construction plans and procedures.

12.0 TOPOGRAPHIC SURVEY: If the Scope of Services includes aerial survey or topographic survey, then the following provisions shall apply:

12.1 HEC shall retain an independent subconsultant to perform aerial survey services. The subconsultant shall provide the aerial survey in conformance with generally accepted standards for such services. HEC makes no warranty, expressed or implied, as to the accuracy of such aerial survey. HEC's sole responsibility and liability with regard to the accuracy or completeness of the aerial survey is limited to the correction of any inaccurate information, and this shall be the Client's sole remedy related to the adequacy or accuracy of the aerial survey and any information derived from that data.

12.2 If the location of subsurface information (i.e., underground utilities, storage tanks, structures, etc.) is to be provided by HEC, the topographic survey shall be limited to the extent of the information provided by the Client or others. HEC shall not be responsible for any unknown conditions not identified in the information provided to HEC or any unknown condition beyond the reasonable scope of the information obtained as a result of any testing, test pit excavations, boring, or samples taken by HEC.

13.0 GEOTECHNICAL ENGINEERING SERVICES: If the Scope of Services includes geotechnical engineering services, then the following provisions shall apply:

13.1 SITE ACCESS: It is assumed that there will be free and uninterrupted access to and from the site in question for personnel and motor vehicle equipment during the course of work. If work is delayed or interrupted because of access difficulties, an additional $200/hour rate will be charged for time lost. (Where clearing trees and other debris is required, time will be charged at the above stated rate.)

13.2 SITE TRUCK ACCESS: It is understood that the site is truck accessible, that the right-of-entry exists, and that all available underground utility information will be provided to HEC prior to our mobilization. HEC's drilling subcontractors will backfill each boring to the original grade before demobilizing from the site. Should settlement occur, it will be the responsibility of the client to maintain each boring at grade, after the drilling subcontractor demobilizes from the site.

13.3 OBSTRUCTIONS: When a test boring cannot be advanced to full depth due to the presence of any kind of obstruction, the test hole will be terminated and relocated. Abandoned holes will be invoiced at the rate established in the estimated cost. Delay time resulting from obstructions will be invoiced at $150/hour.

13.4 SITE INFORMATION: It shall be the responsibility of the client to supply all available information regarding underground utilities to HEC. If this is an agreement for HEC to provide underground borings, HEC hereby represents that the borings taken provide information regarding only a very small portion of the project area. HEC, on the basis of the information provided by these borings, will use its professional expertise to endeavor to project the nature and extent of subsurface conditions but the accuracy of such projections is limited by the number of borings taken. Owner has been advised that additional borings may be done at an additional cost but has opted to engage HEC to perform the number of borings agreed upon with the understanding of the limitations on the conclusions that can be reached based upon that number of borings.

13.5 DISPOSAL OF SAMPLES: All samples, contaminated or otherwise ("Samples"), collected by HEC while performing services under this agreement are the property and responsibility of the Client. HEC may dispose of Samples in its possession after ninety (90) calendar days unless otherwise required by law or other arrangements are mutually agreed to in writing by the parties. At all times, any and all rights, title and responsibility for Samples shall remain with the CLIENT and under no circumstances shall these rights, title and responsibility be transferred to HEC.

13.6 EXISTING CONDITIONS AND SUBSURFACE RISKS: Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions. Even a comprehensive sampling and testing program implemented in accordance with a professional Standard of Care may fail to detect certain conditions. The environmental, geologic, geotechnical, geochemical, and hydrogeologic conditions that HEC interprets to exist between sampling points may differ from those that actually exist. Client recognizes that actual conditions may vary from those encountered at the locations where borings, sampling, surveys, observations or explorations are made by HEC and that the data, interpretation, and recommendations of HEC are based solely on the information available to it. Furthermore, CLIENT recognizes that passage of time, natural occurrences, and/or direct or indirect human intervention at or near the site may substantially alter discovered conditions. HEC shall not be responsible for interpretations by others of the information it develops or provides to the Client.

HEC will take reasonable precautions to avoid damage or injury to subterranean structures or utilities in the performance of its services. CLIENT agrees to defend, indemnify, and hold HEC harmless for any

damage to subterranean structures or utilities and for any impact this damage may cause where the subterranean structures and utilities are not called to HEC's attention or are not correctly shown on the plans furnished.

14.0 HAZARDOUS MATERIALS: It is agreed by the parties, unless otherwise expressly stated in the proposal scope of services, that HEC does not assume responsibility for identification, disposal, treatment or transportation of asbestos, asbestos containing materials, hazardous or toxic materials at the project site, or should it become known in any way that such materials may be present at the project site or any adjacent areas that may affect the performance of HEC's services, HEC may, at its sole option and without liability for consequential or any other damages, suspend performance of services on the project until the Client takes steps to identify, abate and/or remove the asbestos or hazardous or toxic materials, and to warrant that the project site is in full compliance with applicable laws. HEC's responsibility is limited to giving prompt notice to the CLIENT if HEC suspects it has encountered a potential hazardous material.

If the Scope of Services for this Agreement includes services related to hazardous materials, then the following provision shall apply:

In consideration of the substantial risks to HEC posed by the presence or suspected presence of asbestos or hazardous or toxic materials on or about the project site, the Client agrees, to the fullest extent permitted by law, to indemnify and hold harmless HEC, its officers, directors, employees, agents and independent consultants and any of them from all claims and losses, including reasonable attorney's fees and defense costs, arising out of, or in any way connected with, the performance or nonperformance of the obligations under this Agreement unless and until there has been an adjudication by a court or forum of competent jurisdiction that the claims at issue are a direct result of the sole negligence of HEC.

15.0 CONSTRUCTION PHASE SERVICES: It is the responsibility of the CLIENT to provide full time inspection of construction activities unless otherwise agreed to in writing between the CLIENT and HEC, or included in the Scope of Service. The CLIENT may elect to justify savings of inspection costs by assuming the added risk.

If the Scope of Services for this Agreement includes construction observation services, then the following provisions shall apply:

15.1 During the project construction phase, HEC shall consult with and advise Client and act as Client's representative as provided in the Scope of Services. The extent and limitations of the duties, responsibilities and authority of HEC as outlined in the Scope of Services shall not be modified, except as HEC and Client may otherwise agree in writing.

15.2 HEC's services during the construction phase are intended to provide Client a greater degree of confidence that the completed work of Contractor will conform in general to the approved plans and related documents. HEC shall not, during visits to the project site or as a result of observation of Contractor's work in progress, supervise, direct or have control over Contractor's work nor shall HEC have authority over or responsibility for the means, methods, techniques, sequences or procedures of construction selected by Contractor, for safety precautions and programs incident to the work of Contractor or for any failure of Contractor to comply with laws, rules, regulations, ordinances, codes or orders applicable to Contractor's furnishing and performing the work. Accordingly, HEC neither guarantees the performance of any Contractor nor assumes responsibility for any Contractor's failure to furnish and perform its work in accordance with the Contract Documents.

If the Scope of Services for this Agreement includes design services but does not include construction phase services, then the following provisions shall apply:

15.3 It is understood and agreed that HEC's services under this Agreement do not include project observation or review of the Contractor's performance or any other construction phase services, and that the Client will provide such services. The Client assumes all responsibility for interpretation of the Contract Documents and for construction observation and supervision and waives any claims against HEC that may be in any way connected thereto.

15.4 In addition, the Client agrees, to the fullest extent permitted by law, to indemnify and hold HEC harmless from any loss, claim or cost, including reasonable attorney's fees and cost of defense, arising or resulting from the performance of such services by other persons or entities and from any and all claims arising from modifications, clarifications, interpretations, adjustments or changes made to the design plans, reports, or any other documents produced by HEC.

15.5 If the Client requests in writing that HEC provide any specific construction phase services and if HEC agrees in writing to provide such services, HEC shall be compensated in accordance with the written Agreement between the Client and HEC.

16.0 OWNERSHIP AND REUSE OF DOCUMENTS: All reports, plans, specifications, computer files, field data, notes and other documents and instruments prepared by HEC pursuant to this Agreement ("Documents") are and remain the property of HEC as instruments of service with respect to this Agreement. The Documents are not intended or represented to be suitable for reuse by the Client or others on extensions of this project or on any other project. Any reuse of the Documents without the written approval by HEC will be at the Client's sole risk and without liability or legal exposure to HEC. The Client shall indemnify, defend and hold harmless HEC from and against any claims, damages or losses including attorney's fees and costs, arising out of or resulting there from.

HEC grants to the Client and only the Client a non exclusive, non assignable and non transferable license to reproduce, distribute and display the Documents, to the extent necessary for the Client to undertake construction and/or perform other acts that are all collectively required to construct the project. HEC shall retain all common law, statutory and other reserved rights to the Documents, including the copyright thereto. Both the Client and HEC agree that none of the services or Documents provided by HEC are "work made for hire" as defined in the Copyright Act.

17.0 RIGHT TO REFERENCE PROJECT: Client agrees that HEC has the authority to use its name as a client and a general description of the Project as a reference for other prospective clients.

18.0 DISPUTE RESOLUTION: HEC and Client agree that any disputes arising under this Agreement and the performance thereof shall be subject to non-binding mediation as a prerequisite to further legal proceedings.

19.0 GOVERNING LAW: The laws of the Commonwealth of Pennsylvania will govern the validity of this Agreement, its interpretation and performance. Any litigation arising in any way from this Agreement shall be brought in the State or Federal Courts of Pennsylvania.

20.0 SURVIVAL: All express representations, indemnifications or limitations of liability made in or given in this Agreement will survive the completion of all services of HEC under this Agreement or the termination of this Agreement for any reason.

21.0 ENTIRE AGREEMENT: This Agreement (consisting of (1) Proposal/ Scope of Services and (2) General Conditions) comprises the final and complete agreement between the Client and HEC. It supersedes all prior or contemporaneous communications, representations, or Agreements, whether oral or written, relating to the subject matter of this Agreement. Execution of this Agreement signifies that each party has read the document thoroughly, has had the opportunity to have questions explained by independent counsel and is satisfied with the terms and conditions contained herein. Amendments to this Agreement shall not be binding unless made in writing and signed by both the Client and HEC.

To the extent Client provides its own agreement and that agreement is silent with respect to any term or condition expressed herein, these conditions shall prevail and shall be binding upon the parties.

RESOLUTION NO. 2018-10
A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AWARDING THE PROFESSIONAL SERVICES CONTRACT FOR THE ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION DRAWINGS FOR THE RAWLES RUN SANITARY SEWER REPLACEMENT & REPAIR AND VALLEY RUN STREAMBANK RESTORATION CONTRACT, TO GANNETT FLEMING, INCORPORATED

WHEREAS, in two separate locations, the sanitary sewer trunk line at Valley Run is exposed in the creek, and the streambanks severely eroded

WHERAS, it is imperative to replace portions of the trunk line and restore the streambank to affect a permanent repair, for these two projects

WHEREAS, Gannett Fleming, Incorporated has submitted a cost proposal to perform the necessary survey, design, engineering, and permitting in the amount of $111,404.60

NOW, THEREFORE, be it ***RESOLVED*** by the Board of Commissioners of Radnor Township does hereby award the Professional Services Contract for the Engineering, Design, Permitting, and Construction Drawings for the Rawles Run Sanitary Sewer Replacement & Repair and Valley Run Streambank Restoration Contract to Gannett Fleming, Incorporated in the amount of $111,404.60

SO RESOLVED this 16th day of January, A.D., 2018

RADNOR TOWNSHIP

By: _____
Name: Lisa Borowski
Title: President

ATTEST: _____
Robert A. Zienkowski
Manager/Secretary

Radnor Township

PROPOSED LEGISLATION

DATE: January 16, 2018

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer

CC: Robert A. Zienkowski, Township Manager
William M. White, Assistant Township Manager/Finance Director
Roger Phillips, PE, Gannett Fleming, Incorporated

LEGISLATION: **Resolution #2018-10**: Award of the Design, Permitting, Engineering, and Bidding Documents Contract for the Rawles Run Sanitary Sewer Replacement & Repair and Valley Run Streambank Restoration Contract, to Gannett Fleming, Incorporated

LEGISLATIVE HISTORY: This item has not been before the Board of Commissioners previously.

PURPOSE AND EXPLANATION: The Township was alerted to an exposed sanitary sewer stream crossing by a crew of RHM, while they were performing maintenance on our lines (as is specified in our contract with RHM). Upon inspection, it was noted that the concrete encasement was now acting as a dam (similar to the Skunk Hollow project), and the stream has eroded the stream bank severely. Upon further inspection, within 100 feet of the aforementioned crossing, another, similar, exposed concrete sewer encasement was discovered. The Gannett Fleming cost proposal (please see attached) provides for survey, the design of the repair, the DEP permitting, stream bank restoration design, and bidding documents.

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners authorization, a requisition would be entered into our financial system. Upon receipt of a purchase order number, Gannett Fleming would begin work immediately. It is anticipated that the permitting process could take from three to six months (mainly due to the DEP permit process).

FISCAL IMPACT: This project will be funded from the "02" Sewer Fund. The cost proposal for the survey, the design of the repair, the DEP permitting, stream bank restoration design, and bidding documents for the two projects is $111,404.60.

Recommendation: I respectfully request that the Board of Commissioners Award the Professional Services Contract for the Engineering, Design, Permitting, and Construction Drawings for the Rawles Run Sanitary Sewer Replacement & Repair and Valley Run Streambank Restoration Contract, to Gannett Fleming, Incorporated in the amount of $111,404.60

Enclosure: Meliora Design, Incorporated Cost Proposal

Gannett Fleming

Excellence Delivered ***As Promised***

October 25, 2017

Stephen Norcini, P.E.
Township Engineer
Radnor Township
301 Iven Avenue
Radnor, PA 19087

Dear Steve:

RE: Rawles Run Sanitary Sewer Project

Gannett Fleming, Inc. is pleased to submit the following scope of work and cost proposal for the sanitary sewer encasement repairs / streambank stabilization project near Rawles Run Lane.

I. PROJECT UNDERSTANDING

There are two portions of sanitary sewer encasement located within Meadowbrook Run and Finns Run which have become exposed as a result of the streams. The first section of sanitary sewer is from MH 431-1 to MH 309 (approximately 355 LF) and the second section of sanitary sewer is from MH 429 to MH 428 (approximately 150 LF). Radnor Township has requested survey, design documents and permitting associated with repairing the exposed sanitary sewer and streambank stabilization.

Gannett Fleming will complete the design documents and permitting associated with this project. Gannett Fleming has selected Hunt Engineering to perform the survey work on this project. The proposal from the sub-consultant is attached at the end of this document.

II. SCOPE OF WORK

Gannett Fleming, Inc. and their sub-consultants will perform the following services:

1. Survey of the project site. See attached proposal from Hunt Engineering for assumptions.
2. Design Documents
    a. Preparation of plans and profile for the proposed sanitary sewer encasement repair and streambank stabilization. It is our understanding that rock armoring is the preferred stabilization alternative. The limits of the stabilization is assumed to be in the immediate location (approximately 100 feet) of the sanitary sewer encasement. This approach will be verified

once survey information has been completed. In the event that the limits of stabilization are increased, we will seek advance authorization for any additional services prior to proceeding with the work.

b. Preparation of cost estimate for the work.

3. Preparation of specifications and bidding documents for the proposed work.
   a. Attendance of Pre-bid meeting
   b. Review of RFIs and contractor Submittals
4. Preparation of cost estimate for the proposed work.
5. Preparation of Permits
   a. Gannett Fleming assumes that a General Permit #11 (GP-11) and General Permit #3 (GP-3) for streambank stabilization will be required for this project. A single permit application package will be prepared for the project and will include the application forms required for all GP's, plus the information necessary for the combined GP-11/GP-3 including, an E&SC Plan, Project Inventory Worksheet and the Bridge and/or Culvert Replacement Projects or Projects That Change the Waterway Opening Worksheet. We assume that a paper copy of the GP-11/GP-3 registration package will be prepared and submitted for processing by PADEP. Gannett Fleming will address one rounds of comments from PADEP. We assume that PADEP will issue a PASPGP-5 Permit on behalf of USACE for the project. This approach will be verified with the agencies at a preapplication meeting.
   b. We assume that there are no cultural or archaeological resources present. We assume that there will be no work required to obtained agency clearance for involvement with state or federal threatened or endangered species. A wetland presence/absence investigation will be conducted to verify that wetlands are not present onsite. If wetlands are present then a wetland delineation can be conducted as an amendment to the scope of work. At this time we assume that, if wetlands are present, the impacts will not exceed 0.05 acres.

Radnor Township will provide the following to assist Gannett Fleming, Inc. in the prosecution of the work:

- Provide access to the site and provide any plans, documents, and reports associated the project.
- The Township will supply Gannett Fleming with typical "Front End" contractor documents.

II. COST

Based on the above scope of work, we will perform the services for the following estimated costs. Costs are estimates only due to the nature of the work. **Total billings will not be exceeded without written notification:**

Bid Package & Plan Preparation	
Plans, Specifications, and Cost Estimate	**$35,920.00**
Survey	
Survey	**$61,980.00**
Permitting	
GP-3, GP-11	**$8,644.60**
Bid Services	
RFIs and Pre-bid Meeting	**$4,860.00**
TOTAL COSTS	**$111,404.60**

We are prepared to begin this assignment upon your authorization to proceed.

We appreciate this opportunity to offer our services. If you have any questions concerning our proposal please contact me.

Very truly yours,

GANNETT FLEMING, INC.

Roger A. Phillips, P.E.
Senior Project Manager

HUNT ENGINEERING COMPANY

October 16, 2017

Mr. Matthew J. Prusko
Project Designer/Specialist
Gannett Fleming, Inc.
1010 Adams Avenue
Audubon, PA 19403-2402

RE: Rawles Run Lane Sewer Encasement
S. Roberts Road over Valley Run, Radnor, PA
Land Surveying Services

Dear Mr. Prusko:

Hunt Engineering Company is pleased to submit this proposal to provide professional land surveying services for the Rawles Run Lane sewer encasement /stabilization project.

Project Understanding

The project involves encasement repairs/replacement of the Rawles Run Lane Sewer line and streambank stabilization of portions of Meadowbrook Run and Finns Run. Gannet Fleming has requested property boundary and topographic survey information be obtained within the Area of Interest identified on Exhibit A.

The site is identified on FEMA flood insurance rate map number 42045C0039F, last revised 11/18/2009 as being within Zone A. Zone A is identified as having an undetermined base flood elevation.

Figure 1: Photo of exposed sanitary sewer line

Scope of Services

- Attend a project kick-off meeting at the site with Gannet Fleming to review the survey scope and site conditions.
- Prepare and mail Notice of Intent to Enter letters to the owners of tax parcels 062, 064, 065, 066, 072, 073, 075, 077, 078, 081 and 081-001.
- Place a design phase PA One-Call to request utility plans of the area to be surveyed.
- Conduct research to obtain the following information:
  - Delaware County Tax map 36-40
  - Owner names and copies of deeds for tax parcels 062, 064, 065, 066, 072, 073, 075, 077, 078, 081 and 081-001

P.O. Box 537 | 22 East King Street | Malvern | PA | 19355 | p: 610-644-4600 | f: 610-644-2466 | www.huntengineering.com

- Right-of-way information for Rawles Run and Sand Castle Drive.
- FEMA Flood Insurance Rate Map 42045C0039F

- Establish survey control points that will be referenced horizontally to the PA State Plane Coordinate System (NAD83) and vertically to North American Vertical Datum (NAVD 1988).
- Conduct topographic surveys within the Area of Interest depicted on Exhibit A to obtain the location and elevation of the edge of pavement, top and bottom of curb, depressed curb locations, driveways, mail boxes, utility poles, fences, walls, lights, bridge railing, pavement striping, signs, tree masses, individual trees greater than 6" caliper, and surface utility features (such as inlets, manholes, junction boxes, valves, overhead power lines), utility mark-outs resulting from the PA One-Call and other significant existing features.
- Obtain the locations of wetland and watercourse flags within the Area of Interest, as set by others prior to the field survey.
- Obtain the location and elevation of exterior building corners closest to the stream on tax parcels 062, 064, 065, 066, 072, 073, 075, 077, 078, 081 and 081-001.
- Perform conventional field surveys to search for and locate existing right-of-way and property boundary evidence such as concrete monuments, iron pins, and use lines (such as fences).
- Obtain the rim and invert elevation of existing sanitary sewer manholes 432, 431, 430, 429, 428, 427, 430-1, 431-1-1, and 431-1 located within the Area of Interest.
- Perform stream surveys of Meadowbrook Run and Finns Run within the Area of Interest to obtain overbank topography and stream cross sections to locate and obtain the elevation of the top of bank, grade breaks, water's edge, and thalweg. The stream cross sections will be surveyed at approximately 25-foot intervals and extend approximately 10 feet beyond the top of bank on either side of the stream. Locate trees of 6" caliper or greater within this area.
- Prepare an Existing Conditions Plan in AutoCAD 2014 (.DWG) format depicting the information obtained from the tasks above and with contours plotted at one-foot intervals. Underground utilities will be plotted from PA One-Call information provided by the responding utility service providers and field observations and measurements of visible utilities. The property boundaries will be plotted from deeds of record, plans made available to Hunt Engineering Company and boundary evidence obtained from the field surveys. The approximate 100-year floodplain will be sketched onto the Existing Conditions Plan from FEMA map 42045C0039F last revised November 18, 2009.
- Provide Gannett Fleming with the following:
  - Copies of the utility plans received through the PA One-Call system
  - Copies of the deeds for Tax Parcels 062, 064, 065, 066, 072, 073, 075, 077, 078, 081 and 081-001
  - A copy of the Existing Conditions Plan in portable digital file (.PDF) format
  - A copy of the Existing Conditions Plan in AutoCAD 2014 (.DWG) format
  - A copy of the DTM surface created to generate the contours shown on the Existing Conditions Plan

Assumptions

The foregoing scope is based on the following assumptions:

1. Acceptance of this proposal constitutes agreement with Hunt Engineering Company's General Terms and Conditions of Service as attached.
2. Gannett Fleming will:
   - Provide any available plans subdivision plans for Sand Castle Drive and Rawles Run Road
   - Provide available plans of the sewer system within the Area of Interest
   - Provide Radnor Township letterhead upon which the NOITE letters will be prepared and obtain the appropriate signature of a representative from Radnor Township

- Provide copies of field sketches from the wetland delineation efforts
- Arrange to have the sewer manholes opened by the sewer authority during or just prior to the survey

3. The following are not included in this proposal:
   - ALTA, construction and as-built surveys
   - Boundary resolution
   - Wetland delineations
   - Remobilization to locate wetland flags
   - Tree identification
   - Setting property corner or right-of-way monumentation
   - Utility profiles
   - Preparation of drawn roadway and stream cross sections
   - Preparation of right-of-way plans
   - Preparation of wetlands delineation plans, wetlands (if applicable) will be plotted on the Existing Conditions Plan
   - Preparation of plans or legal descriptions for the purposes of right-of-way vacation, subdivision, or establishment of easements
   - Subsurface explorations to expose existing underground utilities and/or identification through geo-physical means such as ground penetrating radar
   - Utility exploration including confined space-entry, vacuum truck excavation or open-pit excavation
   - Invert elevations of storm water, sanitary sewer and other utility pipes or structures that are inaccessible

   In the event that the level of effort changes, we will seek advance authorization for any additional services prior to proceeding with work.
4. Utility plans received through the One-Call system typically show only utilities along public roads and not on private and/or municipal properties. Therefore, we expect to receive only limited information through the PA One-Call system for areas outside the road right-of-way.
5. Underground utility lines will be plotted to the best of our ability from field observations/ measurements and plans provided by the County and the utility companies responding through the PA One-Call Process. As a result, some underground utility locations may be approximate and other utilities may exist that are not shown on plans made available to us.
6. This proposal assumes the wetland delineation will be performed prior to the start of field survey. Re-mobilization to locate wetland delineations may incur additional charges not included in this proposal.

Cost of Services

The fees for the services described above are as follows:

Classification	Hours	Hourly Rate	Subtotal
Project Manager	6	$175.00	$1,050.00
Project Surveyor	20	$160.00	$3,200.00
Registered Surveyor	60	$130.00	$7,800.00
2-Person Survey Crew	270	$145.00	$39,150.00
CADD Supervisor	24	$100.00	$2,400.00
Survey Technician	84	$80.00	$6,720.00
Total			**$60,320.00**

Additional services will be provided by Hunt Engineering Company on a time and expenses basis will be billed monthly in accordance with the following rates:

Classification	Hourly Rate
Principal	$175
Project Manager	$165
Project Engineer	$145
Sr. Engineer	$130
Engineer	$120
Landscape Architect	$105
Designer	$90
Project Surveyor	$160
Registered Surveyor	$130
Survey Crew	$145
Technician	$80
CADD Supervisor	$100
CADD	$60

Mileage, postage and printing charges will be billed on a per unit price as follows:

Mileage Rate:	$0.535 / mile
Overnight Postage:	$13/standard size package
Plan Sheets Reproduction/ Printing:	$0.25 / Square Foot

We appreciate the opportunity to provide this proposal to you. We trust that this proposal is in keeping with your expectations; if otherwise, please let us know. If you have any questions, please do not hesitate to call.

Sincerely,
HUNT ENGINEERING COMPANY

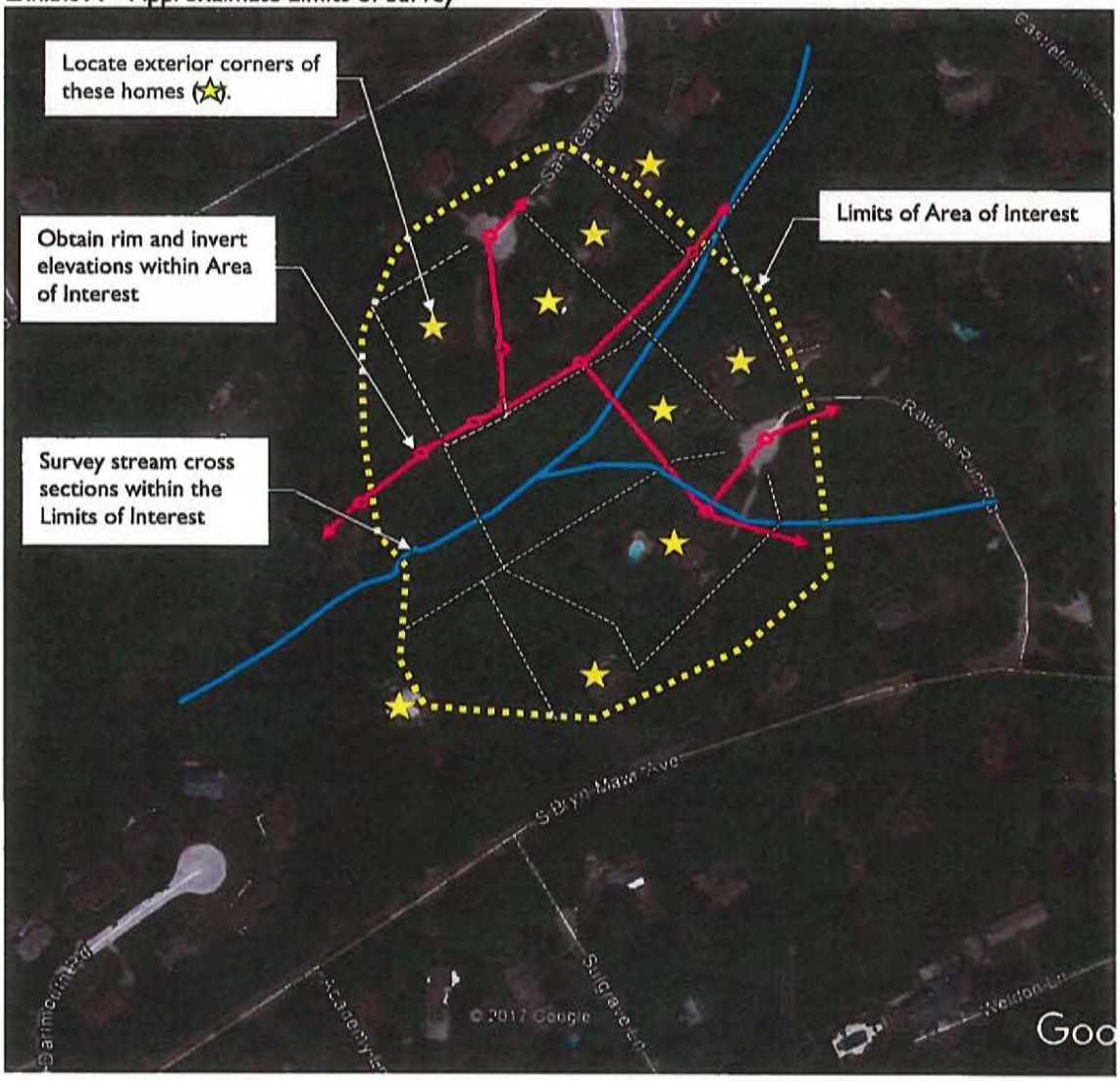
Susan D. Menno, RLA
Principal

Please complete the following and return to Hunt Engineering Company as Authorization to Proceed with the scope of services outlined herein in accordance with Hunt Engineering Company's General Terms and Conditions of Service.

Accepted by: _____ Company: _____
(Signature of Authorized Individual)

_____ Date: _____
(Printed Name and Title)

Exhibit A – Approxaimate Limits of Survey



Hunt Engineering Company
General Terms and Conditions of Service

Client:	Gannett Fleming
Project Name:	Rawles Run Lane Sewer Encasement
Project Location:	Radnor Township, Delaware County, PA
Date:	October 16, 2017

The terms and conditions which shall govern the performance of services pursuant to this agreement are set forth below.

1.0 SCOPE OF SERVICES AND ADDITIONAL SERVICES: Hunt Engineering Company (HEC) will be covered by this Agreement regardless of commencement date. Unless modified in writing by the parties, the duties of HEC shall not be construed to exceed those Services specifically set forth in the proposal. However, if requested by the CLIENT and agreed to by HEC, HEC will perform additional services ("additional Services"), and such Additional Services shall be governed by these provisions. Unless otherwise agreed to in writing, the CLIENT shall pay HEC for the performance of any Additional Services based upon HEC's then-current hourly rates.

2.0 STANDARD OF CARE: The standard of care for services performed or furnished by HEC under this Agreement will be the level of care and skill ordinarily exercised by members of the same profession practicing under similar conditions at the same time and in the same locality based on facts and information available at the time services are provided.

3.0 CLIENT RESPONSIBILITIES: In addition to other responsibilities described herein, The CLIENT shall (i) provide all information criteria as to the CLIENT's requirements, objectives, and expectations for the project, including numerical criteria that are to be met and all standards of development, design and construction; (ii) provide to HEC all previous studies, plans, or other documents pertaining to the project and all new data reasonably necessary in HEC's opinion, such as site survey and engineering data, environmental impact assessments or statements, zoning or other land-use regulations, upon all of which HEC may rely; (iii) furnish approvals and permits from governmental authorities having jurisdiction over the project and approvals and consents from other parties as may be necessary for completion of HEC's services; (iv) give prompt written notice to HEC whenever the CLIENT becomes aware of any development that affects the scope and timing of HEC's services or any defect or noncompliance in any aspect of the project; (v) provide all necessary escrow, permit, application and agency review fees, payable to the respective agency/agencies for the review, entitlement and construction of the subject project and (vi) bear all costs incident to the responsibilities of CLIENT.

3.1 RELIABILITY OF INFORMATION: HEC shall have the right to rely on the accuracy and completeness of all information furnished to it by the Client.

3.2 RIGHTS OF ENTRY, DAMAGES TO PROPERTY: Client will provide for the right of entry for HEC, its subcontractors, and all necessary equipment in order to complete the Services under the Agreement. While HEC will take all reasonable precautions to minimize any damage to the property, it is understood by Client that in the normal course of work some limited incidental damage such as localized disturbance of soil and vegetation may occur, the correction of which is not part of the Agreement.

4.0 COMPENSATION: HEC will be compensated according to the fees stipulated in the proposal. HEC shall submit monthly invoices to the CLIENT and a final bill upon completion of Services. Payment of undisputed invoice amounts is due upon receipt of invoice by CLIENT. Any invoices past-due thirty (30) days from the date of the invoice will be subject to interest.

4.1 REIMBURSABLE EXPENSES: Client shall pay HEC for reimbursable expenses, including printing and reproduction, courier and express delivery service, bulk/special mailings, facsimile transmissions, specialized equipment and laboratory charges, their costs of acquiring materials specifically for CLIENT and related charges. The reimbursable expenses will be added to each monthly invoice. HEC is not responsible for the posting or payment of escrow, permit, application and agency review fees. See 'Client Responsibilities'.

4.2 DISPUTE OF INVOICE: CLIENT shall notify HEC within two weeks of receipt of invoice of any dispute with the invoice. CLIENT and HEC will promptly resolve any disputed items.

4.3 INTEREST: If any invoice is not paid in full, the CLIENT shall pay as interest an additional charge of one-and-one-half percent (1.5%), or the maximum allowable by law, whichever is lower, per month of the Past Due amount. Payment after that shall first be applied to accrued interest and then to unpaid principal.

4.4 SUSPENSION OF SERVICE: If the CLIENT fails to make payment when due or otherwise is in breach of this Agreement, or in breach of any other agreement between client and HEC, then HEC may suspend performance of services at any time.

In the event of a suspension of services or termination of the Agreement by HEC in accordance with Section 5.0 of these General Terms and Conditions, HEC shall have no liability for any delay or damage of any kind actually or allegedly caused by such suspension of services or termination. The Client shall have no right of setoff against the amounts due to HEC and no deductions shall be made from HEC's compensation on account of any actual or alleged claim, action, breach, error, omission, tort, fault, wrong, liability, penalty or damage actually or allegedly caused by, arising from or relating to HEC, HEC's services on the Project, or this Agreement.

If HEC files a claim against the Client arising out of the Client's failure to make payments in accordance with this Agreement and Client subsequently asserts any claim or claims against HEC relating to allegations of professional negligence in performance of HEC'S services under this Agreement, HEC shall be entitled to reimbursement of any costs incurred by HEC in the defense of the professional negligence claim(s), including any expenses incurred as part of HEC'S professional liability insurance deductible, to the extent HEC is successful in its compensation claim or negligence defense.

5.0 TERMINATION: Except as otherwise provided in this Agreement, this Agreement may be terminated by either party upon not less than fourteen (14) calendar days' written notice should the other party fail substantially to perform in accordance with the terms and conditions of this Agreement through no fault of the party initiating the termination. If the defaulting party fails to cure its default within the fourteen (14) calendar day notice period or fails to commence action to cure its default if the cure cannot reasonably be completed within the fourteen (14) days, the nondefaulting party may terminate the Agreement. Failure of the Client to make payments to HEC in accordance with this Agreement shall be considered substantial non-performance and grounds for termination or suspension of services at HEC's option after such fourteen (14) day notice period or anytime thereafter. In the event of termination, HEC shall be compensated for all services performed and reimbursable expenses incurred prior to such termination and all termination expenses.

6.0 INDEMNIFICATION: The Client agrees to indemnify and hold HEC harmless from any damage, liability or cost (including reasonable attorneys' fees and costs of defense) to the extent caused by the Client's negligent acts, errors or omissions and those of his or her contractors, subcontractors or consultants or anyone for whom the Client is legally liable. HEC is not obligated to indemnify the Client for the Client's own negligence.

7.0 LIMITATION OF LIABILITY: Upon the review and advice of their respective attorneys or authorized agents, Client and HEC recognize and agree that HEC's liability for any and all claims or actions, regardless of how arising, shall be limited to the total sum of $50,000.00, or HEC's total fee for services rendered on this project, whichever is less. Client hereby releases HEC from any liability above such amount. Such claims and causes include, but are not limited to

negligence, professional errors or omissions, strict liability, breach of contract or breach of warranty.

In no event shall HEC be liable for any incidental, indirect or consequential damages, including commercial loss, liquidated damages, or lost profits resulting from any Service furnished under this agreement.

8.0 INSURANCE: HEC maintains general and professional liability insurance, and workman's compensation insurance. Certificates will be issued to the Client upon written request.

9.0 FORCE MAJEURE: HEC shall not be responsible or liable for any delays in performance or failure of performance related to any force majeure event, including but not limited to fire, flood, explosion, the elements, or other catastrophe, acts of God, war, riot, civil disturbances, terrorist act, strike, lock-out, refusal of employees to work, labor disputes, inability to obtain materials or services, or delays caused by the Client, its agents, contractors, subcontractors, consultants, subconsultants or employees, or any governmental regulation or agency, or for any other reason beyond the control of HEC.

10.0 OPINION OF COST: Consistent with the Standard of Care in Section 2.0 of this Agreement, any opinions rendered by HEC as to costs, including, but not limited to, opinions as to the costs of construction, remediation and materials, shall be made on the basis of its experience and represent its judgment as an experienced and qualified professional familiar with the industry. HEC cannot and does not guarantee that proposals, bids, or actual costs will not vary from its opinions of cost. HEC's services required to bring costs within any limitation established by the CLIENT will be paid for as Additional Services.

11.0 EARTHWORK ANALYSIS: If the Scope of Services includes earthwork analysis, then the following provisions shall apply:

11.1 In reviewing HEC's earthwork analysis, calculations, reports or opinions, the client understands that HEC's data is based on the topographic mapping used as a Base Map for plan preparation and that such topographic mapping has certain standard tolerances and accuracy limits. The client further understands that due to earthwork differences that result from topographic map accuracy limitations, construction changes, topsoil depth, replacement of unsuitable soils, weather conditions, construction methods, soil conditions, earthwork calculation methods, soil volume calculation methods and other factors, some of which are unique to each contractor and construction site, it is not possible to definitively predict quantities that will ultimately be determined to be associated with a particular project. Earthwork data provided by HEC is provided to assist the client in understanding the general earthwork requirements. Since some degree of uncertainty may still exist, HEC's sole responsibility and liability with regard to the accuracy or completeness of the earthwork analysis is limited to the correction of any inaccurate information. To determine actual quantities and costs associated with required earthwork, the client must solicit actual construction bids from qualified contractors and must require such contractors to determine existing topographic conditions, subgrade conditions, construction plans and procedures.

12.0 TOPOGRAPHIC SURVEY: If the Scope of Services includes aerial survey or topographic survey, then the following provisions shall apply:

12.1 HEC shall retain an independent subconsultant to perform aerial survey services. The subconsultant shall provide the aerial survey in conformance with generally accepted standards for such services. HEC makes no warranty, expressed or implied, as to the accuracy of such aerial survey. HEC's sole responsibility and liability with regard to the accuracy or completeness of the aerial survey is limited to the correction of any inaccurate information, and this shall be the Client's sole remedy related to the adequacy or accuracy of the aerial survey and any information derived from that data.

12.2 If the location of subsurface information (i.e., underground utilities, storage tanks, structures, etc.) is to be provided by HEC, the topographic survey shall be limited to the extent of the information provided by the Client or others. HEC shall not be responsible for any unknown conditions not identified in the information provided to HEC or any unknown condition beyond the reasonable scope of the information obtained as a result of any testing, test pit excavations, boring, or samples taken by HEC.

13.0 GEOTECHNICAL ENGINEERING SERVICES: If the Scope of Services includes geotechnical engineering services, then the following provisions shall apply:

13.1 SITE ACCESS: It is assumed that there will be free and uninterrupted access to and from the site in question for personnel and motor vehicle equipment during the course of work. If work is delayed or interrupted because of access difficulties, an additional $200/hour rate will be charged for time lost. (Where clearing trees and other debris is required, time will be charged at the above stated rate.)

13.2 SITE TRUCK ACCESS: It is understood that the site is truck accessible, that the right-of-entry exists, and that all available underground utility information will be provided to HEC prior to our mobilization. HEC's drilling subcontractors will backfill each boring to the original grade before demobilizing from the site. Should settlement occur, it will be the responsibility of the client to maintain each boring at grade, after the drilling subcontractor demobilizes from the site.

13.3 OBSTRUCTIONS: When a test boring cannot be advanced to full depth due to the presence of any kind of obstruction, the test hole will be terminated and relocated. Abandoned holes will be invoiced at the rate established in the estimated cost. Delay time resulting from obstructions will be invoiced at $150/hour.

13.4 SITE INFORMATION: It shall be the responsibility of the client to supply all available information regarding underground utilities to HEC. If this is an agreement for HEC to provide underground borings, HEC hereby represents that the borings taken provide information regarding only a very small portion of the project area. HEC, on the basis of the information provided by these borings, will use its professional expertise to endeavor to project the nature and extent of subsurface conditions but the accuracy of such projections is limited by the number of borings taken. Owner has been advised that additional borings may be done at an additional cost but has opted to engage HEC to perform the number of borings agreed upon with the understanding of the limitations on the conclusions that can be reached based upon that number of borings.

13.5 DISPOSAL OF SAMPLES: All samples, contaminated or otherwise ("Samples"), collected by HEC while performing services under this agreement are the property and responsibility of the Client. HEC may dispose of Samples in its possession after ninety (90) calendar days unless otherwise required by law or other arrangements are mutually agreed to in writing by the parties. At all times, any and all rights, title and responsibility for Samples shall remain with the CLIENT and under no circumstances shall these rights, title and responsibility be transferred to HEC.

13.6 EXISTING CONDITIONS AND SUBSURFACE RISKS: Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions. Even a comprehensive sampling and testing program implemented in accordance with a professional Standard of Care may fail to detect certain conditions. The environmental, geologic, geotechnical, geochemical, and hydrogeologic conditions that HEC interprets to exist between sampling points may differ from those that actually exist. Client recognizes that actual conditions may vary from those encountered at the locations where borings, sampling, surveys, observations or explorations are made by HEC and that the data, interpretation, and recommendations of HEC are based solely on the information available to it. Furthermore, CLIENT recognizes that passage of time, natural occurrences, and/or direct or indirect human intervention at or near the site may substantially alter discovered conditions. HEC shall not be responsible for interpretations by others of the information it develops or provides to the Client.

HEC will take reasonable precautions to avoid damage or injury to subterranean structures or utilities in the performance of its services. CLIENT agrees to defend, indemnify, and hold HEC harmless for any

damage to subterranean structures or utilities and for any impact this damage may cause where the subterranean structures and utilities are not called to HEC's attention or are not correctly shown on the plans furnished.

14.0 HAZARDOUS MATERIALS: It is agreed by the parties, unless otherwise expressly stated in the proposal scope of services, that HEC does not assume responsibility for identification, disposal, treatment or transportation of asbestos, asbestos containing materials, hazardous or toxic materials at the project site, or should it become known in any way that such materials may be present at the project site or any adjacent areas that may affect the performance of HEC's services, HEC may, at its sole option and without liability for consequential or any other damages, suspend performance of services on the project until the Client takes steps to identify, abate and/or remove the asbestos or hazardous or toxic materials, and to warrant that the project site is in full compliance with applicable laws. HEC's responsibility is limited to giving prompt notice to the CLIENT if HEC suspects it has encountered a potential hazardous material.

If the Scope of Services for this Agreement includes services related to hazardous materials, then the following provision shall apply:

In consideration of the substantial risks to HEC posed by the presence or suspected presence of asbestos or hazardous or toxic materials on or about the project site, the Client agrees, to the fullest extent permitted by law, to indemnify and hold harmless HEC, its officers, directors, employees, agents and independent consultants and any of them from all claims and losses, including reasonable attorney's fees and defense costs, arising out of, or in any way connected with, the performance or nonperformance of the obligations under this Agreement unless and until there has been an adjudication by a court or forum of competent jurisdiction that the claims at issue are a direct result of the sole negligence of HEC.

15.0 CONSTRUCTION PHASE SERVICES: It is the responsibility of the CLIENT to provide full time inspection of construction activities unless otherwise agreed to in writing between the CLIENT and HEC, or included in the Scope of Service. The CLIENT may elect to justify savings of inspection costs by assuming the added risk.

If the Scope of Services for this Agreement includes construction observation services, then the following provisions shall apply:

15.1 During the project construction phase, HEC shall consult with and advise Client and act as Client's representative as provided in the Scope of Services. The extent and limitations of the duties, responsibilities and authority of HEC as outlined in the Scope of Services shall not be modified, except as HEC and Client may otherwise agree in writing.

15.2 HEC's services during the construction phase are intended to provide Client a greater degree of confidence that the completed work of Contractor will conform in general to the approved plans and related documents. HEC shall not, during visits to the project site or as a result of observation of Contractor's work in progress, supervise, direct or have control over Contractor's work nor shall HEC have authority over or responsibility for the means, methods, techniques, sequences or procedures of construction selected by Contractor, for safety precautions and programs incident to the work of Contractor or for any failure of Contractor to comply with laws, rules, regulations, ordinances, codes or orders applicable to Contractor's furnishing and performing the work. Accordingly, HEC neither guarantees the performance of any Contractor nor assumes responsibility for any Contractor's failure to furnish and perform its work in accordance with the Contract Documents.

If the Scope of Services for this Agreement includes design services but does not include construction phase services, then the following provisions shall apply:

15.3 It is understood and agreed that HEC's services under this Agreement do not include project observation or review of the Contractor's performance or any other construction phase services, and that the Client will provide such services. The Client assumes all responsibility for interpretation of the Contract Documents and for construction observation and supervision and waives any claims against HEC that may be in any way connected thereto.

15.4 In addition, the Client agrees, to the fullest extent permitted by law, to indemnify and hold HEC harmless from any loss, claim or cost, including reasonable attorney's fees and cost of defense, arising or resulting from the performance of such services by other persons or entities and from any and all claims arising from modifications, clarifications, interpretations, adjustments or changes made to the design plans, reports, or any other documents produced by HEC.

15.5 If the Client requests in writing that HEC provide any specific construction phase services and if HEC agrees in writing to provide such services, HEC shall be compensated in accordance with the written Agreement between the Client and HEC.

16.0 OWNERSHIP AND REUSE OF DOCUMENTS: All reports, plans, specifications, computer files, field data, notes and other documents and instruments prepared by HEC pursuant to this Agreement ("Documents") are and remain the property of HEC as instruments of service with respect to this Agreement. The Documents are not intended or represented to be suitable for reuse by the Client or others on extensions of this project or on any other project. Any reuse of the Documents without the written approval by HEC will be at the Client's sole risk and without liability or legal exposure to HEC. The Client shall indemnify, defend and hold harmless HEC from and against any claims, damages or losses including attorney's fees and costs, arising out of or resulting there from.

HEC grants to the Client and only the Client a non exclusive, non assignable and non transferable license to reproduce, distribute and display the Documents, to the extent necessary for the Client to undertake construction and/or perform other acts that are all collectively required to construct the project. HEC shall retain all common law, statutory and other reserved rights to the Documents, including the copyright thereto. Both the Client and HEC agree that none of the services or Documents provided by HEC are "work made for hire" as defined in the Copyright Act.

17.0 RIGHT TO REFERENCE PROJECT: Client agrees that HEC has the authority to use its name as a client and a general description of the Project as a reference for other prospective clients.

18.0 DISPUTE RESOLUTION: HEC and Client agree that any disputes arising under this Agreement and the performance thereof shall be subject to non-binding mediation as a prerequisite to further legal proceedings.

19.0 GOVERNING LAW: The laws of the Commonwealth of Pennsylvania will govern the validity of this Agreement, its interpretation and performance. Any litigation arising in any way from this Agreement shall be brought in the State or Federal Courts of Pennsylvania.

20.0 SURVIVAL: All express representations, indemnifications or limitations of liability made in or given in this Agreement will survive the completion of all services of HEC under this Agreement or the termination of this Agreement for any reason.

21.0 ENTIRE AGREEMENT: This Agreement (consisting of (1) Proposal/ Scope of Services and (2) General Conditions) comprises the final and complete agreement between the Client and HEC. It supersedes all prior or contemporaneous communications, representations, or Agreements, whether oral or written, relating to the subject matter of this Agreement. Execution of this Agreement signifies that each party has read the document thoroughly, has had the opportunity to have questions explained by independent counsel and is satisfied with the terms and conditions contained herein. Amendments to this Agreement shall not be binding unless made in writing and signed by both the Client and HEC.

To the extent Client provides its own agreement and that agreement is silent with respect to any term or condition expressed herein, these conditions shall prevail and shall be binding upon the parties.

RESOLUTION NO. 2018-06
A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AWARDING OF CONTRACT #B-17-004, CUSTODIAL SERVICES FOR THE RADNOR TOWNSHIP MUNICIPAL BUILDING AND RADNOR ACTIVITY CENTER TO CLEANNET USA, INCORPORATED

WHEREAS, sealed bids were solicited on PennBid, ebidding site for Contract #B-17-004, Custodial Services for the Radnor Township Municipal Building and Radnor Activity Center

WHEREAS, the lowest responsible bidder was CleanNet USA, Incorporated, in the amount $115,800

NOW, THEREFORE, be it ***RESOLVED*** by the Board of Commissioners of Radnor Township does hereby Award of Contract #B-17-004, Custodial Services for the Radnor Township Municipal Building and Radnor Activity Center to the lowest responsible bidder, CleanNet USA, Incorporated, in the amount $115,800

SO RESOLVED this 22nd day of January, A.D., 2018

RADNOR TOWNSHIP

By: _____
Name: Lisa Borowski
Title: President

ATTEST: _____
Robert A. Zienkowski
Manager/Secretary

Radnor Township

PROPOSED LEGISLATION

DATE: January 16, 2018

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer SFN

CC: Robert A. Zienkowski, Township Manager
William M. White, Assistant Township Manager & Finance Director
Tammy Cohen, Director of Recreation and Community Programming

LEGISLATION: **Resolution #2018-06** - Award of Contract #B-17-004, Custodial Services for the Radnor Township Municipal Building and Radnor Activity Center

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LEGISLATIVE HISTORY: This project has not been before the Board of Commissioners previously.

PURPOSE AND EXPLANATION: The Township solicited sealed bids, via Penn BID ebidding site, for Contract #B-17-004, Custodial Services for the Radnor Township Municipal Building and Radnor Activity Center. This contract includes custodial services for the Radnor Township Municipal Building, as well as the recently renovated Radnor Activity Center. Aside from the standard daily and weekly services, please note the contract also includes the following services, with some of these services having never been performed to date: striping and sealing of floors, shampooing of carpets, cleaning the interior and exterior atrium glass, cleaning the interior and exterior office building windows, cleaning of the backboards, score boards, exterior of HVAC ductwork, light fixtures and bleachers (RAC).

Two bids were received:

CleanNet USA, Incorporated	$115,800
Golden, Incorporated	$60,000 (non-responsive bidder)

Please note that Golden, Incorporated is a "non-responsive bidder", in that they did not submit their bid bond, qualifications, non-collusion affidavit, financial statements, and certificate of insurance. Golden did not submit *any* of the items required in the bid package. CleanNet USA, Incorporated is the lowest responsible bidder.

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners approval, along with the required background checks of the CleanNet employees that will be working in the buildings, and the receipt and approval of material submittals, it is anticipated that the contract will begin in February.

FISCAL IMPACT: This contract will be funded by the 01 Account Building and Grounds. The fee will be billed in monthly installments.

RECOMMENDED ACTION: Staff respectfully requests the Board of Commissioners Award Contract #B-17-004, Custodial Services for the Radnor Township Municipal Building and Radnor Activity Center to CleanNet USA, Incorporated in the amount of $115,800.

MOVEMENT OF LEGISLATION: It is being requested the Board of Commissioners award the contract for custodial services for the Radnor Township Municipal Building and the Radnor Activity Center.

INVITATION FOR BID

FOR THE

CUSTODIAL SERVICES FOR THE RADNOR TOWNSHIP MUNICIPAL BUILDING AND THE RADNOR ACTIVITY CENTER
CONTRACT #B-17-004

Radnor Township
301 Iven Avenue
Wayne, PA 19087-5297
610-688-5600
Fax 610-688-1279
www.radnor.com

Wednesday, November 8, 2017

ADVERTISEMENT

Radnor Township is soliciting sealed bids for custodial services for the Radnor Township Municipal Building, located at 301 Iven Avenue, Wayne, Pennsylvania, and the Radnor Activity Center 125 South Wayne Avenue, Wayne, Pennsylvania (CONTRACT #B-17-004). Bid packages may be obtained at no charge through PennBid (www.Pennbid.net) beginning on November 9, 2017. All bids must be submitted through the Penn BID ebidding site. All questions must be submitted through the Penn BID site; all questions, and all answers, will be posted and shared with all bidders. Bidders shall familiarize themselves with all specifications, requirements, the Radnor Township Municipal Building, and the Radnor Activity Center.

A bid security in the amount of ten percent (10%) of the total bid is required. Bid security shall be in the form of either a Bond issued by a corporate surety approved by the Secretary of Insurance to do business in the Commonwealth of Pennsylvania, or a certified check or an Irrevocable Letter of Credit issued by a bank licensed to do business in the Commonwealth of Pennsylvania. The successful bidder shall supply a performance bond and payment bond in the amount of 100% of the total bid. Further requirement for financial security and insurance requirements are detailed in the Specifications and Requirements section of the project manual.

The contract will be for a term of one year from the Notice to Proceed. The contract may be extended for an additional year, at the Township's sole discretion. The contract may be terminated by the Township Manager, with thirty (30) days written notice to the contactor.

The bidding timeline is as follows:

1. Bid Package Available on Penn BID - November 9th, 2017

2. Mandatory Pre-Bid Meeting - 10:00 AM, November 21st, 2017
   The pre-bid meeting will be held at the Radnor Township Municipal Building. The pre-bid meeting will also consist of a tour of the Municipal Building and the Radnor Activity Center.

3. Close of Questions - Noon, November 25th,2017

4. Bids Due - 10:00 AM, November 28th, 2017

5. Anticipated Award Date - December 11th, 2017

The Township Board of Commissioners reserves the right to waive any informalities and reject any or all proposals, or parts thereof, for any cause permitted by law, as it deems in the best interest of the Township. The standard under which bids will be evaluated and other bid requirements and instructions to bidders are included in the bid package. All bids are valid for ninety days from the bid due date.

Robert A. Zienkowski
Township Secretary

To be Published:
Delaware County Daily Times: Friday, November 10, 2017 and Friday, November 17, 2017

If an electronic copy of the bid security is submitted, the original bid security must be delivered to Radnor Township, Attention: Melissa Conn, Purchasing and Contracts Coordinator within three business days after the bid opening (postmarked by bid due date as stated in the Advertisement).

The bid security shall be payable to the Radnor Township as payee or oblige, and shall be forfeited as liquidated damages if the bidder fails to execute the Contract in conformity with the Agreement incorporated in the Contract Documents. The successful bidder and second lowest bidder's bid security shall be returned promptly upon Radnor Township's receipt of the successful bidders executed contracts, bond(s) (if applicable), and other required forms and applications (if applicable).

5.2 ☐ Statement of Bidder's Qualifications

Bids must be accompanied by a completed, signed, and notarized Statement of Bidder's Qualifications, with all necessary supporting documentation.

5.3 ☐ Non-Collusion Affidavit

Bids must be accompanied by a completed, signed, and notarized Non-Collusion Affidavit.

5.4 ☐ Client References

Bids must be accompanied by a completed list of Client References. References should include a minimum of five municipalities, school districts, or other clients for which the bidder has delivered similar goods and/or services in the past three years.

5.5 ☐ Bid Price Submission

Bid prices must be submitted using the online Bid Form on PennBid (www.Pennbid.net), unless otherwise stated in the Advertisement. All other forms of bid price submissions will not be accepted. Bidders may submit price quote(s) by clicking on the "Bid" tab and providing price quote(s) in the area provided. Bids may be updated or withdrawn any time prior to bid due date and time as stated in the Advertisement.

5.6 ☐ Bulletins (Addenda)

Bids must be accompanied by the Bulletins acknowledgement form if any bulletins were issued by the Township during the bidding period.

6. Insurance

Throughout the life of the Agreement, bidders shall be required to procure and maintain the insurance coverages as stated in the General Conditions. Only Certificates of insurance from A rated companies licensed to do business in the Commonwealth of Pennsylvania will be approved.

The successful Bidder shall furnish the Township with certificates of insurances, the requisite endorsements, and schedules to its insurance policies listing the Township as an "additional insured" for all required insurance, prior to the Bidder's execution of the Agreement and the start of work.

A Thirty (30) day Notice of Cancellation must be provided to the Township and be so indicated on the Certificate for all policies.

BID SECURITY

Accompanying this proposal is a certified check, bid bond, or standby bank letter of credit in the amount of_____ ($_____), payable to RADNOR TOWNSHIP. The undersigned Bidder agrees that such bid security shall be retained as liquidated damages by the Township should the Bidder, if awarded this Contract, fail to execute this Contract in conformity with the Form of Agreement or Form of Proposal incorporated into these Contract Documents, or should the Bidder fail to furnish any specified Bonds within ten (10) business days after the Township notifies the Bidder that it has been awarded the Contract.

Company Name: _____

By (Signature): _____ (SEAL)

Type Name: _____

Title: _____

Date: _____

5. When Organized: _____

6. If a corporation: _____

6.1 Date of incorporation: _____

6.2 State of incorporation: _____

6.3 President's name: _____

6.4 Vice-presidents name(s) : _____

7.1 How many years have you been engaged in the contracting business under your present firm or trade name?

7.2 Under what other or former names has your organization operated?

8. Contracts in progress: (schedule these, showing amount of each contract and the appropriate anticipated time of completion.)

9. General character of work performed by your company:

10. Have you ever failed to complete any work awarded to you? If so, where and why?

11. Have you ever defaulted on a contract or are you a party to any legal proceeding alleging breach of contract or warranty? If so, where and why?

12. List the more important similar projects in size and complexity completed by your company, in the past ten years, stating the approximate cost of each, and the month and year completed.

13. List your major equipment available or this contract.

14. Experience in construction work similar in scope of this project

15. Background and experience of the principal members and employees of your organization, including officers.

NON-COLLUSION AFFIDAVIT

Contract:_____

State of _____:

County of _____:

I state that I am _____ of _____
(Title) (Name of Firm)

and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

(1) The price(s) and amount of this bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder or potential bidder.

(2) Neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid, have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.

(3) No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.

(4) The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.

(5) _____ its affiliates, subsidiaries, officers, directors, and employees are
(Name of Firm)
not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable for any act prohibited by state or federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as follows:

I state that _____ understands and acknowledges that the above representations are
(Name of Firm)
material and important, and will be relied on by RADNOR TOWNSHIP in awarding the contract(s)/ purchase order(s) for which this bid is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from the RADNOR TOWNSHIP of the true facts relating to the submission of this bid.

SWORN TO AND SUBSCRIBED BEFORE ME

THIS _____DAY OF _____,_____ _____
(Signature)

_____ _____
(Signature of Notary Public) (Signatory's Name)

_____ _____
My Commission Expires (Signatory's Title)

BULLETINS

The bidder acknowledges receipt of the hereinafter enumerated bulletins (addenda) which have been issued during the bidding period and agrees that said bulletins shall become part of this contract. The bidder shall list below the numbers and issuing dates of the bulletins.

Company Name:_____ Date:_____

Bulletin Number	**Issuing Date**

I. Notice

Written notice shall be deemed to have been duly served if delivered in person to the Bidder or Contractor, or to an authorized representative of the Bidder or Contractor, or if sent to or delivered at, by registered mail, the last business address known to the Township.

J. Township

The Township shall be understood to be the Township of Radnor, a Home Rule Municipality in Delaware County, the Commonwealth of Pennsylvania.

ARTICLE II. AWARD, EXECUTION OF AGREEMENT, AND DELIVERY OF BONDS

A. Awarding of Bid

1. The awarding of a Bid, if it is awarded, will be made by the Township Board of Commissioners to the lowest responsible Bidder whose qualifications indicate that the award will be in the best interest of the Township and whose proposal complies with all the prescribed requirements.

2. No award will be made until the Township has concluded such investigations as it deems necessary to establish the responsibilities, qualifications, and financial ability of the Bidder to complete the project in accordance with the Contract Documents to the satisfaction of the Township within the time prescribed.

3. The Township reserves the right to reject the bid of any Bidder that does not pass such investigation to the Township's satisfaction.

4. The Township reserves the right to reject any or all bids or parts thereof and to waive any informality in bids received when such is in the best interest of the Township; the Township also reserves the right to reject the bid of any Bidder who in the opinion of the Township is not in a position to satisfactorily or legally perform the Contract.

5. In analyzing Bids, the Township may take into consideration alternates and unit prices, if requested by the Bid Form.

6. The Contract will be awarded or rejected by a majority vote of the Township Board of Commissioners generally at a subsequent public meeting following the opening of bids. If the Contract is awarded, the Township will generally provide the Successful Bidder written notice of the award within sixty (60) days after the opening of the bids.

B. Execution of Form of Agreement

1. At least two counterparts of the Agreement and such other Contract Documents as practicable shall be signed by both the Township and the Contractor, with at least one counterpart being returned to the Township within the time specified.

C. Delivery of Performance Security

A. Any Bidder may withdraw its bid at any time before the scheduled time for the receipt and opening of such bids.

B. No bid may be withdrawn for at least sixty (60) days, or in accordance with other time provisions in the Contract Documents, after the time of opening of the bids.

C. Negligence on the part of the Bidder in preparing the bid confers no right for the withdrawal of that bid after it has been opened.

ARTICLE VII. SUPPLEMENTAL UNIT

A. Contracts may be either on a lump sum basis, unit price basis, or other basis as provided in the Bid Form.

B. Supplemental prices are generally inserted to provide for any changes in work or extra or less work that may be required by the Township. Space will have been provided in the Bid Form to insert unit prices for the addition and deduction of various types of classes of goods and/or services.

C. Should these prices not be consistent with the whole of the work, the Township reserves the right to require the Contractor to revise these prices to bring them into agreement with the prices outlined for the major portion of the work.

D. The unit prices for additional work should be consistent with the detailed prices submitted by the Contractor for payment, and those for deduction of work should also be similar except that the amount of overhead should be deducted.

E. Each Bidder shall indicate a unit price on the Bid Form when any item of that type is included in the work.

ARTICLE VIII. VERBAL STATEMENTS

A. No verbal or oral interpretation of plans or specifications shall be given before the award of the Contract. Discrepancies, omissions, or doubts about the meaning of plans or specifications should be communicated by posting a question or request for interpretation on the PennBid website (www.pennbid.net) in writing to the Township Manager for clarification.

B. Any interpretation made under section A will be in the form of an addendum to the specifications, which will be posted on the PennBid website..

ARTICLE IX. TIME OF DELIVERY

The Contractor shall begin the work or furnish the goods under this Contract within the number of days as instructed in the Instructions to Bidders or Detailed Specifications.

ARTICLE X. BIDS OR PROPOSALS

A. All bids must be indicated upon the Bid Form.

B. All bids must be addressed and submitted as instructed in the Instructions to Bidders.

C. Any Bidder that does not wish to bid on a specific option or alternate listed on the Bid Form shall insert a "0" (zero) in the unit price field. The reason for a no bid should be specified in the comment section.

2. Any Bidder that attempts to influence a Township official to award the Bid to such bidder's company by promising to provide or by providing to such official any gratuity, entertainment, commission, or any other gift, in exchange for a promise to award the Bid to such Bidder's company, shall be considered unethical.

3. Any Bidder that knows of any Township official having a direct or indirect financial interest in such Bidder's company shall be required to submit with the Bid Form a written statement detailing such interest. Failure to do this shall be considered unethical.

ARTICLE XIII. DESCRIPTIVE LITERATURE

A. Bid proposals for the furnishing of equipment shall be accompanied by the manufacturer's descriptive literature, including technical data and equipment specifications.

B. Additional information or specific literature requirements may be detailed in the Bid Form or Detailed Specifications. All such material shall be clearly marked to the Township to distinguish the type, size, and all other relevant features of the particular item the Bidder proposes to furnish.

C. Bid proposals submitted without the required material may be rejected by the Township.

ARTICLE XIV. PAYMENT

A. The Township will pay the Contractor for goods and/or services provided under this Contract in accordance with the conditions set forth in the Form of Agreement and in conformance with these Contract Documents.

B. Unless otherwise specified, the Township will provide full payment to the Contractor after Final Acceptance and generally within thirty days after subsequent receipt of invoice.

ARTICLE XV. FINAL ACCEPTANCE

A. The Township's final payment to the Contractor may be subject to final acceptance of the goods and/or services furnished.

B. As such, the Township reserves the right to test and examine, as it deems in its best interest, such furnished goods and/or services. Such testings will generally not exceed fifteen days. The exclusive intent of this testing option is to establish the degree of compliance with the Contract Documents.

C. If such testing shows noncompliance with the Contract Documents, the Township may hold the Contractor liable for the portion of the goods and/or services not in compliance. As such, the Township shall have the ability to sue the Contractor to force compliance or to force the Contractor to remit any monies theretofore paid to it by the Township. The Contractor shall also reclaim any rejected goods and/or services at its own expense.

ARTICLE XVI. TAXES

A. As a political subdivision of the Commonwealth of Pennsylvania, the Township is not subject to certain federal, state, and local taxes (EID #23-6000200). As such, Bidders shall exclude such taxes in their bid prices, unless otherwise indicated in the Contract Documents.

B. The Township will furnish the necessary tax exemption certificates when required by the Contractor.

ARTICLE XVII. INSURANCE

B. Unless otherwise specified herein, if any of the goods covered by this Contract are subject to the Wool Products Labeling Act, the Fur Products Labeling Act, the Textile Fiber Products Identification Act, the Flammable Fabrics Act, or any applicable state or federal law, the Contractor shall provide in writing with the Bid Form the separate guarantees provided for under such acts, or shall provide an appropriate statement that a continuing guarantee has been filed in accordance with such acts and applicable rules and regulations of the Federal Trade Commission.

ARTICLE XX. NONDISCRIMINATION

A. No Bidder or Contractor shall discriminate, with respect to any condition of employment or fringe benefit, against any employee, applicant for employment, independent sub-contractor or any other person because of race, color, religious creed, ancestry, national origin, gender, age, veteran or marital status, sexual orientation, political affiliation, or a disability that, with or without reasonable accommodations, does not affect the person's ability to perform the essential functions of the job.

B. Any reasonable accommodation that a Bidder or Contractor may have to make to one of its employees, in order to comply with the Americans with Disabilities Act of 1990 (42 U.S.C. §12101 Note), shall be at such Bidder's or Contractor's own expense. Any such accommodation that may require either a material modification to any property owned by the Township or otherwise require Township assistance or cooperation shall be disclosed to the Township in a separate statement included in such Bidder's bid submission.

C. In order for the Township to comply with certain federal and state grant requirements, Bidders, if a majority of its ownership is composed of women or racial or ethnic minorities, shall submit with their Bid Form a statement certifying such.

D. Any Bidder or Contractor, who has been convicted of violating federal, state, or local laws governing discrimination described in Article XX, Section A, shall disclose such in a separate statement with its bid submission. If any such Bidder or Contractor shall fail to disclose such conviction, the Township shall have just cause to return such Bidder's Bid, or if the Bid has been awarded, to annul the award and declare the Bid and any Security submitted thereof forfeited.

Personnel

The contractor shall ensure that their employees:

1. are properly trained, licensed and/or certified to operate necessary building systems or equipment for which licensed and/or certified personnel are required by Federal, State, or local laws; codes, or ordinances.

2. are responsible to make the management and operational decisions to meet the quality performance standards required under this contract.

3. use innovation, technology and other means and methods to develop and perform the most efficient cleaning services for the Township Building and RAC. These means and methods must be submitted for approval by the Township.

4. implement an effective Quality Control Plan (QCP). This shall include, but not be limited to; an effective service call system that results in prompt, professional, and courteous resolution of Radnor Township concerns, keep the Township informed of the current status of the work being performed, and provide work schedules and provide other pertinent information needed by their supervisor. The plan will also reduce the environmental impacts of work performed under this contract by using, to the maximum extent, environmentally sound practices, processes, and products. The plan will provide training/certifications for their employees that stress stewardship in cleaning practices i.e., the use, disposal and recycling of cleaning chemicals; and dispensing equipment and packaging. The name, brand, and MSDS sheet will be provided for the Township for review. The Township has full authority over the use of the products the contractor shall provide for this contract.

5. The Township shall institute background checks for all employees that the contractor shall have enter the Township Building or RAC. The background checks will be completed by the Radnor Township Police Department. The contractor is required to have the employees proposed for this project provide any and all information required by the Police Department to adequately perform the background checks. This includes supervisors who may periodically be on Township premises. Employees that successfully complete the background check will be issued Radnor Township Vendor picture ID cards. These cards will note the name of the employee, company name, and will also serve as their swipe/access card. Under no circumstances shall and employee enter the building to perform work without their Township vendor card, regardless if they have successfully completed the background check. The contractor is required to provide a list of employees that includes personnel that will fill the void created by the absences (illness, vacation, etc.) of the employees of the contractor.

Services

1. Bare Floors: Floors, base moldings, and grout shall be clean and free of debris including but not limited to dirt, water streaks, mop marks, string, gum, tar, and other foreign matter. The floors shall maintain their natural luster and not have a dull appearance. Wet mopping of bare floors shall be cleaned using disinfectant cleaner(s) with additional scrubbing, if necessary. These floors shall be slip resistant. Surfaces, baseboards, and corners shall be clean and dry.

2. Walls, baseboards, and other surfaces shall be free of splashing and markings from the equipment. There shall be no visible buildup of finish in corners or crevices. Mops and cleaning rags shall be cleaned and sanitized before and after each day of use. Mops and cleaning rags used in restrooms including diapering areas in restrooms and Child Care centers shall not be used to clean any other areas.

13. Restrooms, Shower Rooms, Locker Rooms and Prisoner Holding Cells: All areas shall be cleaned using a disinfectant cleaner.

    a. Fixtures shall maintain a high level of luster and be free of dust, mold, mildew, streaks, and encrustations.
    b. Partitions, doors, vents, sills, and walls shall be free of dust, dirt, bodily fluids and waste, and graffiti.
    c. Shower curtains shall be cleaned and free of mold and dirt. Restrooms shall be free of discarded material and trash shall be emptied to prevent the containers from overflowing.
    d. Dispensers for paper towels, roll towels, tissue paper, and toilet paper shall be filled nightly. The contractor is to supply all products in this regard. The Contractor shall replenish supplies and fill dispensers as a standard service. The supplies for the provided dispensers shall be compatible with the dispenser's manufacturer's requirements.
    e. The Contractor shall empty, clean, and sanitize the sanitary napkin and waste receptacles. Sanitary napkin disposal containers shall be lined with new receptacle bags.

14. Fixtures. Clean and Sanitize: All fixtures and surfaces (washbasins, urinals, modesty panels, toilets, shower stalls, etc.) shall be clean with no dust, spots, soiled substances, discoloration, mold, build-up, or excess moisture.

15. Drinking Fountains. All fountains shall be free of dirt, watermarks, and all other debris or encrustations. Drinking fountains shall be sanitized and present a lustrous appearance. All surfaces shall be free of dust, dirt, oil spots, or smudges.

16. Cabinets and desks with papers, computers, and keyboards shall not be disturbed. Surfaces should be damp mopped or wiped with a germicidal cleaner.

17. Metal, Brass and Woodwork Surfaces (including corners, crevices, moldings, ledges, hand rails, grills, doors, door knobs, door frames, kick plates, etc.) shall be free of dust, streaks, spots, hand marks, oil, smudges, dirt, soiled substances, encrustation, and streaks.

18. Glass Cleaning: All glass, clear partitions, mirror surfaces, bookcases, and other glass (within approximately 120 inches of the floor) shall be clean and free of dirt, dust, streaks, smudges, watermarks, spots, grime, and shall not be cloudy. There shall be no water spots on the glass or adjacent fixtures and furniture.

19. Walls All wall surfaces shall be free of smudges, marks, dirt, and spots. Cleaning shall not cause discoloration.

20. High Cleaning/High Surfaces: Surfaces shall be cleaned and free of dirt, dust, and cobwebs. Where glass is present, both sides shall be clean and free of streaks. This does not include the removal of vents, tiles, or fixtures. Specific to the RAC:

    a. All backboards, scoreboards, bleachers (complete; in, under, and the structure) are to be cleaned weekly,
    b. Walls are to be cleaned annually

21. Dusting Surfaces shall be dust free, using a micro-fiber or damp cloth, or backpack vacuum fitted with the appropriate dusting tool.

Radnor Township Municipal Building and Radnor Activity Center Custodial Services Cleaning Matrix

All work noted below is done to be performed in accordance with the specifications as noted. The cleaning frequency matric provides the general items; the specifications dictate the cleaning goals and requirements.

Hours/Days of Work: Seven (7) days per week, 11:00 PM to 6:00 AM

	PERFORMANCE REQUIREMENTS	DAILY	WEEKLY
	All Areas		
1	Pick up trash, empty all waste and recycling receptacles, reline waste with plastic liners	X	
2	Dust, wipe and polish window ledges and other horizontal surfaces within reach (such as artwork)	X	
3	Dust, wipe and polish surfaces of desks, chairs, tables and other office furniture	X	
4	Dust and wipe office equipment	X	
5	Spot clean marks next to light switches, doors and door frames	X	
6	Brush or vacuum upholstered seating		X
7	Damp wipe and sanitize telephones	X	
8	Vacuum carpeted areas	X	
9	Spot clean minor carpet stains		X
10	Dust off horizontal surfaces	X	
11	Dust wipe and polish chairs, desks, tables, counters, pictures, etc.	X	
12	Dust and clean director board, glass and any mirrors	X	
13	Clean entry door glass	X	
14	Sanitize and polish drinking fountains	X	
15	Police immediate exterior of entries for debris	X	
16	Maintain office furniture and arrange table and counters in a neat and orderly fashion	X	
17	Vacuum all carpeted areas	X	
18	Dust floor, and damp mop floor with disinfectant ((elevator)	X	
19	Spot clean and polish interior/exterior panels (elevator)	X	
20	Clean and disinfect railings (elevator, stairs)	X	
21	**Lunchroom/Kitchen Maintenance:**	X	
22	Pick up trash, empty all waste and recycling receptacles, reline waste with plastic liners	X	
23	Clean tops of garbage cans	X	
24	Clean lunchroom countertops, tabletops, sinks and hardware	X	
25	Stock paper towels if needed	X	
26	Spot clean front of cabinets and major appliances	X	
27	Wipe clean tables and chairs	X	
28	Dust and wipe horizontal surfaces		
29	Dust and damp mop with disinfectant all tiled areas	X	
30	Vacuum all carpeted areas	X	
6.31	**Restroom Cleaning:**	**X**	

AGREEMENT

TOWNSHIP OF RADNOR

DELAWARE COUNTY, PENNSYLVANIA

THIS AGREEMENT is made this _____***day*** _____, by and between

_____ (hereinafter "***Contractor***") of _____,
(Name of Company) (Address of Company)

and the ***TOWNSHIP OF RADNOR***, a Home Rule Municipality in Delaware County, the Commonwealth of Pennsylvania (hereinafter "***Township***").

WITNESSETH, that the Contractor and the Township, for the consideration named herein, agree as follows:

ARTICLE I. ***SCOPE OF WORK***

The Contractor shall furnish the following goods and/or services, at the prices, and for the period, all as indicated on the Detailed Specifications included in the bid package for the CUSTODIAL SERVICES FOR THE RADNOR TOWNSHIP MUNICIPAL BUILDING AND THE RADNOR ACTIVITY CENTER (CONTRACT #B-17-004). All items and/or services furnished shall be in complete conformance with all the Contract Documents (as defined in the Instruction to Bidders and as set forth below) except for such deviations as may be incorporated in writing with the Agreement of the Township.

ARTICLE II. ***CONTRACT SUM***

A. The Township shall pay the Contractor for the performance of the Contract, subject to the additions and deductions provided herein or attached hereto, as follows: The prices of those goods/services that the Township agrees to purchase, indicated on the Form of Proposal, as follows: _____($).

B. The Township approves bills at public meetings on the second and fourth Mondays each month September through May and on the third Monday each month June through August. Contractor's invoices shall be submitted to the Township no later than the end of the first week of each month. Bills shall generally be payable thirty (30) days after Township receipt and approval.

C. The Township will make progress payments on account of the contract price on the basis of Contractor's applications for payment. Progress payments will be made upon application in such amounts as are approved by the Township. In no event shall ninety percent (90%) of the contract price be paid to Contractor until final completion and acceptance of the work has been accomplished.

D. Final Payment. Upon final completion and acceptance of the work by the Township, the Township shall pay the remainder of the contract price.

ARTICLE III. ***INSURANCE***

Contractor shall provide the Township with a Certificate of Liability Insurance in accordance with the Instructions to Bidders, specifically, naming Radnor Township and elected and appointed officials as additional insureds prior to commencing work and shall maintain such liability insurance for the term of this contract.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed in two original counterparts the day and year first written above.

CONTRACTOR

By:_____(SEAL)

Type/Print Name:_____

Title:_____

(President, Partner, Owner)

Attest:_____

Title: _____

(Secretary, Other)

TOWNSHIP OF RADNOR

By:_____(SEAL)

Robert A. Zienkowski
Township Manager and Township Secretary

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, That we, _____ of
(Name of Company)

_____, as Principal and _____
(Address of Company) (Surety Company)

a corporation incorporated under the laws of the State of _____ as Surety
(Name of State)

are held and firmly bond unto the Township of Radnor, in the full and just sum of _____ ($) dollars, lawful money of the United States of America, to be paid to the said Township of Radnor, or its assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with the above municipality hereinafter called Obligee, bearing even date herewith, for the CUSTODIAL SERVICES FOR THE RADNOR TOWNSHIP MUNICIPAL BUILDING AND THE RADNOR ACTIVITY CENTER (#B-17-004

consisting of:_____

for approximately the sum of: _____ ($) dollars.

NOW THEREFORE, the condition of this obligation is such that if the above bounden Principal shall and will promptly pay or cause to be paid in full all sums of money which may be due by contract or otherwise, to any individual, firm, partnership, association or corporation, for all material furnished or labor supplied or performed in the prosecution of the work, whether or not the said for material or labor entered into and became component parts of the work and for rental of the equipment used and services rendered by public utilities in, or in connection with the prosecution of such work, then this obligation to be void, otherwise to remain in full force and effect.

The PRINCIPAL and SURETY, hereby, jointly and severally, agree with the Obligee herein that any individual firm, partnership, association or corporation, which has performed labor or furnished material in the prosecution of the work as provided, and any public utility which has not been paid in full therefore, may sue in assumpsit on this Payment Bond in his, their, or its own name and may prosecute the same to final for such sum or sums as may be justly due him, them or it, and have execution thereon. Provided, however that the Obligee shall not be liable for the payment of any costs or expenses of such suit.

RECOVERY by any individual, firm, partnership, association or corporation hereunder shall be subject to the provisions of the "Public Works Contractors' Bond Law of 1967", ACT No. 385, approved December 20, 1967, P.L. 869, which Act shall be incorporated herein and made a part hereof, as fully and completely as though its provisions were fully and at length herein recited.

It is further provided that any alterations which may be made in the terms of the contract or in the work to be done or materials to be furnished or labor to be supplied or performed under it or in the giving by the Obligee of any extension of time for the performance of the contract or any other forebearance on the part of either the Obligee or the Principal t the other, shall not in any way release the PRINCIPAL and the SURETY or SURETIES of any such alteration, extension of forebearance being hereby waived.

RADNOR TOWNSHIP
301 IVEN AVENUE
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600
Fax (610) 688-1279
www.radnor.com

ADDENDUM #1
FOR THE

CUSTODIAL SERVICES FOR THE RADNOR TOWNSHIP MUNICIPAL BUILDING AND THE RADNOR ACTIVITY CENTER CONTRACT #B-17-004

November 21, 2017

Ladies and Gentlemen:

All prospective bidders for the above referenced RFP are hereby advised of the following changes or clarifications:

1. PRE-BID MEETING NOTES AND SIGN-IN SHEET
   See Pre-bid meeting notes and sign-in sheet as attached.

Thank you for your time and interest and your attention to these changes.

Sincerely,
Melissa Conn
Purchasing and Contracts Coordinator

BIDDER MUST ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE BULLETINS ACKNOWLEDGEMENT FORM INCLUDED IN THE BID DOCUMENTS PACKET.

Pre-Bid Mtg - for Custodial Services for Radnor Twp Bldg + RAC — 11/21/2017 10:00 AM

Name	Company	Contact Info
Tommy Nguyen	BTN Services	267-432-4252
Tony Nguyen	BTN Services	267-294-9924
Chrisna Ngeth	BTN Services	215-668-9544
Ryan Slizofski	Clean Net	484-209-7624
Clinton James	CT Complete Cleaning	267-970-4457
Kevin Smith	Golden Inc.	800-878-1356
Dan Rice	CNS	800-227-9061
Mark Domenich	Radnor Township	
Melissa Conn	Radnor Township	

CUSTODIAL SERVICES FOR THE RADNOR TOWNSHIP MUNICIPAL BUILDING (#B-17-004)
Opened 11/29/2017 10:00 AM Eastern

Bidder	Question Date	Question	Answer	Posted Date
CleanNet o	11/21/2017 12:20	Are locker rooms to be cleaned in the RAC? If so, what is the frequency?	Basic, routine cleaning of these ancillary non-public areas are needed in order to keep them free of dust and buildup. Note the men's locker room can be used as a storage location for the indicated vendor's cleaning supplies but will be a shared space accessible by our Public Works Department. The lockers do not need to be cleaned, other than dusted around and on top - these are not public areas. Monthly should be fine.	11/22/2017 10:44
CleanNet o	11/21/2017 12:23	The SOW calls for lights, scoreboard, HVAC ducts to be cleaned in the gym. Are we also cleaning rafters and is this work in the base bid or separate pricing?	YES. Please account for in base bid.	11/21/2017 15:35
CleanNet o	11/21/2017 12:26	Please confirm, streaks are to be removed from fiberglass backboards bimonthly.	a.We prefer heavy streaking removal is performed routinely as they are apparent.	11/21/2017 15:35
CleanNet o	11/21/2017 12:26	What is the square footage of both locations?	The square footage of the RAC is 9,990 sq. ft. The square footage of the Municipal Building is approximately 9,500 sq. ft. per floor. Please see "RAC Floor Plan with Square Footage" and "Municipal Building - Square Footage" documents under the Documents section.	11/21/2017 16:00
CleanNet o	11/22/2017 8:38	Are consumable products included in the pricing or billed separately based on usage? If included, please provide a daily population of the buildings.	The consumable items are not billable. They are ancillary to the project and shall be included in the bid price.	11/22/2017 10:42

CUSTODIAL SERVICES FOR THE RADNOR TOWNSHIP MUNICIPAL BUILDING (#B-17-004)
Opened 11/29/2017 10:00 AM Eastern

Company	Base Bid
CleanNet of Philadelphia	$115,800.00
Golden Inc Building Maintenance	$60,000.00

CleanNet USA

Taking Pride in the Details ®

PROPOSAL TO PROVIDE

JANITORIAL SERVICES

FOR

Township of Radnor Pennsylvania

Quality Service, through Quality People, Everyday at Every Location

CleanNet of Philadelphia
234 Mall Blvd Suite 115
King of Prussia, PA 19406

Ryan Slizofski
Office: 484-704-7624
Cell: 610-420-4381
rslizofski@cleannetusa.com

November 27, 2017

COMPANY INFORMATION

Company Overview

CleanNet USA was founded in 1987 in Columbia, Maryland. Today, CleanNet USA has become a green certified, national company renowned as one of the premier services in the business. Currently, CleanNet has offices nationwide and provides custodial services to over 35,000 facilities daily, covering over 160 million square feet of cleanable space nightly. CleanNet provides service to many fortune 100 companies as well as many companies with locations nationally.

CleanNet of Philadelphia is a Master Franchise, an independently owned and operated business, of CleanNet USA. From the Philadelphia office we handle custodial services for approximately 750 locations on a nightly basis. Matt Cho purchased the Philadelphia office in 2001. He had previously worked with CleanNet USA in our corporate headquarters as a Quality Assurance Manager and also ran the Quality Assurance team in our Atlanta office. Since taking over the Philadelphia office he has spearheaded tremendous office growth, growing the office from 2.5 million in annual revenue to over 9 million through 2016. In addition, the office retention rate has improved from 86% to over 97% in the same time period. He is charge of the Quality Assurance Department, Sales Department and leads all office initiatives, including training.

As an owner operated company, CleanNet is able to deliver personal service; a difference you see from the very first meeting. All of our Franchise Owners and cleaning personnel have completed our Ten Step Training Program; a structured course designed to provide personnel with the knowledge and skills necessary to perform and manage CleanNet's rigorous service programs. All personnel receive both classroom and on-the-job training covering the operation of state-of-the art equipment, diverse cleaning techniques, chemical usage (including the use of Green products), safety procedures, OSHA standards, Infection Control, Blood Borne Pathogens and customer service. Through our training program, do-it-right attitude and attention to detail, CleanNet of Philadelphia has been a powerful force in the commercial cleaning industry with a retention rate of 97.6%, which is well above industry norms.

As our ranking in Entrepreneur Magazine would suggest (36th in the country), CleanNet continues to set new industry standards for quality and dependability. Across the country we provide a quality service at very affordable rates covering a broad range of facilities from commercial, warehouse, and schools, to medical institutions and government facilities. Through trial and error, CleanNet has developed unique maintenance programs for each type of facility that eliminates time you must spend on cleaning issues for more important business matters. Simply put, our goal is to exceed your cleaning standards, and we have been reaching this goal in virtually every facility that we enter.

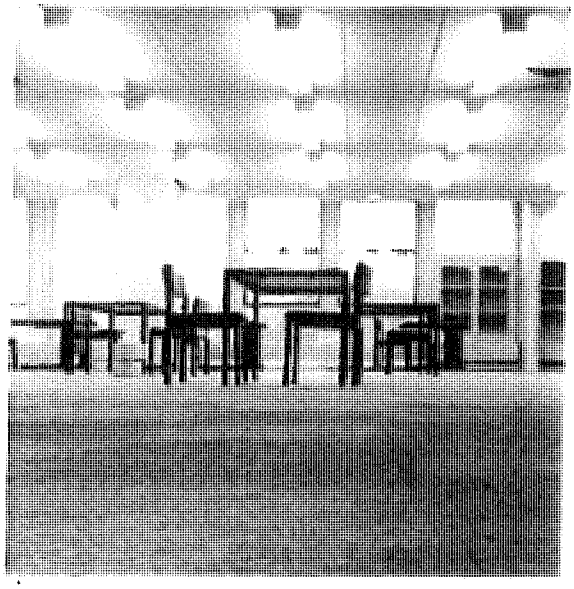
Due to the sensitive nature of a facility such as yours, CleanNet has taken our own steps to ensure security while working in our customers buildings. All personnel will be distinguished by attractive uniforms with accompanying picture identification marking them clearly as CleanNet professionals. Visitors and employees never need to worry about who we are or why are there. Plain and simple, CleanNet offers peace of mind. In addition, CleanNet insures and bonds all of its personnel. You never have to worry about security when CleanNet is on the scene.

CleanNet USA

The CleanNet Mission

It is CleanNet's mission to provide extraordinary, professional and reliable commercial cleaning and janitorial services. We do this every day and at every location through a national network of first-class franchised cleaning operators.

To Treat Our Customers As Life Time Partners



CleanNet enters every new partnership with the attitude of partnering for life. We always want to know "how are we doing?" And "how can we get better?" CleanNet strongly believes that a satisfied customer makes for the best advertising on earth.

We Look At Our Business Through Your Eyes

We make it a regular practice to see, hear and feel during contacts with our clients. Every facility receives regular quality assurance inspections and ratings. Through these inspections we ensure that each detail of service is performed to the highest standards according to your cleaning specifications.

To Deliver More Than Is Promised

The surest way to make customers totally pleased with our service, come back for more, and tell others how good we are, is to practice the "*and then some*" principle. Our products do what we said they would - and then some. Our service is prompt and courteous - and then some. It is our willingness to go the extra mile and Taking Pride in the Details®, which separates us from the rest.

CleanNet USA

We Deliver Total Satisfaction to You Thru -

Quality People - Your highly-motivated CleanNet Franchisee has been carefully selected and trained. CleanNet franchisee's cleaners wear uniforms and ID badges.

Supervision - Each location has a dedicated supervisor on-site during cleaning operations.

Management Team - All of the critical infrastructure is in place and accessible to you to serve your account.

Quality Assurance - Monthly inspections, surveys, and ratings are all rolled up and managed for visibility and response. Areas in need of improvement receive special attention and additional inspections.

Communication / Service Log Book - Communication includes on-site logbooks, cell phone access to your Franchisee and your account manager who are all available 24/7.

Training Programs - Comprehensive franchisee training includes classroom, text, DVD, testing, certificates and on-the-job mentoring. Specialized training for critical applications, like blood borne pathogens, is also in place.

Health & Sanitation - CleanNet uses specific cleaning techniques, equipment and chemicals to insure that areas where cross-contamination generally occurs are sanitized. We will also clean your air vents, removing all visible air-borne contaminates. Our techniques provide a cleaner, healthier and safer work environment.

Green Cleaning - CleanNet uses Green Seal Certified chemicals and products that meet high standards of efficiency, reliability and safety. All of our paper products are made from 100% recycled materials.

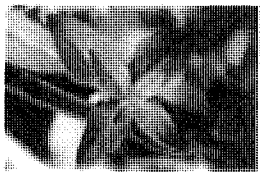
Material Safety Data Sheets (MSDS) - We supply MSDS sheets for all chemicals used at your facility.

Transition Plan - Your transition plan includes meeting with your franchisee's cleaning supervisor, stake holder notification, identifying and communicating site specific needs, delivery of equipment and products, installation and briefing on the Logbook for communication, specialized training as required, key pick up and confirmation of the cleaning start date.

Insurance and Janitorial Bond - Each CleanNet USA franchise operator carries general liability coverage and provides worker's compensation insurance for their employees, as well as a janitorial bond.

CleanNet USA

21st Century Cleaning Techniques -

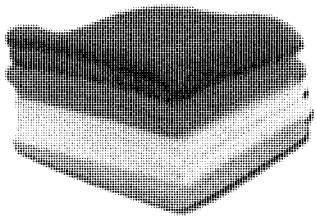


Clean Green ® - In addition to conventional commercial cleaning services, CleanNet offers green cleaning solutions through our Clean Green® Program. These solutions can be used in part or for all of your cleaning services based on your business environment and needs.

Backpack Vacuums - CleanNet employs high powered and energy-efficient vacuums that meet the requirement of the Carpet & Rug Institute's Green Label program. These vacuums utilize high-capture HEPA filters that remove 99.9% of harmful particulate and dust, resulting in a cleaner and healthier environment.

Color-coded Microfiber Technology - Color-coded microfiber technology addresses two critical areas of concern.

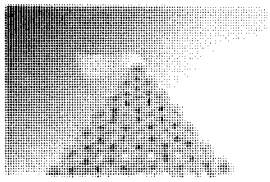
Cross Contamination - Cross contamination often occurs when cleaning tools and cloths are used indiscriminately. Color coded microfiber cloths and tools are highly visible and each color defines the location where the cloth or tool can be safely used. For example: a cleaning cloth used on a floor should not be used on a counter; or a cloth used to clean and bathroom should not be used to clean a kitchen. Color coding provides a method for structuring a healthier cleaning modality.



Microfiber Technology - CleanNet utilizes Microfiber technology that is made from split conjugated fibers. These efficient fibers have electrostatic charge that attract and trap particulate within its fibers.

***Green Seal Certified* Cleaning Products** - Upon request, CleanNet can use products that meet Green Seal's environmental standards for industrial and institutional cleaners based on reduced human and aquatic toxicity and reduced smog producing potential.

Biodegradable trashcan liners - Biodegradable trashcan liners remove a key pollutant from landfills.



Recycled Paper Products - Made from 100% recycled materials, our paper products do not contribute to the further destruction of forests.

Carbon Disclosure Project - CleanNet is a voluntary participant in the Carbon Disclosure Project, working actively to make the world a cleaner and safer place.

Chemicals used at our sites – CleanNet uses a variety of cleaning chemicals by a variety of manufactures with 95% of all chemicals being Green Certified. Every customer receives Material Safety Data Sheets with exact chemicals prior to the start of service. Chemicals for your building are as follows … Spartan Green Solutions All Purpose Cleaner, Spartan Green Solutions Neutral Disinfectant Cleaner, Spartan Biorenewables Restroom Cleaner, Spartan Biorenewables Glass Cleaner, Diversey Stride Citrus Neutral Cleaner, along with NCL strippers and waxes as well as other chemicals dictated based upon facility needs.

QUALITY ASSURANCE

CleanNet USA

Quality Assurance

Our Commitment Is What Sets Us Apart

Quality Standards and Communication

CleanNet USA goes to great lengths to ensure outstanding quality assurance and customer communication. Our tools and techniques include:

Computer Monitoring

CleanNet USA is one of the very few companies in the industry that uses internally developed software programs to monitor quality levels at its sites. Custom software with built-in computer driven controls are tools that allow us to monitor any deficiencies and respond in an appropriate manner, not only resolving the problem but also retraining the individuals performing the task to prevent it from recurring in the future.

Daily Use of Log Books

We keep a log book at your site, where you may leave instructions for the CleanNet USA crew and where our crew can pass important information to you about unusual conditions they have observed in your facility (for example, doors left unlocked or lights left on). We encourage you to communicate whenever you wish with the crew we've assigned. Our log book is reviewed and signed each night by the person supervising your account.

Damage Reports

CleanNet USA's cleaning personnel are required to report any damage, breakage, plumbing problems, or maintenance needs immediately to their supervisor. If this occurs, the supervisor leaves a report in your log book.

Regular Site Inspections

We certainly don't depend on our clients to monitor our services. Every facility receives a regular inspection from one of our Quality Assurance Managers. A written quality report is created for areas requiring improvement. This report is reviewed with the your Franchisee and the cleaner. All deficiencies are rectified immediately. Final reports are submitted and recorded for future tracking in CleanNet USA's proprietary software system.

On a daily basis an inspection report is printed for review by CleanNet USA's regional director, indicating sites visited, problems encountered and steps taken to correct them. Furthermore, various dates are assigned by the system to inspect the site again to ensure a permanent improvement has been achieved.

CleanNet USA

Periodic Telephone Surveys

CleanNet of Philadelphia will contact each customer periodically by telephone to ensure your satisfaction with our work.

Cell Phones

All CleanNet USA crews are equipped with cell phones so that they can be reached 24 hours a day, 7 days a week.

Emergency Hotline

You Quality Assurance Manager will be available 24 hours a day, 7 days a week, 365 days per year for prompt response in special situations and emergencies. In case of an emergency at your facility, our personnel will immediately contact the person you have designated and follow the emergency procedures you have prescribed for the office or building.

APPENDIX A
INSURANCE CERTIFICATE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 11/5/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Exchange Underwriters, Inc
121 West Pike Street
Canonsburg PA 15317

CONTACT NAME: Brenda Berdine
PHONE (A/C, No, Ext): 724-745-1600 **FAX (A/C, No):** 724-745-0224
E-MAIL ADDRESS: bberdine@exchangeunderwriters.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Ohio Casualty	24074
INSURER B : Technology Insurance Company	42376
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
CNU-007
CleanNet of Philadelphia
MKH Services, Inc. dba
234 Mall Boulevard Suite 115
King Of Prussia PA 19406

COVERAGES **CERTIFICATE NUMBER:** 422502912 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC			CBP8923818	9/1/2014	9/1/2015	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $300,000 $15,000 $1,000,000 $2,000,000 $2,000,000
A	AUTOMOBILE LIABILITY [ ] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [X] HIRED AUTOS [X] NON-OWNED AUTOS			CBP8923818	9/1/2014	9/1/2015	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000 $ $ $
A	[X] UMBRELLA LIAB [X] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [X] RETENTION $10,000			CU8923918	9/1/2014	9/1/2015	EACH OCCURRENCE AGGREGATE	$5,000,000 $5,000,000
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N [ ] If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		TWC3434574	9/1/2014	9/1/2015	[X] WC STATU-TORY LIMITS [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$500,000 $500,000 $500,000
A	Third Party Theft			CBP8923818	9/1/2014	9/1/2015	Limit	25,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

ADDITIONAL INSURED STATUS APPLIES WITH RESPECTS TO GENERAL LIABILITY ON A PRIMARY AND NONCONTRIBUTORY BASIS WHEN REQUIRED BY CLEANNET BILLED CONTRACTS. PARTICIPATING FRANCHISEES ARE COVERED FOR GENERAL LIABILITY, WORKERS COMPENSATION AND BOND. GENERAL LIABILITY AND WORKERS COMPENSATION WAIVER OF SUBROGATION APPLIES WHEN REQUIRED BY CONTRACT. UMBRELLA POLICY FOLLOWS FORM.

CERTIFICATE HOLDER

Evidence
of Insurance
King of Prussia PA 19406

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Brenda L Berdine

RADNOR TOWNSHIP
301 IVEN AVENUE
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600
Fax (610) 688-1279
www.radnor.com

ADDENDUM #1
FOR THE

CUSTODIAL SERVICES FOR THE RADNOR TOWNSHIP MUNICIPAL BUILDING AND THE RADNOR ACTIVITY CENTER CONTRACT #B-17-004

November 21, 2017

Ladies and Gentlemen:

All prospective bidders for the above referenced RFP are hereby advised of the following changes or clarifications:

1. PRE-BID MEETING NOTES AND SIGN-IN SHEET
   See Pre-bid meeting notes and sign-in sheet as attached.

Thank you for your time and interest and your attention to these changes.

Sincerely,
Melissa Conn
Purchasing and Contracts Coordinator

BIDDER MUST ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE BULLETINS ACKNOWLEDGEMENT FORM INCLUDED IN THE BID DOCUMENTS PACKET.

RESOLUTION NO. 2018-09
A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AUTHORIZING THE APPLICATION OF A MULITMODAL FUNDING GRANT APPLICATION FOR THE CONSTRUCTION OF INTERSECTION IMPROVEMENTS AT KING OF PRUSSIA, EAGLE, AND PINE TREE ROADS

Be it RESOLVED, Radnor Township in Delaware County hereby requests a Multimodal Transportation Fund grant of $1,302,979 from the Pennsylvania Department of Transportation to be used for roadway, signal and pedestrian safety improvements to the intersection of King of Prussia, Eagle and Pine Tree Roads.

Be it FURTHER RESOLVED, that the Applicant does hereby designate Lisa Borowski, President, Board of Commissioners, and Robert A. Zienkowski, Township Manager and Secretary, as the officials to execute all documents and agreements between Radnor Township and the Pennsylvania Department of Transportation to facilitate and assist in obtaining the requested grant.

I, Robert Zienkowski, duly qualified Secretary of Radnor Township in Delaware County, PA, hereby certify that the forgoing is a true and correct copy of a Resolution duly adopted by a majority vote of the Board of Commissioners at a regular meeting held January 22, 2018 and said Resolution has been recorded in the Minutes of Radnor Township and remains in effect as of this date.

IN WITNESS THEREOF, I affix my hand and attach the seal of Radnor Township, this 22nd day of January A.D., 2018.

RADNOR TOWNSHIP
DELWARE COUNTY, PA

BY: _____

Name: Lisa Borowski
Title: President

ATTEST: _____

Name: Robert Zienkowski
Title: Township Manager and Secretary

Radnor Township

PROPOSED LEGISLATION

DATE: January 17, 2018

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer SFN

CC: Robert A. Zienkowski, Township Manager
William M. White, Assistant Township Manager & Finance Director
Brian Eury, Cabrini University
Ingrid Cooper, Eastern University

LEGISLATION: **Resolution #2018-09**: Authorizing the Grant Application for Improvements to the King of Prussia Road/Eagle Road/Pine Tree Road Intersection, in partnership with Cabrini University and Eastern University

---

LEGISLATIVE HISTORY: This project has not been before the Board of Commissioners previously.

PURPOSE AND EXPLANATION: The intersection of King of Prussia Road, Pine Tree Road, and Eagle Road is the point of considerable congestion. During peak hours, traffic can back up from this intersection to near Berwind Road. This congestion not only affects our residents, but it also affects Cabrini and Eastern Universities. To that end, the Universities approached the Township to partner in improving the intersection, via the use of a Multimodal Transportation Fund Grant (MTF). The following are highlights of the proposed intersection improvements:

- A dedicated left-hand turn lane for south bound King of Prussia Road on to Pine Tree Road
- A dedicated left-hand turn lane for north bound King of Prussia Road onto Eagle Road
- A dedicated right-hand turn lane for east bound Eagle Road onto south bound King of Prussia Road
- A left-hand turn lane from north bound King of Prussia Road into Cabrini University
- Road widening (along the frontage of Eastern and Cabrini Universities), as well as wearing course overlay
- New traffic signals

The plan set for the proposed project is attached for your convenience. The estimated total project cost is $1,861,398. The amount requested in the grant application is $1,302,979. Local matching (30%) funds of $558,419 are required; the match would be split amongst Radnor Township, Cabrini University, and Eastern University equally, with our share being $186,140. Pending Board of Commissioners approval of Resolution #2018-09, the requisite grant request letters (please see attached) letters would be signed by the Township Manager.

IMPLEMENTATION SCHEDULE: Upon approval by the Board of Commissioners, the appropriate funding commitment letters would be signed, and the Resolution attached to the grant applications. The project will still need to go through the Penn DOT approval process, as well as bidding procedure. The actual start of construction would be determined prior to the bidding process.

FISCAL IMPACT: The Township's portion of the grant would be funded from the Capital Improvement Plan (CIP), Traffic Signal Improvements, 005-04-430-48202, in the amount of $186,140.

RECOMMENDED ACTION: I respectfully request the Board of Commissioners authorize grant applications, including funding commitment letters, in partnership with Cabrini and Eastern Universities, for the Multimodal Transportation Fund Grant, with a total cost to the Township of $186,140.

MOVEMENT OF LEGISLATION: It is being requested the Board of Commissioners authorize the submission of the grant applications.

Enclosures:
Plan Set
Resolution
Funding Letter
Econ Partners Grant Summary

Radnor Township Intersection Improvements
(KOP, Eagle and Pine Tree Roads)
PennDOT MTF Application

Multimodal Transportation Fund (MTF) Program

The Multimodal Transportation Fund Program supports the development, rehabilitation and enhancement of transportation assets to existing communities, streetscape, lighting, sidewalk enhancement, pedestrian safety, connectivity of transportation assets and transit-oriented development.

Funding to be requested to support the complete scope of improvements at the intersection of King of Prussia, Eagle and Pine Tree Roads, including: the addition turn lanes off of King of Prussia Road; road widening, signal improvements; repaving; new signage; and related streetscape and stormwater management enhancements. These improvements are currently estimated to cost $1,861,398.

Applicant: Radnor Township **Application Lead:** Cabrini University

Application Deadline: Anticipated January 2018 **Funding Decisions:** Summer – Early Fall 2018

Local Cost Share Requirement: 30% of total project costs (to be provided in thirds by Radnor Township, Eastern University and Cabrini University)

Required Municipal Documents:

- Authorized official resolution
  (see Draft: *Radnor Township KOP_Eagle Roads PennDOT MTF Resolution_1.8.2018.doc*)
- Funding commitment letter identifying source of local matching funds
  (See Draft: *MTF Match Funding Commitment Letter_Radnor Township_KOP_Eagle Roads_January2018.doc*)
- Most recent audited financial statement for Radnor Township

Possible Funding Scenario:

Assuming full funding of the grant request and equal cost share between the Township, Cabrini University and Eastern University.

PennDOT Multimodal Grant

Total Project Cost:	$1,861,398
PennDOT MTF Grant:	$1,302,979
Local Match (30%):	$558,419
Each Party's Total Share:	**$186,140**

RADNOR TOWNSHIP
301 IVEN AVENUE
WAYNE, PENNSYLVANIA 19087-5297

Phone (610) 688-5600
Fax (610) 971-0450
www.radnor.com

January 3, 2018

David J. Bratina
PennDOT Office of Multimodal Transportation
Commonwealth Keystone Building
400 North Street, 8th Floor
Harrisburg, PA 17120-3457

RE: King of Prussia Road and Eagle Road Intersection Improvements Project, Radnor Township

Dear Mr. Bratina,

I am writing to acknowledge the intention of Radnor Township, in Delaware County, to submit an approximately $1,302,979 Multimodal Transportation Fund grant request to complete roadway and pedestrian safety improvements at the intersection of King of Prussia and Eagle Roads in Radnor Township, PA. The municipality is partnering with Cabrini University and Eastern University to complete the project.

Grant funds received from PennDOT will be used to address congestion and multimodal circulation concerns at the intersection of King of Prussia and Eagle Roads. The improvements involve the overall enlargement of the intersection, including: the addition of a northbound turn lane off of King of Prussia Road; signal improvements; repaving; new signage; and related streetscape and stormwater management enhancements.

Cabrini University, Eastern University and Radnor Township will provide the matching funds for this project. The municipality is committed to providing one third (1/3), up to $186,140, of the $558,419 in matching funds towards the anticipated $1,861,398 in total project costs. Collateral for the municipal match is the Township's taxing authority.

Thank you for your consideration of Radnor's MTF request. Should you have any questions about the project or the municipality's committed match funding, please contact me at (610) 688-5600 or rzienkowski@radnor.org.

Sincerely,

Robert A. Zienkowski
Township Manager and Secretary

INTERSECTION IMPROVEMENTS

FOR

EAGLE ROAD (S.R. 1042) AND KING OF PRUSSIA ROAD (S.R. 1021)

SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

1/0 LOCATION MAP

Scale: 1" = 1000 ft

CIVIL DRAWING SCHEDULE

DRAWING NUMBER	DRAWING TITLE	11/18/11 H.O.P. SUBMISSION	H.O.P. RESUBMISSION	H.O.P. RESUBMISSION	H.O.P. RESUBMISSION
CS	COVER SHEET	•	•	•	•
1	PENNDOT CONSTRUCTION PLAN	•	•	•	•
2	EXISTING CONDITIONS & DEMOLITION PLAN	•	•	•	•
3	EXISTING UTILITIES DEMOLITION PLAN	•	•	•	•
4	SOIL EROSION CONTROL PLAN	•	•	•	•
5	SITE DEVELOPMENT PLAN	•	•	•	•
6	ENLARGED INTERSECTION SITE DEVELOPMENT PLAN	•	•	•	•
7	SITE UTILITIES PLAN	•	•	•	•
8	ENLARGED INTERSECTION SITE UTILITIES PLAN	•	•	•	•
9	PAVEMENT MARKING AND SIGNAGE PLAN	•	•	•	•
10	TYPICAL TRAFFIC CONTROL PLANS AND DETAILS	•	•	•	•
11	PENNDOT SITE DETAILS	•	•	•	•
12	PENNDOT STORM SEWER DETAILS	•	•	•	•
13	STORM SEWER PROFILES AND SITE UTILITY DETAILS	•	•	•	•
14	SOIL EROSION CONTROL DETAILS AND NOTES	•	•	•	•
15	REQUIRED RIGHT-OF-WAY PLAN	•	•	•	•
16	SPREAD OF FLOW DRAINAGE AREAS PLAN	•	•	•	•
17	TRUCK TURNING MANEUVERS PLAN			•	•
18	TRUCK TURNING MANEUVERS PLAN			•	•
19	FIRE TRUCK TURNING MANEUVERS PLAN				•

SEAL: DAVID C. BRANDT, PROFESSIONAL ENGINEER, PENNSYLVANIA

PROJECT: INTERSECTION IMPROVEMENTS
EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

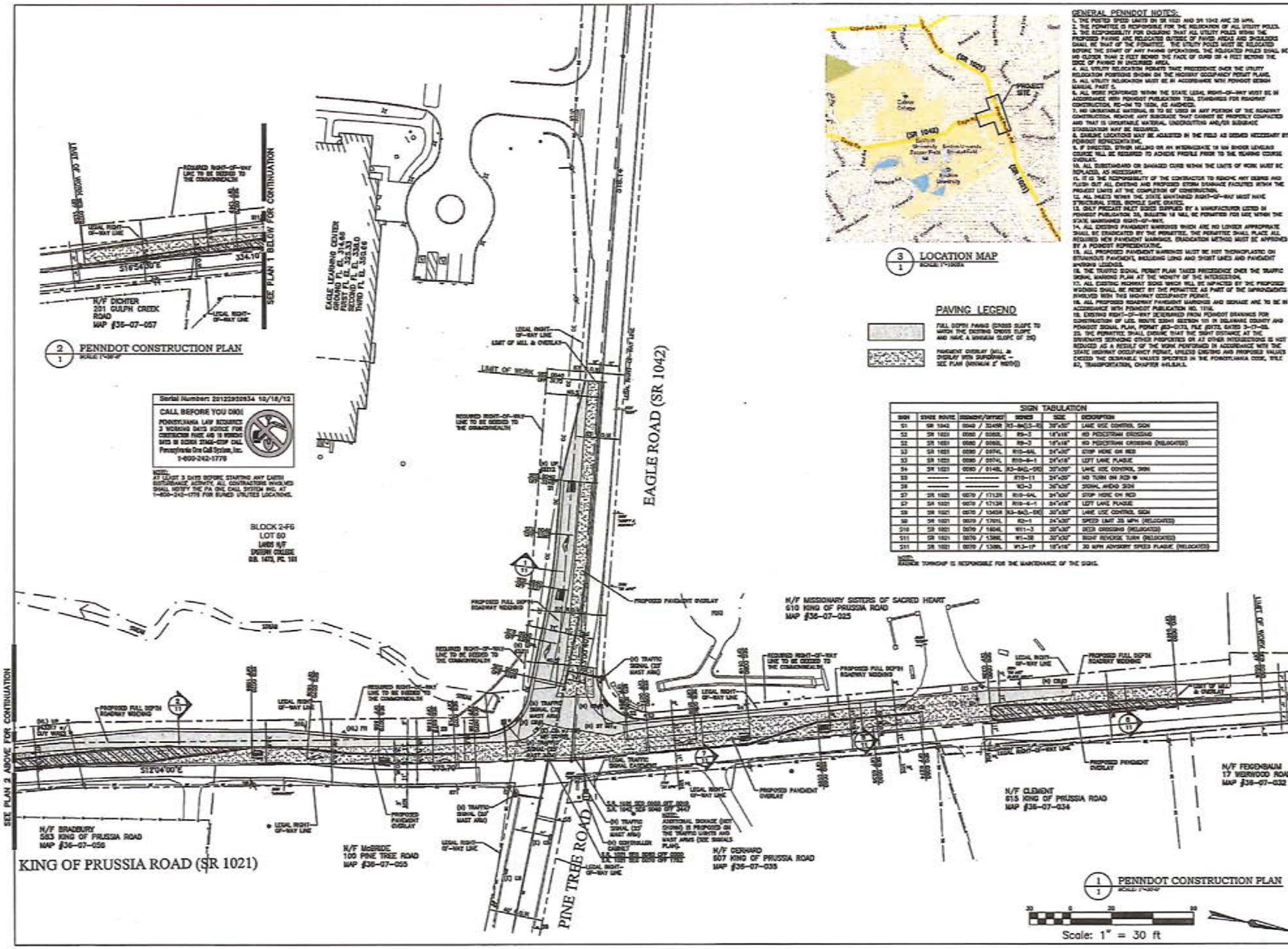
DATE	REVISION
11/18/11	H.O.P. SUBMISSION
[illegible]	H.O.P. RESUBMISSION
[illegible]	H.O.P. RESUBMISSION
[illegible]	H.O.P. RESUBMISSION

SHEET TITLE: COVER SHEET

DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.: CS

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



2 PENNDOT CONSTRUCTION PLAN

1 PENNDOT CONSTRUCTION PLAN

Serial Number: 20122920934 10/18/12

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE—STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776

NOTE:
AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITY, ALL CONTRACTORS INVOLVED SHALL NOTIFY THE PA ONE CALL SYSTEM INC. AT 1-800-242-1776 FOR BURIED UTILITIES LOCATIONS.

3 LOCATION MAP

GENERAL PENNDOT NOTES:

1. THE POSTED SPEED LIMITS ON SR 1021 AND SR 1042 ARE 35 MPH.
2. THE PERMITTEE IS RESPONSIBLE FOR THE RELOCATION OF ALL UTILITY POLES.
3. THE RESPONSIBILITY FOR ENSURING THAT ALL UTILITY POLES WITHIN THE PROPOSED PAVING ARE RELOCATED OUTSIDE OF PAVED AREAS AND SHOULDERS SHALL BE THAT OF THE PERMITTEE. THE UTILITY POLES MUST BE RELOCATED BEFORE THE START OF ANY PAVING OPERATIONS. THE RELOCATED POLES SHALL BE NO CLOSER THAN 2 FEET BEHIND THE FACE OF CURB OR 4 FEET BEYOND THE EDGE OF PAVING IN UNCURBED AREA.
4. ALL UTILITY RELOCATION PERMITS TAKE PRECEDENCE OVER THE UTILITY RELOCATION POSITIONS SHOWN ON THE HIGHWAY OCCUPANCY PERMIT PLANS.
5. ALL UTILITY RELOCATION MUST BE IN ACCORDANCE WITH PENNDOT DESIGN MANUAL PART 5.
6. ALL WORK PERFORMED WITHIN THE STATE LEGAL RIGHT-OF-WAY MUST BE IN ACCORDANCE WITH PENNDOT PUBLICATION 72M, STANDARDS FOR ROADWAY CONSTRUCTION, RC-OM TO 100M, AS AMENDED.
7. NO UNSUITABLE MATERIAL IS TO BE USED IN ANY PORTION OF THE ROADWAY CONSTRUCTION. REMOVE ANY SUBGRADE THAT CANNOT BE PROPERLY COMPACTED AND THAT IS UNSUITABLE MATERIAL. UNDERCUTTING AND/OR SUBGRADE STABILIZATION MAY BE REQUIRED.
8. SUBBASE LOCATIONS MAY BE ADJUSTED IN THE FIELD AS DEEMED NECESSARY BY PENNDOT REPRESENTATIVE.
9. IF DIRECTED, EITHER MILLING OR AN INTERMEDIATE 19 MM BINDER LEVELING COURSE WILL BE REQUIRED TO ACHIEVE PROFILE PRIOR TO THE WEARING COURSE OVERLAY.
10. ALL SUBSTANDARD OR DAMAGED CURB WITHIN THE LIMITS OF WORK MUST BE REPLACED, AS NECESSARY.
11. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REMOVE ANY DEBRIS AND FLUSH OUT ALL EXISTING AND PROPOSED STORM DRAINAGE FACILITIES WITHIN THE PROJECT LIMITS AT THE COMPLETION OF CONSTRUCTION.
12. ALL INLETS WITHIN THE STATE MAINTAINED RIGHT-OF-WAY MUST HAVE STRUCTURAL STEEL BICYCLE SAFE GRATES.
13. ONLY PRECAST INLET BOXES SUPPLIED BY A MANUFACTURER LISTED IN PENNDOT PUBLICATION 35, BULLETIN 15 WILL BE PERMITTED FOR USE WITHIN THE STATE MAINTAINED RIGHT-OF-WAY.
14. ALL EXISTING PAVEMENT MARKINGS WHICH ARE NO LONGER APPROPRIATE SHALL BE ERADICATED BY THE PERMITTEE. THE PERMITTEE SHALL PLACE ALL REQUIRED NEW PAVEMENT MARKINGS. ERADICATION METHOD MUST BE APPROVED BY A PENNDOT REPRESENTATIVE.
15. ALL PROPOSED PAVEMENT MARKINGS MUST BE HOT THERMOPLASTIC ON BITUMINOUS PAVEMENT, INCLUDING LONG AND SHORT LINES AND PAVEMENT MARKING LEGENDS.
16. THE TRAFFIC SIGNAL PERMIT PLAN TAKES PRECEDENCE OVER THE TRAFFIC SIGNAL MARKING PLAN AT THE VICINITY OF THE INTERSECTION.
17. ALL EXISTING HIGHWAY SIGNS WHICH WILL BE IMPACTED BY THE PROPOSED WIDENING SHALL BE RESET BY THE PERMITTEE AS PART OF THE IMPROVEMENTS INVOLVED WITH THIS HIGHWAY OCCUPANCY PERMIT.
18. ALL PROPOSED ROADWAY PAVEMENT MARKINGS AND SIGNAGE ARE TO BE IN ACCORDANCE WITH PENNDOT PUBLICATION NO. 111M.
19. EXISTING RIGHT-OF-WAY DETERMINED FROM PENNDOT DRAWINGS FOR CONSTRUCTION OF LEG. ROUTE 23041 SECTION 101 IN DELAWARE COUNTY AND PENNDOT SIGNAL PLAN, PERMIT #63-0173, FILE #0173, DATED 3-17-03.
20. THE PERMITTEE SHALL ENSURE THAT THE SIGHT DISTANCE AT THE DRIVEWAYS SERVING OTHER PROPERTIES OR AT OTHER INTERSECTIONS IS NOT REDUCED AS A RESULT OF THE WORK PERFORMED IN ACCORDANCE WITH THE STATE HIGHWAY OCCUPANCY PERMIT, UNLESS EXISTING AND PROPOSED VALUES EXCEED THE DESIRABLE VALUES SPECIFIED IN THE PENNSYLVANIA CODE, TITLE 67, TRANSPORTATION, CHAPTER 441.8.H.1.

PAVING LEGEND

- FULL DEPTH PAVING (CROSS SLOPE TO MATCH THE EXISTING CROSS SLOPE AND HAVE A MINIMUM SLOPE OF 2%)
- PAVEMENT OVERLAY (MILL & OVERLAY WITH SUPERPAVE — SEE PLAN (MINIMUM 2" WIDTH))

SIGN TABULATION

SIGN	STATE ROUTE	SEGMENT/OFFSET	SERIES	SIZE	DESCRIPTION
S1	SR 1042	0040 / 3249R	R3-8A(L5-R)	30"x30"	LANE USE CONTROL SIGN
S2	SR 1021	0080 / 0060L	R9-3	18"x18"	NO PEDESTRIAN CROSSING
S2	SR 1021	0080 / 0060L	R9-3	18"x18"	NO PEDESTRIAN CROSSING (RELOCATED)
S3	SR 1021	0080 / 0974L	R10-6AL	24"x30"	STOP HERE ON RED
S3	SR 1021	0080 / 0974L	R10-6-1	24"x18"	LEFT LANE PLAQUE
S4	SR 1021	0080 / 0148L	R3-8A(L-SR)	30"x30"	LANE USE CONTROL SIGN
S5	———	———	R10-11	24"x30"	NO TURN ON RED ●
S6	———	———	W3-3	36"x36"	SIGNAL AHEAD SIGN
S7	SR 1021	0070 / 1713R	R10-6AL	24"x30"	STOP HERE ON RED
S7	SR 1021	0070 / 1713R	R10-6-1	24"x18"	LEFT LANE PLAQUE
S8	SR 1021	0070 / 1345R	R3-8A(L-SR)	30"x30"	LANE USE CONTROL SIGN
S9	SR 1021	0070 / 1701L	R2-1	24"x30"	SPEED LIMIT 35 MPH (RELOCATED)
S10	SR 1021	0070 / 1604L	W11-3	30"x30"	DEER CROSSING (RELOCATED)
S11	SR 1021	0070 / 1386L	W1-3R	30"x30"	RIGHT REVERSE TURN (RELOCATED)
S11	SR 1021	0070 / 1386L	W13-1P	18"x18"	30 MPH ADVISORY SPEED PLAQUE (RELOCATED)

NOTE:
RADNOR TOWNSHIP IS RESPONSIBLE FOR THE MAINTENANCE OF THE SIGNS.

aec
Associated Engineering Consultants, Inc.

SEAL
DAVID C. BRANDT
PROFESSIONAL ENGINEER

PROJECT
INTERSECTION IMPROVEMENTS
EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

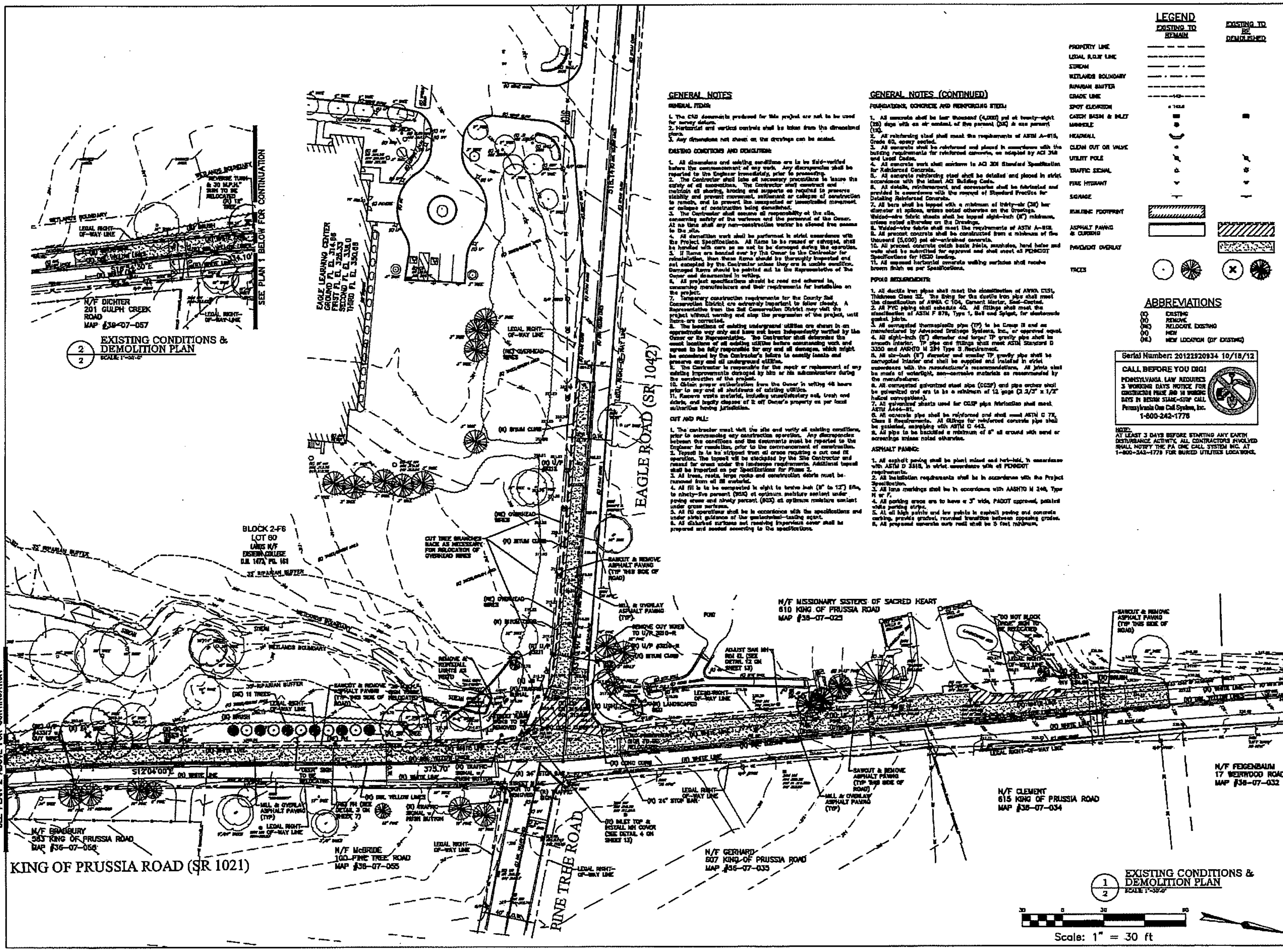
DATE	REVISION
7/18/11	H.O.P. SUBMISSION
03/11/12	H.O.P. RESUBMISSION
06/20/12	H.O.P. RESUBMISSION
09/10/12	H.O.P. RESUBMISSION

SHEET TITLE
PENNDOT CONSTRUCTION PLAN

DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.
1
SHEET NO. 2 OF 14

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



GENERAL NOTES

GENERAL ITEMS:

EXISTING CONDITIONS AND DEMOLITION:

CUT AND FILL:

GENERAL NOTES (CONTINUED)

FOUNDATIONS, CONCRETE AND REINFORCING STEEL:

PIPING REQUIREMENTS:

ASPHALT PAVING:

LEGEND

	EXISTING TO REMAIN	EXISTING TO BE DEMOLISHED
PROPERTY LINE		
LEGAL R.O.W. LINE		
STREAM		
WETLANDS BOUNDARY		
RIPARIAN BUFFER		
GRADE LINE		
SPOT ELEVATION		
CATCH BASIN & INLET		
MANHOLE		
HEADWALL		
CLEAN OUT OR VALVE		
UTILITY POLE		
TRAFFIC SIGNAL		
FIRE HYDRANT		
SIGNAGE		
BUILDING FOOTPRINT		
ASPHALT PAVING & CURBING		
PAVEMENT OVERLAY		
TREES		

ABBREVIATIONS

(E) EXISTING
(R) REMOVE
(RE) RELOCATE EXISTING
(N) NEW
(NL) NEW LOCATION (OF EXISTING)

Serial Number: 20122920934 10/18/12

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE-STOP CALL
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AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITY, ALL CONTRACTORS INVOLVED SHALL NOTIFY THE PA ONE CALL SYSTEM INC. AT 1-800-242-1776 FOR BURIED UTILITIES LOCATIONS.

aec

SEAL

DAVID C. BRANDT
PROFESSIONAL ENGINEER

PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
11/18/11	H.O.P. SUBMISSION
03/13/12	H.O.P. RESUBMISSION
08/28/12	H.O.P. RESUBMISSION
02/13/13	H.O.P. RESUBMISSION

SHEET TITLE

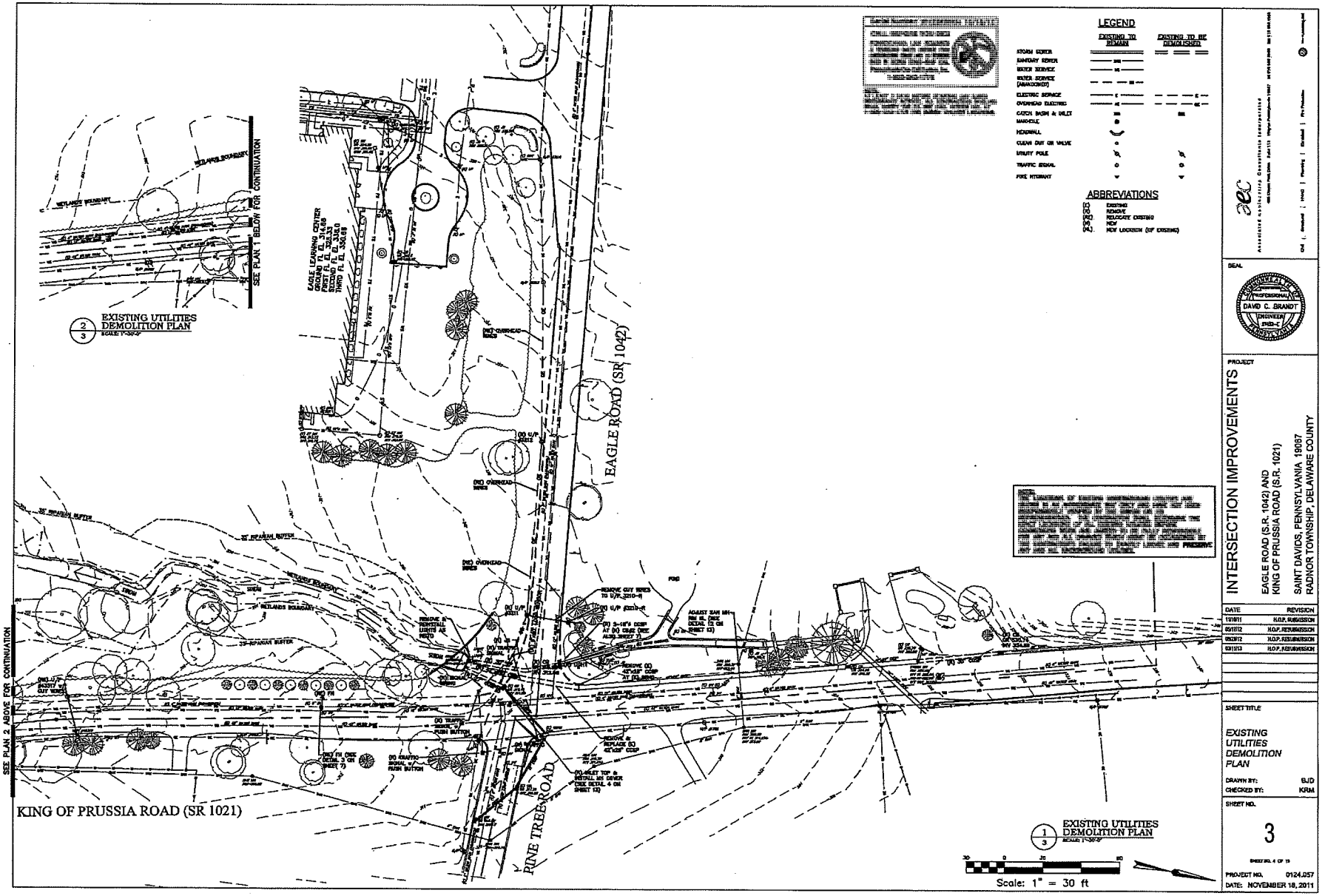
EXISTING CONDITIONS & DEMOLITION PLAN

DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.

2

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



aec
Associated Exploration Consultants Incorporated

SEAL
COMMONWEALTH OF PENNSYLVANIA
PROFESSIONAL ENGINEER
DAVID C. BRANDT
ENGINEER
PE#23-7

PROJECT
INTERSECTION IMPROVEMENTS
EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
12/9/11	H.O.P. SUBMISSION
05/17/12	H.O.P. RESUBMISSION
09/28/12	H.O.P. RESUBMISSION
03/13/13	H.O.P. RESUBMISSION

SHEET TITLE
EXISTING UTILITIES DEMOLITION PLAN

DRAWN BY: EJD
CHECKED BY: KRM

SHEET NO.
3

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011

CONSTRUCTION SEQUENCE:

IN GENERAL:

A. All earth disturbance activities shall proceed in accordance with the following sequence. Each stage shall be completed before any following stage is initiated. Clearing and grubbing shall be limited only to those areas described in each stage.

B. At least 7 days before starting any earth disturbance activities, the Contractor shall invite all subcontractors involved in those activities, the Owner, the Civil Engineer, and all appropriate municipal officials to an on-site pre-construction meeting.

C. Township engineer shall be notified 48 hours prior to the start of earthmoving activities.

D. Figure numbers referenced herein refer to PennDOT's Maintenance and Protection of Traffic during construction in PennDOT Publication 213, "Work Zone Traffic Control Guidelines", as amended April 1, 2010, and Title 67 PA Code, Chapter 212, "Official Traffic Control Devices", dated February 4, 2006 or most current.

E. Removal and replacement of the storm pipes shall be performed only when the weather forecast predicts at least 72 hours of rain-free weather.

F. Any and all open excavations shall be plated at the end of each work day.

SEQUENCE OF CONSTRUCTION:

1. Utilizing Figure 10b along the south side of Eagle Road, the electric utility company shall install the new utility poles #3211 and #3212, relocate the overhead wires to the new poles and remove the old utility poles.

2. Utilizing Figure 10a along the west side of King of Prussia Road south of Eagle Road, the electric utility company shall install the new guy pole #43317, relocate the overhead guy wires to the new pole and remove the old guy pole.

3. Utilizing Figure 10b along the west side of King of Prussia Road south of Eagle Road, the water utility company shall remove the existing fire hydrant, install the new water service to the relocated fire hydrant and install the relocated fire hydrant.

4. Install the silt fence adjacent to the existing headwall as shown on the "Soil Erosion Control Plan" Sheet 4.

5. Utilizing Figure 10b along the south side of Eagle Road, excavate and remove the existing 27" CCSP pipe from the existing curb inlet to the existing headwall. Install new CB#1, the new 27" CCSP pipe from the headwall to new CB#1, the new 21" CCSP pipe from new CB#1 to the existing curb inlet. Remove the inlet top and install manhole top. Backfill pipe trenches, patch pavement at capped inlet and install temporary inlet filter bag at new CB#1.

6. Install the temporary pump, intake pipe, pump discharge pipe and dam at the existing inlet on King of Prussia Road (see Plan for location).

7. Utilizing Figure 10b along the south side of Eagle Road, excavate and remove the existing 42"x29" CCSP pipe from the existing headwall to the limit of the temporary traffic controls. Install the new 42"x29" CCSP pipe from the existing headwall to the limit of the temporary traffic controls. Backfill the pipe trench and restore the pavement. Plate the opening at the ends of the existing and new pipes before the next step.

8. Utilizing Figure 10b along the north side of Eagle Road, excavate and remove the remainder of the existing 42"x29" CCSP pipe to the new ST MH location. Install new ST MH and the remainder of the new 42"x29" CCSP pipe. Backfill the pipe trench and restore the pavement.

9. Once ST MH and the new 42"x29" CCSP pipe are installed and backfilled, remove the temporary dam and pumping system at the existing inlet upslope of ST MH.

10. Install the temporary pump, intake pipe, pump discharge pipe and dam at the headwall below the existing concrete channel (see Plan for location).

CONSTRUCTION SEQUENCE (CONTINUED):

11. Utilizing Figure 10b along the south side of Eagle Road, excavate and remove the existing 30" CCSP pipe from the existing headwall to the limit of the temporary traffic controls. Install the new 27" RCP pipe from the existing headwall to the limit of the temporary traffic controls. Backfill the pipe trench and restore the pavement. Plate the opening at the ends of the existing and new pipes before the next step.

12. Utilizing Figure 10b along the north side of Eagle Road, excavate and remove the remainder of the existing 30" CCSP pipe, the existing inlet and the two 18" CCSP pipes at the new CB#2 location. Install new CB#2 and the remainder of the new 27" RCP pipe. Backfill the pipe trench and restore the pavement. Install temporary inlet filter bag at new CB#2.

13. Once CB#2 and the new 27" RCP pipe are installed and backfilled, remove the temporary dam and pumping system at the existing headwall.

14. Utilizing Figure 10b along the west side of King of Prussia Road north of Eagle Road, remove the existing curbing at the northwest corner of the intersection. Install the new pavement base drains to CB#2 and the new concrete curbing. Construct the full depth roadway widening. Regrade and seed between the roadway and the concrete channel. Adjust the sanitary manhole top as noted. Install curlex blankets where shown at slopes steeper than 3:1.

15. Utilizing Figure 10b along the west side of King of Prussia Road south of Eagle Road, install the temporary silt fence, staggered up the slope as indicated on the Plan. Remove and relocate the existing trees along the roadway as indicated on Sheets 1 and 5. Relocate the existing signs as indicated. Remove the traffic signal and existing curbing south of new CB#1. Provide temporary traffic signal. Install the new concrete curbing south of new CB#1. Install the new traffic signal south of CB#1. Construct the full depth roadway widening. Regrade and seed the disturbed areas beyond the roadway. Remove the temporary silt fence. Stabilize the areas that are disturbed due to the removal of the temporary control measures.

16. Utilizing Figure 10b along the south side of Eagle Road, relocate the existing signs as indicated. Remove the traffic signal and existing curbing west of new CB#1. Provide temporary traffic signal. Install the new pavement base drain to CB#1 and the new concrete curbing west of new CB#1. Construct the full depth roadway widening. Install the new traffic signal west of CB#1. Regrade and seed the disturbed areas beyond the roadway.

17. Utilizing Figure 10b along the east side of King of Prussia Road north of Pine Tree Road, remove the existing traffic signal. Install the new traffic signal and new controller cabinet.

18. Remove the existing traffic signal located on the southeast corner of the intersection and install the new traffic signal in the same corner.

19. Install the silt fence north of the Cabrini College entrance driveway and the temporary inlet filter in existing inlet at the driveway (see Plan for location).

20. Install the temporary pump, intake pipe, pump discharge pipe and dams at the existing inlet and manhole on King of Prussia Road (see Plan for locations).

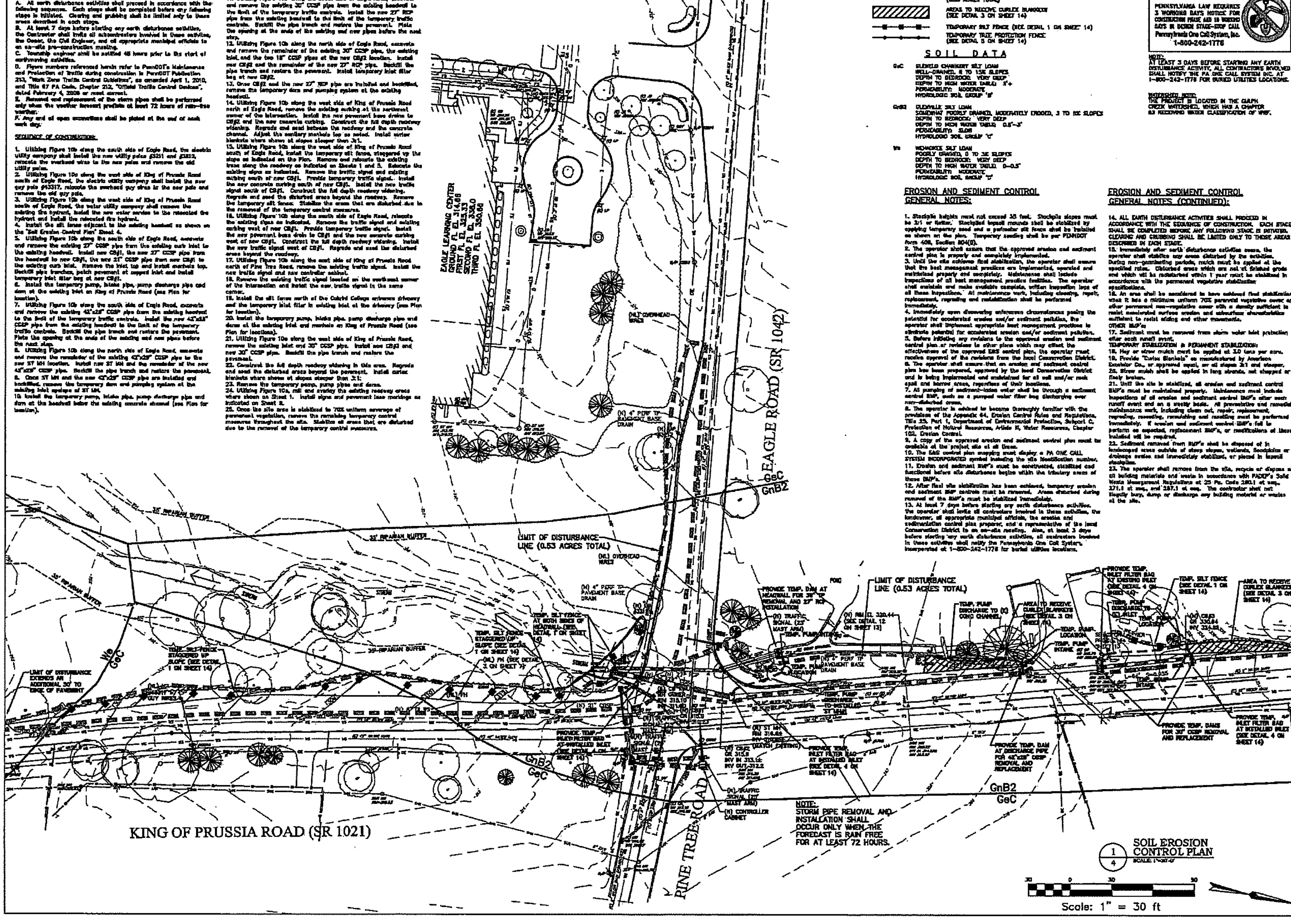
21. Utilizing Figure 10a along the west side of King of Prussia Road, remove the existing inlet and 30" CCSP pipe. Install new CB#3 and new 30" CCSP pipe. Backfill the pipe trench and restore the pavement.

22. Construct the full depth roadway widening in this area. Regrade and seed the disturbed areas beyond the pavement. Install curlex blankets where shown at slopes steeper than 3:1.

23. Remove the temporary pump, pump pipes and dams.

24. Utilizing Figure 10a, mill and overlay the existing roadway areas where shown on Sheet 1. Install signs and pavement lane markings as indicated on Sheet 8.

25. Once the site area is stabilized to 70% uniform coverage of perennial vegetation, remove the remaining temporary control measures throughout the site. Stabilize all areas that are disturbed due to the removal of the temporary control measures.



TEMP. CONSTRUCTION LEGEND

(dashed line)	LIMIT OF DISTURBANCE LINE (0.53 ACRES TOTAL)
(hatched area)	AREAS TO RECEIVE CURLEX BLANKETS (SEE DETAIL 3 ON SHEET 14)
(line with squares)	TEMPORARY SILT FENCE (SEE DETAIL 1 ON SHEET 14)
(line with dots)	TEMPORARY TREE PROTECTION FENCE (SEE DETAIL 5 ON SHEET 14)

S O I L D A T A

GeC — GLENELG CHANNERY SILT LOAM
WELL-DRAINED, 8 TO 15% SLOPES
DEPTH TO BEDROCK: VERY DEEP
DEPTH TO HIGH WATER TABLE: 3'+
PERMEABILITY: MODERATE
HYDROLOGIC SOIL GROUP 'B'

GnB2 — GLENVILLE SILT LOAM
SOMEWHAT POORLY DRAINED, MODERATELY ERODED, 3 TO 8% SLOPES
DEPTH TO BEDROCK: VERY DEEP
DEPTH TO HIGH WATER TABLE: 0.5'–3'
PERMEABILITY: SLOW
HYDROLOGIC SOIL GROUP 'C'

We — WEHADKEE SILT LOAM
POORLY DRAINED, 0 TO 3% SLOPES
DEPTH TO BEDROCK: VERY DEEP
DEPTH TO HIGH WATER TABLE: 0–0.5'
PERMEABILITY: MODERATE
HYDROLOGIC SOIL GROUP 'D'

EROSION AND SEDIMENT CONTROL GENERAL NOTES:

1. Stockpile heights must not exceed 35 feet. Stockpile slopes must be 2:1 or flatter. Stockpiled topsoil mounds shall be stabilized by applying temporary seed and a perimeter silt fence shall be installed as shown on the plan. Temporary seeding shall be per PENNDOT form 408, Section 804(B).

2. The operator shall ensure that the approved erosion and sediment control plan is properly and completely implemented.

3. Until the site achieves final stabilization, the operator shall ensure that the best management practices are implemented, operated and maintained properly and completely. Maintenance shall include inspections of all best management practice facilities. The operator shall maintain and make available complete, written inspection logs of all these inspections. All maintenance work, including cleaning, repair, replacement, regrading and restabilization shall be performed immediately.

4. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the operator shall implement appropriate best management practices to eliminate potential for accelerated erosion and/or sediment pollution.

5. Before initiating any revisions to the approved erosion and sediment control plan or revisions to other plans which may affect the effectiveness of the approved E&S control plan, the operator must receive approval of the revisions from the local Conservation District.

6. The operator shall ensure that an erosion and sediment control plan has been prepared, approved by the local Conservation District and is being implemented and maintained for all soil and/or rock spoil and borrow areas, regardless of their locations.

7. All pumping of sediment-laden water shall be through a sediment control BMP, such as a pumped water filter bag discharging over non-disturbed areas.

8. The operator is advised to become thoroughly familiar with the provisions of the Appendix 64, Erosion Control Rules and Regulations, Title 25, Part 1, Department of Environmental Protection, Subpart C, Protection of Natural Resources, Article II, Water Resources, Chapter 102, Erosion Control.

9. A copy of the approved erosion and sediment control plan must be available at the project site at all times.

10. The E&S control plan mapping must display a PA ONE CALL SYSTEM INCORPORATED symbol including the site identification number.

11. Erosion and sediment BMP's must be constructed, stabilized and functional before site disturbance begins within the tributary areas of those BMP's.

12. After final site stabilization has been achieved, temporary erosion and sediment BMP controls must be removed. Areas disturbed during removal of the BMP's must be stabilized immediately.

13. At least 7 days before starting any earth disturbance activities, the operator shall invite all contractors involved in these activities, the landowner, all appropriate municipal officials, the erosion and sedimentation control plan preparer, and a representative of the local Conservation District to an on-site meeting. Also, at least 3 days before starting any earth disturbance activities, all contractors involved in these activities shall notify the Pennsylvania One Call System, Incorporated at 1-800-242-1776 for buried utilities locations.

EROSION AND SEDIMENT CONTROL GENERAL NOTES (CONTINUED):

14. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE OF CONSTRUCTION. EACH STAGE SHALL BE COMPLETED BEFORE ANY FOLLOWING STAGE IS INITIATED. CLEARING AND GRUBBING SHALL BE LIMITED ONLY TO THOSE AREAS DESCRIBED IN EACH STAGE.

15. Immediately after earth disturbance activities cease, the operator shall stabilize any areas disturbed by the activities. During non-germinating periods, mulch must be applied at the specified rates. Disturbed areas which are not at finished grade and which will be redisturbed within 1 year must be stabilized in accordance with the permanent vegetative stabilization specifications.

16. An area shall be considered to have achieved final stabilization when it has a minimum uniform 70% perennial vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding and other movements.

OTHER BMP's:

17. Sediment must be removed from storm water inlet protection after each runoff event.

TEMPORARY STABILIZATION & PERMANENT STABILIZATION:

18. Hay or straw mulch must be applied at 3.0 tons per acre.

19. Provide "Curlex Blankets" as manufactured by American Excelsior Co., or approved equal, on all slopes 3:1 and steeper.

20. Straw mulch shall be applied in long strands, not chopped or finely broken.

21. Until the site is stabilized, all erosion and sediment control BMP's must be maintained properly. Maintenance must include inspections of all erosion and sediment control BMP's after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, remulching and renetting must be performed immediately. If erosion and sediment control BMP's fail to perform as expected, replacement BMP's, or modifications of those installed will be required.

22. Sediment removed from BMP's shall be disposed of in landscaped areas outside of steep slopes, wetlands, floodplains or drainage swales and immediately stabilized, or placed in topsoil stockpiles.

23. The operator shall remove from the site, recycle or dispose of all building materials and waste in accordance with PADEP's Solid Waste Management Regulations at 25 Pa. Code 260.1 et seq., 271.1 et seq., and 287.1 et seq. The contractor shall not illegally bury, dump or discharge any building material or wastes at the site.

Serial Number: 20122920934 10/18/12

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE–STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776

NOTE:
AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITY, ALL CONTRACTORS INVOLVED SHALL NOTIFY THE PA ONE CALL SYSTEM INC. AT 1-800-242-1776 FOR BURIED UTILITIES LOCATIONS.

WATERSHED NOTE:
THE PROJECT IS LOCATED IN THE GULPH CREEK WATERSHED, WHICH HAS A CHAPTER 93 RECEIVING WATER CLASSIFICATION OF WWF.

SOIL EROSION CONTROL PLAN (1/4)
SCALE: 1"=30'-0"

Scale: 1" = 30 ft

aec — Associated Engineering Consultants Incorporated

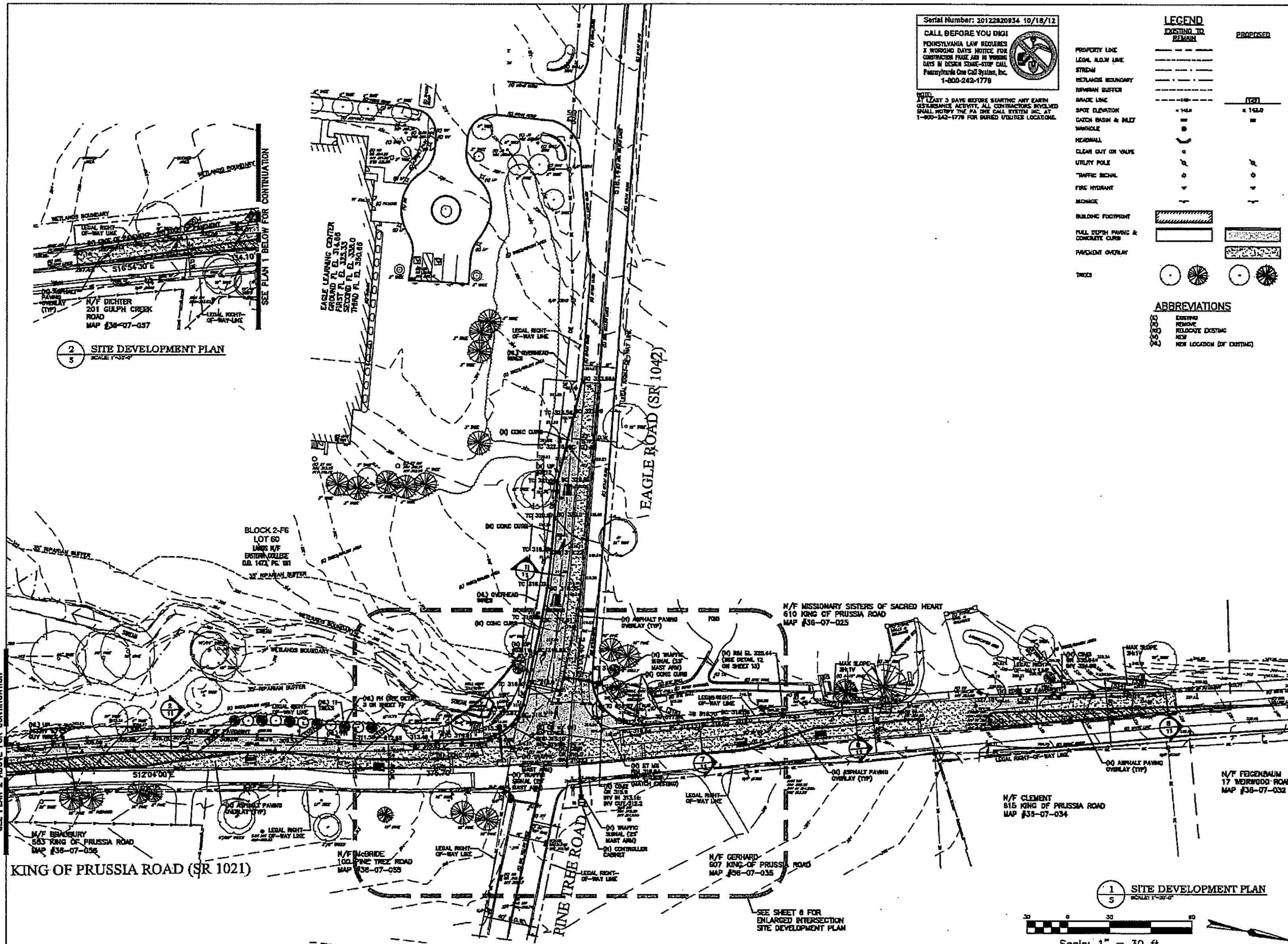
SEAL: DAVID C. BRANDT, PROFESSIONAL ENGINEER, PENNSYLVANIA

PROJECT: INTERSECTION IMPROVEMENTS
EAGLE ROAD (S.R. 1042) AND KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
11/3/11	H.O.P. SUBMISSION
3/21/12	H.O.P. RESUBMISSION
8/28/12	H.O.P. RESUBMISSION
3/11/13	H.O.P. RESUBMISSION

SHEET TITLE: SOIL EROSION CONTROL PLAN

DRAWN BY: BJD
CHECKED BY: KRM
SHEET NO. 4
SHEET NO. 5 OF 19
PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011


Serial Number: 20122820934 10/18/12
CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE–STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776
LEGEND
EXISTING TO REMAIN
PROPOSED
PROPERTY LINE
LEGAL R.O.W LINE
STREAM
WETLANDS BOUNDARY
RIPARIAN BUFFER
GRADE LINE
SPOT ELEVATION
CATCH BASIN & INLET
MANHOLE
HEADWALL
CLEAN OUT OR VALVE
UTILITY POLE
TRAFFIC SIGNAL
FIRE HYDRANT
SIGNAGE
BUILDING FOOTPRINT
FULL DEPTH PAVING & CONCRETE CURB
PAVEMENT OVERLAY
TREES
ABBREVIATIONS
EAGLE ROAD (SR 1042)
KING OF PRUSSIA ROAD (SR 1021)
PINE TREE ROAD
EAGLE LEARNING CENTER
BLOCK 2-F6
LOT 60
N/F MISSIONARY SISTERS OF SACRED HEART
610 KING OF PRUSSIA ROAD
MAP #36-07-025
N/F FEIGENBAUM
17 WEIRWOOD ROAD
MAP #36-07-032
N/F CLEMENT
615 KING OF PRUSSIA ROAD
MAP #36-07-034
N/F GERHARD
607 KING OF PRUSSIA ROAD
MAP #36-07-035
N/F McBRIDE
100 PINE TREE ROAD
MAP #36-07-053
N/F BRADBURY
583 KING OF PRUSSIA ROAD
MAP #36-07-056
N/F DICHTER
201 GULPH CREEK ROAD
MAP #36-07-057
SEE PLAN 1 BELOW FOR CONTINUATION
SEE PLAN 2 ABOVE FOR CONTINUATION
SEE SHEET 6 FOR ENLARGED INTERSECTION SITE DEVELOPMENT PLAN
2/5 SITE DEVELOPMENT PLAN
1/5 SITE DEVELOPMENT PLAN
Scale: 1" = 30 ft

SEAL
DAVID C. BRANDT
PROFESSIONAL ENGINEER

PROJECT
INTERSECTION IMPROVEMENTS
EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
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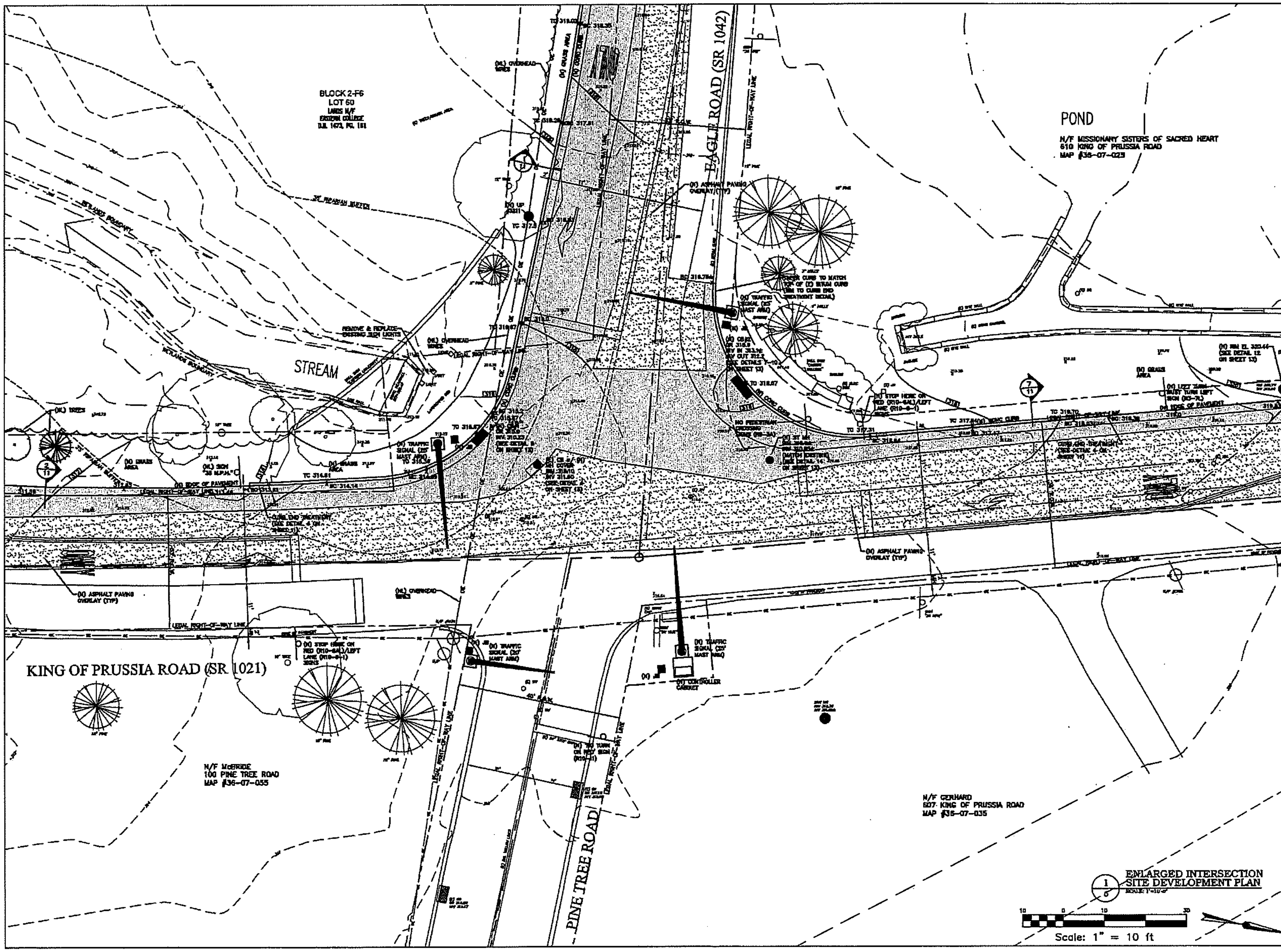
09/28/12	H.O.P. RESUBMISSION
03/11/13	H.O.P. RESUBMISSION

SHEET TITLE
SITE DEVELOPMENT PLAN

DRAWN BY: BJD
CHECKED BY: KRM
SHEET NO.
5
SHEET NO. 5 OF 11
PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



SEAL: DAVID C. BRANDT, PROFESSIONAL ENGINEER

PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)

SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
11/18/11	H.O.P. SUBMISSION
08/17/12	H.O.P. RESUBMISSION
09/28/12	H.O.P. RESUBMISSION
03/11/13	H.O.P. RESUBMISSION

SHEET TITLE

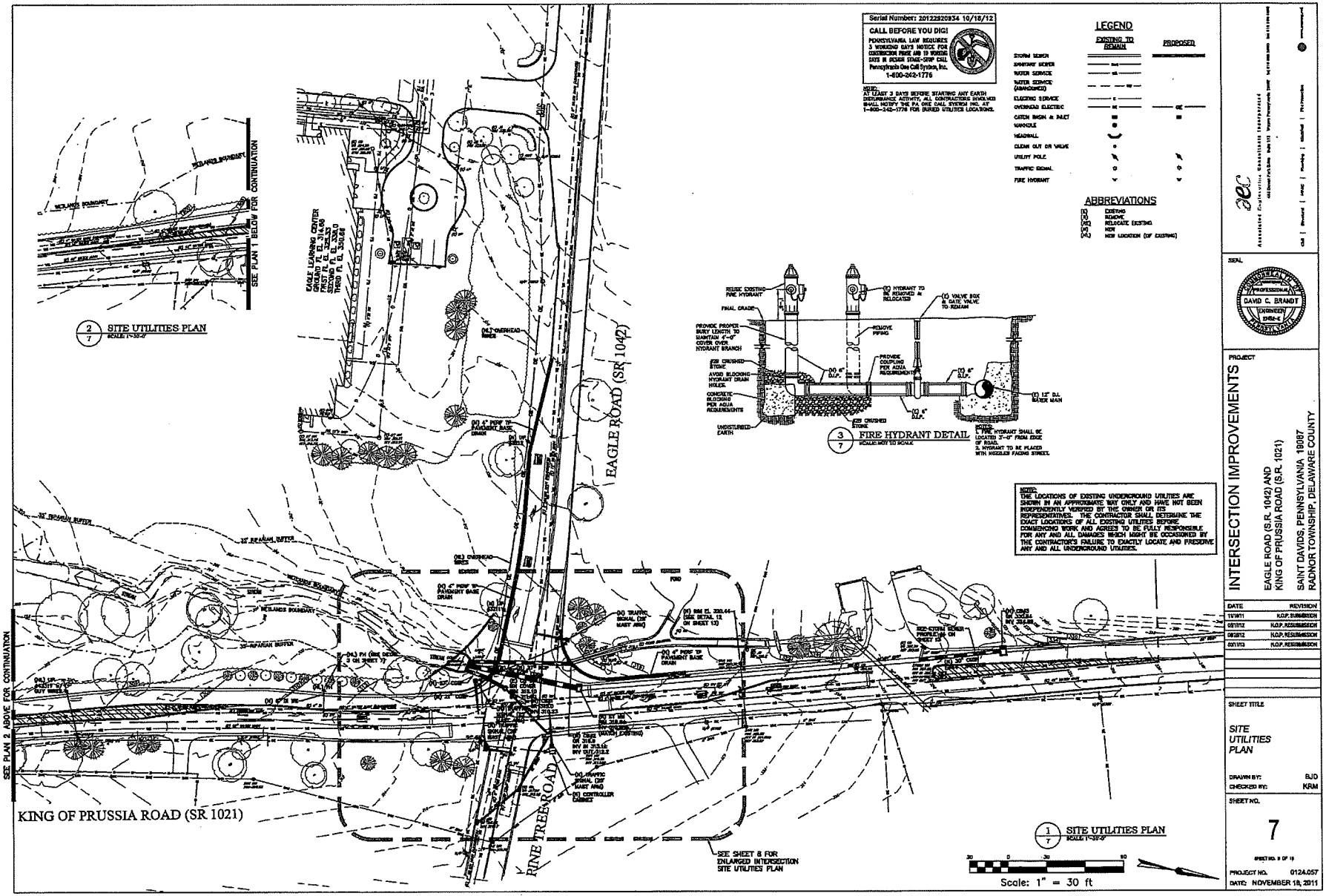
ENLARGED INTERSECTION SITE DEVELOPMENT PLAN

DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.

6

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



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Associates Engineering Consultants Incorporated

SEAL
COMMONWEALTH OF PENNSYLVANIA
PROFESSIONAL
DAVID C. BRANDT
ENGINEER
045E-E

PROJECT
INTERSECTION IMPROVEMENTS
EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

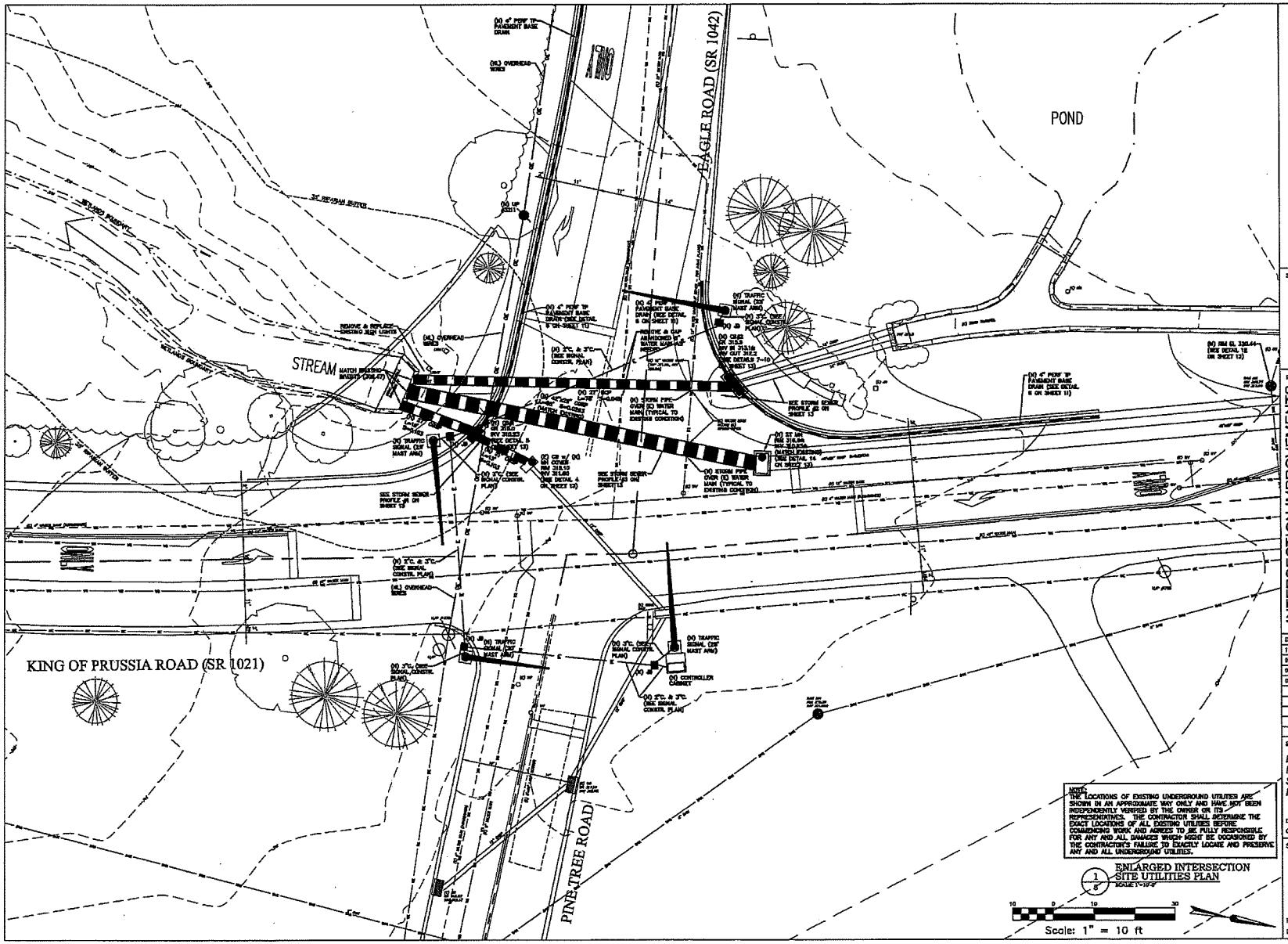
DATE	REVISION
11/18/11	N.O.P. SUBMISSION
02/10/12	N.O.P. RESUBMISSION
06/28/12	N.O.P. RESUBMISSION
10/31/12	N.O.P. RESUBMISSION

SHEET TITLE
SITE UTILITIES PLAN

DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.
7
SHEET NO. 8 OF 19

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



aec

SEAL

DAVID C. BRANDT
ENGINEER

PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)

SAINT DAVIDS, PENNSYLVANIA 19087
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DATE	REVISION
11/30/11	H.D.P. SUBMISSION
02/17/12	H.D.P. RESUBMISSION
06/29/12	H.D.P. RESUBMISSION
09/11/12	H.D.P. RESUBMISSION

SHEET TITLE

ENLARGED INTERSECTION SITE UTILITIES PLAN

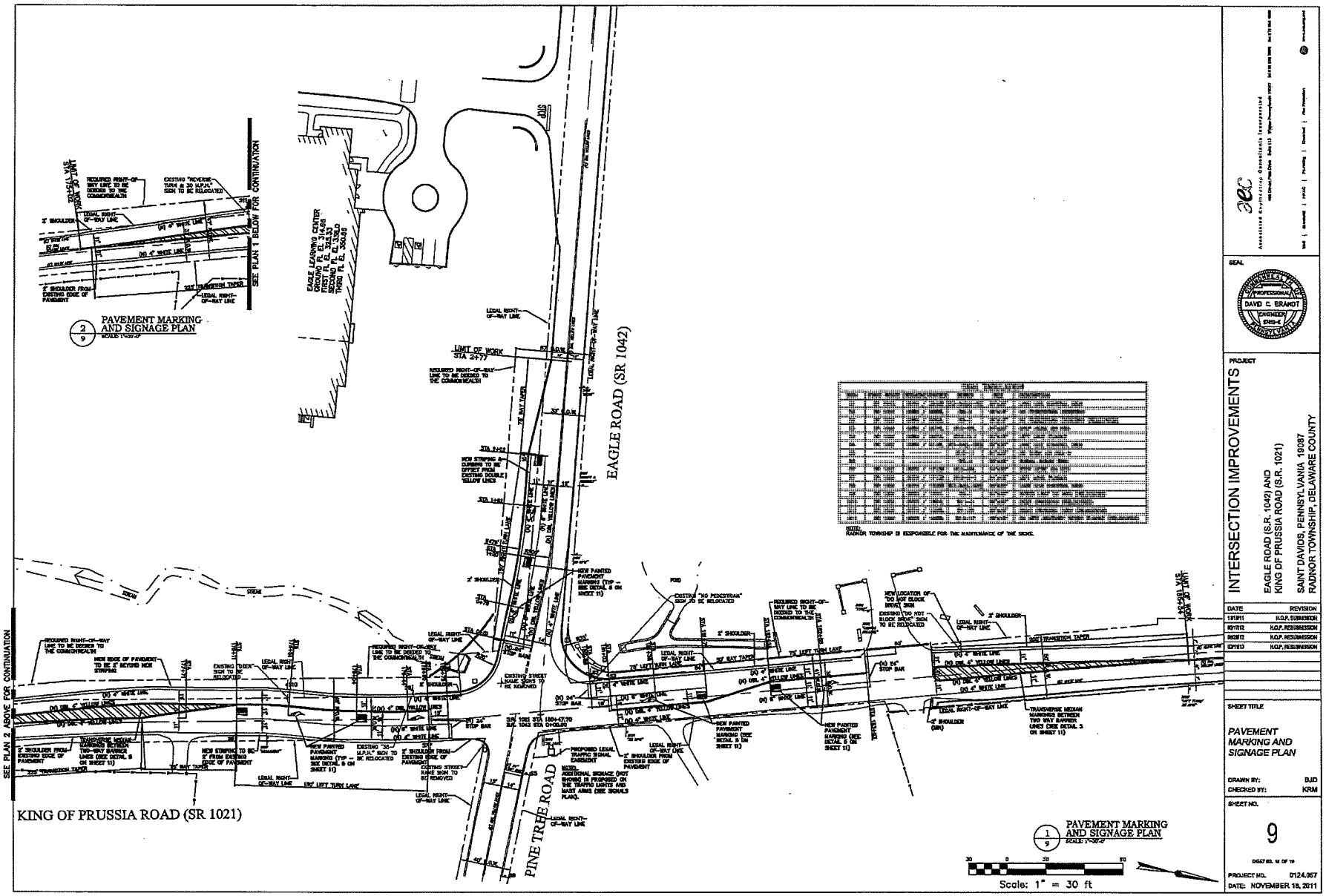
DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.

8

SHEET NO. 8 OF 19

PROJECT NO. 0124.057
DATE: NOVEMBER 16, 2011



INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)

SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
1/19/11	H.O.P. SUBMISSION
6/17/12	H.O.P. RESUBMISSION
9/28/12	H.O.P. RESUBMISSION
12/19/13	H.O.P. RESUBMISSION

SHEET TITLE

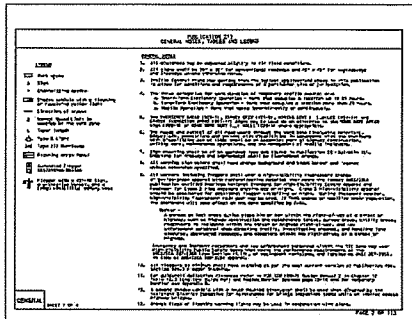
PAVEMENT MARKING AND SIGNAGE PLAN

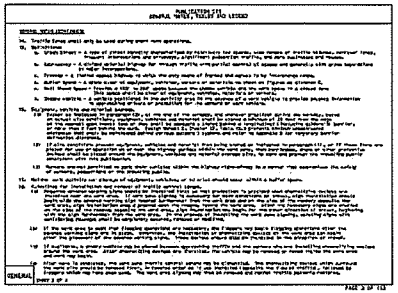
DRAWN BY: BJD
CHECKED BY: KRM

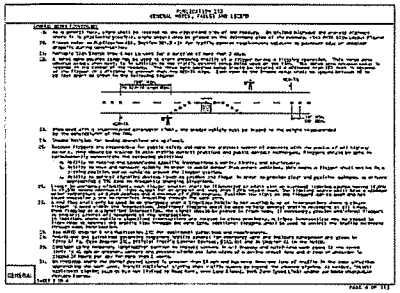
SHEET NO.

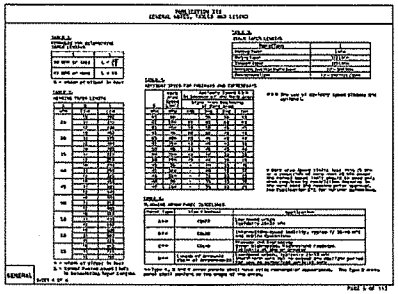
9

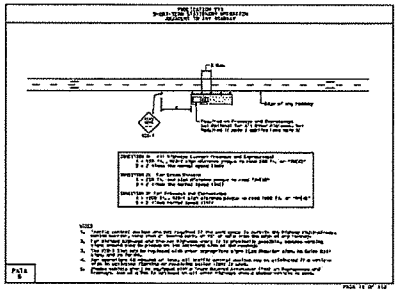
PROJECT NO. D124.057
DATE: NOVEMBER 18, 2011

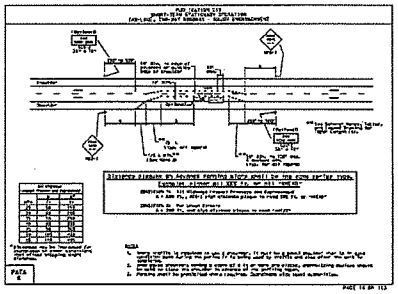


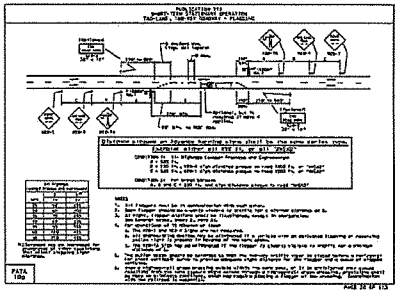


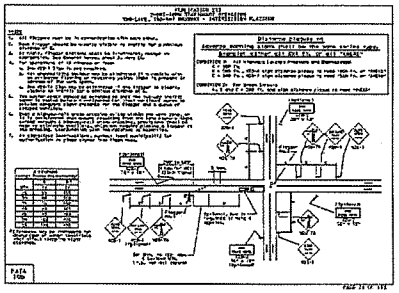


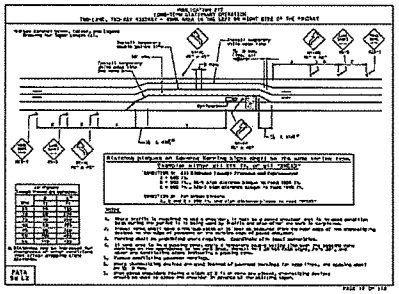


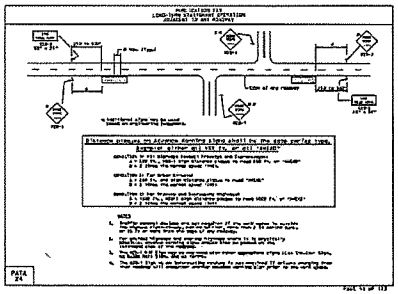


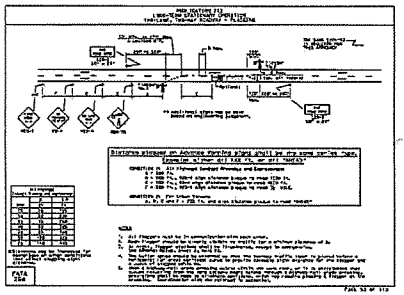


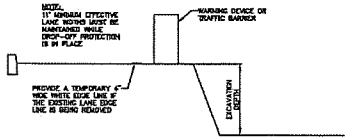












1/10 PAVEMENT DROP-OFF/SAFETY SLOPE PROTECTION DETAIL
SCALE: NOT TO SCALE

NOTES:
1. Maintenance and Protection of Traffic during construction shall be in accordance with applicable figures PATA 2, 8, 10a, 10b, 9a&2, 24, and 28a in PennDOT Publication 213, "Work Zone Traffic Control Guidelines", as amended April 1, 2010, and Title 67 PA Code, Chapter 212, "Official Traffic Control Devices", dated February 4, 2006 or most current.
2. No traffic restrictions or lane closures are permitted between the hours of 6:00AM to 9:00AM and 3:00PM to 8:00PM, Monday through Friday and legal holidays.
3. The contractor must notify the District 6-0 Traffic Management Center (TMC) two (2) days in advance of any proposed lane or shoulder restrictions or road closures, and fifteen (15) minutes prior to the start of work. The contractor must notify the TMC when the road is restored to normal operation. The TMC phone number is (610) 205-8234.
4. The contractor must notify Gene Bloom of the District 6-0 Press Office at (610) 205-6500 two (2) weeks in advance of any significant lane closures or detours.
5. The local municipality must be notified when a signalized intersection falls within the work zone. A signalized intersection must not be flagged without the municipality placing the signal on flash.
6. The contractor shall limit disruption to pedestrian facilities during the proposed construction and all provide alternative pedestrian routes when extended disruption to the pedestrian facilities cannot be avoided.
7. Access to all driveways must be maintained at all times.
8. All workers shall wear safety apparel as set forth in Title 23 of the Code of Federal Regulations (CFR) Part 634 effective November 24, 2008.

Associated Engineering Consultants Incorporated

SEAL

PROFESSIONAL ENGINEER DAVID C. BRANDT 27023-E

PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)

SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
11/4/11	H.O.P. SUBMISSION
03/12/12	H.O.P. RESUBMISSION
09/28/12	H.O.P. RESUBMISSION
03/11/13	H.O.P. RESUBMISSION

SHEET TITLE

TYPICAL TRAFFIC CONTROL PLANS AND DETAILS

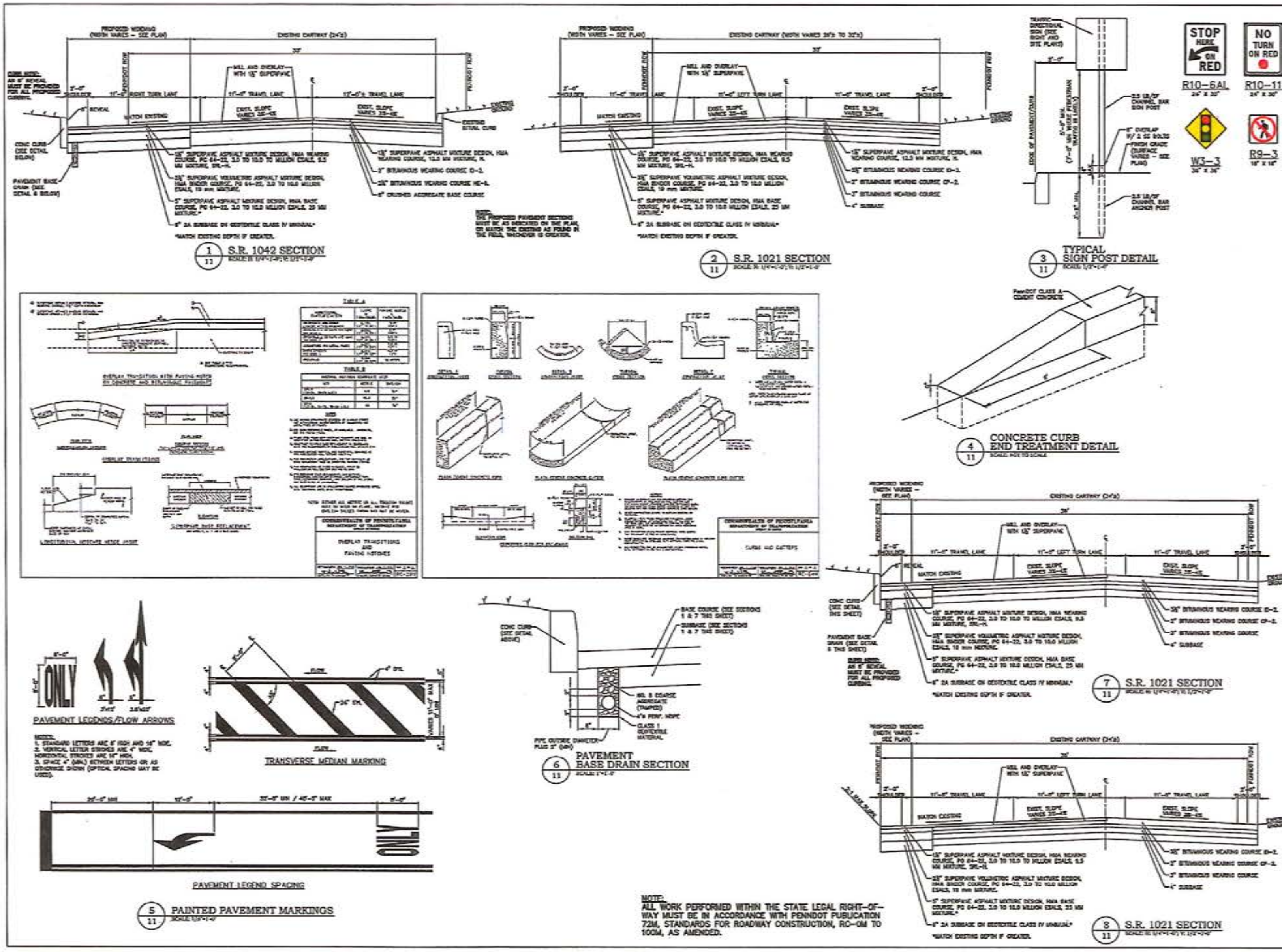
DRAWN BY: EJD
CHECKED BY: KRM

SHEET NO.

10

SHEET NO. 11 OF 18

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



aec
Associated Engineering Consultants Incorporated

SEAL

DAVID G. BRANDT

PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)

SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
10/9/11	H.O.P. SUBMISSION
8/31/12	H.O.P. RESUBMISSION
9/20/12	H.O.P. RESUBMISSION
12/11/12	H.O.P. RESUBMISSION

SHEET TITLE

PENNDOT
SITE
DETAILS

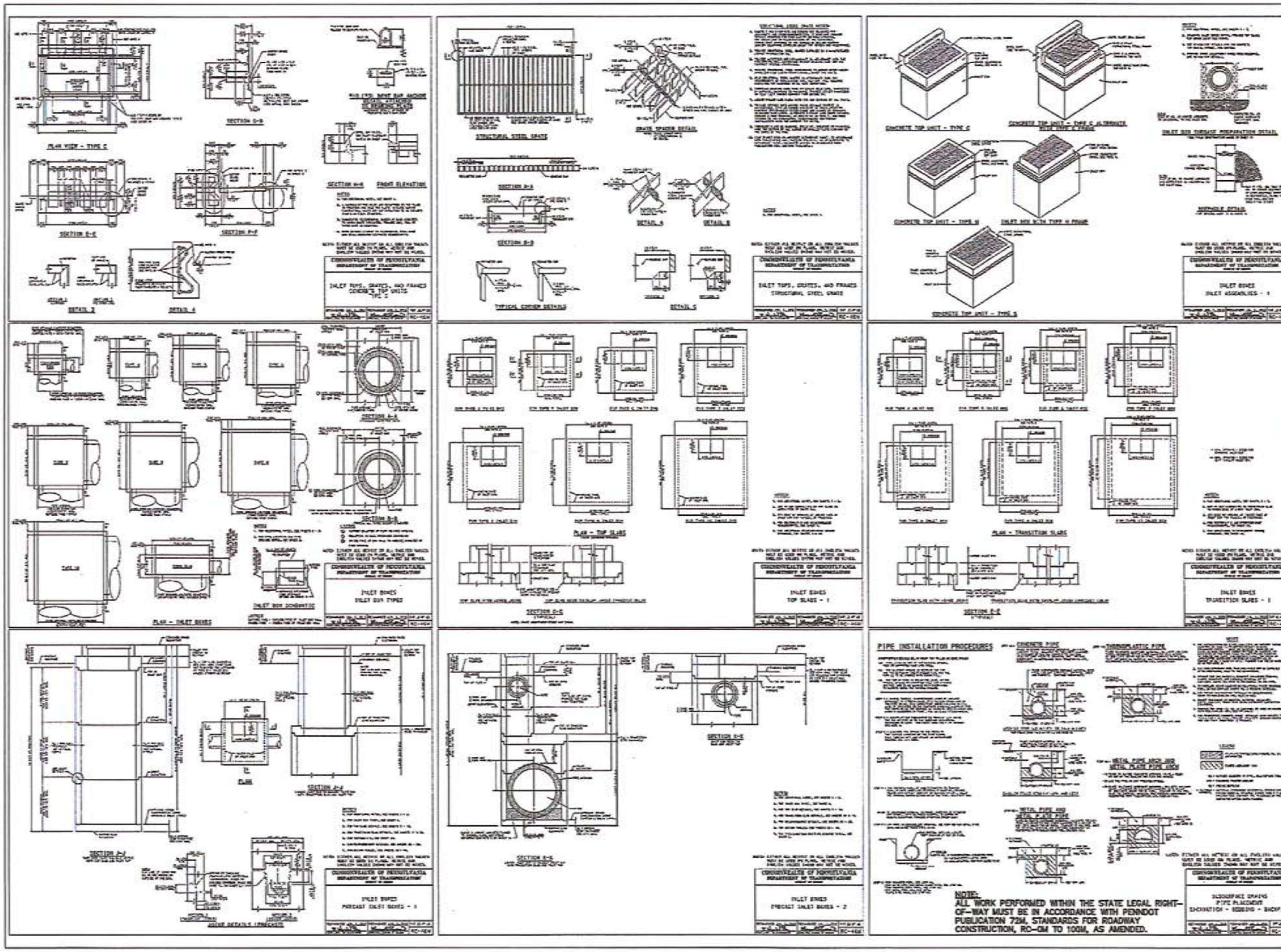
DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.

11

SHEET NO. 12 OF 19

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



aec

SEAL

DAVID C. BRANDT
PROFESSIONAL ENGINEER

PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
1/13/11	H.O.P. SUBMISSION
6/1/12	H.O.P. RESUBMISSION
9/28/12	H.O.P. RESUBMISSION
12/11/13	H.O.P. RESUBMISSION

SHEET TITLE

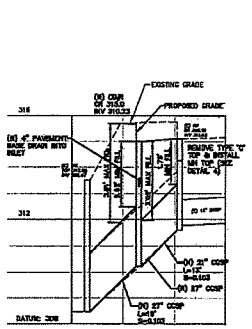
PENNDOT
STORM SEWER
DETAILS

DRAWN BY: BJD
CHECKED BY: KRM

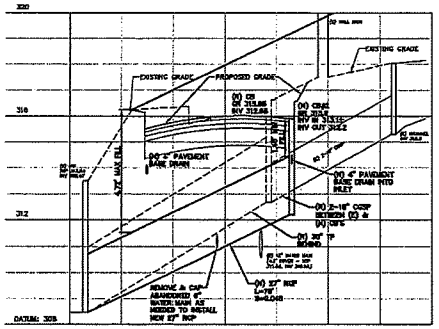
SHEET NO.

12

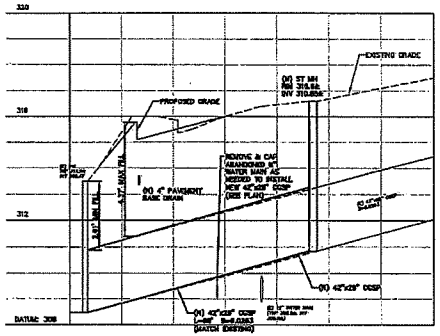
PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



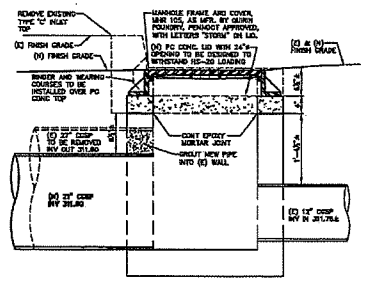
1/13 STORM SEWER PROFILE #1
SCALE: HZ 1"=20'; VT 1"=5'



2/13 STORM SEWER PROFILE #2
SCALE: HZ 1"=20'; VT 1"=5'



3/13 STORM SEWER PROFILE #3
SCALE: HZ 1"=20'; VT 1"=5'

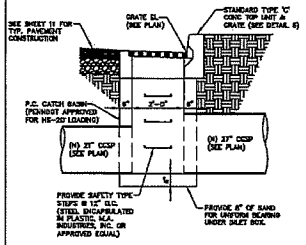


4/13 TYPE 'C' CATCH BASIN MODIFICATION DETAIL
SCALE: 1"=1'-0"

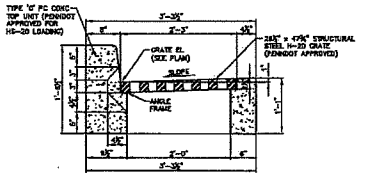
INLET & CATCH BASIN SCHEDULE

C.B. NO.	INLET INV. SIZE	INLET INV. DETAIL	GRATE SIZE	FRAME & GRATE MFR.	REMARKS
CB#1	24"x42 1/4"	2	28½"x47½"	CAMPBELL	TYPE 'C'
CB#2	24"x72"	7-10	28½"x74½"	CAMPBELL	TYPE 'C'
CB#3	48"x78"	18	28½"x99½"	CAMPBELL	TYPE 'S'

NOTE:
1. FOR CB LOCATIONS, SEE PLAN DRAWINGS.

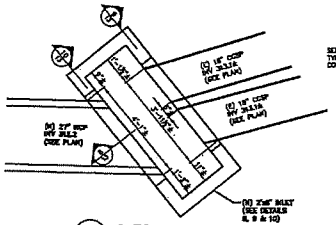


5/13 CATCH BASIN #1 SECTION
SCALE: 1/2"=1'-0"

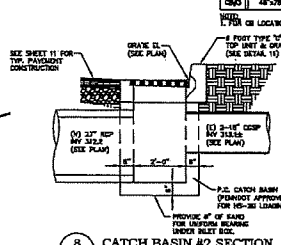


6/13 STANDARD TYPE 'C' INLET FRAME & GRATE DETAIL
SCALE: 1"=1'-0"

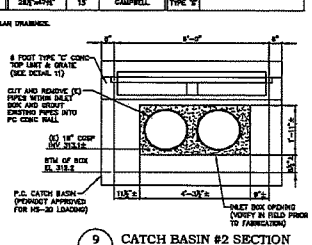
NOTE:
1. SEE DETAIL #5 FOR CATCH BASIN REQUIREMENTS BELOW INLET SHOWN.



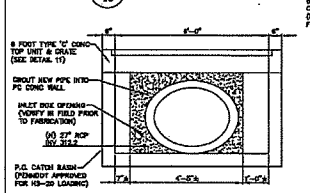
7/13 CATCH BASIN #2 PLAN
SCALE: 1/2"=1'-0"



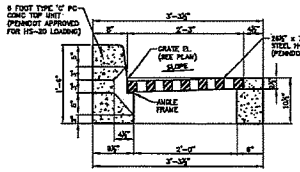
8/13 CATCH BASIN #2 SECTION
SCALE: 1/2"=1'-0"



9/13 CATCH BASIN #2 SECTION
SCALE: 1/2"=1'-0"

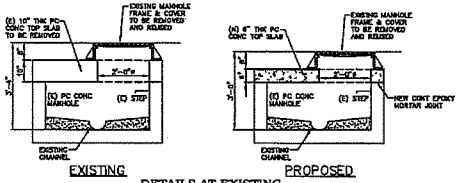


10/13 CATCH BASIN #2 SECTION
SCALE: 1/2"=1'-0"

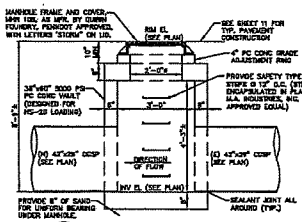


11/13 6 FOOT TYPE 'C' INLET FRAME & GRATE DETAIL
SCALE: 1"=1'-0"

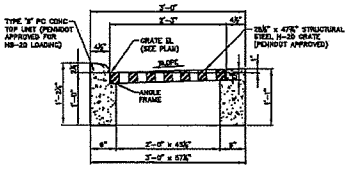
NOTE:
1. SEE DETAILS #7-10 FOR CATCH BASIN REQUIREMENTS BELOW INLET SHOWN.



12/13 DETAILS AT EXISTING SANITARY MANHOLE
SCALE: 1/2"=1'-0"

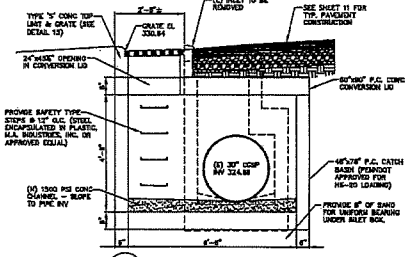


14/13 STORM MANHOLE DETAIL
SCALE: 1/2"=1'-0"

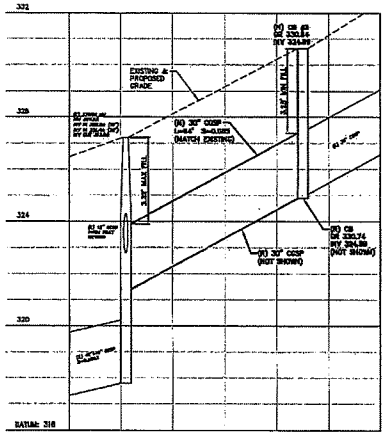


15/13 TYPE 'S' INLET FRAME & GRATE DETAIL
SCALE: 1"=1'-0"

NOTE:
1. SEE DETAIL #... FOR CATCH BASIN REQUIREMENTS BELOW INLET SHOWN.



16/13 CATCH BASIN #3 SECTION
SCALE: 1/2"=1'-0"



13/13 STORM SEWER PROFILE #4
SCALE: HZ 1"=20'; VT 1"=5'

Associated Engineering Consultants Incorporated

SEAL
DAVID C. BRANDT
PROFESSIONAL ENGINEER
21434-E
COMMONWEALTH OF PENNSYLVANIA

PROJECT
INTERSECTION IMPROVEMENTS
EAGLE ROAD (S.R. 1042) AND KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

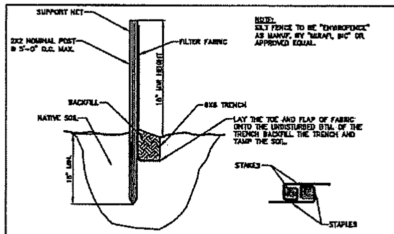
DATE	REVISION
12/1/11	H.O.P. SUBMISSION
2/17/12	H.O.P. RESUBMISSION
5/2/12	H.O.P. RESUBMISSION
10/10/13	H.O.P. RESUBMISSION

SHEET TITLE
STORM SEWER PROFILES AND SITE UTILITY DETAILS

DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.
13
SHEET NO. 14 OF 19

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011

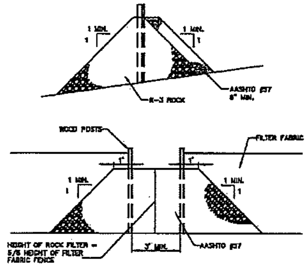


NOTE:
SILT FENCE TO BE "ENVIROFENCE" AS MANUF. BY "MIRAFI, INC" OR APPROVED EQUAL.

1/14 SILT FENCE DETAIL
SCALE: NOT TO SCALE

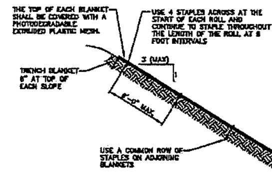
(LOCATION SHOWN THUS —■—■—■— ON SHEET 3)

NOTES:
1. SILT FENCE SHALL NOT BE REMOVED UNTIL A 70% UNIFORM COVERAGE OF PERMANENT VEGETATION IS ESTABLISHED.
2. SEDIMENT MUST BE REMOVED WHERE ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF SILT FENCING.
3. LOCATION SHOWN THUS —■——■——■——■— ON PLAN.



2/14 ROCK FILTER OUTLET
SCALE: NOT TO SCALE

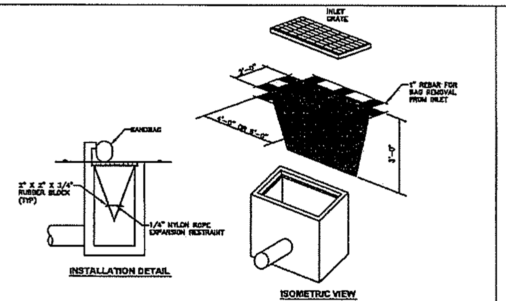
NOTE:
TO BE INSTALLED WHERE SILT FENCE HAS BEEN OVERSTRESSED BY SEDIMENT BUILD UP.



3/14 TYPICAL CURLEX BLANKET INSTALLATION DETAIL
SCALE: NOT TO SCALE

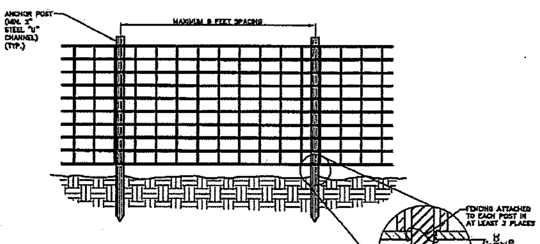
(LOCATION SHOWN THUS ▨ ON SHEET 3)

NOTES:
1. PROVIDE CURLEX BLANKET AS MANUFACTURED BY AMERICAN EXCELSIOR COMPANY, OR APPROVED EQUAL.
2. INSTALL ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
3. EACH EDGE OF FABRIC IS TO OVERLAP 6" MIN.
4. ALL STAPLES SHALL BE MADE OF WIRE, 0.091" IN DIAMETER OR GREATER, "U" SHAPED WITH LEGS 8" IN LENGTH AND A 1" CROWN.



4/14 TEMPORARY ROADWAY TYPE 'C' INLET FILTER BAG DETAIL
SCALE: NOT TO SCALE

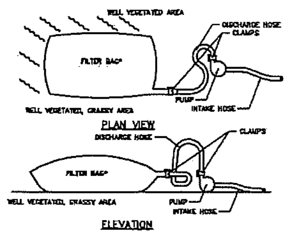
NOTES:
1. INSPECT INLET FILTER BAG AFTER EACH RUNOFF EVENT. MAINTAIN AS REQUIRED TO ENSURE PROPER FUNCTIONING OF THE BAG.
2. REMOVE ACCUMULATED SEDIMENT/DEBRIS WHEN THE INLET FILTER REACHES ONE-HALF MAXIMUM CAPACITY.
3. REPLACE FILTER BAG IF RIPPED OR TORN.
4. USE SANDBAGS AT TYPE C INLET CURB OPENINGS TO PREVENT BYPASS FLOW.
5. REMOVE AND PROPERLY DISPOSE OF INLET FILTER BAG WHEN NO LONGER NEEDED.



5/14 TREE PROTECTION BARRIER FENCING DETAIL
SCALE: NOT TO SCALE

(LOCATION SHOWN THUS ———— ON SHEET 3)

NOTES:
1. PROTECTION BARRIER SHALL BE 4 FEET HIGH, CONSTRUCTED OF DURABLE AND HIGHLY VISIBLE MATERIAL (PLASTIC ORANGE CONSTRUCTION FENCE AND SNOW FENCE MAY BE USED).
2. PROTECTION BARRIERS SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE WORK AT THE SITE.
3. ADDITIONAL WARNING SIGNS SHOULD ALSO BE PLACED ON THE FENCING AND IN APPROPRIATE AREAS NEAR THE WORK ZONE.
4. TREE PROTECTION FENCE SHALL BE INSPECTED & MAINTAINED BY THE CONTRACTOR AT THE END OF EVERY DAY FOR THE DURATION OF THE PROJECT. THE FENCE SHALL BE REPAIRED WHERE NECESSARY.



6/14 DETAIL FOR PUMPING DIRTY WATER
SCALE: NOT TO SCALE

[illegible]

FILL MATERIAL NOTES:

If the site will need to import or export material from the site, the responsibility for performing environmental due diligence and determination of clean fill will rest with the General Contractor.

DEFINITIONS:

Clean Fill is defined as: Uncontaminated, non-water soluble, non-decomposable, inert, solid material. The term includes soil, rock, stone, dredged material, used asphalt, and brick, block or concrete from construction and demolition activities that is separate from other waste and is recognizable as such. The term does not include materials placed in or on the waters of the Commonwealth unless otherwise authorized. (The term "used asphalt" does not include milled asphalt or asphalt that has been processed for re-use).

Clean Fill affected by a spill or release of a regulated substance: Fill materials affected by a spill or release of a regulated substance still qualifies as clean fill provided the testing reveals that the fill material contains concentrations of regulated substances that are below the residential limits in Tables FP-1a and FP-1b found in the Department's policy "Management of Fill".

Any person placing clean fill that has been affected by a spill or release of a regulated substance must use form FP-001 to certify the origin of the fill material and the results of the analytical testing to qualify the material as clean fill. Form FP-001 must be retained by the owner of the property receiving the fill. A copy of Form FP-001 can be found at the end of these instructions.

[illegible]

NOTE:
Fill material that does not qualify as clean fill is regulated fill. Regulated fill is waste and must be managed in accordance with the Department's municipal or residual waste regulations based on 25 Pa. Code Chapters 287 Residual Waste Management or 271 Municipal Waste Management, whichever is applicable. These regulations are available on-line at www.pacode.com.

UTILITY LINE TRENCH EXCAVATION

1. Limit advanced clearing and grubbing operations to a distance equal to two times the length of the pipe installation that can be completed in one day.
2. Work crews and equipment for trenching, pipe installation and backfilling shall be self-contained and separate from clearing, grubbing, site restoration and stabilization operations.
3. All soil excavated from the trench shall be placed on the uphill side of the trench.
4. Limit daily trench excavation to the length of pipe placement and backfilling that can be completed that same day.
5. Water which accumulates in the open trench shall be completely removed by pumping before pipe placement and/or backfilling begins. Water removed from the trench shall be pumped through a filtration device.
6. On the day following pipe placement and backfilling, the disturbed area shall be graded to final contours and appropriate temporary erosion and sediment pollution control measures/facilities shall be installed. Stabilization shall be done immediately after the backfilling is complete.

EROSION AND SEDIMENTATION CONTROL CONSTRUCTION NOTES:

1. SILT FENCE: Silt fence shall be installed downslope of all areas to be disturbed before any work begins. Silt fence shall be installed as near as possible to the locations shown on the plan. Installation shall be as follows:
   a. Silt fencing must be installed parallel to existing contours or constructed level alignments. Both ends of each fence section must be extended at least 8 feet upslope at 45 degrees to the main fence alignment.
   b. Dig a 8" deep trench along the upslope side of the fence line.
   c. Install fence posts 18" below the ground surface at 8' maximum intervals on a slight angle toward the anticipated runoff source.
   d. Stretch and fasten filter fabric to the upslope side of the support stakes. Wherever reinforced fabric fence is installed, the reinforcement mesh shall be fastened to the stakes prior to the fabric.
   e. At fabric ends, both ends should be wrapped around the support stake and stapled. If the fabric comes already attached to the stakes, the end stakes shall be held together while the fabric is wrapped around the stakes at least one revolution prior to driving the stakes.
   f. The bottom of the fence shall be anchored by placing the fabric in the bottom of the trench, and backfilling and compacting the fill material in the trench.
   g. Guy wires shall be attached to reinforced silt fence. An acceptable alternative is to stake straw bales on the downslope side of the fence.
   h. Silt fence shall be inspected weekly and after each runoff event. Needed repairs shall be performed immediately after the inspection. Damaged fences shall be immediately replaced. Rock filter outlets shall be installed where fences have become overstressed due to sediment build up.
2. Stormwater inlets must be protected until the tributary areas are stabilized.
3. STRUCTURAL AND CONSTRUCTION FILL: In all areas where structural or construction fill is to be placed, "grubbing" shall be carried out prior to placing any fill. All trees, brush and other vegetation within the construction fill areas shall be removed from the site.
4. DUST CONTROL: To control dust generation on-site, the contractor shall wet construction traffic routes and sloping areas.
5. TEMPORARY VEGETATION BY SITE CONTRACTOR: Upon completion of an earth disturbance activity or any stage or phase of an activity, the site shall be immediately seeded, mulched or otherwise protected from accelerated erosion and sedimentation. Temporary seeding shall be as follows:
   1. Lime shall be evenly broadcast @ 180 lbs/1,000 sq. ft. (or as per soil test).
   2. 10-25-25 Basic Fertilizer shall be evenly broadcast at the rate of 25 lbs/1,000 sq. ft.
   3. Seed with annual ryegrass at a rate of 1 lb/1,000 sq. ft.

If the season prevents the establishment of a temporary vegetative cover, the disturbed areas will be mulched with straw, or equivalent material, at a rate of 140 pounds per 1000 square feet. Mulch should be applied regardless of the time of year.

6. EXISTING ROADWAY CLEANING: Contractor shall maintain a clean approach to the site. If the dirt and/or debris builds up on existing asphalt surfaces, the site contractor shall professionally clean that surface to the satisfaction of the authority having jurisdiction.
7. Inlet protection shall be applied, as detailed on the plan, to every inlet which has been constructed in the roadway subbase elevation.
8. Pollutants such as fuels, lubricants, bitumens, raw sewage and other harmful materials shall not be discharged into or near rivers, streams and impoundments or into natural or manmade channels leading thereto.

PERMANENT VEGETATION BY CONTRACTOR:

GRADING AND SUB-SOIL PREPARATION

All areas that will receive permanent vegetation, such as, but not limited to, turf and planting beds, shall be prepared in the following manner:

A. Sub soils shall be native material free from any construction debris, stones larger than 3", organic material such as wood or dead plants larger than 2" in diameter. Any additional fill soil material brought onto site must be inspected by owner for suitability.
B. Where Sub soils are backfilled or constructed to depths greater than 2 feet, each 2 foot lift shall be compacted to minimize subsidence.
C. Sub grade to be graded to within 6" of contours called for on plan, to provide proper drainage and be free of standing water.
D. Sub soils to be scarified and loosened to relieve surface compaction prior to placement of topsoil.
E. After approval of subsoil grading, no additional equipment or vehicles may be driven on the area approved, except for equipment used in landscape operations. Any compaction or depressions must be corrected to reestablish proper sub grade as previously approved, prior to installation of topsoil and plant material.

TOPSOIL APPLICATION AND TREATMENT:

A. After topsoil (6" minimum thickness) is graded to the proper elevations, the following materials shall be applied and tilled (mixed) into the top 4" of the surface:
   1. Lime shall be evenly broadcast @ 150 lbs/1,000 sq. ft. (or as per soil test).
   2. Soil Conditioner shall be evenly broadcast @ 80 lbs/1,000 sq. ft.
   3. 10-25-25 Basic Fertilizer shall be evenly broadcast at the rate of 25 lbs/1,000 sq. ft.
   4. Soil Amendment (Axis or Isolite) is evenly mixed into the top 4" of the field surface.
B. After incorporation of the above materials, the topsoil shall be re-firmed by dry-rolling (topsoil moisture content must be near zero percent) with a five (5) ton roller on a dual flotation tired agricultural tractor.
C. The surface grades shall be surveyed and any undulations or irregularities resulting from applications and soil structuring shall be corrected.
D. Any stones larger than 2 inches in any dimension, shall be removed from the top 3" utilizing a mechanical rock picker.
E. Final grading shall be accomplished utilizing an automatic draft sensing hydraulic land plane attached to a flotation tired agricultural tractor.
F. Cultivate and restructure the topsoil to a depth of 3-4". Grade tolerances shall be held to 1/4" per foot.
G. Cultivate and till the soil to a depth of 4-6" (depth may be limited by subsurface conditions).
H. Re-grade, re-firm and rake the soil surface. This is a smoothing and leveling operation to establish the final green contours and elevations.
I. Final stone pick the surface of any stones larger than 1" in any dimension.

SEEDING AND MULCHING

A. Only Flotation Tire Equipment will be permitted after final grade approval.
B. Drill seeding shall be accomplished by utilizing a 4' wide seeder constructed with 18 rows of steel slicers spaced 3" or less on center and capable of placing seed 1/4" into the surface at a rate of 8 lbs. per 1000 square feet.
C. Seed shall be Villanova Mixture Lot No. L30M-4-FSMSM-2, as supplied by Fisher and Son Co., Inc., 237 King Street, Malvern, PA 19355
D. Mulching — The Contractor shall mulch all newly seeded areas with salt hay, at the rate of 140 pounds per 1,000 square feet in accordance with DEP specifications.
E. Provide manufacturer's fabric and straw combination to all seeded areas on banks 3 to 1 or steeper and where potential erosion may take place.

MAINTENANCE

A. Seeded lawn maintenance shall be for not less than 60 days after substantial completion.
   a. If seeded in fall and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.
B. Maintain lawns by watering, fertilizing, weeding, mowing, trimming and other operations such as rolling, regrading and replanting, as required, to establish a smooth, acceptable lawn, free of eroded or bare areas.
C. When seeding is completed, including maintenance, Owner will make an inspection to determine acceptability.
D. When it becomes necessary, the Owner shall inform the Contractor of unsatisfactory conditions of erosion and sediment devices, at such time the Contractor shall improve the conditions of said devices to meet with the approval of the Owner.
E. Should unforeseen erosive conditions develop during construction the Contractor shall take action to remedy such conditions and to prevent damage to adjacent properties as a result of increased runoff and/or sediment displacement.
F. Seeded areas that have been washed away shall be filled and graded as necessary and then reseeded. This procedure shall be repeated after each storm or until no more signs of erosion are evident.

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aec — Associated Engineering Consultants Incorporated

SEAL: COMMONWEALTH OF PENNSYLVANIA — PROFESSIONAL ENGINEER — DAVID C. BRANDT — 37459-E

PROJECT

EASTERN UNIVERSITY
PROPOSED STUDENT UNION BUILDING
1300 EAGLE ROAD
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

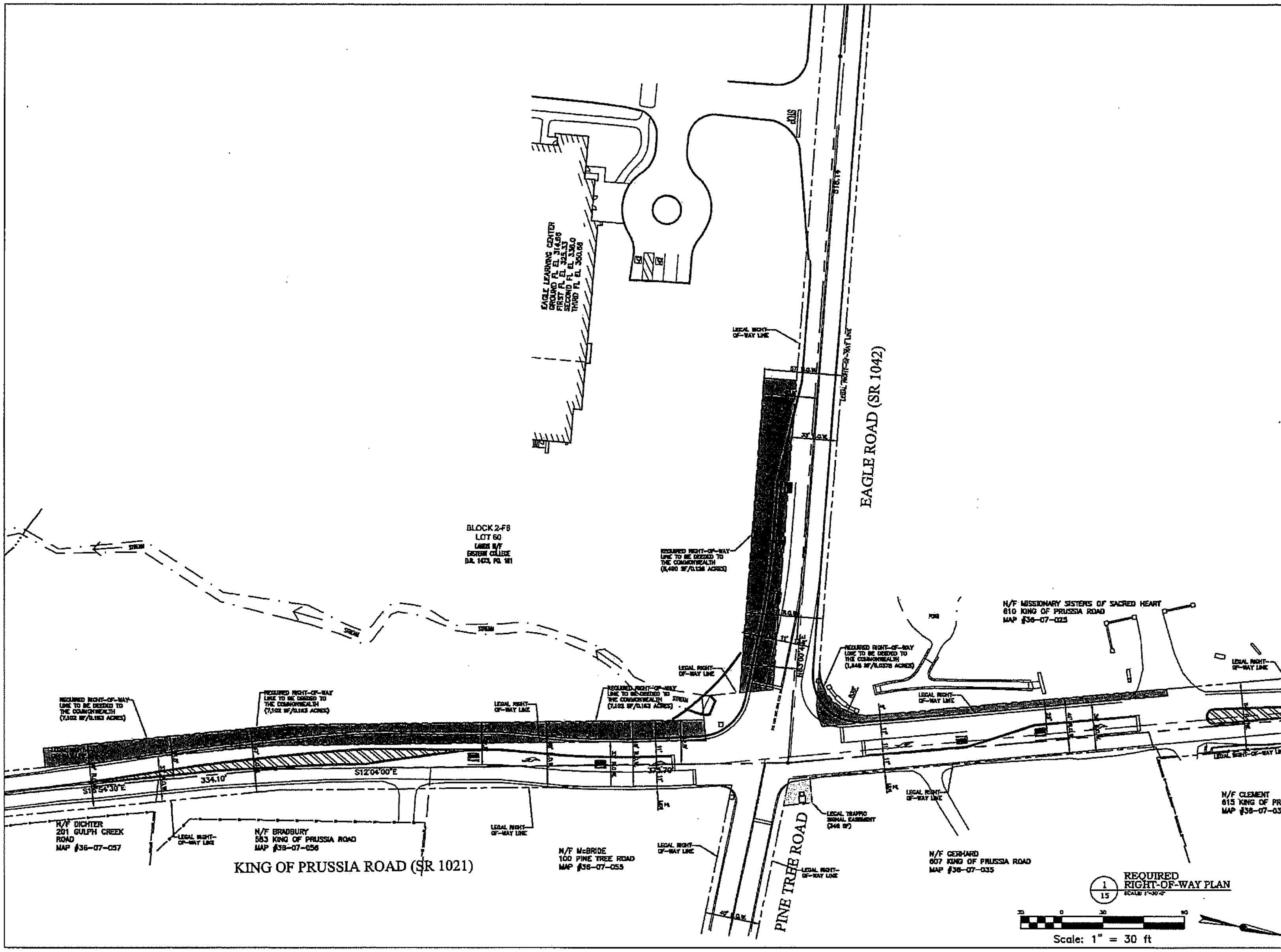
DATE	REVISION
10/18/11	H.O.P. SUBMISSION
05/07/12	H.O.P. RESUBMISSION
08/28/12	H.O.P. RESUBMISSION
03/11/13	H.O.P. RESUBMISSION

SHEET TITLE
SOIL EROSION CONTROL DETAILS AND NOTES

DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.
14
SHEET NO. 14 OF 18

PROJECT NO. 0124.051
DATE: SEPTEMBER 13, 2010



Associated Engineering Consultants Incorporated

SEAL

DAVID C. BRANDT
PROFESSIONAL ENGINEER

PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
11/9/11	H.O.P. SUBMISSION
[illegible]	H.O.P. RESUBMISSION
[illegible]	H.O.P. RESUBMISSION
[illegible]	H.O.P. RESUBMISSION

SHEET TITLE

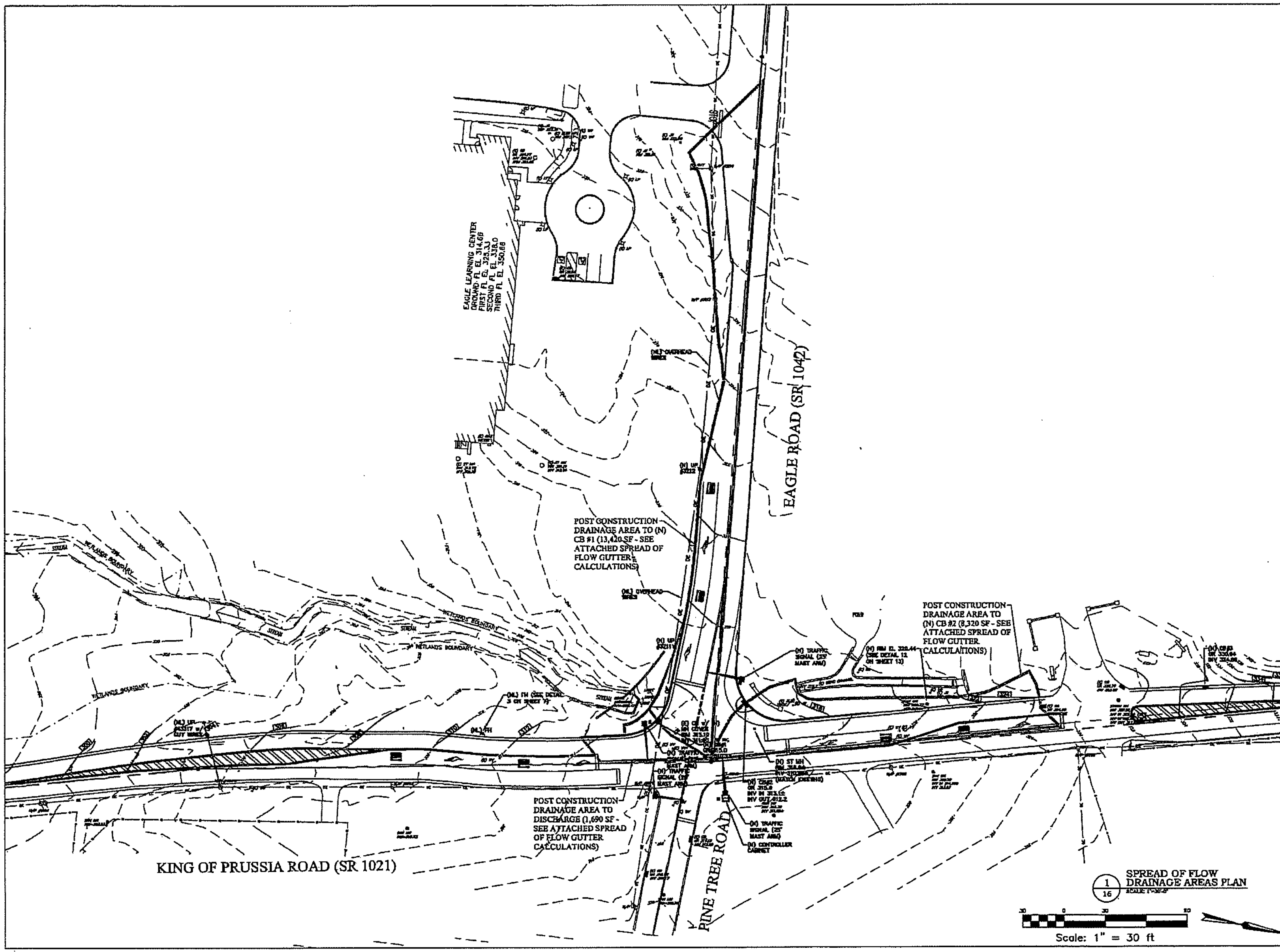
REQUIRED RIGHT-OF-WAY PLAN

DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.

15

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)

SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

SEAL

DAVID C. BRANDT
PROFESSIONAL ENGINEER

DATE	REVISION
11/18/11	H.O.P. SUBMISSION
6/21/12	H.O.P. RESUBMISSION
9/28/12	H.O.P. RESUBMISSION
3/11/13	H.O.P. RESUBMISSION

SHEET TITLE

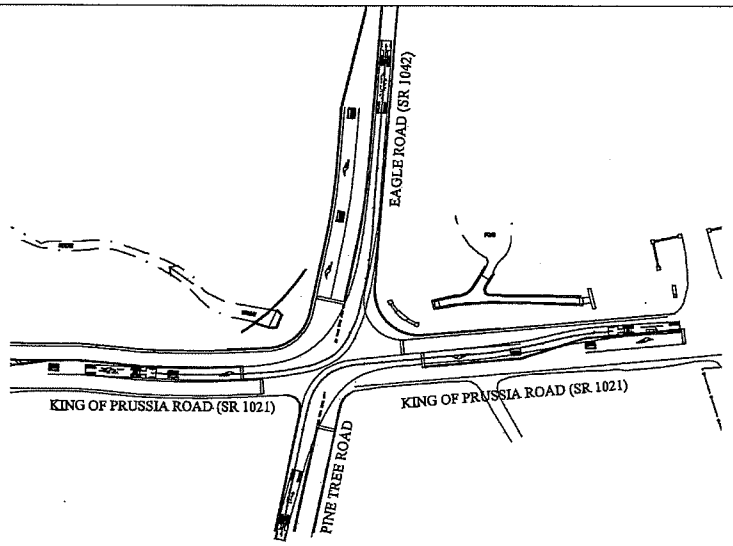
SPREAD OF FLOW DRAINAGE AREAS PLAN

DRAWN BY: BJD
CHECKED BY: KRM

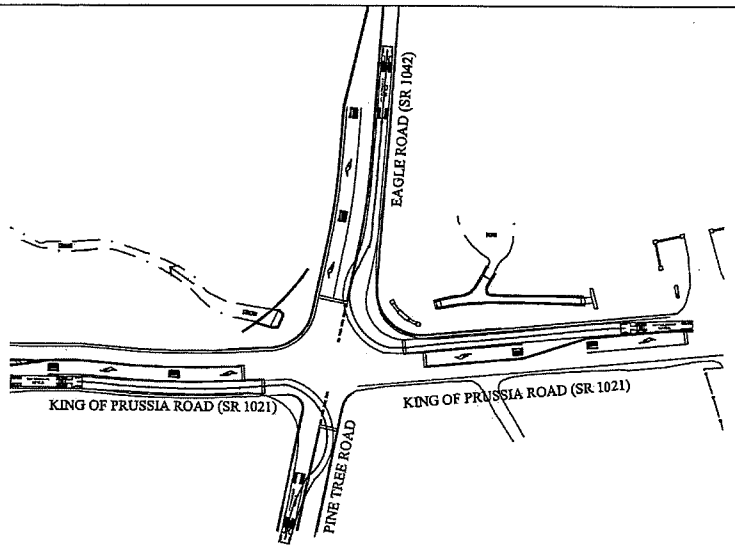
SHEET NO.

16

PROJECT NO. 0124.057
DATE NOVEMBER 18, 2011



1/17 S.R. 1021 LEFT TURN MANEUVERS PLAN
SCALE 1"=40'-0"



3/17 S.R. 1021 RIGHT TURN MANEUVERS PLAN
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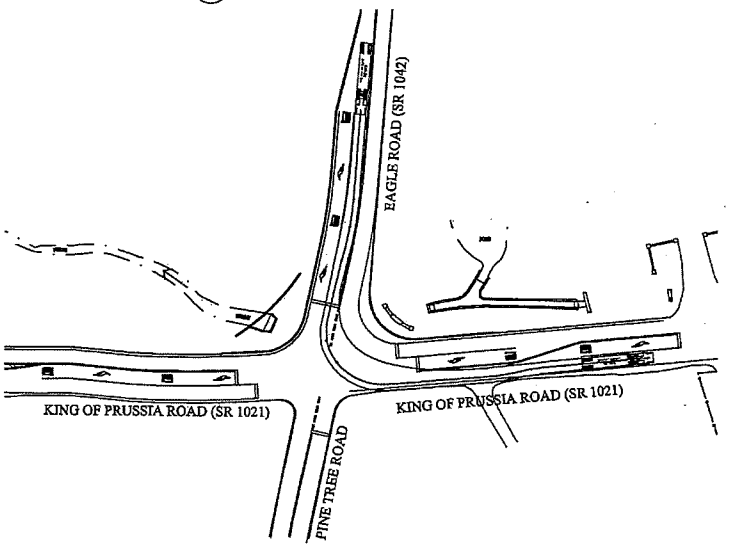

2/17 S.R. 1042 LEFT TURN MANEUVERS PLAN
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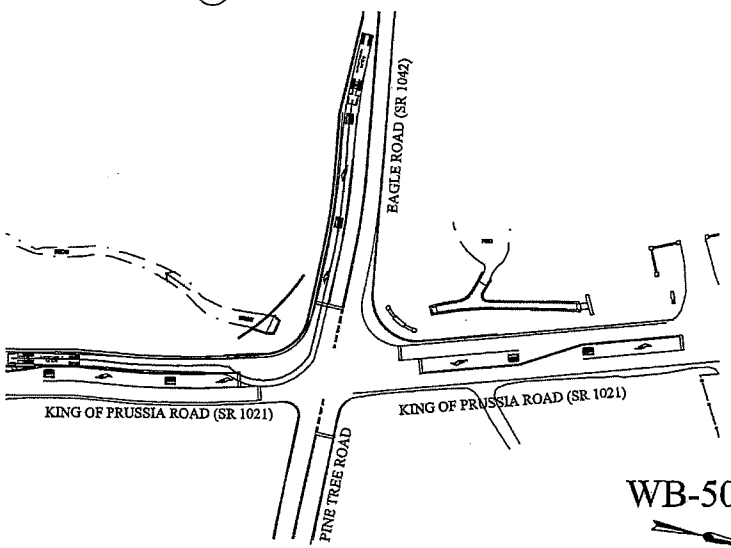


4/17 S.R. 1042 RIGHT TURN MANEUVERS PLAN
SCALE 1"=40'-0"

WB-50

40 0 40 120
Scale: 1" = 40 ft

aec
Associated Engineering Consultants Incorporated

SEAL

COMMONWEALTH OF PENNSYLVANIA
PROFESSIONAL
DAVID C. BRANDT
ENGINEER
57484-E
REGISTERED

PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)

SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
09/09/11	H.O.P. RESUBMISSION
03/19/12	H.O.P. RESUBMISSION

SHEET TITLE

TRUCK TURNING MANEUVERS PLAN

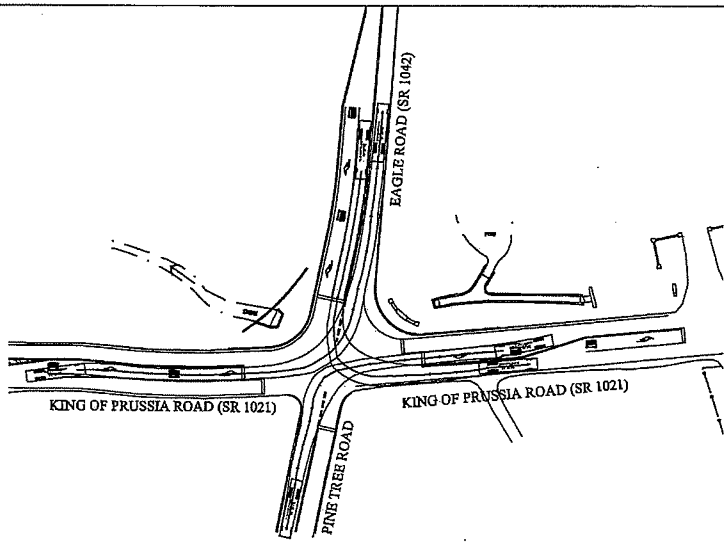
DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.

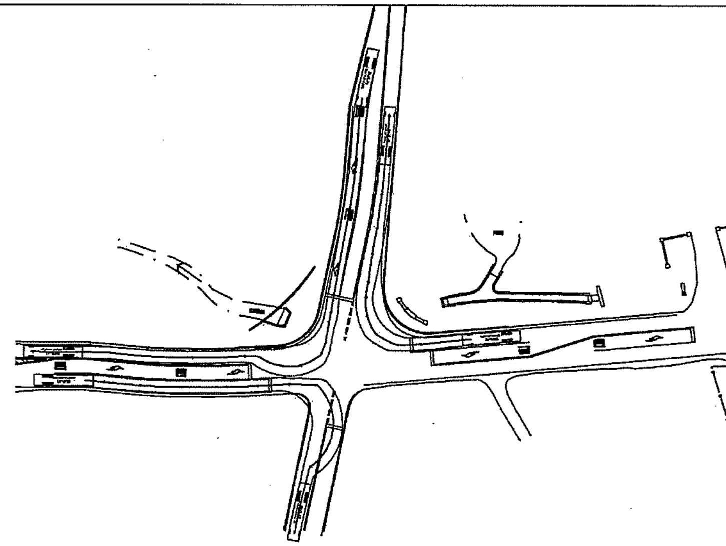
17

SHEET NO. 16 OF 17

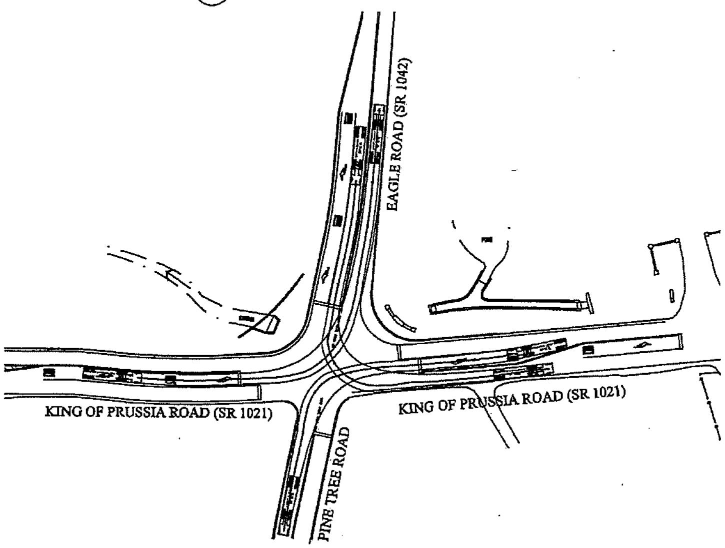
PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



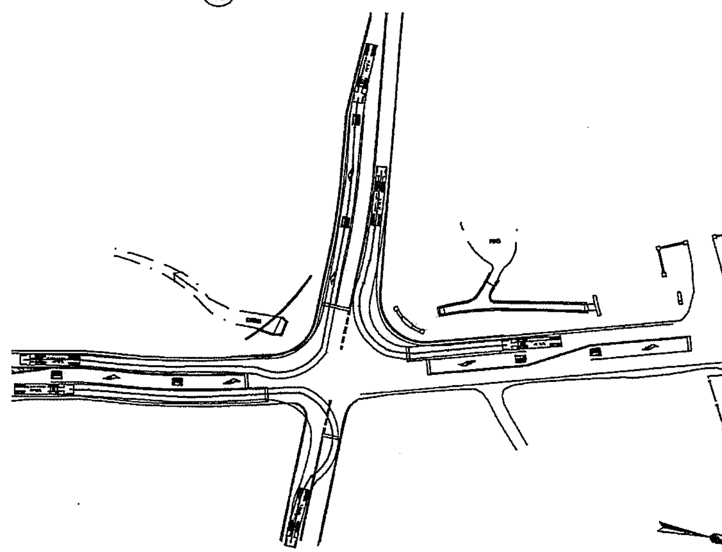
1/18 45' BUS LEFT TURN MANEUVERS PLAN



3/18 45' BUS RIGHT TURN MANEUVERS PLAN



2/18 WB-40 LEFT TURN MANEUVERS PLAN



4/18 WB-40 RIGHT TURN MANEUVERS PLAN

Scale: 1" = 40 ft

aec

SEAL: DAVID C. BRANDT, PROFESSIONAL ENGINEER, PENNSYLVANIA

PROJECT

INTERSECTION IMPROVEMENTS

EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)

SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
	H.O.P. RESUBMISSION
	H.O.P. RESUBMISSION

SHEET TITLE

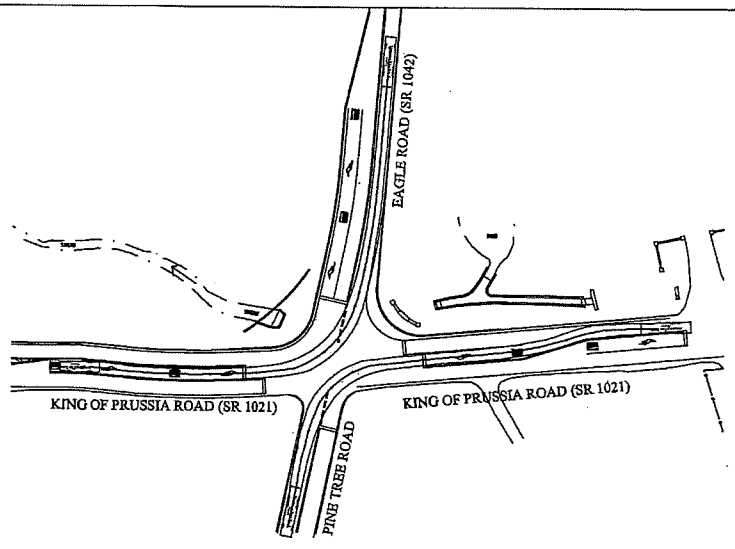
TRUCK TURNING MANEUVERS PLAN

DRAWN BY: BJD
CHECKED BY: KRM

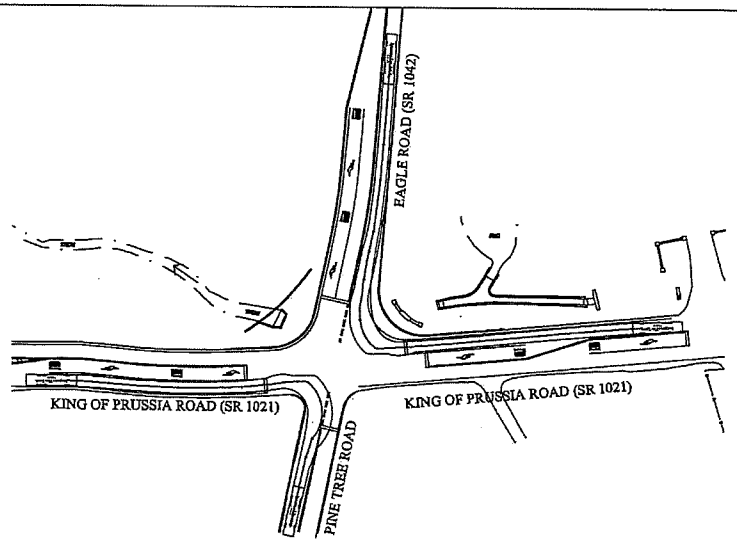
SHEET NO.

18

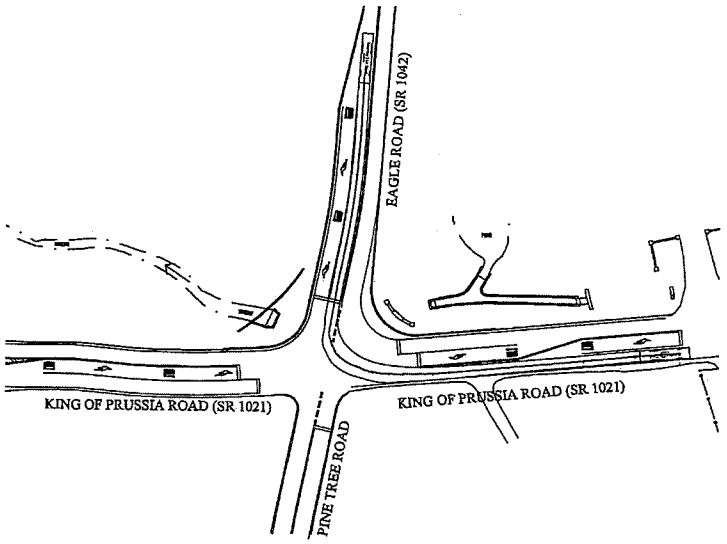
PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011



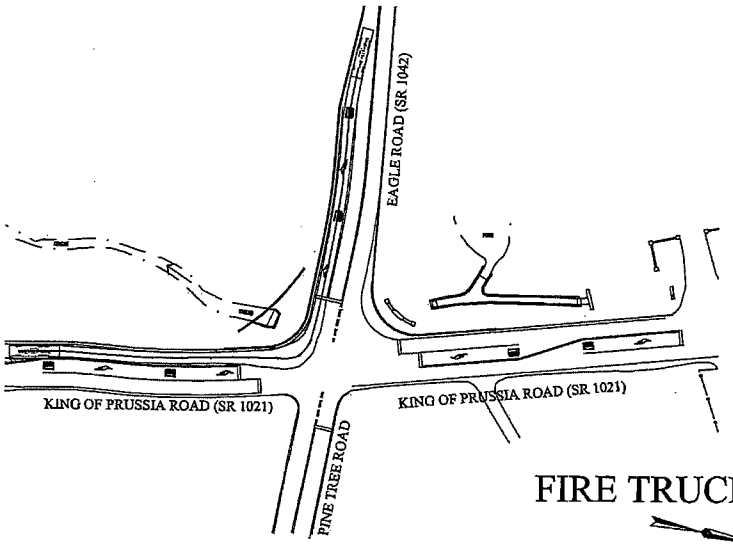
1/19 S.R. 1021 LEFT TURN MANEUVERS PLAN



3/19 S.R. 1021 RIGHT TURN MANEUVERS PLAN



2/19 S.R. 1042 LEFT TURN MANEUVERS PLAN



4/19 S.R. 1042 RIGHT TURN MANEUVERS PLAN

FIRE TRUCK

Scale: 1" = 40 ft

aec
Associated Architecture, Consultants Incorporated

SEAL

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
DAVID C. BRANDT
ENGINEER
27423-E

PROJECT

INTERSECTION IMPROVEMENTS
EAGLE ROAD (S.R. 1042) AND
KING OF PRUSSIA ROAD (S.R. 1021)
SAINT DAVIDS, PENNSYLVANIA 19087
RADNOR TOWNSHIP, DELAWARE COUNTY

DATE	REVISION
10/1/13	H.O.P. RESUBMISSION

SHEET TITLE

FIRE TRUCK TURNING MANEUVERS PLAN

DRAWN BY: BJD
CHECKED BY: KRM

SHEET NO.

19

SHEET NO. 20 OF 20

PROJECT NO. 0124.057
DATE: NOVEMBER 18, 2011

Recognition of the Passing of Charles Harper

Public Participation

Appointments to Advisory Boards and Commissions

Reappointments to Advisory Boards and Commissions

Board of Commissioners Standing Committees

2018 appointments to Chair and Members of the Board of Commissioners Standing Committees are as follows:

Committee of the Whole

Lisa Borowski, Chair
Luke Clark, Vice Chair
Jake Abel
Richard Booker
Sean Farhy
John Nagle

Community Development

Luke Clark, Chair
Lisa Borowski
Rich Booker

Finance and Audit

All Commissioners

Library

Lisa Borowski, Chair
Rich Booker
Ward 1

Open Space

Jake Abel, Chair
Lisa Borowski
John Nagle

Parks and Recreation

John Nagle, Chair
Jake Abel
Luke Clark

Personnel and Administration

Jake Abel, Chair
John Nagle
Ward 1

Public Health

John Nagle, Chair
Sean Farhy
Ward 1

Public Safety

Luke Clark, Chair
Jake Abel
Sean Farhy

Public Works & Sewer

Rich Booker, Chair
Luke Clark
Ward 1

Discussion and Possible Appointment of Vacancy Board Chairperson

Mike Lihota
John Osborne
John Smith
Alex Yannopoulos

Interviews of Potential Ward 1 Interim Commissioner by the Vacancy Board

Jack Larkin
Jim Rogers
Leslie Morgan
Candyce Wilson
Matthew Marshall

Possible Appointment of Interim 1st Ward Commissioner by the Vacancy Board

RADNOR TOWNSHIP

ENGINEERING DEPARTMENT

Memorandum

To: Radnor Township Board of Commissioners

From: Stephen F. Norcini, PE, Township Engineer

CC: Robert A. Zienkowski, Township Manager
William M. White, Assistant Manager/Director of Finance

Date: January 17, 2018

Re: SALDO Application #2016-D-04 – *Caucus;* Preliminary Land Development - 145 King of Prussia Road, Penn Medicine

Before the Board of Commissioners will be representatives of Penn Medicine, to present plans for Preliminary Land Development, at caucus.

The applicant is proposing to construct three buildings and two structured parking garages for mixed use of hotel, office, and a medical facility. A grading permit has been issued for demolition site work, and it is anticipated that the actual demolition permit from codes will be issued soon.

The plans before the Board of Commissioners are recently revised, and have not been fully reviewed by staff and the consultants (please note the review letters in the packet are from the previous plan set). That being said, staff and the consultants have met with the applicant to discuss the revisions on the plans before the Commissioners. The Board of Commissioners and our residents will be able to read review letters from our consultants based on the revised plans prior to the applicant's attendance at the meeting requesting final Preliminary Land Development approval.

Please find attached "Penn Medicine Road Improvements", which outlines the traffic improvements the applicant has agreed to construct.

Enclosures: Penn Medicine Road Improvements
Previous Plan Reviews & Documentation
Revised Plan Set

301 IVEN AVENUE, WAYNE PA 19087
T 610-688-5600, EXT. 130

PENN MEDICINE ROAD IMPROVEMENTS

A. King of Prussia Road and Lancaster Avenue (U.S. Route 30)/I-476 NB Off-Ramp-

i. Restripe northbound I-476 off-ramp for a shared through/right-turn lane.

B. King of Prussia Road and Raider Road-

i. Construct a new traffic signal.
ii. Construct left turn lanes on both approaches of King of Prussia Road

C. King of Prussia Road and Southern Site Access-

i. Restripe northbound King of Prussia Road to provide a shared through/ right lane

ii. Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.

iii. Provide 45-foot curb radii (at minimum), or larger if necessary for the anticipated delivery traffic.

D. King of Prussia Road and SEPTA Access/Northern Site Access-

i. Widen the roadway to 25 feet.

ii. Construct a southbound King of Prussia Road left turn lane into the Northern Site Access.

iii. Construct a bus shelter on King of Prussia Road southeast of the SEPTA Access/Northern Site Access, to the extent that it is approved by SEPTA.

iv. Construct sidewalks from the site to the R-100 Station at the rear of the property.

E. King of Prussia Road-

i. Provide a four-lane cross section along the property's site frontage along King of Prussia Road (between the Southern Access and the Main Site Driveway/ Raider Road).

ii. Construct 5 foot wide sidewalks along the entire property frontage on King of Prussia Road.

F. Partner with the Township to install Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review and approval:

i. Route 30 & I-476 Northbound Ramps

ii. Route 30 & I-476/King of Prussia Road.

iii. Route 30 & I-476 Southbound Ramps.

iv. Route 30 & Radnor-Chester Road.

v. Route 30 & Radnor Financial Center Eastern Driveway

vi. Route 30 & Radnor Financial Center Western Driveway

vii. King of Prussia Road & Radnor-Chester Road.

viii. King of Prussia Road & Matsonford Road.

ix. Matsonford Road & South Centennial Drive.

x. Matsonford Road & North Centennial Drive.

xi. King of Prussia Road & Raider Road.

xii. King of Prussia Road & Northern Driveway (if signalized).

xiii. Radnor Chester and Raider Road

xiv. Radnor Chester and Radnor Financial Center

G. Construct a trail extension from the Southern Driveway through the existing PennDOT Right-of-Way, southeast of the site with connections to the existing Route 30 sidewalks. The location, width and composition of the path materials shall be approved by the Radnor Township Engineer.

Pennoni

One South Church Street
Second Floor
West Chester, PA 19382
T: 610-429-8907
F: 610-429-8918

www.pennoni.com

January 17, 2018

UPHS1504

Radnor Township
Attn: Mr. Robert Zienkowski
301 Iven Ave.
Wayne, PA19087

RE: PRELIMINARY LAND DEVELOPMENT APPLICATION
PENN MEDICINE AT RADNOR
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA

Dear Mr. Zienkowski:

We are in receipt of the Township's consultants review letters, including Gilmore & Associates, Inc letter dated November 29, 2017 and Gannett Fleming's letter dated November 28, 2017. Below is a summary of the Township's consultants comments in *italics* with our responses in **bold**. Please note that we will submit revised plans based on these comments as part of the Final Land Development process.

Comments from Gannett Fleming Letter dated November 28, 2017:

Sewage Facilities Planning

1. *Final plan approval will not be granted until Planning Approval is received from the PA DEP.*

   Pennoni Response: We have submitted documentation for an exemption of Sanitary Sewer Planning to Radnor Township for review. We will provide PA DEP approval once received.

Zoning

1. *§280-63.D(5) – A parking structure, when constructed as an accessory structure for the purposed of eliminating allowable surface parking is allowed. The applicant must indicate on the plans where any surface parking that is being eliminated would have been located.*

   Pennoni Response: Included with this submission is an exhibit which demonstrate the surface parking to be eliminated and relocated to the parking garage. Please refer to sheet EX-24.

2. *§280-64.D(2) – The distance at the closet point between any two buildings or group of attached buildings, including accessory structures, shall not be less than 45 feet. A dimension must be added to the plan between the corner of the hotel and the corner of the office building. Plan measurements appears to indicate a separation distance of less than 45 feet.*

   Pennoni Response: A dimension has been added to the site plan to show the required 45-ft separation between buildings. Please refer to sheet CS1001.

3. *§280-64.G – The Zoning Table must be revised to clearly indicated the zoning compliance requirements for each building and structure. The square footage of the buildings provided on the plan, do not*

match the square footage of the buildings located on a table subsequently provided by the applicant. This must be revised to be consistent.

Pennoni Response: A table summarizing the building areas has been added to sheet CS1001. In addition, the building areas on plan view have been updated accordingly.

4. *§280-64.G.(4) – A parking garage or parking structure may have a height of up to 55 feet so long as such parking garage or parking structure does not exceed the height of any building on the site. The mixed use medical building is proposed to be 54.5' and the parking garage next to the hotel is 54.83'. This must be revised or a variance requested.*

   Pennoni Response: The parking garage height has been revised to 54.2'. Please refer to sheet CS1001.

5. *§280-64.G.(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. Additional information must be provided to indicate that the proposed buildings are in compliance with this section.*

   Pennoni Response: We will coordinate with the Township consultants and comply as provide additional detail as part of the Final Land Development process.

6. *§280-64.G.(10) – All Mixed Use developments shall submit a Transportation Impact and Mitigation Report to the Township as part of the land development application. We note that a Traffic Impact Study was submitted.*

   Pennoni Response: The Traffic Impact Study has been revised based on comments from Gilmore & Associates, Inc. outlined later in this letter.

7. *§280-70.C. – Service, utility, maintenance and storage areas, including solid waste containers, loading and unloading areas and heating, ventilating and air condition equipment, shall be screened from view from public streets and abutting properties. This may be accomplished by means of enclosing walls, stone, brick or wood fences or a buffer planting strip. Visual screening so provided shall be of sufficient density so as not to be seen through and of sufficient height to constitute an effective screen. Appropriate visual screenings must be provided.*

   Pennoni Response: We will coordinate with the Township consultants and comply as provide additional detail as part of the Final Land Development process.

8. *§280-103.B(4) – The parking calculations provided must be revised to include the specific use of hotel.*

   Pennoni Response: The parking table on sheet CS1001 has been updated to include the specific use of hotel.

9. *§280-112.C. – Areas of steep slopes containing slopes steeper than 14% shall be outlined as following (1) Areas containing slopes steeper than 14% but less than 20% shall be distinguished from the areas containing slopes of 20% or steeper. (2) Areas containing slopes of 20% and steeper shall be separately identified. The applicant has shown the location of these areas on the plans and has indicated that these slopes are manmade and excluded from this section.*

Pennoni Response: No comment necessary.

Subdivision and Land Development

1. *§255.20.B(1)(n) – Existing principal buildings and their respective uses, and driveways on the adjacent peripheral strip; sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site (this includes properties across streets). This must be provided or a waiver requested.*

   Pennoni Response: A waiver request has been added to sheet CS1001. In addition, an overall existing conditions plan with an aerial photograph has been added to the plan set as sheet CS0200.

2. *§255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.*

   Pennoni Response: A waiver request has been added to sheet CS1001.

3. *§255-27.C.(1) – King of Prussia Road is designated as a major collector and has a required Right-of-Way of 80 feet, and cartway of 48 feet. The ultimate right of way shown on the plans is 65 feet.*

   Pennoni Response: The ultimate right-of-way shown on the plans equates to half of the required 80-ft width or 40-ft. Please refer to sheet CS1001.

4. *§255-27.C.(2) – Additional right-of-way and/or cartway widths may be required by the Board of Commissioners in order to lessen traffic congestion, to secure safety from fire, panic and other dangers, to facilitate the adequate provision for transportation and other public requirements and to promote the general welfare.*

   Pennoni Response: Roadway improvements have been provided within the ultimate right-of-way based on discussions with Township Staff. Roadway improvements are discussed later in this letter.

5. *§255-29.A.(12)(b) – The width of entrance and exit drives shall be 25 feet for two way use. The two-way drive on the Northerly side of the property is 20 feet wide. This must be revised or a waiver requested.*

   Pennoni Response: The plans have been revised to include 5-ft of widening for the Northerly driveway to the SEPTA station in order to provide the 25-ft cartway width. Please refer to sheet CS1001.

6. *§255-29.A.(14) – No less that a five-foot radius of curvature shall be permitted for all curblines in the parking areas. The radii of all curb lines must be clearly identified on the plans.*

   Pennoni Response: The plans have been revised to label curb radii as needed. A note has also been added to General Note #16 on sheet CS0002 to state that the minimum curb radii shall be 5-ft unless otherwise noted.

7. §255-29.B.(1) – *All parking areas shall have at least one tree 2 ½ inches minimum in caliper for every five parking spaces in single bays and one tree 2 ½ inches minimum in caliper for every 10 parking spaces in double bays. This must be clearly shown on the plans.*

   Pennoni Response: The Landscape plans have been revised as required.

8. §255-37.E. – *Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners.*

   Pennoni Response: Lighting is provided along sidewalks and pedestrian paths. We will discuss this item further with the Board of Commissioners. Please refer to sheet CS2201.

9. §255-38.A. – *Within any land development or major subdivision, street trees shall be planted along all streets where suitable street trees do not exist.*

   Pennoni Response: The Landscape plans have been revised as required.

10. §255-38.B. – *Street trees 2 ½ inches dbh at intervals of not more than 30 feet along both sides of new streets and along one or both sides of an existing street within the proposed subdivision and land development. An equivalent number may be planted in an informal arrangement subject to the approval of the Board of Commissioners.*

    Pennoni Response: The Landscape plans have been revised as required.

11. §255-41.H. – *Outdoor collection stations shall be provided for garbage and trash removal when indoor collection is not provided. Collection stations shall be screened from view and landscaped. We note there is one collection station shown on the plans. The applicant must explain how garbage and trash removal will be provided for the hotel and office building.*

    Pennoni Response: Additional detail has been added to the loading areas for the hotel and office building to demonstrate the location of dumpsters. Please refer to sheet CS1001.

12. §255-43.1.E(2) – *Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be $3,307 per 4,000 square feet of building area. The applicant must conform to this section.*

    Pennoni Response: The required fee will be paid upon Final Land Development Approval.

13. §255-54.B – *The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided.*

    Pennoni Response: Water lines and fire hydrants have been depicted on the Utility Plan. We will work with the Township Engineer and Fire Marshall as needed.

Sanitary Sewer

1. *The applicant has indicated that sanitary sewer service is being provided to the hotel, office building and one of the parking garages. The applicant must provide sewer service to the mixed medical facility. An explanation must be provided as to why sanitary sewer service to the parking garage is provided.*

   Pennoni Response: Sanitary sewer connections will be coordinated on future plans.

2. *A profile of the proposed sanitary sewer must be provided. The sizes of all proposed sanitary sewer must be shown on the profile. All utilities crossing the sanitary sewer must be shown on the profile to ensure adequate clearance.*

   Pennoni Response: Profiles will be provided on Final Land Development Plans.

3. *The plans indicate that the contractor will connection to the existing sewer. It is unclear from the plans if the contactor is going to connect to a portion of the existing service lateral. If that is the case, the condition of the existing lateral must be evaluated to determine if this is acceptable.*

   Pennoni Response: The plans have been revised to show a new connection to the existing sanitary sewer manhole located within King of Prussia Road.

4. *Sanitary sewer note #5 on sheet 2 of 26 must be revised to indicate that the typical cover of a sanitary sewer main must be 5 feet.*

   Pennoni Response: Sanitary sewer note #4 has been revised to specify 5-ft of cover.

Storm Sewer

1. *Please provide pre-development hydrographs for POI #2 for the 1-yr through 50-yr storm events.*

   Pennoni Response: The hydrographs for POI #2 have been added to the revised PCSM Report.

2. *§245-23(D)(2) – Water quality volume requirement can be accomplished by the permanent volume of a wet basin or the detained volume from other BMPs. Where appropriate, wet basins shall be utilized for water quality control and shall follow the guidelines of the BMP manuals referenced in Appendix G. The applicant is proposing soil amendment credit for the water quality volume required at POI #1, which does not meet Ordinance requirements. Please revise to meet the Ordinance requirement.*

   Pennoni Response: The water quality calculations have bene revised to remove the soil amendment credit.

3. *§245-27(J) - Underground stormwater management systems must be designed to store the two- through one-hundred-year storms within a pipe or other open system that will permit the inspection and maintenance of the system. The entire storm must be placed in the pipe (i.e., the stone bedding around the pipe is not to be included in the volume calculations). We note that in Section 4.3 of the stormwater management report the applicant states that the basin volume will include the storage in the rock voids. This must be revised to meet the Ordinance requirements or a waiver must be requested.*

   Pennoni Response: The stormwater calculations have been revised to exclude the stone voids for subsurface basins as required.

4. *Table 10 on page 15 of the stormwater management report lists a tree credit for POI #1 water quality volume. Worksheet #5 for POI #1 in Appendix C and the Runoff Calculation in Appendix D list a soil amendment credit. Please revise this inconsistency.*

   Pennoni Response: The calculations have been revised to remove the tree credit and soil amendment credits.

5. *Please provide permeability/infiltration rates for the permeable pavers and permeable pavement.*

   Pennoni Response: Infiltration testing will be provided during future submissions.

6. *Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans.*

   Pennoni Response: Infiltration testing will be provided during future submissions.

7. *Please clarify what the stippled pattern shown in Proposed Surface Stormwater Basin 1 and Proposed Bio Retention Basin 2 on Sheet CS9001 represents.*

   Pennoni Response: The hatch pattern depicts the area of the amended soil for the bio-retention basins. The hatch pattern has been labeled on the revised plans.

8. *A profile of the proposed storm sewer must be provided. The sizes of all proposed storm sewer must be shown on the profile. All utilities crossing the storm sewer must be shown on the profile to ensure adequate clearance.*

   Pennoni Response: Storm sewer profiles will be provided on Final Land Development Plans.

9. *Stormwater calculations demonstrating that the requirements of the stormwater ordinance must be submitted as part of the Final Plan submission. Final approval of the stormwater management plan will be required as part of the Grading Permit process. Any revisions to the size or location of the individual structures or other features will be addressed at that time.*

   Pennoni Response: All required stormwater calculations will be submitted with Final Land Development Plans.

General

1. *New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots.*

   Pennoni Response: New deeds will be prepared and recorded as part of the Final Land Development Plan process.

2. *The Radnor Township tree protection detail must be shown on the plans.*

   Pennoni Response: The tree protection detail has been added to sheet CS8502.

3. *Lighting details must be provided on the plans.*

Pennoni Response: Lighting details have been added to sheet CS6001.

4. *The height of all retaining walls must be indicated on the plans.*

   Pennoni Response: Top and bottom of wall elevations have been added to the Grading Plan, sheet CS1501.

5. *Detailed parking structure plans must be provided for review.*

   Pennoni Response: Parking structure plans will be provided with the Final Land Development submission.

Comments from Gilmore & Associates, Inc. Letter dated November 29, 2017:

Land Development Plan Review

A. *Subdivision and Land Development Ordinance (SALDO) comments:*

1. *§255-20.B(1)(n) – Existing principal buildings, and their respective uses, and driveways on the adjacent peripheral strip, sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site shall be shown on the plans.*

   Pennoni Response: A waiver request has been added to sheet CS1001.

2. *§255-20.B(5)(d)[2][a] and §255-20.B(5)(d)[6][b] Coordinate with SEPTA and revise the plans to provide an ADA accessible connection from the proposed on- site sidewalk to the existing SEPTA facilities.*

   Pennoni Response: We will coordinate with SEPTA in regard to sidewalk connections from the proposed site to the existing SEPTA station at the northwest corner of the site.

3. *§255-21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be so drawn as to be legible if the plan should be reduced to half size. The Applicant has requested a waiver from this requirement; we have no engineering objection to this request.*

   Pennoni Response: A waiver request has been added to sheet CS1001.

4. *§255-27.B(3)(c) and §255-27.C(1) - King of Prussia Road is identified as a Major Collector and requires an 80' right-of-way (40' half-width) and a minimum 48' cartway width (24' half-width). The applicant proposes to provide a half-width right-of-way of 40' from the centerline of the roadway. The existing cartway width (36') is less than the minimum required cartway width (48' full width; 24' half- width) and the Applicant is required to widen the cartway for the full length of the site frontage along King of Prussia Road. Revise the plans to continue the two northbound lanes along the entire site frontage on King of Prussia Road beginning at the South Driveway and extending through and including the SEPTA/Northern site driveway.*

   Pennoni Response: The plans have been revised to include widening of King of Prussia Road from the Raider Road/Main Site Driveway intersection to the southern driveway entrance to the site. The proposed ultimate right-of-way is equal to the half width of 40-ft. Please refer to sheet CS1001.

5. *§255-27.C(1) – Sidewalk shall be provided along the entire site frontage. The onsite trail doesn't provide an adequate walkway for pedestrians walking along the site frontage. If the Applicant considers and the Township agrees the sidewalks located along the west side of King of Prussia Road (along the Radnor Township School District frontage) as adequate; additional improvements should be provided as follows:*

   a. *Pedestrian crosswalks meeting the current Public Right-of-Way Accessibility Guidelines for Americans with Disabilities Act Accessibility Guidelines (PROWAG/ADAAG) requirements as indicated in PennDOT Publication 13M DM-2 Design Manual 2: Highway Design, Chapter 6; and PennDOT Publication 70M Roadway Construction Standards (RC-67) must be constructed on all approaches to the proposed traffic signal at Raider Road and at the north and south access driveways to provide adequate crossing locations.*

   b. *Widen the sidewalks along the west side of King of Prussia Road (Radnor Township School District frontage) to five feet (5') as required by PROWAG/ADAAG or provide 5 foot by 5 foot passing areas at a 200 foot minimum interval along the length of the roadway.*

   Pennoni Response: The plans have been revised based on discussions with the Township Staff to show a 5-ft sidewalk with 5-ft grass strip from the northern driveway/SEPTA entrance to main driveway/Raider Road intersection. From the main driveway/Raider Road intersection the sidewalk is proposed to meander through the site to a point on the southern driveway near the trail entrance under I-476. Please refer to sheet CS1001.

6. *§255-29.A(12)(b) – The width of entrance and exit drives shall be 25 feet for two- way use. The width of the existing SEPTA/Northern site driveway is 20 feet and must be widened to comply with this section of the ordinance or a waiver must be requested.*

   Pennoni Response: As shown on the revised sheet CS1001, the northern driveway/SEPTA driveway is proposed to be widened by 5-ft.

7. *§255-29.A(14) – No less than a five-foot radius of curvature shall be permitted for all curblines in parking areas. Revise the plans to label all curb radii and provide a minimum 5'curb radii along the south end of the drop-off area behind the proposed 4- story office building.*

   Pennoni Response: The plans have been revised to label curb radii as needed. A note has also been added to General Note #16 on sheet CS0002 to state that the minimum curb radii shall be 5-ft unless otherwise noted.

8. *§255-30 – Revise the plans to delineate the proposed loading stall(s) adjacent to the proposed hotel and office building.*

   Pennoni Response: The plans have been revised to depict the loading stalls adjacent to the proposed hotel and office building. Please refer to sheet CS1001.

9. *§255-30.A – Identify the area adjacent to the parking garage that is east of the loading area wall and is approximately 10'x 60'. If this area is intended for loading, it must meet the requirements for this section.*

   Pennoni Response: The plans have been revised to depict the loading stalls adjacent to the proposed hotel and office building. Please refer to sheet CS1001.

10. *§255-37.A – Sidewalks and pedestrian paths shall minimize pedestrian-vehicle conflicts. As a pedestrian safety precaution, include a grass verge between the curbline and the proposed sidewalk*

along the King of Prussia Road site frontage to match the existing sidewalk opposite the site.

Pennoni Response: The plans have been revised based on discussions with the Township Staff to show a 5-ft sidewalk with 5-ft grass strip from the northern driveway/SEPTA entrance to main driveway/Raider Road intersection. From the main driveway/Raider Road intersection the sidewalk is proposed to meander through the site to a point on the southern driveway near the trail entrance under I-476. Please refer to sheet CS1001.

11. *§255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. Revise the lighting plan to provide pedestrian lighting along all proposed sidewalks including along King of Prussia Road. Coordinate with the Township Engineer and Township Planner regarding lighting levels.*

    Pennoni Response: Lighting is provided along sidewalks and pedestrian paths. We will discuss this item further with the Board of Commissioners. Please refer to sheet CS2201.

12. *§255-37.H – Steps or a combination of steps and ramps shall be utilized to maintain maximum grades, where necessary. Where sidewalk grades exceed 5%, a nonslip surface texture shall be used. We recommend the Applicant provide a sidewalk connection along the north side of the central access driveway opposite to the intersection of Raider Road. We understand the ADA accessible access is provided on the south side of the driveway.*

    Pennoni Response: An ADA accessible route has been added south of the main entrance drive from King of Prussia Road to the site. In addition, a sidewalk with stairs has been added on the north side of the main entrance drive from King of Prussia Road to the site. Please refer to sheets CS1001 and CS1501.

13. *§255-40.F – Revise the plans to indicate the location of refuse collection stations for the proposed hotel and 4-story office building.*

    Pennoni Response: Dumpster locations have been added for the proposed hotel and 4-story office building. Please refer to sheet CS1001.

B. *General Comments*

1. *We recommend the Applicant coordinate with the Township staff regarding the width and location of the proposed trail and consider providing a trail or sidewalk connection adjacent to the Southern Site Driveway from the trail to King of Prussia Road.*

    Pennoni Response: The plans have been revised based on discussions with the Township Staff to show a 5-ft sidewalk with 5-ft grass strip from the northern driveway/SEPTA entrance to main driveway/Raider Road intersection. From the main driveway/Raider Road intersection the sidewalk is proposed to meander through the site to a point on the southern driveway near the trail entrance under I-476. Please refer to sheet CS1001. This walkway is proposed as porous asphalt and a detail is located on sheet CS9503.

2. *Provide a separate pavement marking and signage plan including all right-of-way lines, lane lengths, widths, bay taper lengths, lane line colors, lane line widths, etc.*

    Pennoni Response: Detailed roadway improvement plans will be provided with the Final Land Development Plan submission.

3. *Provide a 24" stop bar and an R1-1 stop sign at the northern and Southern Site Driveway egresses.*

    Pennoni Response: A stop bar and stop sign has been added to the northern and southern driveway

egresses. Please refer to sheet CS1001.

4. *Install R7-302 No Parking SYMBOL/ARROW signs along the Northern/SEPTA driveway. It appears this is currently being used as overflow parking and the illegal parking creates a de facto and unacceptable single travel lane.*

   Pennoni Response: No parking signs have been added along the Northern/SEPTA driveway. Please refer to sheet CS1001.

5. *Revise the plans to provide a minimum 6' crosswalk as required in PennDOT Publication 111, TC-8600.*

   Pennoni Response: The plans and details have been revised to show a 6-ft crosswalk. Please refer to sheets CS1001 and CS6000.

6. *Per PennDOT Publication 111, TC-8600, we recommend the Applicant provide a 4" DY centerline along the central access and Raider Road driveways extending for a minimum of 150 feet beyond the intersection of King of Prussia Road.*

   Pennoni Response: The plans have been revised to show a 4" double yellow line along the main driveway to the site. Please refer to sheet CS1001.

7. *Revise the plans to include stop bars on driveway and roadway approaches to King of Prussia Road and Raider Road/Site Driveway associated with the traffic signal.*

   Pennoni Response: The plans have been revised to show 24" stop bars on driveway and roadway approaches to King of Prussia Road and Raider Road/Site Driveway associated with the traffic signal.

8. *Replace any references to R7-7A with the PennDOT approved R7-302 NO PARKING SYMBOL/ARROW sign. Refer to PennDOT Publication 236 for further details.*

   Pennoni Response: The plans have been revised accordingly.

9. *Replace any references to R5-3-6 with the PennDOT approved R5-101, EMERGENCY AND AUTHORIZED VEHICLES ONLY. Refer to PennDOT Publication 236 for further details.*

   Pennoni Response: The plans have been revised accordingly.

10. *Sheet 2 includes symbols to assist in identifying proposed signs; however, the symbol callouts were not utilized in the plan set. Include all proposed signs on the various sheets and also include on the requested pavement marking and signage plan.*

    Pennoni Response: The plans have been revised accordingly.

11. *We recommend the Applicant include one ingress and two egress lanes at the site access driveway opposite Raider Road on King of Prussia Road.*

    Pennoni Response: The plans have been revised to provide a second egress lane from the site to King of Prussia Road at the main entrance. Please refer to sheet CS1001.

12. *We recommend eliminating the dedicated right-turn and left-turn lanes into the Southern Site Driveway. Due to the fact that this will be a loading area only, the auxiliary lanes may not be necessary.*

    Pennoni Response: The dedicated right turn lane has been eliminated in favor of continuing the 2nd northbound through lane to Raider Road. A right turn will be permitted from this lane as on any other through lane. The dedicated left turn lane is formed from an area that would otherwise be a

median gore and provides storage for left turning delivery trucks into the site, thus providing a clear lane for through traffic on King of Prussia Road, and we recommend keeping it.

13. *Provide curb radii (at minimum) necessary for the anticipated delivery traffic at the Southern Site Driveway. A 45 foot curb radii is recommended for truck access.*

    Pennoni Response: The plans have been revised to show a 45-ft radii at the southern driveway to accommodate for large vehicle movements.

14. *The fire truck turning templates should be submitted to the Fire Marshall for review.*

    Pennoni Response: We will coordinate with the Fire Marshall as required.

15. *We note the Applicant is only demonstrating the use of a WB-40 truck at the SEPTA/Northern site driveway. Verify that a WB-40 truck will be the largest truck anticipated for Hotel deliveries. Consider increasing the radii to accommodate larger vehicles. If the Northern driveway will only be accommodating WB-40 trucks, the appropriate truck restriction signage will be required.*

    Pennoni Response: Currently this loading dock is planned for a WB-40, we will coordinate and provide necessary signage as part of Final Land Development.

16. *Sheet 25 of 26 (CS9801):*

    a. *The northbound WB-67 movement at the Southern Site Driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane. Increase the corner radii and/or widen the driveway as necessary to accommodate WB-67 trucks.*

    b. *At the Southern Site Driveway, show the WB-67 exiting movement onto King of Prussia Road.*

    c. *Revise the WB-67 movements to eliminate any contact with the adjacent dumpster bay walls and curblines.*

    d. *Revise the WB-67 movement to show the truck not conflicting with the compactor.*

    e. *The WB-67 movement shows the truck reversing into the generator area. Bollards are recommended around the generator area.*

    f. *Show the WB-40 exiting movement onto King of Prussia Road beginning from the loading area at the SEPTA/Northern driveway.*

    Pennoni Response: The truck turning plan has been revised accordingly. Bollards have been added to the area near the generator.

17. *Sheet 26 of 26 (CS9802):*

    a. *The eastbound fire truck movement at the Raider Road site driveway should be revised to eliminate any contact with the adjacent curb and curb ramp along the patient drop-off area.*

    b. *The northbound fire truck movement at the Raider Road site driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane.*

    c. *The northbound fire truck movement at the Southern Site Driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane.*

    d. *Revise the fire truck movement along the Southern Site Driveway so that the truck remains completely on the roadway during the movement.*

Pennoni Response: The truck turning plan has been revised accordingly.

18. *The Applicant will be responsible for providing the following documents prior to Final Land Development approval:*

    a. *Construction details related to ADA curb ramps, including spot elevations, dimensions and slopes.*

    Pennoni Response: Will Comply and provide construction details for the ADA curb ramps with Final Land Development plans.

    b. *Traffic Signal Construction Plans, Traffic Signal Permit Plans, Traffic Signal System Plans, and a Traffic Signal design report must be provided to the Township and PennDOT for review and approval.*

    Pennoni Response: Will Comply and provide Traffic Signal Construction Plans, Traffic Signal Permit Plans, Traffic Signal System Plans, and a Traffic Signal design report with Final Land Development Plans.

    c. *All new or modified signal permit plans require a completed TE-160 form and associated resolution.*

    Pennoni Response: Will Comply and provide completed TE-160 form for each new or modified signal permit plan with Final Land Development Plans.

    d. *The Applicant will need to coordinate with Radnor Township School District to eliminate parking along the south side of Raider Road near King of Prussia Road. The on-street parking along the south side of Raider Road effectively narrows the 30' cartway width to a 22 foot width which is inadequate to store busses and automobiles. We recommend evaluating the length of parking to be eliminated based on the results of the impending queue analysis noted under the Transportation Impact Assessment section below.*

    Pennoni Response: The Applicant will coordinate with the School District regarding the elimination of existing on-street parking on Raider Road with Final Land Development Plans.

Transportation Impact Assessment (TIS) Review

A. *Subdivision and Land Development Ordinance (SALDO) comments:*

    1. *§255-20.B(5)(d)[2][a] - We recommend the applicant discuss with SEPTA the installation of a bus shelter along King of Prussia Road near the corner of the Raider Road site driveway to encourage and promote transit riders. In addition, we recommend installing a bus turn out lane to minimize traffic flow disruptions along King of Prussia Road.*

    Pennoni Response: Will comply. A bus shelter will be installed on King of Prussia Road southeast of the SEPTA Access/Northern Site Access, to the extent that it is approved by SEPTA.

    2. *§255-20.B(5)(d)[3] Existing traffic conditions.*

        a. *Traffic counts were conducted on November 18, 2015 and November 24, 2015 at some of the studied intersections. These dates were noted as early dismissal days on the Radnor School District calendar. The Applicant should provide a comparison with historical counts at these intersection indicating similar volumes or recount the intersections during a typical full day of school.*

        Pennoni Response: Dismissal on an average school day in Radnor Township occurs between 2:30 and 3:30 PM (depending on the school). The PM traffic counts were collected from 4-6 PM with the system peak hour occurring from 5-6 PM. Typical dismissal occurs outside of the PM

peak period evaluated, therefore an early dismissal will not affect the traffic volumes collected. Also, the early dismissal on November 18th was for grades K-8, which did not affect Radnor High School, which is located on Raider Road.

b. *Crash Data Analysis*

i. *The crash data provided in the body of the report and in Appendix E should be removed from the TIA and provided under separate cover.*

Pennoni Response: The crash data has been removed from the TIA and submitted under a separate cover.

ii. *PennDOT Strike-Off-Letter (SOL) 470-09-4 Transportation Impact Study Guidelines indicates 5 years of crash data should be reviewed; the submission only provided 3 years of historical data. In addition, the crash report should include non-reportable crashes obtained from Radnor Township Police Department. The crash analysis should be revised to provide a more detailed crash data analysis as follows:*

a) *Quantify the number of correctible reportable and non- reportable crash incidents in a rolling 12 month analysis period.*

b) *To identify potential mitigation measures for reportable and non- reportable crashes incidents exceeding five during the rolling 12 month period.*

Pennoni Response: Will comply. 5 years of crash data has been provided along with a more detailed crash data analysis including the number of correctible reportable and non-reportable crash incidents in a rolling 12 month analysis period and potential mitigation measures for reportable and non- reportable crashes incidents exceeding five.

3. *§255-20.B(5)(d)[4] The TIA shall be updated to remove the 7% Transit Ridership reduction for the Trip Generation based on the following:*

a. *As discussed in the ITE Trip Generation Handbook, 3rd Edition, Section 8.4.2, the national database of person trips by mode for the Transit Friendly Development (TFD) is limited. Therefore, the preferred method for estimating a transit mode share for external trips at a TFD would be through development of surveys at proxy sites. The TIA would need to be modified to identify any transit studies previously done for the existing site or any similar nearby sites (i.e., employee transit usage survey, origin/destination study, boarding/alighting at Paoli/Thorndale station, etc.).*

b. *In accordance with the information provided in Appendix B of the ITE publication Trip Generation Manual, 9th Edition Guide and Handbook, this project's Floor Area Ratio (FAR) of 0.40 does not meet the required development intensity to utilize the minimum transit reductions identified in Tables B.2 & B.3.*

c. *Per PennDOT Strike-off-Letter 470-09-4 Transportation Impact Study Guidelines, the Paoli/69th Street SEPTA bus route does not meet the minimum requirement of 3-4 buses per hour and 14-16 daily operation hours to justify a bus related trip reduction.*

d. *More importantly, the agreed upon trip generation methodology for the proposed mixed medical use is based on data collected at local existing sites which inherently accounts for any transit reduction in the data collection process. If there is a 7% transit reduction, the reduction was already accounted for in the lack of a vehicle entering and exiting the local site driveways that were used to develop the trip generation rates for the Mixed Medical Use.*

Pennoni Response: Will comply.

4. *§255-20.B(5)(d)[5] Provide a traffic signal warrant analysis for the intersection of the SEPTA/Northern site driveway and King of Prussia Road.*

Pennoni Response: Will comply. The signal warrant analysis for the SEPTA/Northern site driveway and King of Prussia Road intersection has been provided.

5. *§255-20.B(5)(d)[6] All streets or intersections showing Level of Service below C shall be considered deficient and specific recommendations for elimination of these problems shall be listed. The analysis indicates the corridor along the site frontage of King of Prussia Road is congested with multiple LOS deficiencies. The roadway should be widened to accommodate additional through lanes where possible along King of Prussia Road. The Applicant should evaluate the feasibility of constructing a 4-lane or 5-lane roadway section along King of Prussia Road.*

   Pennoni Response: The applicant is requesting a waiver of this requirement. According to Penndot's "Policies and Procedures for Transportation Impact Studies" from July 2017, the overall intersection Level of Service (LOS) for existing signalized intersections in the horizon year build condition should be no worse than the intersection LOS in the horizon year in the no-build condition. If evaluation of the horizon year build condition indicates that the overall intersection LOS has dropped, the applicant will be required to mitigate the LOS if the increase in overall intersection delay is greater than 10-seconds. If the overall intersection delay increase is less than or equal to 10-seconds mitigation of the intersection will not be required. For locations where the level of service of the design horizon year no-build condition is LOS F and with development, the delay increases more than 10 seconds, the remedies shall provide an estimated delay which will be no worse than the delay for the design year without the development. The improvements recommended in the TIS result in all of the study intersection maintaining the no-build level of service or meeting the PennDOT mitigation delay requirements.

6. *§255-20.B(5)(d)[6][b] A listing of all actions to be undertaken to increase present public transportation usage and improve service, if applicable, shall be included.*

   Pennoni Response: Will comply.

B. *General TIA Comments*

1. *The Applicant indicates a credit was applied for site trips from a previously approved plan for a 427,110 SF General Office Building (Land Use Code 710); this credit is inappropriate and should not be applied to the No-Build conditions for this study. The applicant indicates the existing facility was previously approved and could be occupied by a tenant without additional approvals; however, in our opinion, this has no bearing on the current land development application.*

   Pennoni Response: The TIS includes the evaluation of the 2016 existing condition, future no-build conditions with the existing site fully occupied, and build conditions with the proposed development on the site. In PennDOT Pub 282 , The Policies and Procedures for Transportation Impact Studies from July 2017 states that as a means of encouraging the redevelopment of existing site "the Department may consider permitting trips being generated by the existing development be applied to the proposed redeveloped site as a "trip credit".

2. *The report should be revised to include volume development spreadsheets for each studied intersection. We were unable to verify the No-Build and Build conditions based on the figures provided.*

   Pennoni Response: Will comply. A volume development table has been provided within the appendices of the TIA.

3. *The capacity analyses should be revised to include the timings for all signalized intersections and 95 percentile queues. We were unable to verify the capacity analyses due to insufficient data.*

   Pennoni Response: Will comply. The capacity analyses summary tables and text has been revised to include 95th percentile queues.

4. *The Applicant should provide a 95th percentile queue analysis to determine that adequate storage*

lengths are available at the studied intersections.

Pennoni Response: The capacity analyses summary tables and text have been revised to include 95th percentile queues.

5. *Please provide a Level of Service/Delay in tabular format for the No-Build and Build scenarios as required in PennDOT Strike-off-Letter 470-09-4. Provide No- Build and Build conditions scenarios in the same table for a comparison for each peak hour on each approach by lane movement.*

   Pennoni Response: Will comply. The capacity analyses summary comparison tables have been provided that include No- Build and Build conditions scenarios in the same table for a comparison.

6. *The Applicant should provide turn lane warrant analyses for all three site driveways. Appendix H only provides an analysis for the Raider Road/Site Driveway along King of Prussia Road. In addition provide an analysis for the Raider Road (eastbound) leg at the intersection of King of Prussia Road/Raider Road.*

   Pennoni Response: Will comply. Turn lane warrant analyses for all three site driveways have been included in Appendix H including an analysis for the Raider Road (eastbound) leg at the intersection of King of Prussia Road/Raider Road.

7. *Provide 2025 Build turn lane warrants to determine the maximum turn lane lengths required.*

   Pennoni Response: 2025 Build turn lane warrants have been provided at study intersections.

8. *Per the Institute of Transportation Engineers (ITE) Trip Generation Manual, 3rd Edition, revise the report to include the rates/equations regarding ITE Land Use Code 710 (General Office Building) and Land Use Code 310 (Hotel). The submission only provides the rates and distribution percentages for the Mixed Medical Use Facility.*

   Pennoni Response: Will comply. Table 6 has been revised to include the trip generation rates/equations for Land Uses 310(Hotel) and 710(General Office Building).

9. *Verify the speed along Matsonford Road and revise as needed.*

   Pennoni Response: Will comply. The posted speed limit on Matsonford Road is 40 MPH. The TIA has been revised accordingly.

10. *Revise Figures 3 through 11 to identify the location of King of Prussia Road.*

    Pennoni Response: Will comply. Figures 3 through 11 have been revised accordingly.

11. *The pedestrian and vehicle clearance interval calculations provided in Appendix L will need to be verified and updated based on the final traffic signal permit plan.*

    Pennoni Response: The pedestrian and vehicle clearance calculations will be updated upon the development of a final traffic signal permit plan.

12. *The following comments pertain to discrepancies between the Manual Turning Movement counts and the Capacity Analyses provided in Appendices D, F, I & M:*

    a. *I-476/Southbound Off-Ramp & Lancaster Avenue: Revise the eastbound lane configuration to include a right-turn volume.*

       Pennoni Response: The eastbound right turn from Lancaster Avenue to the I-476 SB ramp is a channelized right turn that does not reach the traffic signal and is not included in the intersection analysis.

    b. *I-476/Southbound Off-Ramp & Lancaster Avenue: Verify the westbound left volume during the 2020 No-Build PM conditions; it appears the volume should be revised from 584 to 571 vehicles.*

       Pennoni Response: Will comply. The no-build volumes have been revised in accordance with

comment #3.

c. *King of Prussia Road & Southern Site Driveway: Verify the northbound through 2020 PM Build volume; it appears the volume should be revised from 405 to 451 vehicles.*

Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.

King of Prussia Road & Southern Site Driveway: Verify the southbound through 2025 PM Build volume; it appears the volume should be revised from 1382 to 1319 vehicles.

Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.

King of Prussia Road & Southern Site Driveway: Verify the northbound through 2025 PM Build volume; it appears the volume should be revised from 411 to 457 vehicles.

Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.

d. *King of Prussia Road & Southern Site Driveway: Verify the southbound through 2025 PM Build volume; it appears the volume should be revised from 1403 to 1338 vehicles.*

Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.

e. *King of Prussia Road & Southern Site Driveway: Verify the northbound through 2020 AM Build volume; it appears the volume should be revised from 1544 to 1554 vehicles.*

Pennoni Response: Will comply. The build volumes have been revised in accordance with comment #3.

13. *The following comments pertain to discrepancies between the Turning Movement counts and the existing 2016 weekday volumes included in Figure 3:*

a. *Northern Driveway and King of Prussia Road: verify the southbound PM through volume; it appears the volume should be revised from 1038 to 1046.*

Pennoni Response: Will comply. The 2016 PM southbound through volume has been revised to 1042 in Figure 3.

b. *Southern Site Driveway and King of Prussia Road: Verify the southbound PM through volume; it appears the volume should be revised from 1011 to 1077.*

Pennoni Response: Will comply. The 2016 PM southbound through volume has been revised to 1042 in Figure 3.

c. *Southern Site Driveway and King of Prussia Road: Verify the northbound PM through volume; it appears the volume should be revised from 337 to 292.*

Pennoni Response: Will comply. The 2016 PM northbound through volume has been revised to 292 in Figure 3.

14. *There is an existing coordinated signal system along King of Prussia Road that includes Radnor-Chester Road and Matsonford Road. Any traffic signals proposed along the site frontage should be included in the overall coordinated system. The Applicant should also investigate coordinating the Matsonford Road/King of Prussia Road signal system with the Lancaster Avenue System.*

Pennoni Response: Will comply.

15. *We recommend the Transportation Impact Study be revised to address the above comments to the satisfaction of the Township. In order to expedite the review process for the resubmission of the above,*

the Applicant should submit a response letter which addresses each of the above comments including the original comment and identify any changes made unrelated to the review.

Pennoni Response: Will comply.

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2457 or mkissinger@pennoni.com.

Sincerely,

PENNONI ASSOCIATES INC.

Michael Kissinger, PE
Land Development Division Manager

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems
David Falcone, Saul Ewing Arnstein & Lehr LLP

Pennoni

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January 17, 2018

UPHS1504

Radnor Township
Attn: Board of Supervisors
301 Iven Ave.
Wayne, PA19087

RE: WAIVER REQUEST LETTER
PENN MEDICINE AT RADNOR
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA

Dear Supervisors:

On behalf of the Trustees of the University of Pennsylvania Health Systems, Pennoni Associates Inc. is respectfully requesting a waiver from the following section of the Township's Subdivision and Land Development Ordinances.

1. Section 255-21.A(6): A waiver is requested for the maximum plan sheet size if 24 inches by 34 inches. The plans will be reduced for recording purposes.
2. Section 255.20.B(1): A waiver is requested for the requirement that the plans include existing principal buildings and their respective uses, and driveways on the adjacent peripheral strip; sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site. We have provided an aerial photograph demonstrating the existing conditions within 500-ft of the site.
3. SECTION 255-20.B(5)(d)[6]: A waiver is requested for the requirement that streets or intersections showing Level of Service below C shall be considered deficient and specific recommendations for elimination of these problems shall be listed.

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2457 or mkissinger@pennoni.com.

Sincerely,

PENNONI ASSOCIATES INC.

Michael Kissinger

Michael Kissinger, PE
Land Development Division Manager

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems
David Falcone, Saul Ewing Arnstein & Lehr LLP

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 King of Prussia Road
Radnor Township
Delaware County, Pennsylvania

James P. Markham, PE

Pennsylvania Professional Engineer License No. PE061283

Prepared For:

University of Pennsylvania Health System
3400 Civic Center Boulevard
Philadelphia, PA 19104

September 2017
Revised January 2018
UPHS 1507

TRAFFIC IMPACT STUDY
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EXECUTIVE SUMMARY

This document summarizes the results of an evaluation of traffic impacts associated with the proposed University of Pennsylvania Health Systems site located at 145 King of Prussia Road in Radnor Township, Delaware County, Pennsylvania.

The site currently is vacated and located on the east side of King of Prussia Road between the existing Southern driveway and existing Septa/Northern driveway. The proposed site will be comprised of a 250,000 square foot mixed medical use building, a 150,000 square foot general office building, and a 75,000 square foot, 120 room hotel. The proposed development is anticipated to be constructed and occupied by 2020.

Turning movement counts, including heavy vehicles and pedestrian counts, were conducted between the hours of 7:00 – 9:00A.M.and 4:00 – 6:00 P.M. at the following intersections:

1. King of Prussia Road & Matsonford Road (SR 1038) – November 18, 2015
2. King of Prussia Road & Radnor Chester Road (SR 1021) – April 27, 2016
3. King of Prussia Road & SEPTA Station Driveway– September 15, 2016
4. King of Prussia Road & Existing Northern Site Driveway – April 27, 2016
5. King of Prussia Road & Existing Raider Road/Site Driveway – November 18, 2015
6. King of Prussia Road & Existing Southern Site Driveway – April 27, 2016
7. Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp– November 18, 2015
8. Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps – September 15, 2016
9. Lancaster Avenue (SR 0030) & I-476 NB On Ramp Hillside Circle – November 18, 2015
10. Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021) – April 27, 2016

The performance of the study intersections were evaluated under existing, no-build, and build conditions through a qualitative measure of operating conditions called Levels of Service. Levels of Service (LOS) are determined through analysis procedures outlined in the 2010 Highway Capacity Manual (Transportation Research Board, Washington, D.C.). The Levels of Service were obtained using *Synchro 9* and the 2016 existing, 2020 no-build, and 2020 build conditions and were evaluated to identify impacts to the study area. The need for additional mitigations is based on the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies.*

As the existing space was previously approved and could be occupied by a tenant without additional approvals, trips for the existing site were calculated and applied to the existing traffic to develop the future "no build" conditions. The traffic volumes for the existing site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9th Edition, 2012). The existing site trips are based upon the ITE Land Use Codes 710 "General Office" utilizing the square footage of the building as the independent variable. The trip calculations result in a total of **611** (**538** entering and **73** exiting) and **557** (**95** entering and **462** exiting) new trips generated by the site during the morning and afternoon peak hours, respectively.

The proposed mixed use site will be located at 145 King of Prussia Road between the existing Southern Driveway and the shared SEPTA/Site Driveway. The proposed site will have three driveways along King of Prussia Drive at the location of the of the existing entry driveways. The existing driveway across from Raider Road will become a full access driveway. The southern driveway will primarily be for accessing the loading area.

The traffic volumes for the hotel and general office components of the proposed site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9th Edition, 2012). The *ITE Trip Generation Manual* defines a trip as a "single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site."

The proposed Penn Medicine mixed medical use portion of the development will have a gross floor area of 250,000 SF, more than triple the size of 90% of the facilities used by ITE to derive trip generation data. Also, unlike private physician practices used to generate the ITE rates, the proposed Penn Medicine mixed medical use facility will include a number of treatment facilities that are uncommon in a typical medical office and that occupy a larger portion of the gross square floor area of the building, while not accommodating a larger number of patients. These facilities include ambulatory operating rooms, endoscopy rooms, chemotherapy treatment areas, radiological imaging rooms and radiation oncology treatment areas. Therefore, the proposed facility is very different from those used to derive ITE trip generation data. It is for these reasons that the ITE trip generation is not appropriate to use for the proposed Penn Medicine building and a trip generation rate was developed based on an evaluation of three existing mixed medical use facilities for the peak hour of the adjacent street which, based on traffic counts, is 7:15-8:15 AM and 5:00–6:00 PM.

The following existing mixed medical use facilities were evaluated to develop trip generation rates:

- 171,000 square foot facility at 250 King of Prussia Rd in Radnor PA
- 83,000 square foot facility at 1001 Chesterbrook Blvd. in Berwyn PA
- 154,826 square foot facility at 915 Old Fern Hill Road in West Chester, PA

Based on driveway counts and data regarding the number of patient positions at each facility, average weekday, AM and PM trip generation rates and entry/exit distributions were developed and presented to Radnor Township for review and approval.

The trip calculations result in a total of **731** (**577** entering and **154** exiting) and **583** (**158** entering and **425** exiting) new trips generated to the site during the morning and afternoon peak hours, respectively. The proposed site will generate approximately 90% more net trips over the course of a whole day than the existing land use "general office building" but only generates approximately 20% more net trips in the AM peak period and approximately 5% more net trips during the PM peak period.

An analysis was conducted to determine whether left turn lanes or a right turn lane into the site from are warranted. Based on the standard worksheets in the Chapter 11 Appendix of PennDOT Publication 46, the warrants for left turn lanes on King of Prussia Road and a northbound right turn lane into the site at the intersection of King of Prussia Road and Raider Road/Site Driveway are met, along with a southbound left turn lane from King of Prussia Road into the Septa Station Driveway.

Traffic Signal warrant requirements were evaluated at the unsignalized intersections of King of Prussia Road & Raider Road/Site Driveway and King of Prussia Road & Septa Station Driveway using the manual counts and generated site trips. From the signal warrant analysis, it was determined that the 4-Hour and Peak Hour signal warrants were satisfied at the intersection of King of Prussia Road & Raider Road/Site Driveway. Evaluation of the left turn signalization warrants for the northbound and southbound left turn lanes on King of Prussia Road at Raider Road and the proposed site driveway indicate that the left turn movements from King of Prussia Road should be controlled with permitted phases.

Vehicular and pedestrian clearances were calculated for the proposed signal at King of Prussia Road and Raider Road/site driveway based on PennDOT policies.

Operations of the study intersections during the AM and PM peak hours were evaluated for the build configuration of the proposed development in the proposed build year of 2020 and the horizon year of 2025 with the optimized timings from the no-build condition.

Under the 2020 and 2025 no-build configuration, all the study intersections operate at an acceptable LOS D or better except for the following locations:

<u>King of Prussia Road & Radnor-Chester Road (SR 1021)</u>

- In 2020 the overall intersection operates at a LOS F (218.9 seconds of delay) during the AM peak hour and LOS F (85.7 seconds of delay) during the PM peak hour.
- In 2025 the overall intersection operates at a LOS F (227.1 seconds of delay) during the AM peak hour and LOS F

(88.4 seconds of delay) during the PM peak hour.

King of Prussia Road & South Site Driveway

- In 2020 the overall intersection operates at a LOS F (83.9 seconds of delay) during the PM peak hour.
- In 2025 the overall intersection operates at a LOS F (87.3 seconds of delay) during the PM peak hour.

Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

- In 2020 the overall intersection operates at a LOS E (66.2 seconds of delay) during the AM peak hour and LOS E (55.6 seconds of delay) during the PM peak hour.
- In 2025 the overall intersection operates at a LOS E (69.4 seconds of delay) during the AM peak hour and LOS E (60.5 seconds of delay) during the PM peak hour.

Lancaster Avenue (SR 0030) & Radnor Chester Road

- Overall Intersection operates at a LOS E (57.2 seconds of delay) during the PM peak hour in 2020.
- Overall Intersection operates at a LOS E (62.1 seconds of delay) during the PM peak hour in 2025.

Based on the anticipated Level of Service for the exiting movements from the site via the SEPTA Driveway and south site driveway to King of Prussia Road a gap study was performed at both locations. The gap study was conducted from 7:00-9:00 AM and 4:00-6:00 PM on April 27, 2016. Based on the peak hour gap analysis, it is anticipated that sufficient gaps are available to accommodate the anticipated traffic from the site at the two locations.

As required by 255-20.B(5)(d)(6)(a) of the Radnor Township Subdivision and Land Development Ordinance, additional off-site improvements would be necessary to achieve LOS C at all of the off-site intersections. Based on Synchro analysis, Lancaster Avenue would require significant intersection upgrades including widening to provide additional through lanes and providing additional dedicated turn lanes on most approaches. The King of Prussia Road intersections at Radnor-Chester Road and Matsonford Road would require two through lanes in each direction on King of Prussia Road and dual turn lanes on the minor approaches. Due to physical constraints at most of the project intersections, including the SEPTA Rail Bridge on King of Prussia Road and the I-476 Bridges on Lancaster Avenue, the necessary improvements are not feasible and are not proposed by the applicant.

The Intersection LOS and delay under no-build conditions was compared to the 2020 and 2025 build conditions. The comparison indicated that there are no changes in overall intersection LOS at existing signalized intersections between the no-build and build conditions as a result of the trips generated by the proposed site. In conjunction with the proposed development the following roadway improvements are recommended:

- At King of Prussia Road and Matsonford Road/Park Driveway:
  - Modify AM signal timings to shift 3 seconds from the SB King of Prussia Road lead phase to the NB/SB King of Prussia phase (1 second) and the EB/WB Matsonford Road/Park Driveway Phase (2 seconds).
- At King of Prussia Road and Radnor-Chester Road:
  - Modify PM signal timings to shift 6 seconds from the EB/WB King of Prussia Road phase to the NB/SB Radnor Chester Road phase.
- At King of Prussia Road and Septa Station Driveway:
  - Restripe southbound King of Prussia Road to provide a dedicated left turn lane.
- At King of Prussia Road and Raider Road/Site Driveway :
  - Provide left turn lanes on both approaches of King of Prussia Road
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road.
  - Install 2 phase semi-actuated traffic signal.
- At King of Prussia Road and South Site Driveway :

  - Restripe northbound King of Prussia Road to provide shared through/right turn lane.
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.

- At Lancaster Avenue and NB Off Ramps/King of Prussia Road:
  - Restripe northbound I-76 off-ramp at Lancaster Avenue to provide shared through/right turn lane
- At Lancaster Avenue and I-476 SB Off Ramp:
  - Modify PM signal timings to shift 1 second from the EB/WB Lancaster Avenue phase to the WB Lancaster Avenue lead phase.
- At Lancaster Avenue and I-476 NB On Ramp/Hillside Circuit:
  - Modify PM signal timings to shift 7 second from the EB/WB Lancaster Avenue phase to the EB Lancaster Avenue lead phase.
- At Lancaster Avenue and Radnor-Chester Road:
  - Modify AM signal timings to shift 12 seconds from the southbound Radnor-Chester Road lead phase and 1 second from the Lancaster Avenue Phase lead left phase to the EB/WB Lancaster Avenue EB/WB Phase.

The additional improvements result in the overall intersection LOS at Lancaster Avenue and I-476 NB Off Ramp/King of Prussia Road improving from LOS E to LOS D during the AM peak hour in both 2020 and 2025. Striping the additional NB thru lane improves the approach from LOS E to LOS D and the through movement from LOS F to LOS E during the AM peak hour in 2020 and 2025.

Under the build Conditions with the identified improvements implemented, all of the study intersections maintain existing levels of service between the no-build and build conditions and operate at overall LOS D or better with the exception of those that operate at LOS E or F under no-build conditions.

Based on the comparison of the Intersection LOS and delay under no-build conditions and build conditions with the identified mitigation measures, the intersections meet the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies* at all of the study intersections. The Levels of Service exhibited are not a result of, nor is the need for additional mitigation measures triggered as a result of the trips generated by the proposed site.

In addition to the improvements identified within the is TIS, a bus shelter is to be constructed on King of Prussia Road southeast of the SEPTA Driveway to the extent that it is approved by SEPTA and the University of Pennsylvania Health System will partner with the Township to install a Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review:

- Route 30 & I-476 Northbound Ramps
- Route 30 & I-476/King of Prussia Road
- Route 30 & I-476 Southbound Ramps.
- Route 30 & Radnor-Chester Road.
- Route 30 & Radnor Financial Center Eastern Driveway
- Route 30 & Radnor Financial Center Western Driveway
- King of Prussia Road & Radnor-Chester Road.
- King of Prussia Road & Matsonford Road.
- Matsonford Road & South Centennial Drive.
- Matsonford Road & North Centennial Drive
- King of Prussia Road & Raider Road.

- Radnor Chester and Raider Road
- Radnor Chester and Radnor Financial Center

INTRODUCTION

This document summarizes the results of an evaluation of traffic impacts associated with the proposed University of Pennsylvania Health Systems site located at 145 King of Prussia Road in Radnor Township, Delaware County, Pennsylvania.

The site currently is vacated and located on the east side of King of Prussia Road between the existing Southern driveway and existing Northern driveway. The proposed site will be comprised of a 250,000 square foot mixed medical use building with 130,000 square foot of clinical space and 120,000 square feet of ambulatory care space, a 150,000 square foot general office building, and a 75,000 square foot, 120 room hotel. The proposed development is anticipated to be constructed and occupied in 2020. The overall project area is shown in **Figure 1**. A site plan of the proposed development is illustrated in **Figure 2**.

Study Area (Traffic Impact Area)

The peak traffic periods evaluated on the adjacent roadway network are: morning (7:00 am to 9:00 am) and late afternoon (4:00 pm to 6:00 pm) periods on a typical weekday when school is in session.

The following intersections were selected for study:

1. King of Prussia Road & Matsonford Road (SR 1038)
2. King of Prussia Road & Radnor Chester Road (SR 1021)
3. King of Prussia Road & SEPTA Station Driveway
4. King of Prussia Road & Existing Northern Site Driveway
5. King of Prussia Road & Existing Raider Road/Site Driveway
6. King of Prussia Road & Existing Southern Site Driveway
7. Lancaster Avenue (SR 0030) & King of Prussia Road/I-476 NB Off Ramp
8. Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps
9. Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circle
10. Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021)

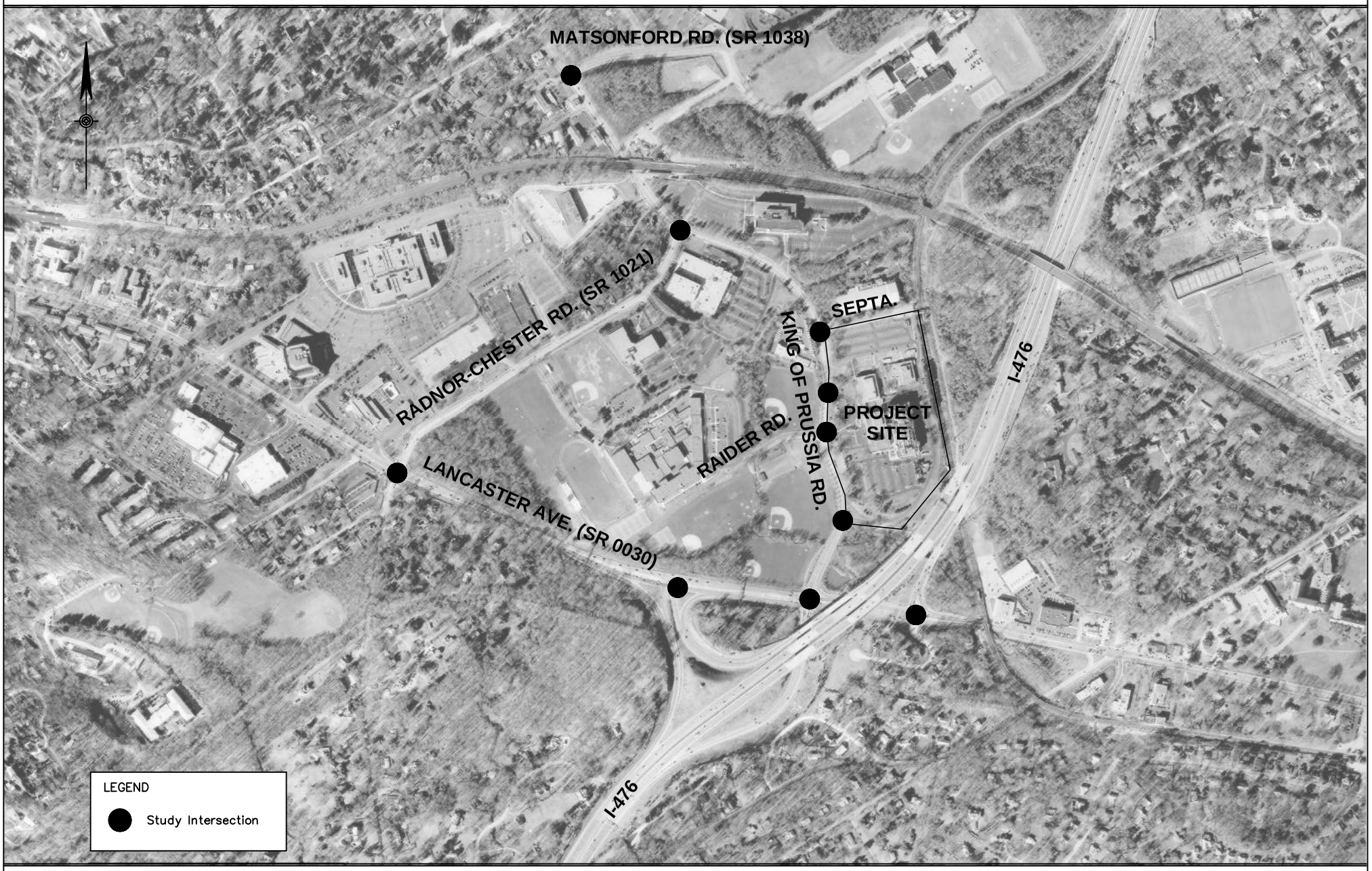
Study Contents

Specific elements included in this assessment are:

- An inventory of the roadway facilities in the vicinity of this project, including the existing physical and traffic operating characteristics.
- Manual turning movement counts performed at the study intersections during weekday morning and afternoon peak traffic hours.
- Calculation of vehicular trip generation for the proposed development within the study area based on trip generation rates contained in the Institute of Transportation Engineers (ITE) manual entitle *Trip Generation,* An ITE Information Report (9th Edition, 2012).
- Gap study of the existing site driveways
- Distribution of development-generated traffic onto the study area roadways in accordance with current travel patterns.
- Assessment of Existing (2016), Opening Year (2020), and Horizon Year (2025) traffic conditions based on

PENN MEDICINE

UPHS 1507



Pennoni Associates Inc.
Consulting Engineers

FIGURE 1
PROJECT LOCATION

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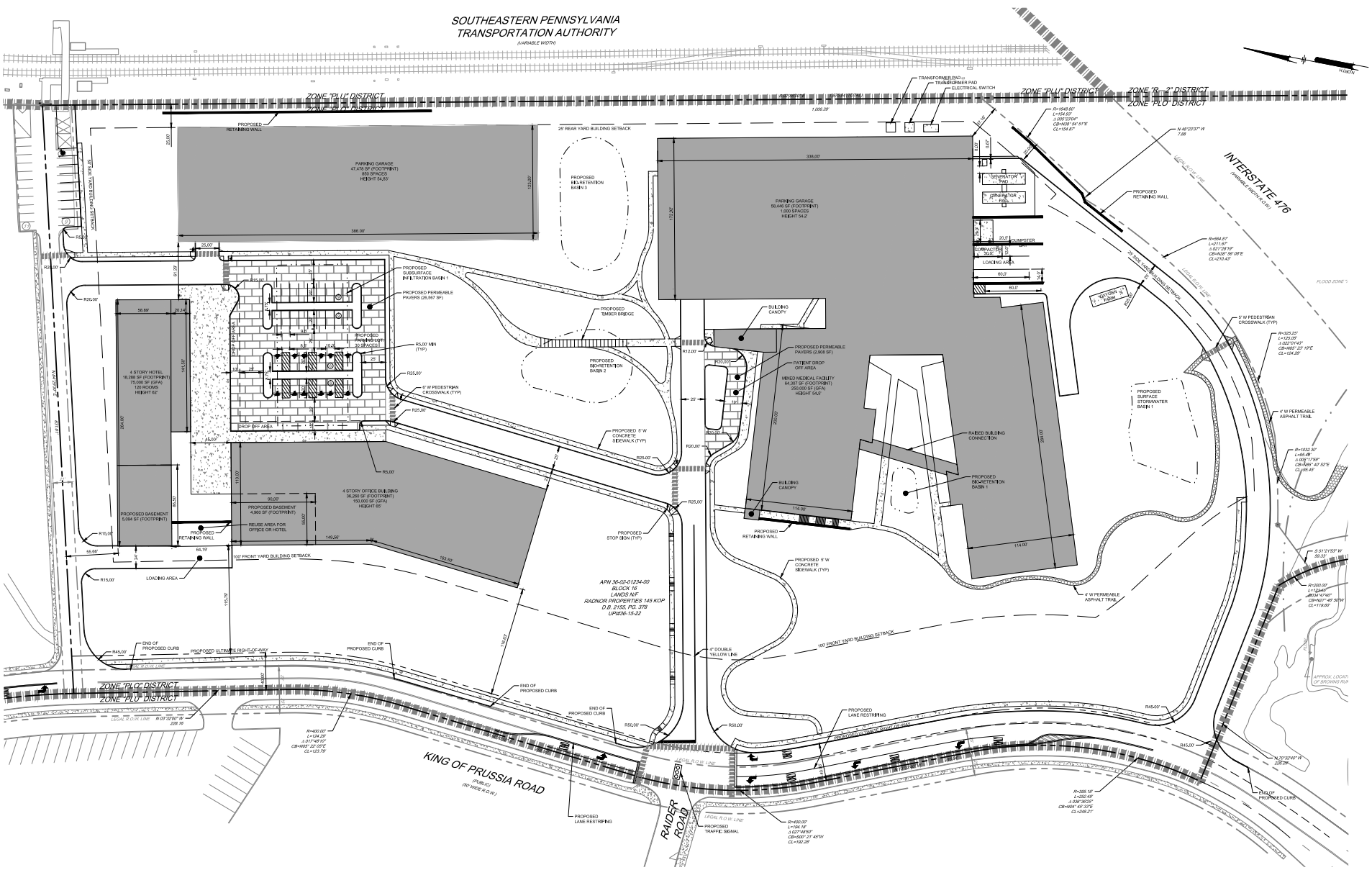

Pennoni Associates Inc.
Consulting Engineers

FIGURE 2
SITE PLAN

Pennoni

capacity and level of service analyses performed at the study intersections.

Study Methodology

The analysis was conducted in accordance with guidelines presented in Pennsylvania Department of Transportation (PennDOT) Policies and Procedures for Transportation Impact Studies, dated January 28, 2009. As required, three analysis years are considered: existing baseline traffic conditions, opening year analysis and design horizon year analysis (5 years after the opening year). The opening year and horizon year analyses include an assessment of the operational conditions of the study intersections under "no-build" and "build" scenarios. Mitigation is assessed for intersections that experience an overall level of service drop and delay increase of more than ten (10) seconds from the "no-build" to "build" conditions.

The performance of the study intersections for each analysis scenario was evaluated through a qualitative measure of operating conditions called Levels of Service (LOS). Six levels of Service (LOS) are defined with letter designations from 'A' to 'F', with Level of Service 'A' representing delays up to ten seconds and Level of Service 'F' indicating delays exceeding eighty seconds. Level of Service 'C' or better is considered acceptable, with a threshold of Level of Service 'D' in urban areas. Levels of Service are determined through analysis procedures outlined in the 2010 Highway Capacity Manual (Transportation Research Board, Washington, D.C.).

Levels of Service for signalized intersections are based on average delay experienced by motorists passing the intersection. The delay is based on the results of the capacity analysis (rate of demand flow to capacity) and other important variables such as quality of progression, cycle length, and ratio of green time.

Levels of Service for unsignalized intersections are defined in terms of delay to vehicles entering from the side road and turning left from a major road. Delay is a function of the capacity of the approach and degree of saturation. The capacity is based on the distribution of gaps in the major street traffic stream, driver judgment in selecting a gap through which to execute the desired maneuver, and follow-up time required by each driver in a queue. The Level of Service Criteria for signalized and unsignalized intersections is provided in **APPENDIX A.**

The operational analyses of the study intersections under all conditions were performed using the Synchro 9 software. Chapter 10 of PennDOT Publication 46 provides Pennsylvania default values to be utilized in the HCM 2010 Level of Service analysis. The following default values were used for signalized intersections: base saturation flow rate of 1800 passenger cars per hour per lane (suburban); an extension of effective green time of 3.5 seconds, and a start-up lost time of 2.5 seconds.

EXISTING CONDITIONS

Existing Roadway Facilities

The following roadways within the immediate vicinity of the project site were evaluated as part of this study:

- **Lancaster Avenue (SR 0030)** is an east-west oriented Principal Arterial Highway. Within the study area, Lancaster Avenue is 90' wide and designated two-way. There are two travel lanes in each direction with separate eastbound and westbound left turn lanes at the two study intersections. The posted speed limit on Lancaster Avenue is 35 mph.

- **King of Prussia Road** is a north-south oriented local roadway with sidewalk on the western side of the roadway. Within the study area, King of Prussia Road is 40' wide with one lane of travel in each direction. The posted speed limit on King of Prussia Road is 35 mph.

- **Matsonford Road (SR 1038)** is an east-west oriented minor arterial roadway. Within the study area, Matsonford Road is 50' wide with one lane of traffic in each direction and a westbound left turn lane. The posted speed limit on Matsonford Road is 40 mph.

- **Radnor Chester Road (SR 1021)** is a north-south oriented minor arterial roadway. Within the study area, Radnor Chester Road is 25' wide with one lane of traffic in each direction. The posted speed limit on Radnor Chester Road is 35 mph.

- **Raider Road** is an east-west oriented local roadway. Within the study area, Raider Road is 30' wide with one lane of traffic in each direction with sidewalk on the southern side. The speed limit on Raider Road is not posted but is assumed to be 25 mph.

Existing Intersections

The following existing intersections were analyzed for existing and future capacity restraints as part of this study:

- **King of Prussia Road & Matsonford Road (SR 1038)/Driveway.** The intersection of King of Prussia Road and Matsonford Road is a four-legged signalized intersection operating on a three-phase traffic signal with a southbound lead. Matsonford Road has a left turn lane and a through/right lane in each direction. Northbound King of Prussia Road has one left turn lane, one through lane, and one yield controlled right turn lane. The southbound approach of King of Prussia Road has a left turn lane and a southbound through/right turn lane.

- **King of Prussia Road & Radnor-Chester Road (SR 1021)**. The intersection of King of Prussia Road and Radnor-Chester Road is a four-legged signalized intersection operating on a two-phase timing with a 90 second cycle length. Radnor-Chester Road provides one eastbound through/left turn lane and one eastbound right turn lane along with one westbound lane. Radnor-Chester Road contains one northbound left turn lane and one northbound through/right turn lane along with one southbound left turn lane, one southbound through lane and one southbound right turn lane.

- **King of Prussia Road & SEPTA Station Driveway.** The intersection of King of Prussia Road and the SEPTA Station Driveway is a three-legged stop-controlled intersection with stop control on the SEPTA Station Driveway. Northbound King of Prussia Road has one lane. Southbound King of Prussia Road has one through lane and one left turn lane. The driveway has one lane in each direction.

- **King of Prussia Road & Northern Site Exit Driveway** The intersection of Lancaster Avenue and the site's northern driveway is a three-legged stop-controlled intersection with stop control on the driveway. King of Prussia Road contains one lane in each direction with a center two-way left turn lane. Raider Road has one lane in each direction. The site driveway is a one lane exit driveway.

- **King of Prussia Road & Raider Road/ Entry Driveway**. The intersection of King of Prussia Road and Raider Road is a three-legged unsignalized intersection with stop-control on Raider Road. King of Prussia Road contains one lane in each direction with a center two-way left turn lane. Raider Road has one lane in each direction. The site driveway is a one lane entry driveway.

- **King of Prussia Road & Southern Site Driveway**. The intersection of King of Prussia Road and the sites southern driveway is a three-legged stop-controlled intersection with stop control on the driveway. Northbound King of Prussia Road has one lane. Southbound King of Prussia Road has one through lane and one left turn lane. The driveway has one lane in each direction.

- **Lancaster Avenue (SR 0030) & King of Prussia Road /I-476 NB Off Ramp**. The intersection of Lancaster Avenue and I-476 NB off-ramps/King of Prussia Road is a four-legged signalized intersection. Lancaster Avenue has two eastbound left turn lanes and two eastbound through lanes. Westbound Lancaster Avenue has two through lanes and one channelized right turn lane. The I-476 NB off-ramp contains two left turn lanes, one through lane, and one right turn lane. Southbound King of Prussia Road has two left turn lanes and one right turn lane.

- **Lancaster Avenue (SR 0030) & I-476 SB on/off-ramps**. The intersection of Lancaster Avenue and I-476 on/off-ramps is a three-legged intersection with a three-phase traffic signal. Westbound Lancaster Avenue has two through lanes and two left turn lanes. Eastbound Lancaster Avenue has two through lanes and one eastbound channelized right turn lane. The I-476 SB off-ramp has two northbound left turn lanes and one channelized right turn lane.

- **Lancaster Avenue (SR 0030) & I-476 NB On Ramps/Hillside Circle**. The intersection of Lancaster Avenue and I-476 off-ramps is a four-legged signalized intersection. Westbound Lancaster Avenue has one left turn lane, two through lanes, and one right turn lane. Eastbound Lancaster Avenue has two left turn lanes, one through lane, and one through/right turn lane. Hillside Circle has one northbound through/left turn lane and one northbound right turn lane.

- **Lancaster Avenue (SR 0030) & Radnor-Chester Road (SR 1021)**. The intersection of Lancaster Avenue and Radnor-Chester Road four-legged signalized intersection. Eastbound Lancaster Avenue has one left turn lane, two through lanes, and one right turn lane. Westbound Lancaster Avenue has one left turn lane, one through lane, and one through/right turn lane. Northbound Radnor-Chester Road has one left turn lane, one through lane, and one through/right turn lane. Southbound Radnor-Chester Road has one left/through lane, one through/right lane.

Signal plans and timings Signal for the study area intersections were obtained PennDOT and are provided in **APPENDIX B**.

Pedestrian Access

King of Prussia Road has sidewalk on both sides of the roadway from the Matsonford Road to the SEPTA station driveway. Sidewalk is provided on the west side of King of Prussia Road from the SEPTA station driveway to Lancaster Avenue. Crosswalks with ADA compliant crosswalks are provided at each of the signalized intersections on King of Prussia Road. There is an unsignalized midblock crosswalk approximately 400' south of Matsonford Road.

Sidewalk is provided on the north side of Lancaster Avenue east of King of Prussia Road. There is no sidewalk provided on Lancaster Avenue west of King of Prussia Road.

Transit Facilities

Transit facilities are present within the study area including, Septa Regional Rail and Septa Bus Routes. The site is located

adjacent to the Radnor Train Station which is serviced by Norristown High Speed Line and the Paoli-Thorndale Regional Rail Line. Several bus routes run adjacent to the site including the 105 and 106 lines on King of Prussia Road.

Data Collection

Turning movement counts, including heavy vehicles and pedestrian counts, were conducted between the hours of 7:00 – 9:00 A.M. and 4:00 – 6:00 P.M. at the following intersections:

1. King of Prussia Road & Matsonford Road (SR 1038) – November 18, 2015
2. King of Prussia Road & Radnor Chester Road (SR 1021) – April 27, 2016
3. King of Prussia Road & Existing Northern Site Driveway – April 27, 2016
4. King of Prussia Road & Existing Raider Road/Site Driveway – November 18, 2015
5. King of Prussia Road & Existing Southern Site Driveway – April 27, 2016
6. Lancaster Avenue (SR 0030) & King of Prussia Road / I-476 NB Off Ramp– November 18, 2015
7. Lancaster Avenue (SR 0030) & I-476 SB On/Off Ramps – September 15, 2016
8. Lancaster Avenue (SR 0030) & I-476 NB On Ramp Hillside Circle – November 18, 2015
9. Lancaster Avenue (SR 0030) & Radnor Chester Road (SR 1021) – April 27, 2016

A gap study was also performed for the existing site driveways on April 27, 2016 between the hours of 7:00 – 9:00 A.M. and 4:00 – 6:00 P.M.

The existing traffic volumes are shown on **FIGURE 3**.

The count and gap study data is provided in **APPENDIX C.**

Existing Levels of Service/Queue Analysis

The operational analyses of the study intersections under all conditions were performed using the *Synchro/Simtraffic* Version 9.0 software. Chapter 10 of *PennDOT Publication 46* provides Pennsylvania default values to be utilized in the HCM 2010 Level of Service analysis.

Under the existing conditions, all of the study intersections operate at an overall Level of Service D or better, with all movements operating at Level of Service D or better during the AM and PM peak hours besides the following locations:

- King of Prussia Road & Radnor Chester Road
  - Northbound approach operates at a LOS F during the AM and PM peak hours with 613.9 and 249.3 seconds of delay, respectively.
  - Northbound left/through movement operates at a LOS F during the AM and PM peak hours with 666.0 and 328.0 seconds of delay, respectively.
  - The overall intersection operates at a LOS F during the AM peak hour (228.6 seconds of delay) and at a LOS F during the PM peak hour (93.3 seconds of delay).
- King of Prussia Road & Raider Road
  - Eastbound movement operates at a LOS F (53.4 seconds of delay) during the AM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road
  - Eastbound approach operates at a LOS E (57.4 seconds of delay) during the AM peak hour.
  - Eastbound through operates at a LOS E (58.1 seconds of delay) during the AM peak hour.
  - Northbound through movement operates at LOS F (81.1 seconds of delay) during the AM peak hour.
  - Northbound right movement operates at LOS E (78.0 seconds of delay) during the PM peak hour.

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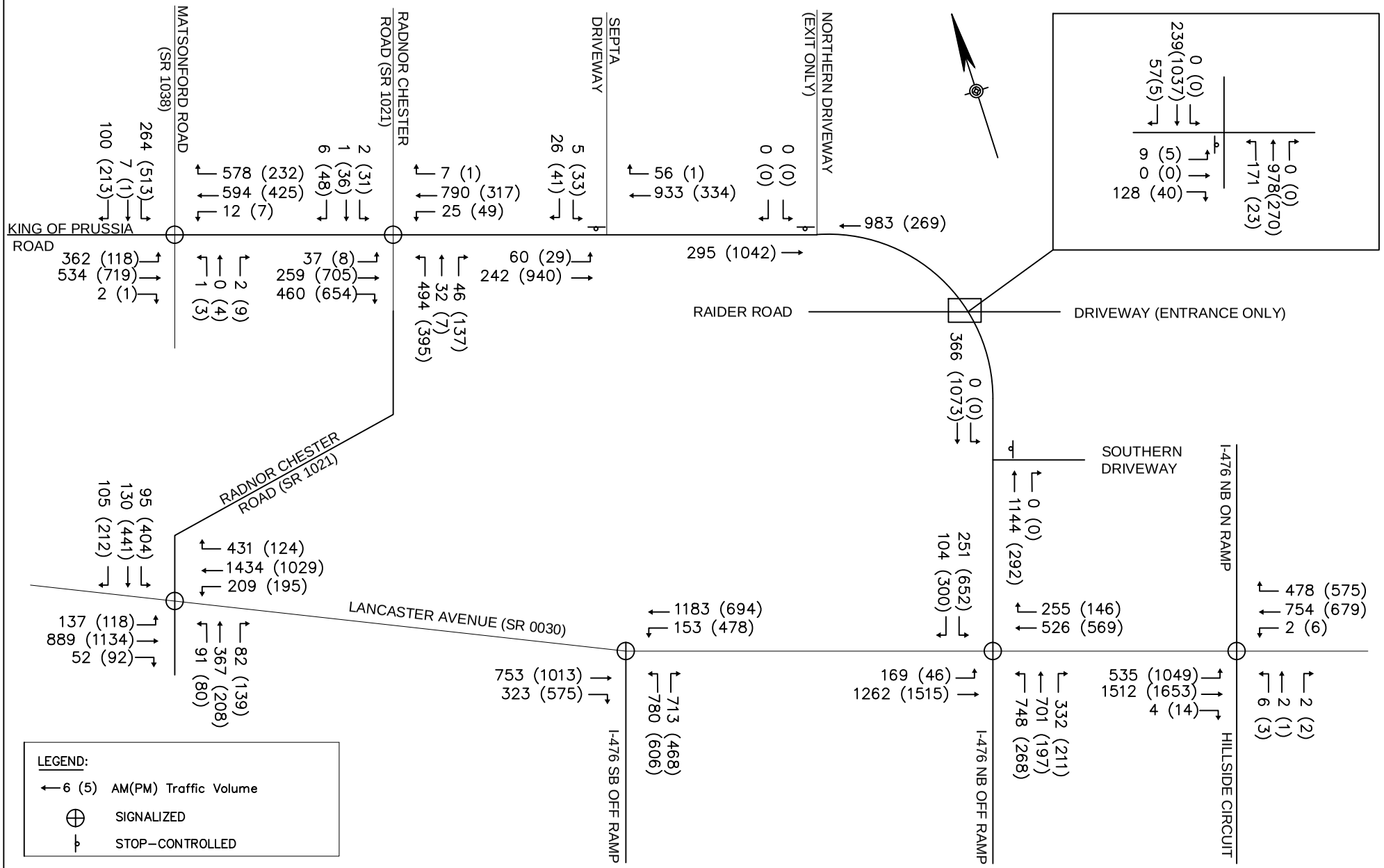

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FIGURE 3
EXISTING 2016 WEEKDAY
PEAK HOUR TRAFFIC VOLUMES

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  - Southbound approach movement operates at a LOS E (57.1 seconds of delay) during the AM peak hour.

- Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit
  - Eastbound left movement operates at a LOS E (57.4 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS E during the AM and PM peak hours with 56.5 and 59.3 seconds of delay, respectively.
  - Northbound approach operates at a LOS E during the AM and PM peak hours with 58.1 and 56.7 seconds of delay, respectively.
  - Northbound through/left movement operates at a LOS E during the AM and PM peak hours with 58.8 and 56.9 seconds of delay, respectively.
  - Northbound right movement operates at a LOS E during the AM and PM peak hours with 55.1 and 56.2 seconds of delay, respectively.
- Lancaster Avenue (SR 0030) & Radnor Chester Road
  - Westbound left operates at LOS E (62.2 seconds of delay) during the PM peak hour.
  - Westbound thru operates at LOS E (63.7 seconds of delay) during the AM peak hour.
  - Southbound approach operates at a LOS F (81.9 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (174.7 seconds of delay) during the PM peak hour.

In the existing conditions, the estimated 95th percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95th percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 345'during the AM peak period.
- The reported 95th percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 60'during the PM peak period.
- The reported 95th percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 925' and 40' during the AM and PM peak periods, respectively.
- The reported 95th percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 40' during the PM peak period.
- The reported 95th percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 128' during the PM peak period.
- The reported 95th percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 505' during the PM peak period.
- The reported 95th percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 143' during the AM peak period.
- The reported 95th percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 232' and 138' during the AM and PM peak periods respectively.
- The reported 95th percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 658' during the PM peak period.

A summary of the Delays, LOS, and 95th Percentile Queues for the existing conditions analysis are summarized in **TABLE 1.** Detailed outputs of the 2016 existing conditions analysis are provided in **APPENDIX D.**

Table 1 – 2016 Existing Conditions Summary Table

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		27.9	C	-	19.3	B	-
	(EB Left)	50'	30.8	C	0	24.5	C	3
	(EB Thru/Right)	50'	26.5	C	3	18.2	B	10
	WB Approach	-	36.7	D	-	43.1	D	-
	(WB Left)	550'	39.7	D	310	52.1	D	610
	(WB Thru/Right)	950'	29.3	C	113	21.6	C	195
	SB Approach	-	23.9	C	-	23.3	C	-
	(SB Left)	100'	45.5	D	445	15.9	B	80
	(SB Thru/Right)	1000'+	9.3	A	313	24.5	C	618
	NB Approach	-	40.8	D	-	27.5	C	-
	(NB Left)	130'	17.7	B	10	30.6	C	8
	(NB Thru)	1150'	41.3	D	543	27.4	C	382
	Overall	**-**	**31.9**	**C**	**-**	**31.3**	**C**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	18.1	B	-	21.0	C	-
	(EB Left)	75'	46.3	D	50	16.6	B	5
	(EB Thru)	1200'	14.1	B	178	21.1	C	470
	WB Approach	-	38.1	D	-	18.0	B	-
	(WB Left)	160'	16.6	B	20	38.2	D	60
	(WB Thru/Right)	1100'	38.8	D	800	14.8	B	225
	NB Approach	-	613.9	F	-	249.3	F	-
	(NB Left/Thru)	1200'	666.0	F	2125	328.0	F	1240
	(NB Right)	280'	18.1	B	35	19.5	B	110
	SB Approach	100'	21.8	C	8	50.8	D	140
	Overall	**-**	**228.6**	**F**	**-**	**93.3**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	26.2	D	73	19.1	C	25
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	2.5	A	90	0.3	A	3
	Overall	**-**	**1.2**	**A**	**-**	**1.2**	**A**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	0.0	A	0	0.0	A	0
	NB Approach	280'	0.0	A	0	0.0	A	0
	SB Approach	380	0.0	A	0	0.0	A	0
	Overall	**-**	**0.0**	**A**	**-**	**0.0**	**A**	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (E)	EB Approach	500'	53.4	F	128	24.1	C	18
	NB Approach	550'	1.3	A	18	0.9	A	3
	SB Approach	280	0.0	A	0	0.0	A	0
	Overall	**-**	**5.6**	**A**	**-**	**1.0**	**A**	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	0.0	A	0	0.0	A	0
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.0	A	0	0.0	A	0
	(SB Left)	75'	0.0	A		0.0	A	
	Overall	**-**	**0.0**	**A**	**-**	**0.0**	**A**	**-**

Table 1 – 2016 Existing Conditions Summary Table (Cont.)

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	57.4	E	-	56.6	E	-
	(EB Left)	800'	52.1	D	120	54.0	D	35
	(EB Thru)	800'	58.1	E	765	56.7	E	928
	WB Approach	600'	23.8	C	240	8.3	A	128
	NB Approach	-	44.5	D	-	47.4	D	-
	(NB Left)	500'	17.6	B	300	19.8	B	123
	(NB Thru)	1900'	81.1	F	1350	52.0	D	275
	(NB Right)	500'	27.9	C	330	78.0	E	345
	SB Approach	500'	57.1	E	32	47.5	D	407
	Overall	**-**	**47.2**	**D**	**-**	**45.1**	**D**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	16.9	B	208	21.6	C	298
	WB Approach	-	33.7	C	-	33.9	C	-
	(WB Left)	600'	53.4	D	108	52.6	D	295
	(WB Thru)	800'	31.1	C	556	20.9	C	340
	NB Approach	1000'+	40.1	D	435	46.5	D	365
	Overall	**-**	**31.0**	**C**	**-**	**32.1**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.9	A	-	22.4	C	-
	(EB Left)	400'	32.9	C	250	57.4	E	905
	(EB Thru/Right)	600'	0.4	A	8	0.3	A	5
	WB Approach	-	9.5	A	-	15.6	B	-
	(WB Left)	100'	56.5	E	3	59.3	E	10
	(WB Thru/Right)	750'	9.4	A	238	15.3	B	263
	NB Approach	-	58.1	E	-	56.7	E	-
	(NB Left/Thru)	750'	58.8	E	13	56.9	E	8
	(NB Right)	50'	55.1	E	3	56.2	E	3
	Overall	**-**	**9.2**	**A**	**-**	**21.1**	**C**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		31.2	C	-	51.0	D	-
	(EB Left)	260'	42.6	D	143	22.2	C	93
	(EB Thru)	750'	29.6	C	473	53.7	D	730
	WB Approach	-	53.5	D	-	35.7	D	-
	(WB Left)	340'	30.2	C	155	62.2	E	240
	(WB Thru)	1800'	63.7	E	1280	32.4	C	503
	(WB Right)	300'	30.9	C	443	21.0	C	113
	NB Approach	-	45.7	D	-	34.8	C	-
	(NB Left/Thru)	1000'+	44.6	D	340	34.9	C	235
	(NB Thru/Right)	100	46.9	D	332	34.8	C	238
	SB Approach	-	26.3	C	-	81.9	F	-
	(SB Left)	160'	29.4	C	98	174.7	F	818
	(SB Thru)	350'	25.1	C	118	24.7	C	300
	Overall	**-**	**44.3**	**D**	**-**	**52.2**	**D**	**-**

2020 and 2025 "NO-BUILD" TRAFFIC CONDITIONS

Operations of the study intersections during the AM and PM peak hours were evaluated for the no-build configuration without the proposed development in the proposed build year 2020 and the horizon year 2025.

No-Build Traffic Volumes

In order to account for general traffic growth in the area, an annual background growth rate is applied to existing traffic volumes on the study area roadways. An annual background growth rate of 0.38% per year has been previously established by PennDOT's *Bureau of Planning and Research* for urban, non-interstate roadways in the study area.

The existing 427,109 SF office/research and development space is currently vacant with access provided via four driveways along King of Prussia Road. As the existing space was previously approved and could be occupied by a tenant without additional approvals, trips for the existing site were calculated and applied to the existing traffic to develop the future "no-build" conditions.

The traffic volumes for the existing site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9th Edition, 2012). The existing site trips are based upon the ITE Land Use Codes 710 "General Office" utilizing the square footage of the building as the independent variable. The trip calculations result in a total of **611** (**538** entering and **73** exiting) and **557** (**95** entering and **462** exiting) new trips generated to the site during the morning and afternoon peak hours, respectively. **TABLE 2** summarizes the trip calculation for the existing site during the weekday morning and weekday afternoon peak hours.

Table 2 – Existing Site Trip Generation

Land Use Code	Size	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
General Office Building (ITE Land Use 710)	427,110 SF	1,000 SF GFA	1,979	1,978	3,957	538	73	611	95	462	557
Total			**1,979**	**1,978**	**3,957**	**538**	**73**	**611**	**95**	**462**	**557**

The trip distribution of the existing site based on the proposed location along King of Prussia Road and the existing traffic patterns on the surrounding roadway network. The estimated distribution of the site traffic is:

To/From King of Prussia Road northbound - 25%
To/From King of Prussia Road southbound - 75%

The trip distribution and volumes generated at the proposed site are provided in **FIGURES 4 and 5**. The 2020 and 2025 no-build Traffic volumes are illustrated in **FIGURES 6 and 7.** Traffic volumes development tables are provided in **APPENDIX E**.

Signal timing adjustments were made for future no-build conditions to optimize the intersection performance minimizing the overall intersection delay where possible. The following timing adjustments were made:

- At King of Prussia Road and Matsonford Road/Park Driveway:
  - Modify AM signal timings to shift 3 seconds from the SB King of Prussia Road lead phase to the NB/SB King of Prussia phase (1 second) and the EB/WB Matsonford Road/Park Driveway Phase (2 seconds).
- At King of Prussia Road and Radnor-Chester Road:

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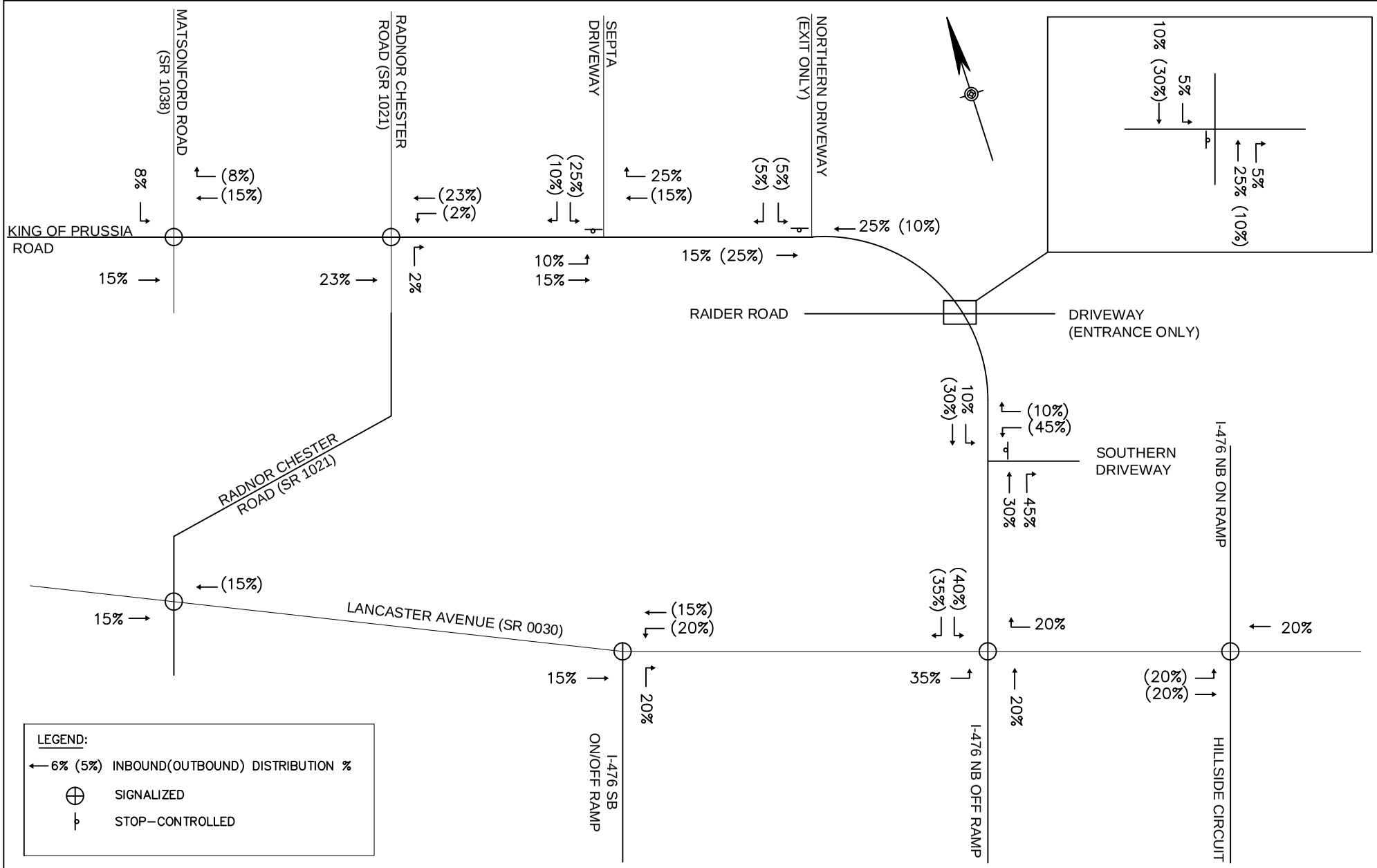

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FIGURE 4
EXISTING SITE TRIP DISTRIBUTION

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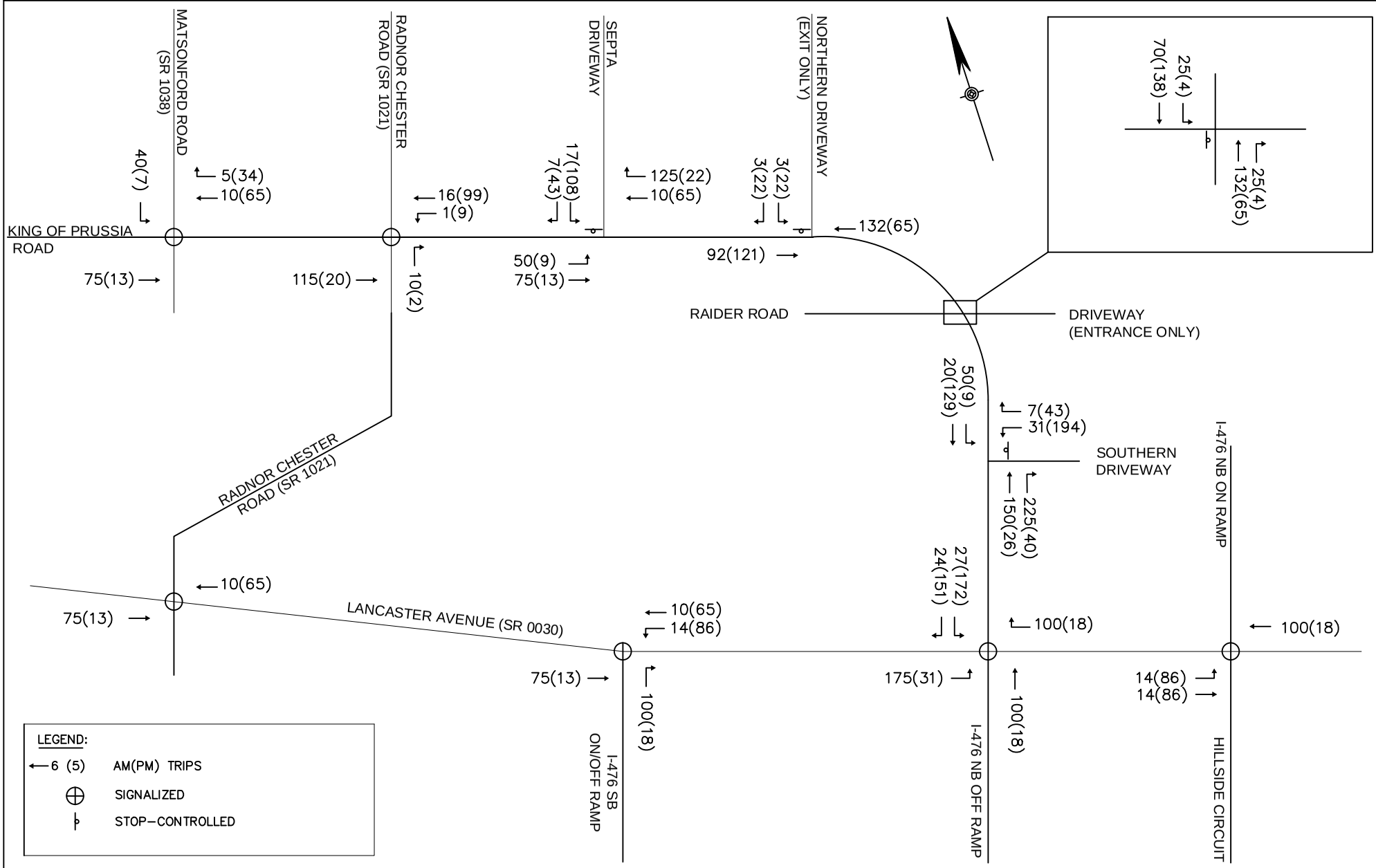

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FIGURE 5
EXISTING SITE TRIPS
(CALCULATED)

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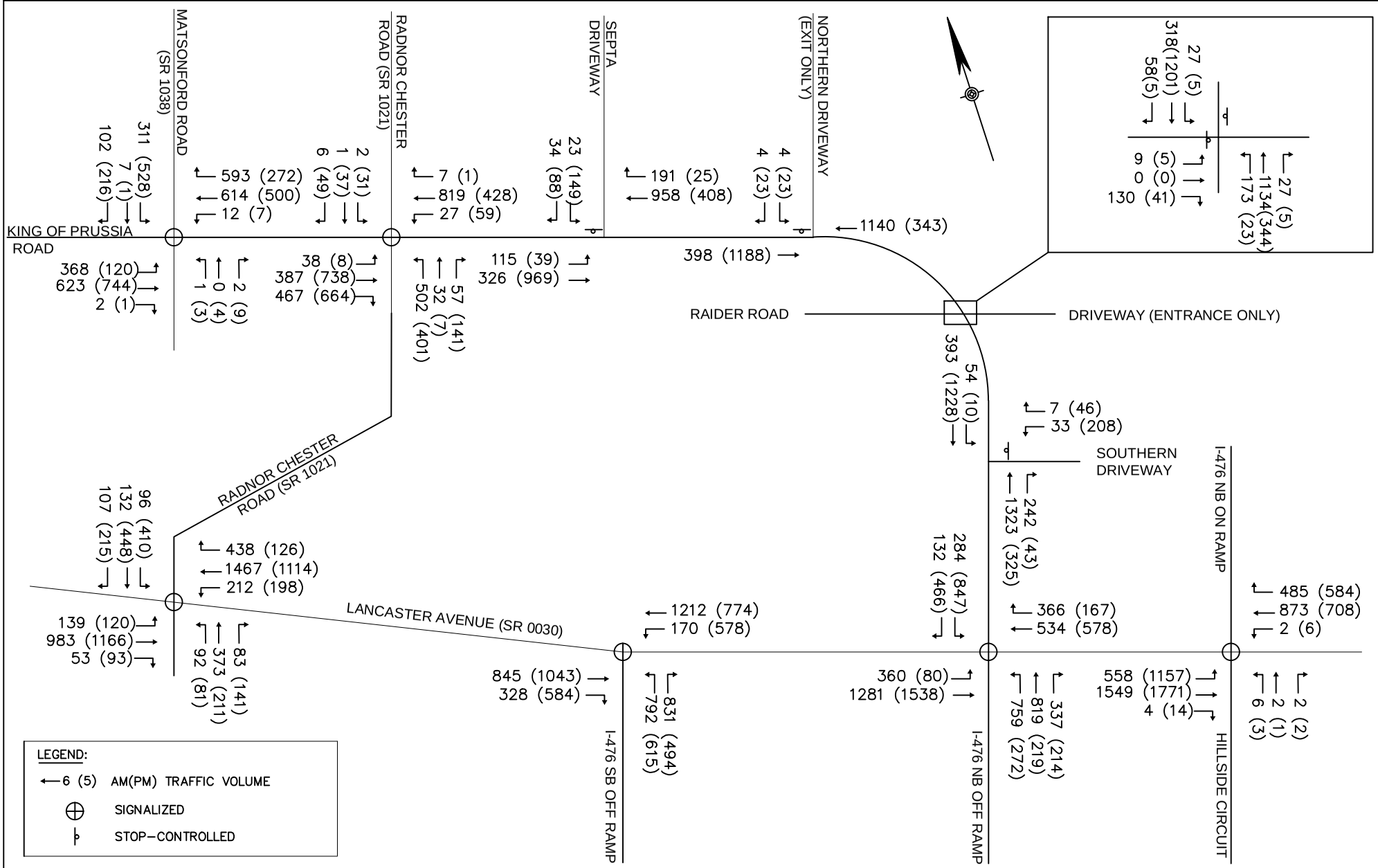

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FIGURE 6
2020 NO-BUILD WEEKDAY
PEAK HOUR TRAFFIC VOLUMES

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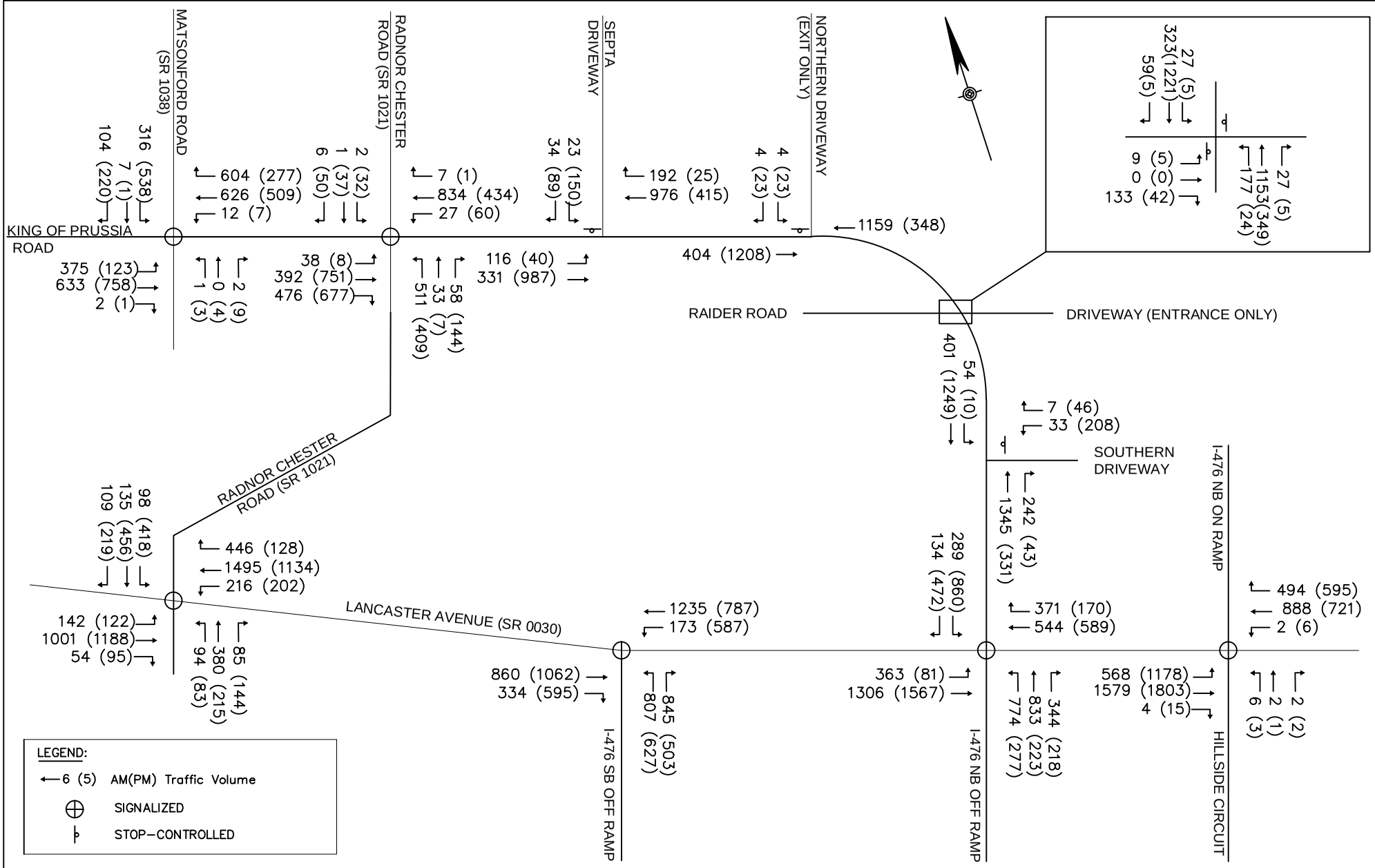

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FIGURE 7
2025 NO-BUILD WEEKDAY
PEAK HOUR TRAFFIC VOLUMES

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  - Modify PM signal timings to shift 4 seconds from the EB/WB King of Prussia Road phase to the NB/SB Radnor Chester Road phase.

- At Lancaster Avenue and I-476 SB Off Ramp:
  - Modify PM signal timings to shift 1 second from the EB/WB Lancaster Avenue phase to the WB Lancaster Avenue lead phase.

- At Lancaster Avenue and I-476 NB On Ramp/Hillside Circuit:
  - Modify PM signal timings to shift 6 seconds from the EB/WB Lancaster Avenue phase to the EB Lancaster Avenue lead phase.

- At Lancaster Avenue and Radnor-Chester Road:
  - Modify AM signal timings to shift 12 seconds from the southbound Radnor-Chester Road lead phase to the EB/WB Lancaster Avenue Phase.

2020 No-Build Levels of Service Analysis

Operations of the study intersections during the AM and PM peak hours were evaluated for the no-build configuration of the proposed development in the proposed build year of 2020. The signal timing adjustments were made for future no-build conditions to minimizing the overall intersection delay where possible. Under the 2020 no-build Conditions, all the study intersections and movements operate at an acceptable LOS D or better besides the following locations:

- King of Prussia Road & Matsonford Road
  - Westbound left movement operates at a LOS E (55.8 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (84.9 seconds of delay) during the AM peak hour.
  - Northbound approach movement operates at LOS E (60.9 seconds of delay) during the AM peak hour.
  - Northbound thru movement operates at LOS E (61.7 seconds of delay) during the AM peak hour.
- King of Prussia Road & Radnor Chester Road
  - Overall intersection LOS of F (218.9 seconds of delay) during the AM peak hour and LOS F (85.7 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS E (62.4 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS F (617.3 seconds of delay) during the AM peak hour and at a LOS F (225.5 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS F (681.6 seconds of delay) during the AM peak hour and a LOS E (297.7 seconds of delay) during the PM peak hour.

- King of Prussia and SEPTA Driveway
  - Westbound approach movement operates at a LOS E (38.6 seconds of delay) during the AM peak hour and at LOS F (120.0 seconds of delay) during the PM peak hour.

- King of Prussia and Southern Driveway
  - Overall intersection LOS of F (83.9 seconds of delay) during the PM peak hour.
  - Westbound approach movement operates at a LOS F (265.0 seconds of delay) during the AM peak hour and at a LOS F (613.8 seconds of delay) during the PM peak hour.

- Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road
  - Overall intersection LOS of E (66.2 seconds of delay) during the AM peak hour and LOS E (55.6 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (60.5 seconds of delay) during the AM peak hour and at a LOS E (58.5 seconds of delay) during the PM peak hour.
  - Eastbound left movement operates at a LOS E (59.1 seconds of delay) during the AM peak hour.
  - Eastbound through movement operates at a LOS E (60.9 seconds of delay) during the AM peak hour and at a LOS E (58.8 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (74.8 seconds of delay) during the AM peak hour.

  - Northbound through movement operates at a LOS F (146.9 seconds of delay) during the AM peak hour and a LOS E (57.8 seconds of delay) during the PM peak hour.
  - Northbound right movement operates at a LOS E (79.3 seconds of delay) during the PM peak hour.
  - Southbound approach movement operates at a LOS E (63.9 seconds of delay) during the AM peak hour and at a LOS F (85.8 seconds of delay) during the PM peak hour.

- Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit
  - Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and at a LOS E (59.3 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (58.1 seconds of delay) during the AM peak hour and at a LOS E (56.7 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and at a LOS E (56.9 seconds of delay) during the PM peak hour
  - Northbound right movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour and at a LOS E (56.2 seconds of delay) during the PM peak hour.

- Lancaster Avenue (SR 0030) & Radnor Chester Road
  - Overall intersection operates at a LOS E (57.2 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (59.1) seconds of delay) during the PM peak hour.
  - Eastbound through movement operates at a LOS E (62.5 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS E (79.4 seconds of delay) during the PM peak hour.
  - Westbound thru movement operates at a LOS E (58.0 seconds of delay) during the AM peak hour.
  - Southbound approach movement operates at a LOS F (83.9 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (180.3 seconds of delay) during the PM peak hour.

In the 2020 no-build conditions, the estimated 95th percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95th percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 618'during the AM peak period.
- The reported 95th percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 90'during the PM peak period.
- The reported 95th percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 970' and 15' during the AM and PM peak periods, respectively.
- The reported 95th percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 38' during the PM peak period.
- The reported 95th percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 535' during the PM peak period.
- The reported 95th percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 17' during the AM peak period.
- The reported 95th percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 442' during the PM peak period.
- The reported 95th percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 45' during the PM peak period.
- The reported 95th percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 2' during the PM peak period.

- The reported 95th percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 135' during the AM peak period.
- The reported 95th percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 240' and 142' during the AM and PM peak periods respectively.
- The reported 95th percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 688' during the PM peak period.

A summary of the Delays, LOS, and 95th Percentile Queues for the no-build conditions analysis are summarized in **TABLE 3.** Detailed outputs of the 2020 no-build conditions analysis are provided in **APPENDIX F.**

Table 3 – 2020 No-Build Conditions Summary Table

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	19.3	B	-
	(EB Left)	50'	29.1	C	0	24.5	C	3
	(EB Thru/Right)	50'	25.0	C	3	18.2	B	10
	WB Approach	-	38.8	D	-	45.9	D	-
	(WB Left)	550'	42.8	D	368	55.8	E	640
	(WB Thru/Right)	950'	27.6	C	110	21.6	C	195
	SB Approach	-	39.0	D	-	25.9	C	-
	(SB Left)	100'	84.9	F	718	18.0	B	83
	(SB Thru/Right)	1000'+	12.0	B	403	27.1	C	660
	NB Approach	-	60.9	E	-	33.5	C	-
	(NB Left)	130'	17.3	B	10	33.1	C	8
	(NB Thru)	1150'	61.7	E	785	33.5	C	492
	Overall	**-**	**45.7**	**D**	**-**	**34.6**	**C**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.0	B	-	28.1	C	-
	(EB Left)	75'	50.4	D	53	23.2	C	8
	(EB Thru)	1200'	16.0	B	255	28.1	C	548
	WB Approach	-	44.2	D	-	25.2	C	-
	(WB Left)	160'	20.5	C	25	62.4	E	93
	(WB Thru/Right)	1100'	45.0	D	883	20.1	C	333
	NB Approach	-	617.3	F	-	225.5	F	-
	(NB Left/Thru)	1200'	681.6	F	2170	297.7	F	1215
	(NB Right)	280'	18.2	B	45	16.8	B	105
	SB Approach	100'	21.8	C	8	49.3	D	138
	Overall	**-**	**218.9**	**F**	**-**	**85.7**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	38.6	E	43	120.0	F	288
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.2	A	30	0.3	A	3
	Overall	**-**	**2.5**	**A**	**-**	**17.1**	**C**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	21.8	C	3	18.2	C	13
	NB Approach	280'	0.0	A	0	0.0	A	0
	SB Approach	380	0.0	A	0	0.0	A	0
	Overall	**-**	**0.1**	**A**	**-**	**0.5**	**A**	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.3	B	30	32.1	D	25
	NB Approach	550'	1.2	A	20	0.7	A	3
	SB Approach	280	0.9	A	5	0.0	A	0
	Overall	**-**	**2.0**	**A**	**-**	**1.1**	**A**	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	265.0	F	108	613.8	F	567
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.1	A	-
	(SB Left)	75'	15.2	C	13	8.0	A	0
	Overall	**-**	**5.6**	**A**	**-**	**83.9**	**F**	**-**

Table 3 – 2020 No-Build Conditions Summary Table (Cont.)

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	60.5	E	-	58.5	E	-
	(EB Left)	800'	59.1	E	252	52.5	D	58
	(EB Thru)	800'	60.9	E	787	58.8	E	1335
	WB Approach	600'	53.9	D	338	10.3	B	163
	NB Approach	-	74.8	E	-	49.7	D	-
	(NB Left)	500'	17.6	B	305	19.8	B	123
	(NB Thru)	1900'	146.9	F	1917	57.8	E	313
	(NB Right)	500'	28.1	C	335	79.3	E	353
	SB Approach	500'	63.9	E	78	85.8	F	328
	Overall	**-**	**66.2**	**E**	**-**	**55.6**	**E**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.0	B	235	24.6	C	323
	WB Approach	-	34.5	C	-	35.3	D	-
	(WB Left)	600'	53.8	D	120	53.1	D	342
	(WB Thru)	800'	31.8	C	568	22.0	C	370
	NB Approach	1000'+	40.0	D	443	46.6	D	370
	Overall	**-**	**31.3**	**C**	**-**	**33.9**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.6	A	-	9.7	A	-
	(EB Left)	400'	31.8	C	248	24.4	C	842
	(EB Thru/Right)	600'	0.3	A	5	0.2	A	5
	WB Approach	-	10.4	B	-	19.8	B	-
	(WB Left)	100'	56.5	E	3	59.3	E	10
	(WB Thru/Right)	750'	10.3	B	280	19.4	B	303
	NB Approach	-	58.1	E	-	56.7	E	-
	(NB Left/Thru)	750'	58.8	E	13	56.9	E	8
	(NB Right)	50'	55.1	E	3	56.2	E	3
	Overall	**-**	**9.3**	**A**	**-**	**11.8**	**B**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		31.5	C	-	59.1	E	-
	(EB Left)	260'	43.8	D	145	24.3	C	95'
	(EB Thru)	750'	30.0	C	520	62.5	E	795
	WB Approach	-	49.7	D	-	42.2	D	-
	(WB Left)	340'	35.0	C	185	79.4	E	342
	(WB Thru)	1800'	58.0	E	1285	37.9	D	575
	(WB Right)	300'	29.0	C	435	21.5	C	115
	NB Approach	-	45.9	D	-	34.6	C	-
	(NB Left/Thru)	1000'+	44.7	D	345	34.8	C	238
	(NB Thru/Right)	100	47.1	D	340	34.4	C	242
	SB Approach	-	27.8	C	-	83.9	F	-
	(SB Left)	160'	31.3	C	103	180.3	F	848
	(SB Thru)	350'	26.5	C	125	24.4	C	300
	Overall	**-**	**42.3**	**D**	**-**	**57.2**	**E**	**-**

2025 No-Build Levels of Service Analysis

Operations of the study intersections during the AM and PM peak hours were evaluated for the no-build configuration of the proposed development in the proposed build year of 2020. The signal timing adjustments were made for future no-build conditions to minimizing the overall intersection delay where possible. Under the 2025 no-build Conditions, all the study intersections and movements operate at an acceptable LOS D or better besides the following locations:

- King of Prussia Road & Matsonford Road
  - Northbound approach movement operates at a LOS E (64.6 seconds of delay) during the AM peak hour.
  - Southbound left movement operates at a LOS F (93.0 seconds of delay) during the AM peak hour.
  - Northbound thru movement operates at a LOS E (65.5 seconds of delay) during the AM peak hour.
- King of Prussia Road & Radnor Chester Road
  - Overall intersection LOS of F (227.1 seconds of delay) during the AM peak hour and LOS F (88.4 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS F (96.4 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS F (636.0 seconds of delay) during the AM peak hour and at a LOS F (212.9 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS F (702.2 seconds of delay) during the AM peak hour and a LOS E (281.3 seconds of delay) during the PM peak hour.
- King of Prussia and SEPTA Driveway
  - Westbound approach movement operates at a LOS E (39.8 seconds of delay) during the AM peak hour and at a LOS F (132.3 seconds of delay) during the PM peak hour.
- King of Prussia and Southern Driveway
  - Overall intersection LOS of F (87.3 seconds of delay) during the PM peak hour.
  - Westbound approach movement operates at a LOS F (298.0 seconds of delay) during the AM peak hour and at a LOS F (647.9 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road
  - Overall intersection LOS of E (69.4 seconds of delay) during the AM peak hour and at a LOS E (60.5 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (64.2 seconds of delay) during the AM peak hour and at a LOS E (64.6 seconds of delay) during the PM peak hour.
  - Eastbound left movement operates at a LOS E (59.6 seconds of delay) during the AM peak hour.
  - Eastbound through movement operates at a LOS E (65.4 seconds of delay) during the AM peak hour and at a LOS E (65.2 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (78.6 seconds of delay) during the AM peak hour.
  - Northbound through movement operates at a LOS F (155.9 seconds of delay) during the AM peak hour and a LOS E (60.3 seconds of delay) during the PM peak hour.
  - Northbound right movement operates at a LOS E (85.4 seconds of delay) during the PM peak hour.
  - Southbound approach movement operates at a LOS E (65.3 seconds of delay) during the AM peak hour and at a LOS F (94.1 seconds of delay) during the PM peak hour.
- Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit
  - Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and at a LOS E (59.3 seconds of delay) during the PM peak hour.
  - Northbound approach movement operates at a LOS E (58.1 seconds of delay) during the AM peak hour and at a LOS E (56.7 seconds of delay) during the PM peak hour.
  - Northbound through/left movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and at a LOS E (56.9 seconds of delay) during the PM peak hour
  - Northbound right movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour and at a LOS E (56.2 seconds of delay) during the PM peak hour.

- Lancaster Avenue (SR 0030) & Radnor Chester Road
  - Overall intersection LOS of E (62.1 seconds of delay) during the PM peak hour.
  - Eastbound approach movement operates at a LOS E (67.7 seconds of delay) during the PM peak hour.
  - Eastbound left movement operates at a LOS E (63.1 seconds of delay) during the AM peak hour.
  - Eastbound through movement operates at a LOS E (71.9 seconds of delay) during the PM peak hour.
  - Westbound left movement operates at a LOS F (92.1 seconds of delay) during the PM peak hour.
  - Westbound through movement operates at a LOS E (57.1 seconds of delay) during the AM peak hour.
  - Southbound approach movement operates at a LOS F (86.4 seconds of delay) during the PM peak hour.
  - Southbound left movement operates at a LOS F (187.1 seconds of delay) during the PM peak hour.

In the 2025 no-build conditions, the estimated 95th percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

In the 2020 no-build conditions, the estimated 95th percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95th percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 653'during the AM peak period.
- The reported 95th percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 70'during the PM peak period.
- The reported 95th percentile queue for westbound left turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 20'during the PM peak period.
- The reported 95th percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 1030' and 10' during the AM and PM peak periods, respectively.
- The reported 95th percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 43' during the PM peak period.
- The reported 95th percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 323' and 593' during the AM and PM peak periods, respectively.
- The reported 95th percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 95' during the AM peak period.
- The reported 95th percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 130' during the PM peak period.
- The reported 95th percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 398' during the PM peak period.
- The reported 95th percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 85' during the PM peak period.
- The reported 95th percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 413' during the AM peak period.
- The reported 95th percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 250' and 145' during the AM and PM peak periods respectively.
- The reported 95th percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 725' during the PM peak period.

A summary of the Delays, LOS, and 95th Percentile Queues for the no-build conditions analysis are summarized in **TABLE 4.** Detailed outputs of the 2025 no-build conditions analysis are provided in **APPENDIX F.**

Table 4 – 2025 No-Build Conditions Summary Table

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	18.0	B	-
	(EB Left)	50'	29.3	C	0	22.9	C	3
	(EB Thru/Right)	50'	25.0	C	3	17.0	B	10
	WB Approach	-	39.6	D	-	39.8	D	-
	(WB Left)	550'	43.8	D	378	47.9	D	620
	(WB Thru/Right)	950'	27.7	C	115	20.1	C	193
	SB Approach	-	42.3	D	-	31.6	C	-
	(SB Left)	100'	93.0	F	753	20.2	C	90
	(SB Thru/Right)	1000'+	12.2	B	415	33.4	C	733
	NB Approach	-	64.6	E	-	41.0	D	-
	(NB Left)	130'	17.3	B	10	37.5	D	10
	(NB Thru)	1150'	65.5	F	1090	41.0	D	542
	Overall	**-**	**48.5**	**D**	**-**	**36.6**	**D**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.2	B	-	39.5	D	-
	(EB Left)	75'	53.0	D	63	25.3	C	8
	(EB Thru)	1200'	16.0	B	260	39.7	D	992
	WB Approach	-	48.0	D	-	31.1	C	-
	(WB Left)	160'	20.6	C	25	96.4	F	120
	(WB Thru/Right)	1100'	48.9	D	928	22.1	C	350
	NB Approach	-	636.0	F	-	212.9	F	-
	(NB Left/Thru)	1200'	702.2	F	2230	281.3	F	1210
	(NB Right)	280'	18.2	B	45	15.6	B	105
	SB Approach	100'	21.8	C	8	53.0	D	143
	Overall	**-**	**227.1**	**F**	**-**	**88.4**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	39.8	E	43	132.3	F	305
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.3	A	33	0.3	A	5
	Overall	**-**	**2.5**	**A**	**-**	**18.7**	**C**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	22.3	C	3	18.4	C	13
	NB Approach	280'	0.0	A	0	0.0	A	0
	SB Approach	380	0.0	A	0	0.0	A	0
	Overall	**-**	**0.1**	**A**	**-**	**0.5**	**A**	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.5	B	33	33.4	D	28
	NB Approach	550'	1.2	A	20	0.8	A	3
	SB Approach	280	0.9	A	8	0.0	A	0
	Overall	**-**	**2.1**	**A**	**-**	**1.1**	**A**	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	298.0	F	113	647.9	F	580
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.1	A	-
	(SB Left)	75'	15.5	C	15	8.0	A	0
	Overall	**-**	**6.1**	**A**	**-**	**87.3**	**F**	**-**

Table 5 – 2025 No-Build Conditions Summary Table (Cont.)

		Available Storage Length	AM Peak Hour			PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.2	E	-	64.6	E	-
	(EB Left)	800'	59.6	E	253	53.1	D	60
	(EB Thru)	800'	65.4	E	1123	65.2	F	1393
	WB Approach	600'	54.4	D	345	10.0	A	165
	NB Approach	-	78.6	E	-	52.3	D	-
	(NB Left)	500'	17.8	B	313	19.9	B	128
	(NB Thru)	1900'	155.9	F	1995	60.3	E	323
	(NB Right)	500'	28.5	C	345	85.4	F	370
	SB Approach	500'	65.3	E	83	94.1	F	368
	Overall	**-**	**69.4**	**E**	**-**	**60.5**	**E**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.5	B	240	25.3	C	330
	WB Approach	-	35.0	C	-	35.5	D	-
	(WB Left)	600'	53.9	D	123	53.2	D	345
	(WB Thru)	800'	32.4	C	578	22.3	C	372
	NB Approach	1000'+	39.9	D	450	46.7	D	375
	Overall	**-**	**31.7**	**C**	**-**	**34.3**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.4	A	-	8.7	A	-
	(EB Left)	400'	31.3	C	245	21.6	C	530
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	10.7	B	-	20.6	C	-
	(WB Left)	100'	56.5	E	3	59.3	E	10
	(WB Thru/Right)	750'	10.6	B	288	20.3	C	310
	NB Approach	-	58.1	E	-	56.7	E	-
	(NB Left/Thru)	750'	58.8	E	13	56.9	E	8
	(NB Right)	50'	55.1	E	3	56.2	E	3
	Overall	**-**	**9.2**	**A**	**-**	**11.1**	**B**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		33.3	C	-	67.7	E	-
	(EB Left)	260'	63.1	E	258	25.3	C	98
	(EB Thru)	750'	29.4	C	528	71.9	E	1148
	WB Approach	-	50.1	D	-	47.0	D	-
	(WB Left)	340'	46.6	D	228	92.1	F	425
	(WB Thru)	1800'	57.1	E	1313	41.7	D	605
	(WB Right)	300'	28.5	C	713	22.1	C	118
	NB Approach	-	47.0	D	-	34.3	C	-
	(NB Left/Thru)	1000'+	45.7	D	357	34.6	C	240
	(NB Thru/Right)	100	48.3	D	350	34.1	C	245
	SB Approach	-	28.0	C	-	86.4	F	-
	(SB Left)	160'	31.7	C	115	187.1	F	885
	(SB Thru)	350'	26.6	C	128	24.1	C	305
	Overall	**-**	**43.2**	**D**	**-**	**62.1**	**E**	**-**

DEVELOPMENT TRAFFIC

Project Description

The proposed mixed use site will be located at 145 King of Prussia Road between the existing Southern Driveway and the shared SEPTA/Site Driveway. The proposed site will have three full access driveways along King of Prussia Drive at the location of the of the existing entry driveways. The existing driveway across from Raider Road will become a 2-lane full access driveway. The southern driveway will primarily be for accessing the loading area. The proposed facility is anticipated to be constructed and occupied in 2020.

The following assumptions regarding the square footage and other parameters about the site were provided by the University of Pennsylvania Health Systems:

- 250,000 square foot mixed medical use building with 271 patient positions
- 150,000 square foot general office building
- 120 room hotel

Figure 2 is a Site Plan of the proposed development.

Site Access

Access to the site will be provided through 3 full access driveways. The primary site driveway will be a full access driveway located on King of Prussia Drive across from Raider Road. A second driveway will be located on the north side of the site and accessed via the existing SEPTA driveway on King of Prussia Drive. The third site driveway provides access to loading areas and is located at the southern corner of the site on King of Prussia Road approximately 500' north of Lancaster Avenue (SR 0030). The site driveways are shown on the Site Plan illustrated in **Figure 2**.

Public Transit

University of Pennsylvania Health Systems (UPHS) promotes public transportation and tax incentive programs for commuting costs at all of its City and suburban locations and encourages the use of public transportation options by staff and patients. UPHS educates its employees on programs like Transportation Reimbursement Incentive Program (TRIP) that allow commuting costs to be paid with pre-tax dollars and offers discounts on SEPTA travel and new employees to Penn Medicine Radnor receive are public transportation options around the campus during a new employee orientation. UPHS also uses its website to inform patients of opportunities to us public transportation to and from their facilities.

Trip Generation

The traffic volumes for the hotel and general office components of the proposed site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9th Edition, 2012). The *ITE Trip Generation Manual* defines a trip as a "single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site."

The traffic volumes for the hotel and office portions of the site proposed site were estimated based on information contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation* (9th Edition, 2012). The expected trip generation for the site is based upon the following ITE Land Use Codes utilizing the square footage of the building as the independent variable:

- 310 "Hotel"

- 710 "General Office"

The Institute of Transportation Engineers' Trip Generation Manual, 9th Edition states: "A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility." The AM and PM ITE Trip Generation Rate for a medical-dental office are derived based on 64 studies, of which 63 had buildings with a gross floor area of less than 70,000 SF.

The proposed Penn Medicine mixed medical use portion of the development will have a gross floor area of 250,000 SF, more than triple the size of 90% of the facilities used by ITE to derive trip generation data. Also, unlike private physician practices used to generate the ITE rates, the proposed Penn Medicine mixed medical use facility will include a number of treatment facilities that are uncommon in a typical medical office and that occupy are larger portion of the gross square floor area of the building, while not accommodating a larger number of patients. These facilities include ambulatory operating rooms, endoscopy rooms, chemotherapy treatment areas, radiological imaging rooms and radiation oncology treatment areas. Therefore, the proposed facility is very different from those used to derive ITE trip generation data.

It is for these reasons that the ITE trip generation is not appropriate to use for the proposed Penn Medicine building and a trip generation rate was developed based on an evaluation of three existing mixed medical use facilities for the peak hour of the adjacent street which, based on traffic counts, is 7:15-8:15 AM and 5:00–6:00 PM.

The following existing mixed medical use facilities were evaluated to develop trip generation rates:

- 171,000 square foot facility at 250 King of Prussia Rd in Radnor PA
- 83,000 square foot facility at 1001 Chesterbrook Blvd. in Berwyn PA
- 154,826 square foot facility at 915 Old Fern Hill Road in West Chester, PA

Based on driveway counts and data regarding the number of patient positions at each facility average weekday, AM and PM trip generation rates and entry/exit distributions were developed and approved by Radnor Township. The following are the developed trip generation rates for a mixed medical use facility and the rates used for the general office and hotel land uses:

Table 5 –Trip Generation Rates

Land Use Code	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
		Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out
Medical Mixed Use*	Patient Positions	18.02	50%	50%	1.60	77%	23%	1.06	29%	71%

* Trip generation calculated using calculated trip rates for Medical Mixed Use based on observations of similar facilities

Land Use Code	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
		Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out
General Office	KSF	11.03	50%	50%	1.56	88%	12%	1.49	17%	83%

Land Use Code	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
		Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out
Hotel	Rooms	8.17	50%	50%	0.53	59%	41%	0.60	51%	49%

The proposed development is a mixed use site and internal trips were calculated using the methodology outlined in the ITE Trip Generation Handbook.

The trip calculations result in a total of **731** (**577** entering and **154** exiting) and **583** (**158** entering and **425** exiting) new trips generated to the site during the morning and afternoon peak hours, respectively. **TABLE 6** summarizes the calculated peak hour trips to/from the proposed development during the weekday morning and weekday afternoon peak hours.

Table 6 –Proposed Site Trip Generation

Land Use Code	Size	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
Medical Mixed Use*	250,000 SF (271 PP)	Patient Positions	2,442	2,442	4,883	334	100	434	83	204	287
General Office Building (ITE Land Use 710)	150,000 SF	1,000 SF GFA	827	827	1,655	206	28	234	38	186	224
Hotel (ITE Land Use 310)	75,000 SF (120 rooms)	Rooms	490	490	980	38	26	64	37	35	72
Total			**3,759**	**3,759**	**7,518**	**577**	**154**	**731**	**158**	**425**	**583**

The trip generation calculations and the Letter to Radnor Township outlining the development of the trip generation rates for the mixed medical use facility are provided in **APPENDIX G**.

The proposed site will generate approximately 90% more net trips over the course of a whole day than the existing land use "general office building" but only generates approximately 20% more net trips in the AM peak period and approximately 5% more net trips during the PM peak period. The comparison of the net trips generated by the existing land use versus the proposed is illustrated in **TABLE 7.**

Table 7 –Net Trip Comparison

Land Use	Size	Net Trips		
		Weekday	AM Peak Hour	PM Peak Hour
Existing General Office Building	427,110 SF	3,957	611	557
Proposed Mixed Use (Mixed Medical/ Hotel/General Office)	475,000 SF	7,518	731	583
Difference	Volume	**3,561**	**120**	**26**
	% Difference	**90.0%**	**19.6%**	**4.7%**

Trip Distribution and Assignment

The trip distribution of the University of Pennsylvania Health Systems medical-dental office, general office building, and hotel were based on the proposed location along King of Prussia Road and the existing traffic patterns on the surrounding roadway network. The proposed site will have 3 driveways along King of Prussia Road with the primary driveway located across from Raider Road. The estimated distribution of the site traffic is:

To/From the north on King of Prussia Road northbound 25%
To/From south on King of Prussia Road southbound 75%

The trip distribution and volumes generated at the proposed site are provided in **Figures 8 and 9**.

Build Traffic Volumes

The traffic volumes generated by the proposed development were added to the 2020 and 2025 base traffic volumes to provide the 2020 and 2025 build traffic volumes. The peak hour traffic volumes are illustrated in **Figures 10 and 11** and traffic volumes development tables are provided in **APPENDIX E**.

Turn Lane Warrant Assessment

An analysis was conducted at the proposed site driveways using the 2025 build volumes to determine whether left turn lanes or a right turn lane into the site from are warranted. Based on the standard worksheets in the Chapter 11 Appendix of PennDOT Publication 46, the following turn lanes at site driveways are warranted during both the AM and PM peak periods:

King of Prussia Road & Septa Driveway

- Left turn lane from SB King of Prussia Road into the Septa Driveway.

King of Prussia Road & Raider Road

- Left turn lane from SB King of Prussia Road into the Site Driveway.
- Left turn lane from NB King of Prussia Road into Raider Road.
- Right turn lane from NB King of Prussia Road into the Site Driveway.

The turn lanes warranted in both the AM and PM Peak periods are being recommended as mitigation measures to the proposed development.

Although the southbound left turn lane from King of Prussia Drive to the Southern Driveway is only warranted in the AM peak period, it is an existing condition. Therefore, the dedicated left lane on southbound King of Prussia Road is proposed to remain. The dedicated left turn lane is formed from an area that would otherwise be a median gore and provides storage for left turning delivery trucks into the site, thus providing a clear lane for through traffic on King of Prussia Road.

A northbound right turn lane from King of Prussia Drive to the Septa is only warranted during the AM peak period and is not being recommended as a mitigation measure.

The detailed turn lane warrant analysis for the driveway entries is provided in **APPENDIX H**.

PENN MEDICINE

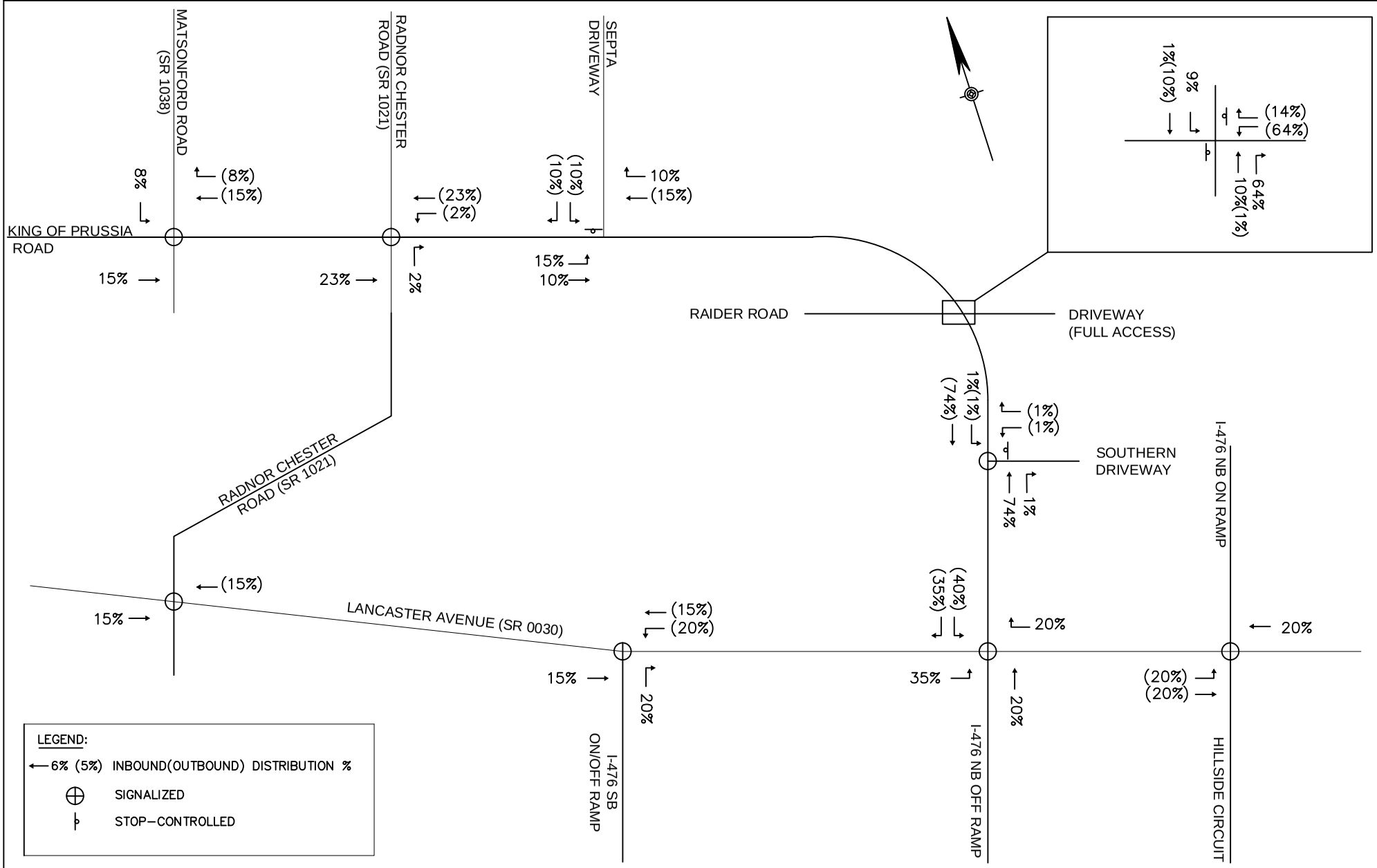

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FIGURE 8
PROPOSED SITE TRIP DISTRIBUTION

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PENN MEDICINE

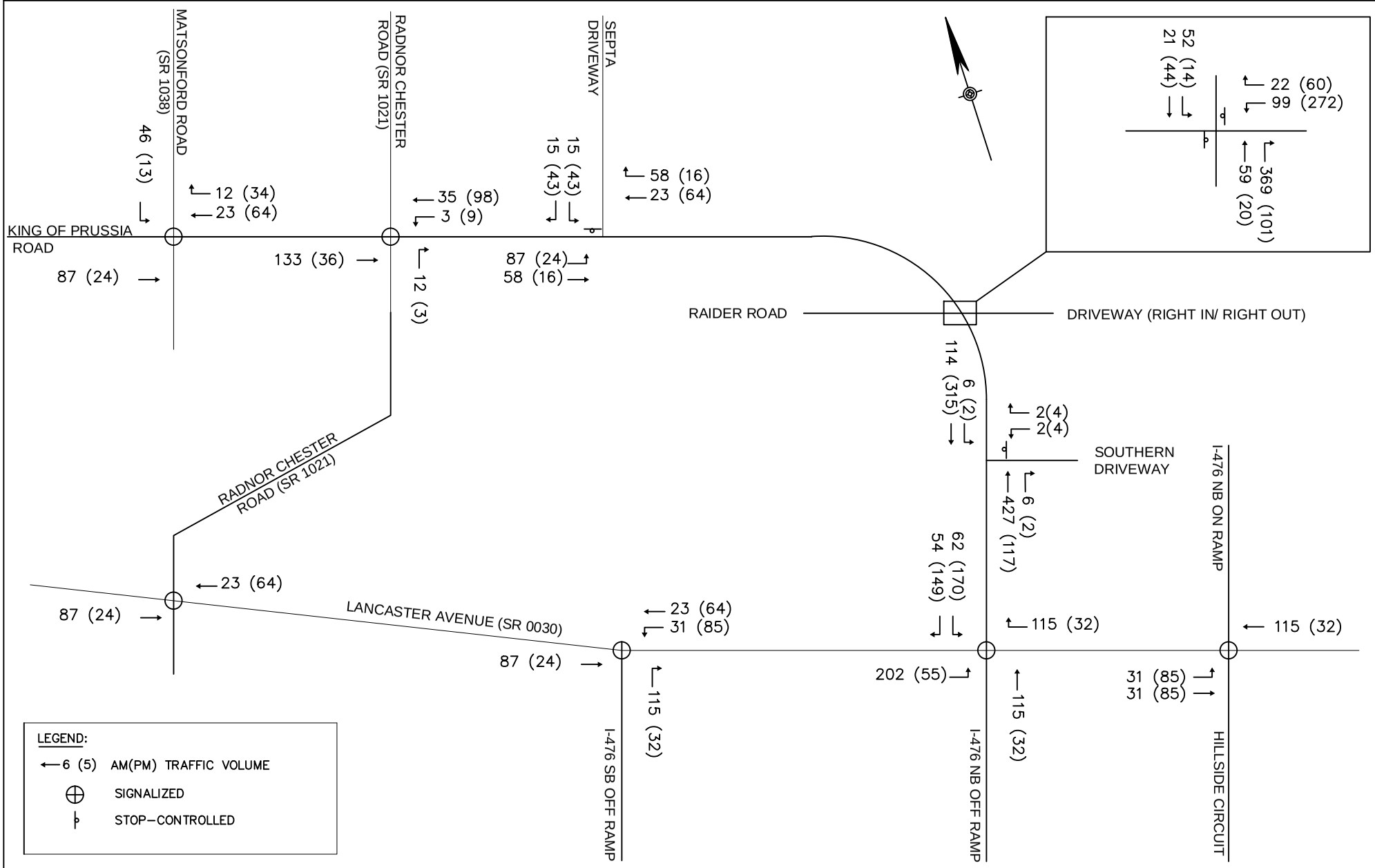

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FIGURE 9
PROPOSED SITE TRIPS

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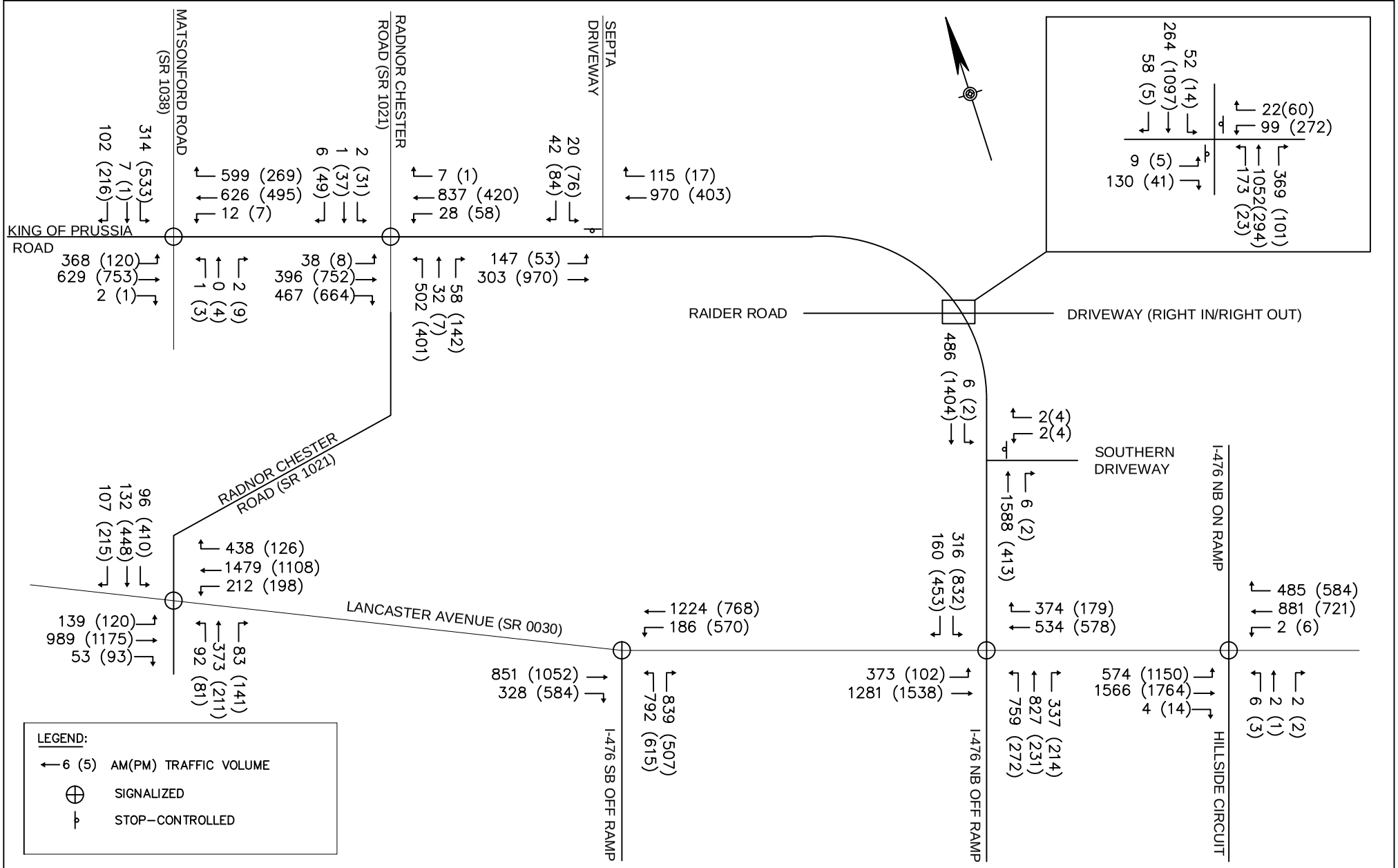

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FIGURE 10
2020 BUILD WEEKDAY
PEAK HOUR TRAFFIC VOLUMES

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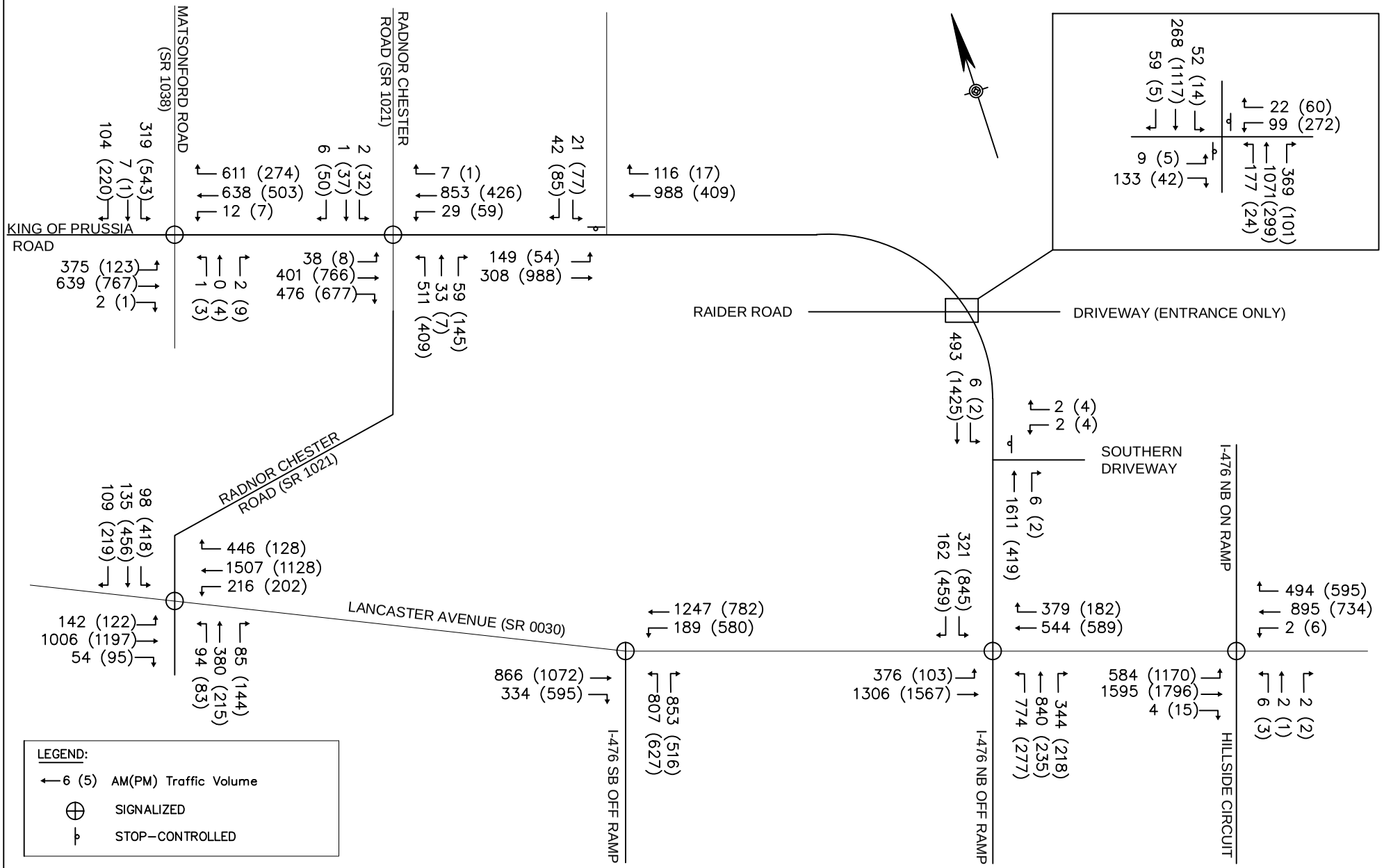

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FIGURE 11
2025 BUILD WEEKDAY
PEAK HOUR TRAFFIC VOLUMES

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2020 and 2025 "BUILD" TRAFFIC CONDITIONS WITHOUT MITIGATION

Operations of the study intersections during the AM and PM peak hours were evaluated for the build configuration of the proposed development in the proposed build year of 2020 and the horizon year of 2025 with the optimized timings from the no-build condition.

2020 Build Levels of Service

Under the 2020 build configuration without any improvements, all the study intersections and movements operate at an acceptable LOS D or better except for the following locations:

King of Prussia Road & Matsonford Road (SR 1038)

- Southbound left movement operates at a LOS F (86.7 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS E (57.7 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at LOS E (64.6 seconds of delay) during the AM peak hour.
- Northbound thru movement operates at LOS E (65.5 seconds of delay) during the AM peak hour.

King of Prussia Road & Radnor-Chester Road (SR 1021)

- Overall intersection operates at a LOS F (218.4 seconds of delay) during the AM peak hour and LOS F (86.0 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS E (67.9 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS F (616.3 seconds of delay) during the AM peak hour and at a LOS F (225.1 seconds of delay) during the PM peak hour.
- Northbound through/left movement operates at a LOS F (681.6 seconds of delay) during the AM peak hour and a LOS F (297.7 seconds of delay) during the PM peak hour.

King of Prussia Road & Septa Driveway

- Westbound approach movement operates at a LOS E (39.3 seconds of delay) during the AM peak hour and LOS E (38.6 seconds of delay) during the PM peak hour.

King of Prussia Road & Raider Road

- The intersection operates at a LOS F (282.8 seconds of delay) during the AM peak hour and at a LOS F (260.3 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS F (240.2 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS F (5992.0 seconds of delay) during the AM peak hour and at LOS F (1820.4 seconds of delay) during the PM peak hour.
- Westbound thru/right movement operates at a LOS E (39.5 seconds of delay) during the AM peak hour.

King of Prussia Road & Southern Driveway

- Westbound approach movement operates at LOS F (92.2 seconds of delay) during the AM peak hour.

Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

- Overall intersection operates at a LOS E (68.4 seconds of delay) during the AM peak hour and at a LOS E (56.0 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (61.1 seconds of delay) during the AM peak hour and at LOS E (59.6 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (62.0 seconds of delay) during the AM peak hour.
- Eastbound through movement operates at a LOS E (60.9 seconds of delay) during the AM peak hour and at LOS E (60.0 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS E (77.4 seconds of delay) during the AM peak hour.
- Northbound through movement operates at a LOS F (152.3 seconds of delay) during the AM peak hour and at a LOS E (64.3 seconds of delay) during the PM peak hour.

- Northbound right operates at a LOS F (81.6 seconds of delay) during the PM peak hour.
- Southbound approach movement operates at a LOS E (75.9 seconds of delay) during the AM peak hour and at a LOS F (83.2 seconds of delay) during the PM peak hour.

Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit

- Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and a LOS E (59.3 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS E (58.1 seconds of delay) during the AM peak hour and a LOS E (56.7 seconds of delay) during the PM peak hour.
- Northbound left/through movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and a LOS E (56.9 seconds of delay) during the PM peak hour.
- Northbound right movement operates at a LOS E (55.1 seconds of delay) during the AM peak hour and at LOS E (56.2 seconds of delay) during the PM peak hour.

Lancaster Avenue (SR 0030) & Radnor Chester Road

- Overall Intersection operates at a LOS E (57.7 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (60.6 seconds of delay) during the PM peak hour.
- Eastbound thru movement operates at a LOS E (63.9 seconds of delay) during the PM peak hour.
- Westbound approach movement operates at LOS E (64.5 seconds of delay) during the AM peak hour.
- Westbound left movement operates at a LOS F (82.5 seconds of delay) during the PM peak hour.
- Westbound through movement operates at a LOS E (77.1 seconds of delay) during the AM peak hour
- Southbound approach movement operates at a LOS F (83.9 seconds of delay) during the PM peak hour.
- Southbound left movement operates at a LOS F (180.3 seconds of delay) during the PM peak hour.

In the 2020 build conditions, the estimated 95th percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95th percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100' by 622'during the AM peak period.
- The reported 95th percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550' by 103'during the PM peak period.
- The reported 95th percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 970' and 15' during the AM and PM peak periods, respectively.
- The reported 95th percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100' by 38' during the PM peak period.
- The reported 95th percentile queue for westbound lefts at the intersection of King of Prussia Road & Raider Road exceeds the available storage length of 500' by 298' during the PM peak period.
- The reported 95th percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800' by 540' during the PM peak period.
- The reported 95th percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900' by 62' during the AM peak period.
- The reported 95th percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400' by 433' during the PM peak period.
- The reported 95th percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750' by 63' during the PM peak period.

- The reported 95th percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340' by 5' during the PM peak period.
- The reported 95th percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 153' during the AM peak period.
- The reported 95th percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 240' and 143' during the AM and PM peak periods respectively.
- The reported 95th percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 728' during the PM peak period.

A summary of the Delays, LOS, and 95th Percentile Queues for the build conditions analysis are summarized in **TABLE 8.** Detailed outputs of the 2020 build conditions analysis are provided in **APPENDIX I.**

Table 8 – 2020 Build Conditions Summary Table

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.1	C	0	29.1	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	39.3	D	-	39.3	D	-
	(WB Left)	550'	43.4	D	375	43.4	D	375
	(WB Thru/Right)	950'	27.6	C	110	27.6	C	110
	SB Approach	-	39.6	D	-	49.5	D	-
	(SB Left)	100'	86.7	F	722	86.7	F	722
	(SB Thru/Right)	1000'+	12.2	B	198	8.3	A	408
	NB Approach	-	64.6	E	-	64.6	E	-
	(NB Left)	130'	17.1	B	10	17.1	B	10
	(NB Thru)	1150'	65.5	E	1090	65.5	E	1090
	Overall	**-**	**47.3**	**D**	**-**	**52.5**	**D**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.0	B	-	19.6	B	-
	(EB Left)	75'	50.4	D	53	55.1	E	55
	(EB Thru)	1200'	16.0	B	255	16.3	B	270
	WB Approach	-	44.2	D	-	48.7	D	-
	(WB Left)	160'	20.5	C	25	20.8	C	25
	(WB Thru/Right)	1100'	45.0	D	883	49.7	D	940
	NB Approach	-	617.3	F	-	616.3	F	-
	(NB Left/Thru)	1200'	681.6	F	2170	681.6	F	2170
	(NB Right)	280'	18.2	B	45	18.2	B	45
	SB Approach	100'	21.8	C	8	21.8	C	8
	Overall	**-**	**218.9**	**F**	**-**	**218.4**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	38.6	E	43	39.3	E	45
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.2	A	30	5.4	A	40
	Overall	**-**	**2.5**	**A**	**-**	**3.0**	**A**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	21.8	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380	0.0	A	0	-	-	-
	Overall	**-**	**0.1**	**A**	**-**	**-**	**-**	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.3	B	30	240.2	F	278
	WB Approach	500'	-	-	-	4909.7	F	-
	(WB Left)	500'	-	-	-	5992.0	F	435
	(WB Thru/Right)	500'	-	-	-	39.5	E	20
	NB Approach	550'	1.2	A	20	1.0	A	0
	SB Approach	660'	0.9	A	5	2.5	A	18
	Overall	**-**	**2.0**	**A**	**-**	**282.8**	**F**	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	265.0	F	108	92.2	F	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.2	C	13	16.7	C	3
	Overall	**-**	**5.6**	**A**	**-**	**0.2**	A	**-**

Table 8 – 2020 Build Conditions Summary Table (Cont.)

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	60.5	E	-	61.1	E	-
	(EB Left)	800'	59.1	E	252	62.0	E	263
	(EB Thru)	800'	60.9	E	787	60.9	E	785
	WB Approach	600'	53.9	D	338	53.9	D	338
	NB Approach	-	74.8	E	-	77.4	E	-
	(NB Left)	500'	17.6	B	305	17.6	B	305
	(NB Thru)	1900'	146.9	F	1917	152.3	F	1962
	(NB Right)	500'	28.1	C	335	28.1	C	333
	SB Approach	500'+	63.9	E	78	75.9	E	125
	Overall	**-**	**66.2**	**E**	**-**	**68.4**	**E**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.0	B	235	18.4	B	238
	WB Approach	-	34.5	C	-	34.9	C	-
	(WB Left)	600'	53.8	D	120	54.4	D	130
	(WB Thru)	800'	31.8	C	568	31.9	C	573
	NB Approach	1000'+	40.0	D	443	40.0	D	443
	Overall	**-**	**31.3**	**C**	**-**	**31.6**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.6	A	-	8.4	A	-
	(EB Left)	400'	31.8	C	248	30.9	C	240
	(EB Thru/Right)	600'	0.3	A	5	0.2	A	3
	WB Approach	-	10.4	B	-	10.8	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.3	B	280	10.7	B	285
	NB Approach	-	58.1	E	-	58.1	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	55.1	E	3
	Overall	**-**	**9.3**	**A**	**-**	**9.2**	**A**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		31.5	C	-	34.3	C	-
	(EB Left)	260'	43.8	D	145	43.9	D	150
	(EB Thru)	750'	30.0	C	520	33.1	C	545
	WB Approach	-	49.7	D	-	64.5	E	-
	(WB Left)	340'	35.0	C	185	43.5	D	200
	(WB Thru)	1800'	58.0	E	1285	77.1	E	1390
	(WB Right)	300'	29.0	C	435	31.8	C	453
	NB Approach	-	45.9	D	-	45.9	D	-
	(NB Left/Thru)	1000'+	44.7	D	345	44.7	D	345
	(NB Thru/Right)	100	47.1	D	340	47.1	D	340
	SB Approach	-	27.8	C	-	26.1	C	-
	(SB Left)	160'	31.3	C	103	29.3	C	100
	(SB Thru)	350'	26.5	C	125	24.9	C	120
	Overall	**-**	**42.3**	**D**	**-**	**50.5**	**D**	**-**

Table 8 – 2020 Build Conditions Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		19.3	B	-	19.3	B	-
	(EB Left)	50'	24.5	C	3	24.5	C	3
	(EB Thru/Right)	50'	18.2	B	10	18.2	B	10
	WB Approach	-	45.9	D	-	47.3	D	-
	(WB Left)	550'	55.8	E	640	57.7	E	653
	(WB Thru/Right)	950'	21.6	C	195	21.6	C	195
	SB Approach	-	25.9	C	-	26.5	C	-
	(SB Left)	100'	18.0	B	83	17.8	B	83
	(SB Thru/Right)	1000'+	27.1	C	660	27.8	C	678
	NB Approach	-	33.5	C	-	31.6	C	-
	(NB Left)	130'	33.1	C	8	33.6	C	8
	(NB Thru)	1150'	33.5	C	492	31.6	C	460
	Overall	**-**	**34.6**	**C**	**-**	**34.9**	**C**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	28.1	C	-	29.0	C	-
	(EB Left)	75'	23.2	C	8	22.9	C	8
	(EB Thru)	1200'	28.1	C	548	29.1	C	560
	WB Approach	-	25.2	C	-	25.7	C	-
	(WB Left)	160'	62.4	E	93	67.9	E	95
	(WB Thru/Right)	1100'	20.1	C	333	19.9	B	328
	NB Approach	-	225.5	F	-	225.1	F	-
	(NB Left/Thru)	1200'	297.7	F	1215	297.7	F	1215
	(NB Right)	280'	16.8	B	105	16.8	B	108
	SB Approach	100'	49.3	D	138	49.3	D	138
	Overall	**-**	**85.7**	**F**	**-**	**86.0**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	120.0	F	288	38.6	E	108
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	0.3	A	3	0.5	A	5
	Overall	**-**	**17.1**	**C**	**-**	**4.2**	**A**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	18.2	C	3	-	-	13
	NB Approach	280'	0.0	A	0	-	-	0
	SB Approach	380	0.0	A	0	-	-	0
	Overall	**-**	**0.5**	**A**	**-**	**-**	**-**	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	32.1	D	25	31.1	D	25
	WB Approach	500'	-	-	-	1493.4	F	-
	(WB Left)	500'	-	-	-	1820.4	F	798
	(WB Thru/Right)	500'	-	-	-	10.9	B	8
	NB Approach	550'	0.7	A	3	0.6	A	3
	SB Approach	660'	0.0	A	0	0.1	A	0
	Overall	**-**	**1.1**	**A**	**-**	**260.3**	**F**	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	613.8	F	567	34.4	D	5
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.1	A	-	0.0	A	-
	(SB Left)	75'	8.0	A	0	8.2	A	0
	Overall	**-**	**83.9**	**F**	**-**	**0.2**	**A**	**-**

Table 8 – 2020 Build Conditions Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	58.5	E	-	59.6	E	-
	(EB Left)	800'	52.5	D	58	52.5	D	75
	(EB Thru)	800'	58.8	E	1335	60.0	E	1340
	WB Approach	600'	10.3	B	163	11.1	B	170
	NB Approach	-	49.7	D	-	52.6	D	-
	(NB Left)	500'	19.8	B	123	19.9	B	125
	(NB Thru)	1900'	57.8	E	313	64.3	E	343
	(NB Right)	500'	79.3	E	353	81.6	F	360
	SB Approach	500'+	85.8	F	328	83.2	F	310
	Overall	**-**	**55.6**	**E**	**-**	**56.0**	**E**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	24.6	C	323	24.5	C	323
	WB Approach	-	35.3	D	-	35.2	D	-
	(WB Left)	600'	53.1	D	342	53.1	D	338
	(WB Thru)	800'	22.0	C	370	21.9	C	368
	NB Approach	1000'+	46.6	D	370	46.6	D	370
	Overall	**-**	**33.9**	**C**	**-**	**33.8**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	9.7	A	-	9.1	A	-
	(EB Left)	400'	24.4	C	842	22.9	C	833
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	19.8	B	-	19.9	B	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	19.4	B	303	19.6	B	308
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
	Overall	**-**	**11.8**	**B**	**-**	**11.3**	**B**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		59.1	E	-	60.6	E	-
	(EB Left)	260'	24.3	C	95	24.2	C	95
	(EB Thru)	750'	62.5	E	795	63.9	E	813
	WB Approach	-	42.2	D	-	42.3	D	-
	(WB Left)	340'	79.4	E	342	82.5	F	345
	(WB Thru)	1800'	37.9	D	575	37.5	D	570
	(WB Right)	300'	21.5	C	115	21.5	C	115
	NB Approach	-	34.6	C	-	34.6	C	-
	(NB Left/Thru)	1000'+	34.8	C	238	34.8	C	238
	(NB Thru/Right)	100	34.4	C	242	34.4	C	243
	SB Approach	-	83.9	F	-	83.9	F	-
	(SB Left)	160'	180.3	F	848	180.3	F	848
	(SB Thru)	350'	24.4	C	300	24.4	C	300
	Overall	**-**	**57.2**	**E**	**-**	**57.7**	**E**	**-**

2025 Build Levels of Service

Under the 2025 build configuration with identified improvements, all the study intersections and movements operate at an acceptable LOS D or better except for the following locations:

King of Prussia Road & Matsonford Road (SR 1038)

- Southbound left movement operates at a LOS F (93.0 seconds of delay) during the AM peak hour.
- Northbound approach movement operates at a LOS E (69.8 seconds of delay) during the AM peak hour.
- Northbound thru movement operates at a LOS E (70.7 seconds of delay) during the AM peak hour.

King of Prussia Road & Radnor-Chester Road (SR 1021)

- Overall intersection operates at a LOS F (226.5 seconds of delay) during the AM peak hour and LOS F (90.4 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (55.6 seconds of delay) during the AM peak hour.
- Eastbound thru movement operates at a LOS F (45.4 seconds of delay) during the PM peak hour.
- Westbound left movement operates at a LOS F (94.4 seconds of delay) during the PM peak hour.
- Westbound thru/right movement operates at a LOS F (54.4 seconds of delay) during the AM peak hour.
- Northbound approach movement operates at a LOS F (635.1 seconds of delay) during the AM peak hour and at a LOS F (212.6 seconds of delay) during the PM peak hour.
- Northbound through/left movement operates at a LOS F (702.2 seconds of delay) during the AM peak hour and a LOS F (281.3 seconds of delay) during the PM peak hour.

King of Prussia Road & Septa Driveway

- Westbound approach movement operates at a LOS E (41.4 seconds of delay) during the AM peak hour and at a LOS E (41.4 seconds of delay) during the PM peak hour.

King of Prussia Road & Raider Road

- The intersection operates at a LOS F (313.4 seconds of delay) during the AM peak hour and at LOS F (278.8 seconds of delay) during the PM peak hour.
- The eastbound approach operates at a LOS F (287.6 seconds of delay) during the AM peak hour.
- The westbound approach operates at a LOS F (5492.6 seconds of delay) during the AM peak hour and at LOS F (1622.6 seconds of delay) during the PM peak hour.
- Westbound left movement operates at a LOS F (6704.1 seconds of delay) during the AM peak hour and at LOS F (1978.1 seconds of delay) during the PM peak hour.
- Westbound thru/right movement operates at a LOS E (40.9 seconds of delay) during the AM peak hour.

King of Prussia Road & Southern Driveway

- Westbound approach movement operates at LOS F (99.0 seconds of delay) during the AM peak hour.

Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

- Overall intersection operates at a LOS E (71.4 seconds of delay) during the AM peak hour and a LOS E (59.5 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (64.8 seconds of delay) during the AM peak hour and at a LOS E (64.4 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (62.6 seconds of delay) during the AM peak hour.
- Eastbound through movement operates at a LOS E (65.4 seconds of delay) during the AM peak hour and at a LOS E (65.2 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS F (80.7 seconds of delay) during the AM peak hour.
- Northbound thru movement operates at a LOS F (160.2 seconds of delay) during the AM peak hour and at a LOS E (66.3 seconds of delay) during the PM peak hour.
- Northbound right operates at a LOS F (85.4 seconds of delay) during the PM peak hour.
- Southbound approach movement operates at a LOS E (78.5 seconds of delay) during the AM peak hour and at a LOS F (88.1 seconds of delay) during the PM peak hour.

Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit

- Westbound left movement operates at a LOS E (56.5 seconds of delay) during the AM peak hour and a LOS E (59.3 seconds of delay) during the PM peak hour.
- Northbound approach movement operates at a LOS E (58.0 seconds of delay) during the AM peak hour and a LOS E (56.7 seconds of delay) during the PM peak hour.
- Northbound left/through movement operates at a LOS E (58.8 seconds of delay) during the AM peak hour and a LOS E (56.9 seconds of delay) during the PM peak hour.
- Northbound right movement operates at a LOS E (56.2 seconds of delay) during the PM peak hour.

Lancaster Avenue (SR 0030) & Radnor Chester Road

- Overall Intersection operates at a LOS E (62.5 seconds of delay) during the PM peak hour.
- Eastbound approach movement operates at a LOS E (69.4 seconds of delay) during the PM peak hour.
- Eastbound left movement operates at a LOS E (60.6 seconds of delay) during the AM peak hour.
- Eastbound through movement operates at a LOS E (73.8 seconds of delay) during the PM peak hour.
- Westbound left movement operates at a LOS F (92.1 seconds of delay) during the PM peak hour.
- Westbound through movement operates at a LOS E (61.9 seconds of delay) during the AM peak hour.
- Southbound approach movement operates at a LOS F (86.4 seconds of delay) during the PM peak hour.
- Southbound left movement operates at a LOS F (187.1 seconds of delay) during the PM peak hour.

In the 2025 build conditions, the estimated 95th percentile queues at the study intersections are within the available storage lengths and do not extend into adjacent intersections with the following exceptions:

- The reported 95th percentile queue for southbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 100’ by 652’during the AM peak period.
- The reported 95th percentile queue for westbound left turns at the intersection of King of Prussia Road & Matsonford Road (SR 1038) exceeds the available storage length of 550’ by 80’ during the PM peak period.
- The reported 95th percentile queues for westbound thru/right lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1100 by 270’ during the AM peak period.
- The reported 95th percentile queues for northbound left/thru lane at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 1200 by 1030’ and 10’ during the AM and PM peak periods, respectively.
- The reported 95th percentile queue for southbound left/thru/right turns at the intersection of King of Prussia Road & Radnor Chester Road exceeds the available storage length of 100’ by 43’ during the PM peak period.
- The reported 95th percentile queue for westbound lefts at the intersection of King of Prussia Road & Raider Road exceeds the available storage length of 500’ by 310’ during the PM peak period.
- The reported 95th percentile queue for the eastbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 800’ by 325’ and 593’ during the AM and PM peak periods, respectively.
- The reported 95th percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road exceeds the available storage length of 1900’ by 132’ during the AM peak period.
- The reported 95th percentile queue for eastbound left turns at the intersection of Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Drive exceeds the available storage length of 400’ by 110’ during the PM peak period.
- The reported 95th percentile queue for the eastbound through lane at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 750’ by 413’ during the PM peak period.
- The reported 95th percentile queue for westbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 340’ by 85’ during the PM peak period.

- The reported 95th percentile queue for westbound right turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 300' by 145' during the AM peak period.
- The reported 95th percentile queues for northbound thru/right turn at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 100' by 248' and 145' during the AM and PM peak periods respectively.
- The reported 95th percentile queues for southbound left turns at the intersection of Lancaster Avenue (SR 0030) & Radnor Chester Road exceeds the available storage length of 160' by 725' during the PM peak period.

A summary of the Delays, LOS, and 95th Percentile Queues for the build conditions analysis are summarized in **TABLE 9.** Detailed outputs of the 2025 build conditions analysis are provided in **APPENDIX I.**

Table 9 – 2025 Build Conditions Summary Table

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.3	C	0	29.3	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	39.6	D	-	40.1	D	-
	(WB Left)	550'	43.8	D	378	44.4	D	383
	(WB Thru/Right)	950'	27.7	C	115	27.7	C	115
	SB Approach	-	42.3	D	-	42.2	D	-
	(SB Left)	100'	93.0	F	753	93.0	F	752
	(SB Thru/Right)	1000'+	12.2	B	415	12.4	B	420
	NB Approach	-	64.6	E	-	69.8	E	-
	(NB Left)	130'	17.3	B	10	17.3	B	10
	(NB Thru)	1150'	65.5	F	1090	70.7	F	1135
	Overall	**-**	**48.5**	**D**	**-**	**50.3**	**D**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.2	B	-	19.5	B	-
	(EB Left)	75'	53.0	D	63	55.6	E	55
	(EB Thru)	1200'	16.0	B	260	16.1	B	265
	WB Approach	-	48.0	D	-	53.3	D	-
	(WB Left)	160'	20.6	C	25	21.0	C	25
	(WB Thru/Right)	1100'	48.9	D	928	54.4	F	1370
	NB Approach	-	636.0	F	-	635.1	F	-
	(NB Left/Thru)	1200'	702.2	F	2230	702.2	F	2230
	(NB Right)	280'	18.2	B	45	18.3	B	48
	SB Approach	100'	21.8	C	8	21.8	C	8
	Overall	**-**	**227.1**	**F**	**-**	**226.5**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	39.8	E	43	41.4	E	48
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.3	A	33	5.5	A	40
	Overall	**-**	**2.5**	**A**	**-**	**3.2**	**A**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	22.3	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380	0.0	A	0	-	-	-
	Overall	**-**	**0.1**	**A**	**-**	**-**	-	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.5	B	33	287.6	F	305
	WB Approach	500'	-	-	-	5492.6	F	-
	(WB Left)	500'	-	-	-	6704.1	F	438
	(WB Thru/Right)	500'	-	-	-	40.9	E	20
	NB Approach	550'	1.2	A	20	1.0	A	0
	SB Approach	660'	0.9	A	8	2.6	A	18
	Overall	**-**	**2.1**	**A**	**-**	**313.4**	F	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	298.0	F	113	99.0	F	10
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.5	C	15	17.0	C	3
	Overall	**-**	**6.1**	**A**	**-**	**0.2**	**A**	**-**

Table 9 – 2025 Build Conditions Summary Table (Cont.)

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build No Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.2	E	-	64.8	E	-
	(EB Left)	800'	59.6	E	253	62.6	E	265
	(EB Thru)	800'	65.4	E	1123	65.4	F	1125
	WB Approach	600'	54.4	D	345	54.3	D	343
	NB Approach	-	78.6	E	-	80.7	F	-
	(NB Left)	500'	17.8	B	313	17.8	B	313
	(NB Thru)	1900'	155.9	F	1995	160.2	F	2032
	(NB Right)	500'	28.5	C	345	28.5	C	345
	SB Approach	500'+	65.3	E	83	78.5	E	135
	Overall	**-**	**69.4**	**E**	**-**	**71.4**	**E**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.5	B	240	18.9	B	245
	WB Approach	-	35.0	C	-	35.5	D	-
	(WB Left)	600'	53.9	D	123	54.4	D	133
	(WB Thru)	800'	32.4	C	578	32.6	C	583
	NB Approach	1000'+	39.9	D	450	39.9	D	450
	Overall	**-**	**31.7**	**C**	**-**	**32.0**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.4	A	-	8.3	A	-
	(EB Left)	400'	31.3	C	245	30.7	C	243
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	3
	WB Approach	-	10.7	B	-	11.0	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.6	B	288	10.9	B	293
	NB Approach	-	58.1	E	-	58.0	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	54.7	D	3
	Overall	**-**	**9.2**	**A**	**-**	**9.2**	**A**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		33.3	C	-	33.4	C	-
	(EB Left)	260'	63.1	E	258	60.6	E	252
	(EB Thru)	750'	29.4	C	528	29.8	C	532
	WB Approach	-	50.1	D	-	53.7	D	-
	(WB Left)	340'	46.6	D	228	48.0	D	228
	(WB Thru)	1800'	57.1	E	1313	61.9	E	1340
	(WB Right)	300'	28.5	C	713	28.8	C	445
	NB Approach	-	47.0	D	-	46.2	D	-
	(NB Left/Thru)	1000'+	45.7	D	357	45.0	D	353
	(NB Thru/Right)	100	48.3	D	350	47.6	D	348
	SB Approach	-	28.0	C	-	27.6	C	-
	(SB Left)	160'	31.7	C	115	31.2	C	105
	(SB Thru)	350'	26.6	C	128	26.3	C	128
	Overall	**-**	**43.2**	**D**	**-**	**44.9**	**D**	**-**

Table 9 – 2025 Build Conditions Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.6	E	-	64.4	E	-
	(EB Left)	800'	53.1	D	60	52.4	D	75
	(EB Thru)	800'	65.2	F	1393	65.2	F	1393
	WB Approach	600'	10.0	A	165	11.2	B	170
	NB Approach	-	52.3	D	-	54.4	D	-
	(NB Left)	500'	19.9	B	128	19.9	B	128
	(NB Thru)	1900'	60.3	E	323	66.3	E	353
	(NB Right)	500'	85.4	F	370	85.4	F	370
	SB Approach	500'+	94.1	F	368	88.1	F	235
	Overall	**-**	**60.5**	**E**	**-**	**59.5**	**E**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	25.3	C	330	25.3	C	333
	WB Approach	-	35.5	D	-	35.4	D	-
	(WB Left)	600'	53.2	D	345	53.1	D	343
	(WB Thru)	800'	22.3	C	372	22.3	C	373
	NB Approach	1000'+	46.7	D	375	46.7	D	375
	Overall	**-**	**34.3**	**C**	**-**	**34.2**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.7	A	-	8.0	A	-
	(EB Left)	400'	21.6	C	530	20.1	C	510
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	20.6	C	-	20.7	C	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	20.3	C	310	20.4	C	318
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
	Overall	**-**	**11.1**	**B**	**-**	**10.6**	**B**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		67.7	E	-	69.4	E	-
	(EB Left)	260'	25.3	C	98	25.2	C	98
	(EB Thru)	750'	71.9	E	1148	73.8	E	1163
	WB Approach	-	47.0	D	-	46.6	D	-
	(WB Left)	340'	92.1	F	425	92.1	F	425
	(WB Thru)	1800'	41.7	D	605	41.2	D	603
	(WB Right)	300'	22.1	C	118	22.1	C	118
	NB Approach	-	34.3	C	-	34.3	C	-
	(NB Left/Thru)	1000'+	34.6	C	240	34.6	C	240
	(NB Thru/Right)	100	34.1	C	245	34.1	C	245
	SB Approach	-	86.4	F	-	86.4	F	-
	(SB Left)	160'	187.1	F	885	187.1	F	885
	(SB Thru)	350'	24.1	C	305	24.1	C	305
	Overall	**-**	**62.1**	**E**	**-**	**62.5**	**E**	**-**

Table 9 – 2025 Build Conditions Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build No Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.6	E	-	64.4	E	-
	(EB Left)	800'	53.1	D	60	52.4	D	75
	(EB Thru)	800'	65.2	F	1393	65.2	F	1393
	WB Approach	600'	10.0	A	165	11.2	B	170
	NB Approach	-	52.3	D	-	54.4	D	-
	(NB Left)	500'	19.9	B	128	19.9	B	128
	(NB Thru)	1900'	60.3	E	323	66.3	E	353
	(NB Right)	500'	85.4	F	370	85.4	F	370
	SB Approach	500'+	94.1	F	368	88.1	F	235
	Overall	**-**	**60.5**	**E**	**-**	**59.5**	**E**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	25.3	C	330	25.3	C	333
	WB Approach	-	35.5	D	-	35.4	D	-
	(WB Left)	600'	53.2	D	345	53.1	D	343
	(WB Thru)	800'	22.3	C	372	22.3	C	373
	NB Approach	1000'+	46.7	D	375	46.7	D	375
	Overall	**-**	**34.3**	**C**	**-**	**34.2**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.7	A	-	8.0	A	-
	(EB Left)	400'	21.6	C	530	20.1	C	510
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	20.6	C	-	20.7	C	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	20.3	C	310	20.4	C	318
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
	Overall	**-**	**11.1**	**B**	**-**	**10.6**	**B**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		67.7	E	-	69.4	E	-
	(EB Left)	260'	25.3	C	98	25.2	C	98
	(EB Thru)	750'	71.9	E	1148	73.3	E	1163
	WB Approach	-	47.0	D	-	46.6	D	-
	(WB Left)	340'	92.1	F	425	92.1	F	425
	(WB Thru)	1800'	41.7	D	605	41.2	D	603
	(WB Right)	300'	22.1	C	118	22.1	C	118
	NB Approach	-	34.3	C	-	34.3	C	-
	(NB Left/Thru)	1000'+	34.6	C	240	34.6	C	240
	(NB Thru/Right)	100	34.1	C	245	34.1	C	245
	SB Approach	-	86.4	F	-	86.4	F	-
	(SB Left)	160'	187.1	F	885	187.1	F	885
	(SB Thru)	350'	24.1	C	305	24.1	C	305
	Overall	**-**	**62.1**	**E**	**-**	**62.5**	**E**	**-**

Gap Analysis

Based on the anticipated Level of Service for the exiting movements from the site via the SEPTA Driveway and south site driveway to King of Prussia Road a gap study was performed at both locations. The gap study was conducted from 7:00-9:00 AM and 4:00-6:00 PM on April 27, 2016.

Based on the weekday AM and PM peak hour gap analysis, it is anticipated that sufficient gaps are available to accommodate the anticipated traffic from the site at the two locations. The summary of the available gaps compared to the anticipated exiting traffic is shown in **TABLE 10.** The gap data is provided in **APPENDIX C**.

Table 10 – Capacity vs Anticipated Traffic Volume

King of Prussia Road and SEPTA Driveway

Peak Hour	Existing Capacity per Field Data fo Left Turns[1]	Existing Capacity per Field Data for RightTurns[1]	2020 Anticipated Traffic Volume		2025 Anticipated Traffic Volume	
			Left	Right	Left	Right
Weekday AM	59	149	20	42	21	42
Weekday PM	104	733	76	84	77	85

King of Prussia Road and Southern Driveway

Peak Hour	Existing Capacity per Field Data fo Left Turns[1]	Existing Capacity per Field Data for RightTurns[1]	2020 Anticipated Traffic Volume		2025 Anticipated Traffic Volume	
			Left	Right	Left	Right
Weekday AM	33	75	2	2	2	2
Weekday PM	80	654	4	4	4	4

1. Gap Data provided in Appendix C

Comparison of No Build versus Build without mitigation

A comparison of the performance of the study intersections under no-build conditions and build conditions was evaluated to identify impacts to the study area and the need for additional mitigation area based on the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies* which are that overall intersection LOS should be no worse than no-build Year overall intersection LOS. If the overall intersection LOS drops, mitigation will be required if the overall intersection delay increases by more than 10 seconds.

King of Prussia Road & Matsonford Road (SR 1038)

Under the 2020 and 2025 build conditions, the overall intersection and approaches maintain the no-build condition LOS in both the AM and PM peak periods. The overall intersection delay increase between no-build and build condition is less than 7 seconds for both peak periods in 2020 and 2025.

King of Prussia Road & Radnor-Chester Road (SR 1021)

Under the 2020 and 2025 build conditions, the overall intersection and approaches maintain the no-build condition LOS in both the AM and PM peak periods. The overall intersection delay increase between no-build and Build condition is less than 2 seconds for both peak periods in 2020 and 2025.

King of Prussia Road & SEPTA Driveway

Under the 2020 and 2025 build conditions, the intersection does not experience a worsening of LOS under the build conditions in either the AM or PM peak periods.

King of Prussia Road & Raider Road/Site Driveway

Under the 2020 and 2025 No-Build conditions the intersection is stop controlled with the north approach being an in only driveway. Under the 2020 and 2025 Build conditions without mitigation the intersection will remain stop-controlled with the north approach being a 2-lane full access site driveway. The unsignalized intersection operates with significant increase in delay and at an overall LOS F during the AM and PM peak periods in both the 2020 and 2025 Build conditions.

King of Prussia Road & Southern Driveway

Under the 2020 and 2025 Build conditions, the intersection operates at the same overall LOS as under the no-build conditions in the AM peak period. Under the 2020 and 2025 build PM peak period condition, the southern driveway experiences a significant reduction in traffic and thus improved LOS. . The reduced traffic is due to the fact that the southern driveway will primarily be used for deliveries.

Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. The overall intersection delay increase between no-build and build condition is less than 3 seconds in both peak periods in 2020 and 2025.

Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. There is very little change in overall intersection delay between no-build and build conditions in either peak period in 2020 and 2025.

Lancaster Avenue (SR 0030) & I-476 SB Off Ramps

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. There is less than 1 second change in overall intersection delay between no-build and build condition in either peak period in 2020 and 2025.

Lancaster Avenue (SR 0030) & Radnor Chester Road

Under the 2020 and 2025 build conditions, the intersection operates at the same overall LOS as under the no-build conditions in both the AM and PM peak periods. The overall intersection delay increase between no-build and build condition is less than 8 seconds in all both peak periods in 2020 and 2025.

Based on the comparison of the Intersection LOS and delay under no build conditions and build conditions and using the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies*, the need for additional mitigation measures at most of the study intersections is not triggered as a result of the trips generated by the proposed site. However, the unsignalized intersection of King of Prussia Road & Raider Road/Site Driveway exhibits a significant increase in overall intersection delay will be mitigated through the installation of a traffic signal.

2020 and 2025 "BUILD" TRAFFIC CONDITIONS WITH MITIGATION

Improvements to Achieve LOS C per SLDO Requirements and Mitigate Intersections

As required by 255-20.B(5)(d)(6)(a) of the Radnor Township Subdivision and Land Development Ordinance, additional off-site improvements would be necessary to achieve LOS C at all of the off-site intersections. Based on Synchro analysis, Lancaster Avenue would require significant intersection upgrades including widening to provide additional through lanes and providing additional dedicated turn lanes on most approaches. The King of Prussia Road intersections at Radnor-Chester Road and Matsonford Road would require two lanes in each direction on King of Prussia Road and dual turn lanes on the minor approaches. Due to physical constraints at most of the project intersections, including the SEPTA Rail Bridge on King of Prussia Road and the I-476 Bridges on Lancaster Avenue, the necessary improvements are not feasible and are not proposed by the applicant.

The intersection of King of Prussia Road & Raider Road/Site Driveway exhibits a significant increase in overall intersection delay as a result of proposed site traffic. In order to mitigate the intersection, it is proposed that the intersection be signalized and left turn lanes be added on both approaches of King of Prussia Road.

The following additional improvements are proposed:

- Restripe northbound I-476 off-ramp at Lancaster Avenue to provide a shared through/right turn lane
- Restripe northbound King of Prussia Road at the southern site driveway to provide a shared through/right turn lane
- Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
- Construct a southbound King of Prussia Road left turn lane into the Septa Driveway.

Signal Warrant Assessment

Signal warrant analyses were conducted for the intersections of King of Prussia Road and Raider Road/Site Driveway and King of Prussia Road and Septa Station Driveway using the warrants set forth in FHWA's Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition. Based on the MUTCD requirements for intersections warranting a signal, MUTCD Warrants 2 and 3 are applicable to the intersections King of Prussia Road and Raider Road/Site Driveway and King of Prussia Road and Septa Station Driveway.

King of Prussia Road and Raider Road/Site Driveway

Warrant 2 – Four Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-1 of the MUTCD. For the intersection of King of Prussia Road and Raider Road/Site Driveway, an Urban 2 or more major lanes and 1 minor lane curve is used for the Warrant 2 analysis. As illustrated on Table 4C-1 provided in **APPENDIX J**, four of the plotted points exceed the four hour warrant curve using the combination of manual count data and trip generation data. Therefore for the purposes of this analysis, **Warrant 2 is satisfied**.

Warrant 3 – Peak Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-3 of the MUTCD. For the intersection of King of Prussia Road and Raider Road/Site Driveway, an Urban 2 major lanes and 1 minor lane curve is used for the Warrant 3 analysis. As illustrated on Table 4C-3 provided in **APPENDIX J**, four of the plotted points exceed the peak hour warrant curve using the combination of manual count data and trip generation data. Therefore for the purposes of this analysis, **Warrant 3 is satisfied.**

King of Prussia Road and Septa Station Driveway

Warrant 2 – Four Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor

street approaches fall above the appropriate curve on Figure 4C-1 of the MUTCD. For the intersection of King of Prussia Road and Septa Station Driveway, an Urban 2 major lanes and 1 minor lane curve is used for the Warrant 2 analysis. As illustrated on Table 4C-1 provided in **APPENDIX J**, only two of the plotted points exceed the four hour warrant curve using the combination of manual count data and trip generation data. Therefore for the purposes of this analysis, **Warrant 2 is not satisfied**.

Warrant 3 – Peak Hour Vehicular Volume is met if four plotted points representing vehicles per hour on the major and minor street approaches fall above the appropriate curve on Figure 4C-3 of the MUTCD. For the intersection of King of Prussia Road and Septa Station Driveway, an Urban 2 major lanes and 1 minor lane curve is used for the Warrant 3 analysis. As illustrated on Table 4C-3 provided in **APPENDIX J**, four of the plotted points exceed the peak hour warrant curve using the combination of manual count data and trip generation data. Therefore for the purposes of this analysis, **Warrant 3 is satisfied.**

As both Warrant 2 and Warrant 3 are satisfied at the intersection of King of Prussia Road and Raider Road/Site Driveway, a traffic signal is proposed at the intersection as a mitigation measure.

At the King of Prussia Road and Septa Station Driveway warrant 3 is satisfied during the PM peak period but Warrant 2 was not met. Typically, a traffic signal is not considered if Warrant 3 is the only warrant that can be met. Therefore, a traffic signal was not proposed as a mitigation measure at the intersection.

The warrant volume analysis worksheet and MUTCD Figures are provided in **APPENDIX J.**

Left Turn Signalization Warrant Assessment

Left turn signalization warrants were performed for the northbound and southbound left turns on King of Prussia Road at Raider Road and the proposed site driveway. The results indicate that the left turn movements from King of Prussia Road should be provided by permitted left turn phases. The warrant worksheet is provided in **APPENDIX K.**

Vehicular and Pedestrian Clearances

Estimated vehicular and pedestrian clearances were calculated for the proposed signal at King of Prussia Road and Raider Road/site driveway based on PennDOT policies. The yellow and all-red times determined from these calculations were used for the future build scenario traffic analyses. The policies and the results of the calculations are provided in **APPENDIX L**. It is anticipated that the pedestrian and vehicular clearances will be refined during the development of an approved traffic signal plan.

2020 and 2025 Build Levels of Service with Mitigation Improvements

Operations of the study intersections during the AM and PM peak hours were evaluated for the build configuration of the proposed development in the proposed build year of 2020 and the horizon year of 2025 with the with the implementation of the identified mitigations.

Under the build conditions with the identified improvements implemented the following changes occur to overall and approach LOS:

<u>2020</u>

- At King of Prussia Road and Raider Road/Site Driveway:
    - Overall PM intersection operation improves from an overall LOS F (282.8 seconds of delay) to LOS D (41.4 seconds of delay) during the AM peak hour and from overall LOS F (260.3 seconds of delay) to LOS C (31.1 seconds of delay) during the PM peak hour.
    - Westbound approach improves from LOS F (4909.7 seconds of delay) to LOS D (34.4 seconds of delay) during the AM peak hour and from LOS F (1493.4 seconds of delay) to LOS C (38.5 seconds of delay) during the PM peak hour.

  - Eastbound improves from LOS F (240.2 seconds of delay) to LOS C (33.7 seconds of delay) during the AM peak hour.

- At Lancaster Avenue and I-476 NB Off Ramp/King of Prussia Road:
  - Overall intersection operation improves from LOS E (68.4 seconds of delay) to LOS D (51.5 seconds of delay) during the AM peak hour.
  - Northbound approach improves from LOS E (74.8 seconds of delay) to LOS D (43.2 seconds of delay) during the AM peak hour.
  - NB Through movement improves from LOS F (152.3 seconds of delay) to LOS E (58.5 seconds of delay) during the AM peak hour

Under the 2020 build conditions with the identified improvements implemented the following changes will occur to the reported 95th percentile queues:

- The reported 95th percentile queue for northbound approach at the intersection of King of Prussia Road & Raider Road will increase to 1068' during the AM peak period. This will extend through the southern site driveway and approach the intersection of Lancaster Avenue.
- The reported 95th percentile queue for westbound left at the intersection of King of Prussia Road & Raider Road will be reduced from 795' to 308' during the PM peak period.
- The reported 95th percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road will be reduced from 1962' to 760' during the AM peak period.

<u>2025</u>

- At King of Prussia Road and Raider Road/Site Driveway:
  - Overall intersection operation improves from an overall LOS F (313.4 seconds of delay) to LOS D (45.7 seconds of delay) during the AM peak hour and from overall LOS F (278.8 seconds of delay) to LOS D (33.8 seconds of delay) during the PM peak hour.
  - Westbound approach improves from LOS F (5492.6 seconds of delay) to LOS D (34.4 seconds of delay) during the AM peak hour and from LOS F (1622.6 seconds of delay) to LOS C (38.5 seconds of delay) during the PM peak hour.
  - Eastbound improves from LOS F (287.6 seconds of delay) to LOS C (33.7 seconds of delay) during the AM peak hour.
- At Lancaster Avenue and I-476 NB Off Ramp/King of Prussia Road:
  - Overall intersection operation improves from LOS E (71.4 seconds of delay) to LOS D (53.8 seconds of delay) during the AM peak hour.
  - Northbound approach improves from LOS F (80.7 seconds of delay) to LOS D (45.4 seconds of delay) during the AM peak hour.
  - NB Through movement improves from LOS F (160.2 seconds of delay) to LOS E (62.0 seconds of delay) during the AM peak hour.

Under the 2025 build conditions with the identified improvements implemented the following changes will occur to the reported 95th percentile queues:

- The reported 95th percentile queue for northbound approach at the intersection of King of Prussia Road & Raider Road will increase to 1138'' during the AM peak period. This will extend through the southern site driveway to the intersection of Lancaster Avenue.
- The reported 95th percentile queue for westbound left at the intersection of King of Prussia Road & Raider Road will be reduced from 810' to 308' during the PM peak period.

- The reported 95th percentile queue for the northbound through movements at the intersection of Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road will be reduced from 2032' to 787' during the AM peak period.

A summary of the Delays, LOS, and 95th Percentile Queues for the build conditions analysis are summarized in **TABLE 11** and **TABLE 12.** Detailed outputs of the 2025 build conditions analysis are provided in **APPENDIX M.**

Table 11 – 2020 Build Conditions with Improvements Summary Table

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.1	C	0	29.1	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	38.8	D	-	39.3	D	-
	(WB Left)	550'	42.8	D	368	43.4	D	375
	(WB Thru/Right)	950'	27.6	C	110	27.6	C	110
	SB Approach	-	39.0	D	-	39.6	D	-
	(SB Left)	100'	84.9	F	718	86.7	F	723
	(SB Thru/Right)	1000'+	12.0	B	403	12.2	B	158
	NB Approach	-	60.9	E	-	64.6	E	-
	(NB Left)	130'	17.3	B	10	17.3	B	10
	(NB Thru)	1150'	61.7	E	785	65.5	E	1090
	Overall	**-**	**45.7**	**D**	**-**	**47.3**	**D**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.0	B	-	19.3	B	-
	(EB Left)	75'	50.4	D	53	53.7	D	55
	(EB Thru)	1200'	16.0	B	255	16.1	B	263
	WB Approach	-	44.2	D	-	48.7	D	-
	(WB Left)	160'	20.5	C	25	20.8	C	25
	(WB Thru/Right)	1100'	45.0	D	883	49.7	D	940
	NB Approach	-	617.3	F	-	616.3	F	-
	(NB Left/Thru)	1200'	681.6	F	2170	681.6	F	2170
	(NB Right)	280'	18.2	B	45	18.3	B	45
	SB Approach	100'	21.8	C	8	21.8	C	8
	Overall	**-**	**218.9**	**F**	**-**	**218.3**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	38.6	E	43	39.3	E	45
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.2	A	30	5.4	A	40
	Overall	**-**	**2.5**	**A**	**-**	**3.0**	**A**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	21.8	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380	0.0	A	0	-	-	-
	Overall	**-**	**0.1**	**A**	**-**	**-**	**-**	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.3	B	30	33.7	C	183
	WB Approach	500'	-	-	-	34.4	C	-
	(WB Left)	500'	-	-	-	35.5	D	135
	(WB Thru/Right)	500'	-	-	-	29.2	C	25
	NB Approach	550'	1.2	A	20	47.9	D	-
	(NB Left)	75'	-	-	-	10.1	B	133
	(NB Thru)	550'	-	-	-	68.4	F	1068
	(NB Right)	550'	-	-	-	7.0	A	35
	SB Approach	550'	0.9	A	5	18.8	B	-
	(SB Left)	75'	-	-	-	96.9	F	128
	(SB Thru)	660'	-	-	-	6.2	A	188
	Overall	**-**	**2.0**	**A**	**-**	**41.4**	**D**	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	265.0	F	108	90.2	F	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.2	C	13	16.8	C	3
	Overall	**-**	**5.6**	**A**	**-**	**0.2**	**A**	**-**

Table 11 – 2020 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2020 No Build - AM Peak Hour			2020 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	60.5	E	-	55.8	E	-
	(EB Left)	800'	59.1	E	252	56.3	E	253
	(EB Thru)	800'	60.9	E	787	55.6	E	758
	WB Approach	600'	53.9	D	338	53.9	D	338
	NB Approach	-	74.8	E	-	43.2	D	-
	(NB Left)	500'	17.6	B	305	18.3	B	313
	(NB Thru)	1900'	146.9	F	1917	58.5	E	760
	(NB Right)	500'	28.1	C	335	60.5	E	740
	SB Approach	500'+	63.9	E	78	75.9	E	125
	Overall	**-**	**66.2**	**E**	**-**	**51.5**	**D**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.0	B	235	18.4	B	238
	WB Approach	-	34.5	C	-	34.9	C	-
	(WB Left)	600'	53.8	D	120	54.4	D	130
	(WB Thru)	800'	31.8	C	568	31.9	C	575
	NB Approach	1000'+	40.0	D	443	40.0	D	443
	Overall	**-**	**31.3**	**C**	**-**	**31.6**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.6	A	-	8.4	A	-
	(EB Left)	400'	31.8	C	248	30.9	C	240
	(EB Thru/Right)	600'	0.3	A	5	0.2	A	5
	WB Approach	-	10.4	B	-	10.8	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	3
	(WB Thru/Right)	750'	10.3	B	280	10.7	B	285
	NB Approach	-	58.1	E	-	58.1	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	55.0	D	3
	Overall	**-**	**9.3**	**A**	**-**	**9.2**	**A**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		31.5	C	-	34.3	C	-
	(EB Left)	260'	43.8	D	145	43.9	D	150
	(EB Thru)	750'	30.0	C	520	33.1	C	545
	WB Approach	-	49.7	D	-	64.5	E	-
	(WB Left)	340'	35.0	C	185	43.5	D	200
	(WB Thru)	1800'	58.0	E	1285	77.1	E	1390
	(WB Right)	300'	29.0	C	435	31.8	C	453
	NB Approach	-	45.9	D	-	45.9	D	-
	(NB Left/Thru)	1000'+	44.7	D	345	44.7	D	345
	(NB Thru/Right)	100	47.1	D	340	47.1	D	340
	SB Approach	-	27.8	C	-	26.1	C	-
	(SB Left)	160'	31.3	C	103	29.3	C	100
	(SB Thru)	350'	26.5	C	125	24.9	C	120
	Overall	**-**	**42.3**	**D**	**-**	**50.5**	**D**	**-**

Table 11 – 2020 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		19.3	B	-	19.3	B	-
	(EB Left)	50'	24.5	C	3	24.5	C	3
	(EB Thru/Right)	50'	18.2	B	10	18.2	B	10
	WB Approach	-	45.9	D	-	47.3	D	-
	(WB Left)	550'	55.8	E	640	57.7	E	653
	(WB Thru/Right)	950'	21.6	C	195	21.6	C	195
	SB Approach	-	25.9	C	-	26.5	C	-
	(SB Left)	100'	18.0	B	83	17.8	B	83
	(SB Thru/Right)	1000'+	27.1	C	660	27.8	C	678
	NB Approach	-	33.5	C	-	31.6	C	-
	(NB Left)	130'	33.1	C	8	33.6	C	8
	(NB Thru)	1150'	33.5	C	492	31.6	C	460
	Overall	**-**	**34.6**	**C**	**-**	**34.9**	**C**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	28.1	C	-	29.0	C	-
	(EB Left)	75'	23.2	C	8	22.9	C	8
	(EB Thru)	1200'	28.1	C	548	29.1	C	560
	WB Approach	-	25.2	C	-	25.7	C	-
	(WB Left)	160'	62.4	E	93	67.9	E	95
	(WB Thru/Right)	1100'	20.1	C	333	19.9	B	328
	NB Approach	-	225.5	F	-	225.1	F	-
	(NB Left/Thru)	1200'	297.7	F	1215	297.7	F	1215
	(NB Right)	280'	16.8	B	105	16.8	B	108
	SB Approach	100'	49.3	D	138	49.3	D	138
	Overall	**-**	**85.7**	**F**	**-**	**86.0**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	120.0	F	288	38.6	E	108
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	0.3	A	3	0.5	A	5
	Overall	**-**	**17.1**	**C**	**-**	**4.2**	**A**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	18.2	C	13	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380	0.0	A	0	-	-	-
	Overall	**-**	**0.5**	**A**	**-**	**-**	**-**	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	32.1	D	25	28.2	C	45
	WB Approach	500'	-	-	-	38.5	D	-
	(WB Left)	500'	-	-	-	40.7	D	308
	(WB Thru/Right)	500'	-	-	-	28.7	C	60
	NB Approach	550'	0.7	A	3	8.7	A	-
	(NB Left)	75'	-	-	-	50.5	D	35
	(NB Thru)	550'	-	-	-	6.6	A	150
	(NB Right)	550'	-	-	-	5.6	A	45
	SB Approach	550'	0.0	A	0	37.5	D	-
	(SB Left)	75'	-	-	-	7.5	A	8
	(SB Thru)	660'	-	-	-	37.8	D	1128
	Overall	**-**	**1.1**	**A**	**-**	**31.1**	**C**	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	613.8	F	567	37.3	E	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.1	A	-	0.0	A	-
	(SB Left)	75'	8.0	A	0	8.2	A	0
	Overall	**-**	**83.9**	**F**	**-**	**0.2**	**A**	**-**

Table 11 – 2020 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2020 No Build - PM Peak Hour			2020 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	58.5	E	-	59.6	E	-
	(EB Left)	800'	52.5	D	58	52.5	D	75
	(EB Thru)	800'	58.8	E	1335	60.0	E	1340
	WB Approach	600'	10.3	B	163	11.1	B	170
	NB Approach	-	49.7	D	-	55.3	E	-
	(NB Left)	500'	19.8	B	123	19.9	B	125
	(NB Thru)	1900'	57.8	E	313	72.1	E	360
	(NB Right)	500'	79.3	E	353	82.1	F	360
	SB Approach	500'+	85.8	F	328	83.2	E	310
	Overall	**-**	**55.6**	**E**	**-**	**56.5**	**E**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	24.6	C	323	24.5	C	323
	WB Approach	-	35.3	D	-	35.2	D	-
	(WB Left)	600'	53.1	D	342	53.1	D	338
	(WB Thru)	800'	22.0	C	370	21.9	C	368
	NB Approach	1000'+	46.6	D	370	46.6	D	370
	Overall	**-**	**33.9**	**C**	**-**	**33.8**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	9.7	A	-	9.1	A	-
	(EB Left)	400'	24.4	C	842	22.9	C	833
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	19.8	B	-	19.9	B	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	19.4	B	303	19.6	B	308
	NB Approach	-	56.7	E	-	56.7	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.2	E	3
	Overall	**-**	**11.8**	**B**	**-**	**11.3**	**B**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		59.1	E	-	49.4	D	-
	(EB Left)	260'	24.3	C	95	25.9	C	98
	(EB Thru)	750'	62.5	E	795	51.6	D	740
	WB Approach	-	42.2	D	-	44.4	D	-
	(WB Left)	340'	79.4	E	342	118.0	F	323
	(WB Thru)	1800'	37.9	D	575	33.9	C	550
	(WB Right)	300'	21.5	C	115	20.4	C	113
	NB Approach	-	34.6	C	-	34.6	C	-
	(NB Left/Thru)	1000'+	34.8	C	238	34.8	C	238
	(NB Thru/Right)	100	34.4	C	242	34.4	C	243
	SB Approach	-	83.9	F	-	83.9	F	-
	(SB Left)	160'	180.3	F	848	180.3	F	848
	(SB Thru)	350'	24.4	C	300	24.4	C	300
	Overall	**-**	**57.2**	**E**	**-**	**54.8**	**D**	**-**

Table 12 – 2025 Build Conditions with Improvements Summary Table

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		26.4	C	-	26.4	C	-
	(EB Left)	50'	29.3	C	0	29.3	C	0
	(EB Thru/Right)	50'	25.0	C	3	25.0	C	3
	WB Approach	-	39.6	D	-	39.9	D	-
	(WB Left)	550'	43.8	D	378	44.2	D	380
	(WB Thru/Right)	950'	27.7	C	115	27.7	C	115
	SB Approach	-	42.3	D	-	42.2	D	-
	(SB Left)	100'	93.0	F	753	93.0	F	753
	(SB Thru/Right)	1000'+	12.2	B	415	12.4	B	420
	NB Approach	-	64.6	E	-	69.8	E	-
	(NB Left)	130'	17.3	B	10	17.3	B	10
	(NB Thru)	1150'	65.5	F	1090	70.7	E	1135
	Overall	**-**	**48.5**	**D**	**-**	**50.2**	**D**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	19.2	B	-	19.5	B	-
	(EB Left)	75'	53.0	D	63	55.7	E	55
	(EB Thru)	1200'	16.0	B	260	16.1	B	265
	WB Approach	-	48.0	D	-	53.3	D	-
	(WB Left)	160'	20.6	C	25	21.0	C	25
	(WB Thru/Right)	1100'	48.9	D	928	54.4	F	1370
	NB Approach	-	636.0	F	-	635.1	F	-
	(NB Left/Thru)	1200'	702.2	F	2230	702.2	F	2230
	(NB Right)	280'	18.2	B	45	18.3	B	48
	SB Approach	100'	21.8	C	8	21.8	C	8
	Overall	**-**	**227.1**	**F**	**-**	**226.5**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	39.8	E	43	41.4	E	48
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	4.3	A	33	5.5	A	40
	Overall	**-**	**2.5**	**A**	**-**	**3.2**	**A**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	22.3	C	3	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380	0.0	A	0	-	-	-
	Overall	**-**	**0.1**	**A**	**-**	**-**	**-**	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	13.5	B	33	33.7	C	187
	WB Approach	500'	-	-	-	34.4	C	-
	(WB Left)	500'	-	-	-	35.6	D	135
	(WB Thru/Right)	500'	-	-	-	29.1	C	25
	NB Approach	550'	1.2	A	20	54.0	D	-
	(NB Left)	75'	-	-	-	10.9	B	140
	(NB Thru)	550'	-	-	-	77.2	F	1138
	(NB Right)	550'	-	-	-	7.1	A	225
	SB Approach	550'	0.9	A	8	18.8	B	-
	(SB Left)	75'	-	-	-	97.2	F	120
	(SB Thru)	660'	-	-	-	6.3	A	195
	Overall	**-**	**2.1**	**A**	**-**	**45.7**	**D**	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	298.0	F	113	92.2	F	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	1.8	A	-	0.2	A	-
	(SB Left)	75'	15.5	C	15	17.1	C	3
	Overall	**-**	**6.1**	**A**	**-**	**0.2**	**A**	**-**

Table 12 – 2025 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2025 No Build - AM Peak Hour			2025 Build Mit - AM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.2	E	-	58.7	E	-
	(EB Left)	800'	59.6	E	253	56.7	E	255
	(EB Thru)	800'	65.4	E	1123	59.3	E	790
	WB Approach	600'	54.4	D	345	54.4	D	343
	NB Approach	-	78.6	E	-	45.4	D	-
	(NB Left)	500'	17.8	B	313	18.4	B	318
	(NB Thru)	1900'	155.9	F	1995	62.0	E	787
	(NB Right)	500'	28.5	C	345	64.3	E	770
	SB Approach	500'+	65.3	E	83	78.5	E	135
	Overall	**-**	**69.4**	**E**	**-**	**53.8**	**D**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	18.5	B	240	18.9	B	245
	WB Approach	-	35.0	C	-	35.5	D	-
	(WB Left)	600'	53.9	D	123	54.4	D	133
	(WB Thru)	800'	32.4	C	578	32.6	C	585
	NB Approach	1000'+	39.9	D	450	39.9	D	450
	Overall	**-**	**31.7**	**C**	**-**	**32.0**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.4	A	-	8.3	A	-
	(EB Left)	400'	31.3	C	245	30.6	C	245
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	10.7	B	-	11.0	B	-
	(WB Left)	100'	56.5	E	3	56.5	E	5
	(WB Thru/Right)	750'	10.6	B	288	10.9	B	293
	NB Approach	-	58.1	E	-	58.1	E	-
	(NB Left/Thru)	750'	58.8	E	13	58.8	E	13
	(NB Right)	50'	55.1	E	3	55.1	E	3
	Overall	**-**	**9.2**	**A**	**-**	**9.2**	**A**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		33.3	C	-	33.4	C	-
	(EB Left)	260'	63.1	E	258	60.6	E	252
	(EB Thru)	750'	29.4	C	528	29.8	C	533
	WB Approach	-	50.1	D	-	53.7	D	-
	(WB Left)	340'	46.6	D	228	48.0	D	228
	(WB Thru)	1800'	57.1	E	1313	61.9	F	1340
	(WB Right)	300'	28.5	C	713	28.8	C	445
	NB Approach	-	47.0	D	-	46.2	D	-
	(NB Left/Thru)	1000'+	45.7	D	357	45.0	D	353
	(NB Thru/Right)	100	48.3	D	350	47.6	D	348
	SB Approach	-	28.0	C	-	27.6	C	-
	(SB Left)	160'	31.7	C	115	31.2	C	105
	(SB Thru)	350'	26.6	C	128	26.3	C	128
	Overall	**-**	**43.2**	**D**	**-**	**44.9**	**D**	**-**

Table 12 – 2025 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
King of Prussia Road (N/S) & Matsonford Road (E/W)	EB Approach		18.0	B	-	18.0	B	-
	(EB Left)	50'	22.9	C	3	22.9	C	3
	(EB Thru/Right)	50'	17.0	B	10	17.0	B	10
	WB Approach	-	39.8	D	-	40.9	D	-
	(WB Left)	550'	47.9	D	620	49.4	D	638
	(WB Thru/Right)	950'	20.1	C	193	20.1	C	193
	SB Approach	-	31.6	C	-	32.6	C	-
	(SB Left)	100'	20.2	C	90	19.9	B	90
	(SB Thru/Right)	1000'+	33.4	C	733	34.7	C	756
	NB Approach	-	41.0	D	-	37.7	D	-
	(NB Left)	130'	37.5	D	10	38.2	D	8
	(NB Thru)	1150'	41.0	D	542	37.7	D	200
	Overall	**-**	**36.6**	**D**	**-**	**36.6**	**D**	**-**
King of Prussia Road (E/W) & Radnor Chester Road (N/S) (SR 1021)	EB Approach	-	39.5	D	-	45.2	D	-
	(EB Left)	75'	25.3	C	8	25.0	C	8
	(EB Thru)	1200'	39.7	D	992	45.4	D	1037
	WB Approach	-	31.1	C	-	30.7	C	-
	(WB Left)	160'	96.4	F	120	94.4	F	118
	(WB Thru/Right)	1100'	22.1	C	350	21.9	C	345
	NB Approach	-	212.9	F	-	212.6	F	-
	(NB Left/Thru)	1200'	281.3	F	1210	281.3	F	1210
	(NB Right)	280'	15.6	B	105	15.6	B	105
	SB Approach	100'	53.0	D	143	52.5	D	143
	Overall	**-**	**88.4**	**F**	**-**	**90.4**	**F**	**-**
King of Prussia Road (N/S) & Septa Driveway (W)	WB Approach	450'	132.3	F	305	41.0	E	113
	NB Approach	380'	0.0	A	0	0.0	A	0
	SB Approach	1200'	0.3	A	5	0.5	A	5
	Overall	**-**	**18.7**	**C**	**-**	**4.4**	**A**	**-**
King of Prussia Road (N/S) & Northern Driveway (W)	WB Approach	400'	18.4	C	13	-	-	-
	NB Approach	280'	0.0	A	0	-	-	-
	SB Approach	380	0.0	A	0	-	-	-
	Overall	**-**	**0.5**	**A**	**-**	**-**	**-**	**-**
King of Prussia Road (N/S) & Raider Road/Driveway (W)	EB Approach	500'	33.4	D	28	28.3	C	45
	WB Approach	500'	-	-	-	38.5	D	-
	(WB Left)	500'	-	-	-	40.6	D	308
	(WB Thru/Right)	500'	-	-	-	28.7	C	60
	NB Approach	550'	0.8	A	3	9.2	A	-
	(NB Left)	75'	-	-	-	55.5	E	4
	(NB Thru)	550'	-	-	-	6.6	A	153
	(NB Right)	550'	-	-	-	5.6	A	45
	SB Approach	550'	0.0	A	0	41.9	D	-
	(SB Left)	75'	-	-	-	7.6	A	8
	(SB Thru)	660'	-	-	-	42.3	F	1058
	Overall	**-**	**1.1**	**A**	**-**	**33.8**	**C**	**-**
King of Prussia Road (N/S) & Southern Driveway (W)	WB Approach	600'	647.9	F	580	38.2	E	8
	NB Approach	500'	0.0	A	0	0.0	A	0
	SB Approach	550'	0.1	A	-	0.0	A	-
	(SB Left)	75'	8.0	A	0	8.2	A	0
	Overall	**-**	**87.3**	**F**	**-**	**0.2**	**A**	**-**

Table 12 – 2025 Build Conditions with Improvements Summary Table (Cont.)

		Available Storage Length	2025 No Build - PM Peak Hour			2025 Build Mit - PM Peak Hour		
			Delay (Secs)	LOS	95th % Queue	Delay (Secs)	LOS	95th % Queue
Lancaster Avenue (SR 0030) & I-476 NB Off Ramps/King of Prussia Road	EB Approach	-	64.6	E	-	56.1	E	-
	(EB Left)	800'	53.1	D	60	51.3	D	75
	(EB Thru)	800'	65.2	F	1393	56.4	F	1390
	WB Approach	600'	10.0	A	165	11.2	B	173
	NB Approach	-	52.3	D	-	57.3	E	-
	(NB Left)	500'	19.9	B	128	19.9	B	128
	(NB Thru)	1900'	60.3	E	323	75.1	E	356
	(NB Right)	500'	85.4	F	370	85.7	F	373
	SB Approach	500'+	94.1	F	368	88.1	F	235
	Overall	**-**	**60.5**	**E**	**-**	**56.5**	**E**	**-**
Lancaster Avenue (SR 0030) & I-476 SB Off Ramps	EB Approach	1800'	25.3	C	330	24.8	C	335
	WB Approach	-	35.5	D	-	19.6	B	-
	(WB Left)	600'	53.2	D	345	43.0	D	335
	(WB Thru)	800'	22.3	C	372	2.1	A	75
	NB Approach	1000'+	46.7	D	375	46.7	D	380
	Overall	**-**	**34.3**	**C**	**-**	**27.0**	**C**	**-**
Lancaster Avenue (SR 0030) & I-476 NB On Ramp/Hillside Circuit	EB Approach	-	8.7	A	-	8.0	A	-
	(EB Left)	400'	21.6	C	530	20.1	C	510
	(EB Thru/Right)	600'	0.2	A	5	0.2	A	5
	WB Approach	-	20.6	C	-	20.7	C	-
	(WB Left)	100'	59.3	E	10	59.3	E	10
	(WB Thru/Right)	750'	20.3	C	310	20.4	C	308
	NB Approach	-	56.7	E	-	56.6	E	-
	(NB Left/Thru)	750'	56.9	E	8	56.9	E	8
	(NB Right)	50'	56.2	E	3	56.0	E	3
	Overall	**-**	**11.1**	**B**	**-**	**10.6**	**B**	**-**
Lancaster Avenue (E/W) (SR 0030) & Radnor Chester Road (N/S)	EB Approach		67.7	E	-	69.2	E	-
	(EB Left)	260'	25.3	C	98	28.3	C	108
	(EB Thru)	750'	71.9	E	1148	73.3	E	1160
	WB Approach	-	47.0	D	-	42.5	D	-
	(WB Left)	340'	92.1	F	425	92.2	F	425
	(WB Thru)	1800'	41.7	D	605	36.1	D	570
	(WB Right)	300'	22.1	C	118	20.8	C	113
	NB Approach	-	34.3	C	-	34.4	C	-
	(NB Left/Thru)	1000'+	34.6	C	240	34.7	C	238
	(NB Thru/Right)	100	34.1	C	245	34.1	C	243
	SB Approach	-	86.4	F	-	86.9	F	-
	(SB Left)	160'	187.1	F	885	188.3	F	883
	(SB Thru)	350'	24.1	C	305	24.1	C	300
	Overall	**-**	**62.1**	**E**	**-**	**61.3**	**E**	**-**

CONCLUSIONS & RECOMMENDATIONS

The proposed 475,000 square foot development located at 145 King of Prussia Road in Radnor Township, Delaware County, Pennsylvania is expected to generate a total of **731** (**577** entering and **154** exiting) and **583** (**158** entering and **425** exiting) new trips generated by the site during the morning and afternoon peak hours, respectively. Access to the site will be provided through a 3 full access driveways. The primary site driveway will be a full access driveway located on King of Prussia Drive across from Raider Road. A second driveway will be located on the north side of the site and accessed via the existing Septa driveway on King of Prussia Road. The third site driveway is provides access to loading areas and is located at the southern corner of the site on King of Prussia Road approximately 550' north of Lancaster Avenue (SR 0030).

In conjunction with the proposed development the following roadway improvements are recommended:

- At King of Prussia Road and Matsonford Road/Park Driveway:
  - Modify AM signal timings to shift 3 seconds from the SB King of Prussia Road lead phase to the NB/SB King of Prussia phase (1 second) and the EB/WB Matsonford Road/Park Driveway Phase (2 seconds).
- At King of Prussia Road and Radnor-Chester Road:
  - Modify PM signal timings to shift 6 seconds from the EB/WB King of Prussia Road phase to the NB/SB Radnor Chester Road phase.
- At King of Prussia Road and Raider Road/Site Driveway :
  - Provide left turn lanes on both approaches of King of Prussia Road
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from Lancaster Avenue to the signalized intersection at the Main Site Driveway/ Raider Road.
  - Install 2 phase semi-actuated traffic signal.
- At King of Prussia Road and South Site Driveway :
  - Restripe northbound King of Prussia Road at the southern site driveway to provide shared through/right turn lane.
  - Widen the east side of King of Prussia Road to provide two continuous northbound lanes from the south driveway to the Main Site Driveway/ Raider Road, with a transition into a dedicated right turn lane.
- At Lancaster Avenue and NB Off Ramps/King of Prussia Road:
  - Restripe northbound I-76 off-ramp at Lancaster Avenue to provide shared through/right turn lane
- At Lancaster Avenue and I-476 SB Off Ramp:
  - Modify PM signal timings to shift 1 second from the EB/WB Lancaster Avenue phase to the WB Lancaster Avenue lead phase.
- At Lancaster Avenue and I-476 NB On Ramp/Hillside Circuit:
  - Modify PM signal timings to shift 7 second from the EB/WB Lancaster Avenue phase to the EB Lancaster Avenue lead phase.
- At Lancaster Avenue and Radnor-Chester Road:
  - Modify AM signal timings to shift 12 seconds from the southbound Radnor-Chester Road lead phase and 1 second from the Lancaster Avenue Phase lead left phase to the EB/WB Lancaster Avenue EB/WB Phase.

Under the build Conditions with the identified improvements implemented, all of the study intersections maintain existing levels of service between the no-build and build conditions and operate at overall LOS D or better with the exception of those that operate at LOS E or F under no-build conditions.

Under the build Conditions with the identified improvements implemented, all of the study intersections maintain existing

levels of service between the no-build and build conditions and operate at overall LOS D or better with the exception of those that operate at LOS E or F under no-build conditions.

Based on the comparison of the Intersection LOS and delay under no-build conditions and build conditions with the identified mitigation measures, the intersections meet the LOS requirements identified in the PennDOT's *Policies and Procedures for Traffic Impact Studies* at all of the study intersections. The Levels of Service exhibited are not a result of, nor is the need for additional mitigation measures triggered as a result of the trips generated by the proposed site.

In addition to the improvements identified within the is TIS, a bus shelter is to be constructed on King of Prussia Road southeast of the SEPTA Driveway to the extent that it is approved by SEPTA and the University of Pennsylvania Health System will partner with the Township to install a Traffic Adaptive Signal Coordination at the following intersections, subject to PennDOT review:

- Route 30 & I-476 Northbound Ramps
- Route 30 & I-476/King of Prussia Road
- Route 30 & I-476 Southbound Ramps.
- Route 30 & Radnor-Chester Road.
- Route 30 & Radnor Financial Center Eastern Driveway
- Route 30 & Radnor Financial Center Western Driveway
- King of Prussia Road & Radnor-Chester Road.
- King of Prussia Road & Matsonford Road.
- Matsonford Road & South Centennial Drive.
- Matsonford Road & North Centennial Drive
- King of Prussia Road & Raider Road.
- Radnor Chester and Raider Road
- Radnor Chester and Radnor Financial Center

APPENDIX

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

APPENDIX A

Level of Service Criteria

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

LEVEL OF SERVICE

Level of Service is a term used to describe vehicle operator satisfaction with the driving experience. Research has determined that operator satisfaction is based primarily on travel speed and delay. In urban environments these factors, travel speed and delay, are primarily controlled by the operation of intersections.

By utilizing models to simulate the flow of traffic at intersections, the average delay experienced by vehicles can be estimated. These models consider such factors as traffic volumes, roadway geometry, traffic control, and driver behavior. Levels of Service designations are based on a comparison of the average delays calculated by the models with perceived acceptable delays.

The following tables illustrate the guidelines used for designated Levels of Service at intersections:

Level of Service Criteria
for Signalized Intersections[1]

Level of Service	Control Delay (Seconds per Vehicle)
A	≤ 10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	> 80

[1] Exhibit 18-4, Level of Service from Control Delay (2010 HCM)

Level of Service Criteria
for Unsignalized Intersections[2]

Level of Service	Control Delay (Seconds per Vehicle)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	> 50

[2] Table Exhibit 19-1, Level of Service Criteria for TWSC and AWSC intersections (2010 HCM)

APPENDIX B

Existing Signal Permit Plans/Timing Directives

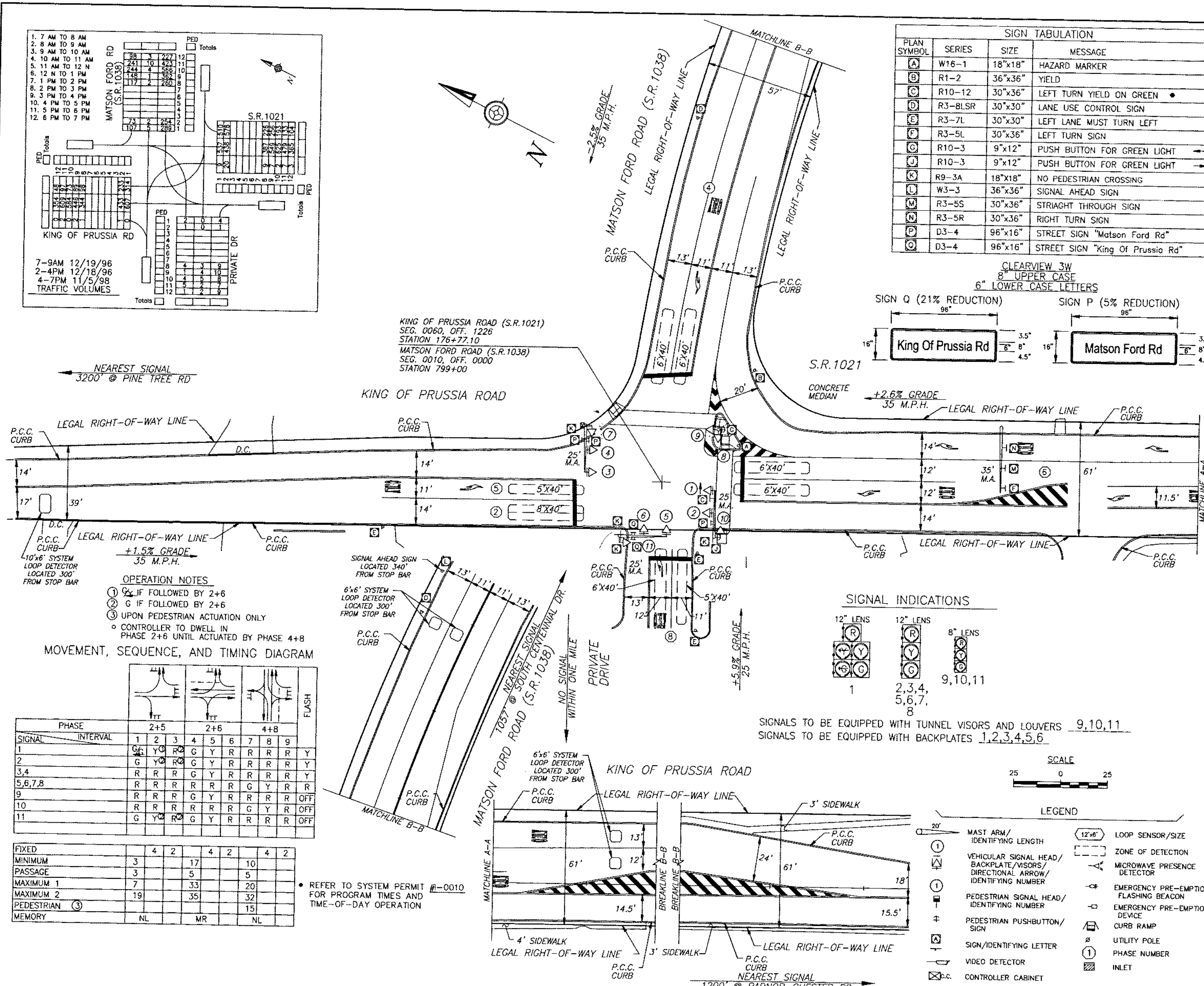
TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni



SIGN TABULATION

PLAN SYMBOL	SERIES	SIZE	MESSAGE
A	W16-1	18"x18"	HAZARD MARKER
B	R1-2	36"x36"	YIELD
C	R10-12	30"x36"	LEFT TURN YIELD ON GREEN ●
D	R3-8LSR	30"x30"	LANE USE CONTROL SIGN
E	R3-7L	30"x30"	LEFT LANE MUST TURN LEFT
F	R3-5L	30"x36"	LEFT TURN SIGN
G	R10-3	9"x12"	PUSH BUTTON FOR GREEN LIGHT ←
J	R10-3	9"x12"	PUSH BUTTON FOR GREEN LIGHT →
K	R9-3A	18"X18"	NO PEDESTRIAN CROSSING
L	W3-3	36"x36"	SIGNAL AHEAD SIGN
M	R3-5S	30"x36"	STRIAGHT THROUGH SIGN
N	R3-5R	30"x36"	RIGHT TURN SIGN
P	D3-4	96"x16"	STREET SIGN "Matson Ford Rd"
Q	D3-4	96"x16"	STREET SIGN "King Of Prussia Rd"

CLEARVIEW 3W
8" UPPER CASE
6" LOWER CASE LETTERS

SIGN Q (21% REDUCTION) — King Of Prussia Rd — 96" x 16" (3.5", 8", 6", 4.5")

SIGN P (5% REDUCTION) — Matson Ford Rd — 96" x 16" (3.5", 8", 6", 4.5")

SIGNAL INDICATIONS

12" LENS — 1

12" LENS — 2,3,4, 5,6,7, 8

8" LENS — 9,10,11

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS AND LOUVERS 9,10,11
SIGNALS TO BE EQUIPPED WITH BACKPLATES 1,2,3,4,5,6

SCALE 25 0 25

LEGEND

- MAST ARM/ IDENTIFYING LENGTH
- VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- SIGN/IDENTIFYING LETTER
- VIDEO DETECTOR
- C.C. CONTROLLER CABINET
- (12'x6') LOOP SENSOR/SIZE
- ZONE OF DETECTION
- MICROWAVE PRESENCE DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- EMERGENCY PRE-EMPTION DEVICE
- CURB RAMP
- UTILITY POLE
- PHASE NUMBER
- INLET

OPERATION NOTES

1. G/←G IF FOLLOWED BY 2+6
2. G IF FOLLOWED BY 2+6
3. UPON PEDESTRIAN ACTUATION ONLY

○ CONTROLLER TO DWELL IN PHASE 2+6 UNTIL ACTUATED BY PHASE 4+8

MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

PHASE	2+5			2+6			4+8			FLASH
SIGNAL \ INTERVAL	1	2	3	4	5	6	7	8	9	
1	G/←G	Y①	R②	G	Y	R	R	R	R	Y
2	G	Y②	R②	G	Y	R	R	R	R	Y
3,4	R	R	R	G	Y	R	R	R	R	Y
5,6,7,8	R	R	R	R	R	R	G	Y	R	R
9	R	R	R	G	Y	R	R	R	R	OFF
10	R	R	R	R	R	R	G	Y	R	OFF
11	G	Y②	R②	G	Y	R	R	R	R	OFF

FIXED		4	2		4	2		4	2
MINIMUM	3			17			10		
PASSAGE	3			5			5		
MAXIMUM 1	7			33			20		
MAXIMUM 2	19			35			32		
PEDESTRIAN ③							15		
MEMORY	NL			MR			NL		

● REFER TO SYSTEM PERMIT #-0010 FOR PROGRAM TIMES AND TIME-OF-DAY OPERATION

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

SYSTEM PERMIT # I-001D

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-D

COUNTY: DELAWARE
MUNICIPALITY: RAONOR TOWNSHIP
INTERSECTION: KING OF PRUSSIA ROAD (S.R. 1021) & MATSON FDRO RDAO (S.R. 1D38)/PRIVATE DRIVE

REVIEWED: ______ DATE

MUNICIPAL OFFICIAL ______ DATE

RECOMMENDED:

WERNER J. EICHORN — 4-8-86
DISTRICT TRAFFIC ENGINEER — DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	NEW DWG: ADDED CLS, OSN, S&W LEG XWALKS/SIGNALS/ PB, YIELD SIGNS; ELIMINATED RT SIGNAL AND WFG SIGN	NV	3/3/00	RP MK	3/8/00 3/8/00	WJE	3/10/00
2	REVISED PMP-ONE LANE EB DEPARTURE	TPD REW	6/12/01	MK	6/15/01	WJE	6/19/01
3	REVISED CURB RAMPS, PEDESTRIAN BUTTONS AND PEDESTRIAN TIMES	MCM	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4							
5							
6							
7							

SHEET 2 OF 2 | PERMIT # 63-D89D | FILE # 0890

TRAFFIC SIGNAL SYSTEM PERMIT PLAN

WEEKLY PROGRAM CHART

EVENT	DAY	TIME	CYCLE	OFFSET	PROGRAM	REMARKS
1	1-7	20:00	–	–	MAX. 1	FREE
2	1-5	06:00	VARIES	VARIES	1	AM PEAK
3	1-5	10:00	VARIES	VARIES	2	OFF PEAK
4	1-5	15:00	VARIES	VARIES	3	PM PEAK
5	6,7	08:00	VARIES	VARIES	2	OFF PEAK

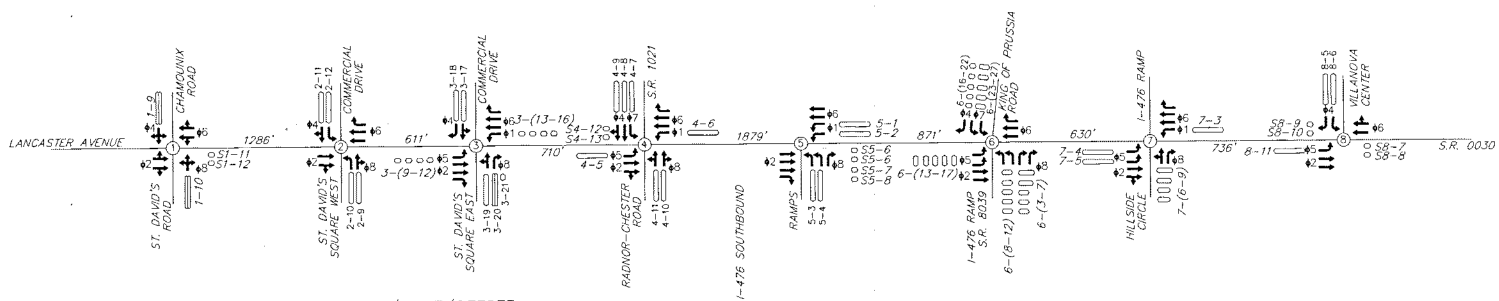
MONDAY = DAY 1
OFFSET IN SECONDS

OFFSET REFERENCED TO START OF YELLOW ON LANCASTER AVE.

NOTES: – ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
– REFER TO SIGNAL PERMIT PLAN FOR MAX 1, MAX 2, CLEARANCE AND PED TIMES.

SYSTEM NOTES

1. PROGRAM TO BE SELECTED BY CLOSED LOOP SYSTEM (TIME OF DAY) OR TBC BACKUP.
2. OFFSETS ARE REFERENCED TO THE BEGINNING OF YELLOW ON LANCASTER AVENUE.
3. SYSTEM LIMITS : LANCASTER AVENUE (8 INTERSECTIONS) FROM ST. DAVID'S RD TO VILLANOVA CENTER.
   MASTER: RADNOR MAINTENANCE BUILDING
4. PRIMARY COORDINATION: FIBER OPTIC CABLE.
   SECONDARY COORDINATION: TBC (DEFAULT TO BACKUP TBC).



CYCLE/SPLIT/OFFSET

	Program 1 =			Phase								Cycle	Offset
	Intersections	File #	Master	1	2	3	4	5	6	7	8		
1	LANCASTER AVE & ST. DAVID'S/CHAMOUNIX RD	0881			36		24		36		24	60	20
2	LANCASTER AVE & ST. DAVID'S SQUARE WEST	0082			82		38		82		38	120	43
3	LANCASTER AVE & ST. DAVID'S SQUARE EAST	0062		13 (LEAD)	68		39	16 (LEAD)	65		39	120	34
4	LANCASTER AVE & RADNOR-CHESTER RD	0063		14 (LEAD)	54		52	14 (LEAD)	54	13 (LEAD)	39	120	22
5	LANCASTER AVE & I-476 SOUTHBOUND RAMPS	2532		16 (LEAD)	42				58		52	110	36
6	LANCASTER AVE & I-476/KING OF PRUSSIA RD	2530			49	48 (LEAD)	13	20 (LEAD)	29	13 (LEAD)	48	110	62
7	LANCASTER AVE & I-476 RAMP/HILLSIDE CIRCLE	2531		12 (LEAD)	86			36 (LEAD)	62		12	110	76
8	LANCASTER AVE & VILLANOVA CENTER	3416			85		25	17 (LEAD)	68			110	66

CYCLE/SPLIT/OFFSET

	Program 2 =			Phase								Cycle	Offset
	Intersections	File #	Master	1	2	3	4	5	6	7	8		
1	LANCASTER AVE & ST. DAVID'S/CHAMOUNIX RD	0881			72		38		72		38	110	15
2	LANCASTER AVE & ST. DAVID'S SQUARE WEST	0082			67		43		67		43	110	12
3	LANCASTER AVE & ST. DAVID'S SQUARE EAST	0062		25 (LEAD)	46		39	13 (LEAD)	58		39	110	5
4	LANCASTER AVE & RADNOR-CHESTER RD	0063		13 (LEAD)	45		52	23 (LEAD)	35	13 (LEAD)	39	110	0
5	LANCASTER AVE & I-476 SOUTHBOUND RAMPS	2532		28 (LEAD)	38				66		30	96	63
6	LANCASTER AVE & I-476/KING OF PRUSSIA RD	2530			50	24 (LEAD)	22	18 (LEAD)	32	24 (LEAD)	22	96	5
7	LANCASTER AVE & I-476 RAMP/HILLSIDE CIRCLE	2531		12 (LEAD)	72			28 (LEAD)	56		12	96	15
8	LANCASTER AVE & VILLANOVA CENTER	3416			71		25	13 (LEAD)	58			96	8

CYCLE/SPLIT/OFFSET

	Program 3 =			Phase								Cycle	Offset
	Intersections	File #	Master	1	2	3	4	5	6	7	8		
1	LANCASTER AVE & ST. DAVID'S/CHAMOUNIX RD	0881			71		29		71		29	100	66
2	LANCASTER AVE & ST. DAVID'S SQUARE WEST	0082			67		33		67		33	100	14
3	LANCASTER AVE & ST. DAVID'S SQUARE EAST	0062		16 (LEAD)	45		39	13 (LEAD)	48		39	100	12
4	LANCASTER AVE & RADNOR-CHESTER RD	0063		13 (LEAD)	35		52	14 (LEAD)	34	13 (LEAD)	39	100	0
5	LANCASTER AVE & I-476 SOUTHBOUND RAMPS	2532		32 (LEAD)	43				75		35	110	51
6	LANCASTER AVE & I-476/KING OF PRUSSIA RD	2530			58	29 (LEAD)	23	18 (LEAD)	40	29 (LEAD)	23	110	88
7	LANCASTER AVE & I-476 RAMP/HILLSIDE CIRCLE	2531		12 (LEAD)	86			39 (LEAD)	59		12	110	99
8	LANCASTER AVE & VILLANOVA CENTER	3416			85		25	13 (LEAD)	72			110	83

LEGEND

- (X-Y) SYSTEM DETECTOR, INTERSECTION X – LOOP NO. Y
- (X-Y) DETECTOR, INTERSECTION X – LOOP NO. Y
- ϕ PHASE

SCALE: NOT TO SCALE

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	DELAWARE	0030	CLR-T	3 OF 4

RADNOR TOWNSHIP

REVISION NUMBER	REVISIONS	DATE	BY

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

REFER TO TRAFFIC SIGNAL PERMIT DRAWING FOR INDIVIDUAL INTERSECTION OPERATION, GEOMETRY, PHASING AND CRITICAL TIMES.

FOR CONSTRUCTION AND INSPECTION THE SYSTEM PERMIT SHOULD ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.

TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL, SUBSYSTEM LEVEL MASTER CONTROLLER LEVEL AND PERSONAL COMPUTER REMOTE DIAL UP LEVEL.

GATHER THE SYSTEM FAILURE CRITICAL ALARMS REPORT AND ARCHIVE THEM WHERE APPLICABLE.

SET UP PENNDOT DISTRICT 6-0 COMPUTER WITH THE SYSTEM DATABASE AND GRAPHICS. MODIFY THE DATABASE AND GRAPHICS FOR SYSTEMS REVISIONS.

ASSIGN LOOP DETECTORS AND PROGRAM THE CONTROLLERS TO GATHER TRAFFIC VOLUMES IN 15 MINUTE INTERVAL, WHERE APPLICABLE.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

OBTAIN POLE ATTACHMENT PERMIT FOR AERIAL FIBER OPTIC INSTALLATION.

MAINTAIN MASTER CONTROLLER COMMUNICATION SUCH AS PHONE DROPS.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 181, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES EFFECTIVE DATE MARCH 29, 2007.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: TRAFFIC SIGNAL SYSTEM

REVIEWED:

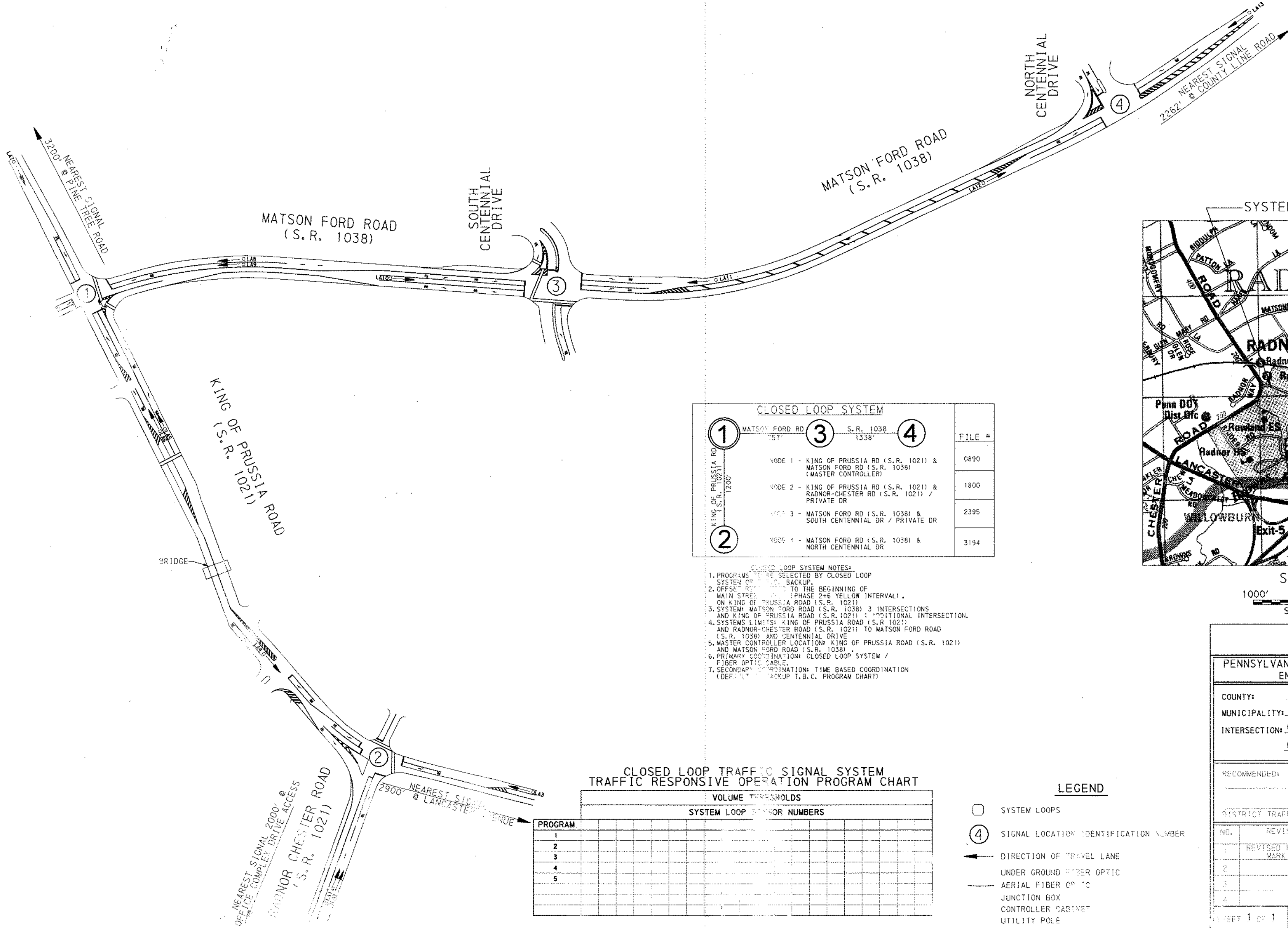
Stephen F. Norcini P.E. [signature] 2/25/15
MUNICIPAL OFFICIAL DATE

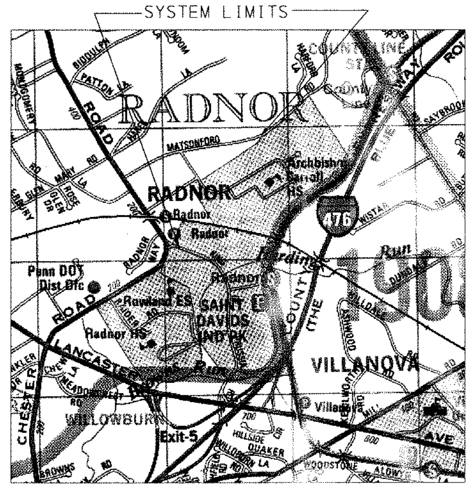
RECOMMENDED:
PAUL M. LUTZ 11/24/08

LOUIS R. BELMONTE, P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./REVW	DATE	REVW	DATE	RECOM	DATE
1	AS-BUILT DRAWING	McM	3/5/12				
2	ADJUST TIMING AND GEOMETRY FOR INTERSECTION 8	TPD	2/21/15		2/21/15		3/5/15
3							
4							
5							
6							
7							
8							

INTERCONNECT PERMIT #I-0071 SHEET 1 OF 1





SITE MAP

1000' 0' 1000' 2000'

SCALE IN FEET

CLOSED LOOP SYSTEM

1 — MATSON FORD RD 757' — 3 — S.R. 1038 1338' — 4

1 — KING OF PRUSSIA RD (S.R. 1021) 1200' — 2

	FILE #
NODE 1 - KING OF PRUSSIA RD (S.R. 1021) & MATSON FORD RD (S.R. 1038) (MASTER CONTROLLER)	0890
NODE 2 - KING OF PRUSSIA RD (S.R. 1021) & RADNOR-CHESTER RD (S.R. 1021) / PRIVATE DR	1800
NODE 3 - MATSON FORD RD (S.R. 1038) & SOUTH CENTENNIAL DR / PRIVATE DR	2395
NODE 4 - MATSON FORD RD (S.R. 1038) & NORTH CENTENNIAL DR	3194

CLOSED LOOP SYSTEM NOTES:

1. PROGRAMS TO BE SELECTED BY CLOSED LOOP SYSTEM OR T.B.C. BACKUP.
2. OFFSET REFERENCED TO THE BEGINNING OF MAIN STREET (PHASE 2+6 YELLOW INTERVAL). ON KING OF PRUSSIA ROAD (S.R. 1021)
3. SYSTEM: MATSON FORD ROAD (S.R. 1038) 3 INTERSECTIONS AND KING OF PRUSSIA ROAD (S.R. 1021) 1 ADDITIONAL INTERSECTION.
4. SYSTEMS LIMITS: KING OF PRUSSIA ROAD (S.R 1021) AND RADNOR-CHESTER ROAD (S.R. 1021) TO MATSON FORD ROAD (S.R. 1038) AND CENTENNIAL DRIVE
5. MASTER CONTROLLER LOCATION: KING OF PRUSSIA ROAD (S.R. 1021) AND MATSON FORD ROAD (S.R. 1038).
6. PRIMARY COORDINATION: CLOSED LOOP SYSTEM / FIBER OPTIC CABLE.
7. SECONDARY COORDINATION: TIME BASED COORDINATION (DEFAULT BACKUP T.B.C. PROGRAM CHART)

CLOSED LOOP TRAFFIC SIGNAL SYSTEM TRAFFIC RESPONSIVE OPERATION PROGRAM CHART

PROGRAM	VOLUME THRESHOLDS / SYSTEM LOOP SENSOR NUMBERS
1	
2	
3	
4	
5	

LEGEND

- SYSTEM LOOPS
- SIGNAL LOCATION IDENTIFICATION NUMBER
- DIRECTION OF TRAVEL LANE
- UNDER GROUND FIBER OPTIC
- AERIAL FIBER OPTIC
- JUNCTION BOX
- CONTROLLER CABINET
- UTILITY POLE

SYSTEM PERMIT # 10010

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: CLOSED LOOP SYSTEM DRAWING
MATSON FORD ROAD (S.R. 1038)

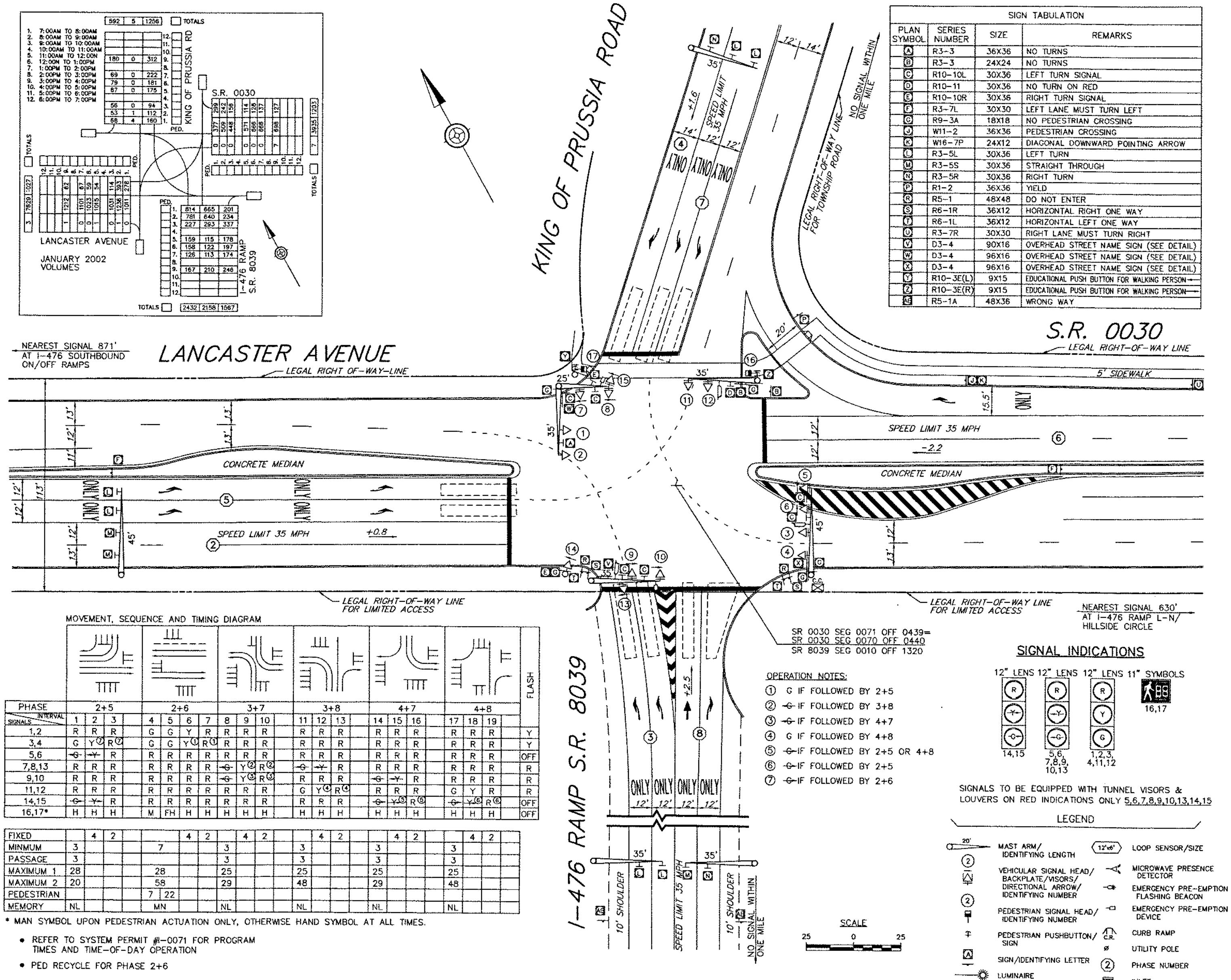
RECOMMENDED:
MARK L. KRAY 3/8/00
WERNER J. EICHORN 3/10/00
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DESN. REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	REVISED PAVEMENT MARKINGS	TPD	6/15/01	BW	6/18/01	WJE	6-19-01
2							
3							
4							

SHEET 1 OF 1

100' 0' 100' 200'
SCALE IN FEET

I-0010



SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R3-3	36X36	NO TURNS
B	R3-3	24X24	NO TURNS
C	R10-10L	30X36	LEFT TURN SIGNAL
D	R10-11	30X36	NO TURN ON RED
E	R10-10R	30X36	RIGHT TURN SIGNAL
F	R3-7L	30X30	LEFT LANE MUST TURN LEFT
G	R9-3A	18X18	NO PEDESTRIAN CROSSING
J	W11-2	36X36	PEDESTRIAN CROSSING
K	W16-7P	24X12	DIAGONAL DOWNWARD POINTING ARROW
L	R3-5L	30X36	LEFT TURN
M	R3-5S	30X36	STRAIGHT THROUGH
N	R3-5R	30X36	RIGHT TURN
P	R1-2	36X36	YIELD
R	R5-1	48X48	DO NOT ENTER
S	R6-1R	36X12	HORIZONTAL RIGHT ONE WAY
T	R6-1L	36X12	HORIZONTAL LEFT ONE WAY
U	R3-7R	30X30	RIGHT LANE MUST TURN RIGHT
V	D3-4	90X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
W	D3-4	96X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
X	D3-4	96X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
Y	R10-3E(L)	9X15	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON ←
Z	R10-3E(R)	9X15	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON →
AE	R5-1A	48X36	WRONG WAY

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2+5				2+6				3+7				3+8				4+7				4+8				FLASH
SIGNALS \ INTERVAL	1	2	3		4	5	6	7	8	9	10		11	12	13		14	15	16		17	18	19		
1,2	R	R	R		G	G	Y	R	R	R	R		R	R	R		R	R	R		R	R	R		Y
3,4	G	Y⑦	R⑦		G	G	Y①	R①	R	R	R		R	R	R		R	R	R		R	R	R		Y
5,6	-G-	-Y-	R		R	R	R	R	R	R	R		R	R	R		R	R	R		R	R	R		OFF
7,8,13	R	R	R		R	R	R	R	-G-	Y②	R②		-G-	-Y-	R		R	R	R		R	R	R		R
9,10	R	R	R		R	R	R	R	-G-	Y③	R③		R	R	R		-G-	-Y-	R		R	R	R		R
11,12	R	R	R		R	R	R	R	R	R	R		G	Y④	R④		R	R	R		G	Y	R		R
14,15	-G-	-Y-	R		R	R	R	R	R	R	R		R	R	R		-G-	-Y-⑤	R⑤		-G-	-Y-⑥	R⑥		OFF
16,17*	H	H	H		M	FH	H	H	H	H	H		H	H	H		H	H	H		H	H	H		OFF

FIXED		4	2				4	2		4	2			4	2			4	2			4	2
MINMUM	3				7				3				3				3				3		
PASSAGE	3								3				3				3				3		
MAXIMUM 1	28				28				25				25				25				25		
MAXIMUM 2	20				58				29				48				29				48		
PEDESTRIAN					7	22																	
MEMORY	NL				MN				NL				NL				NL				NL		

* MAN SYMBOL UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE HAND SYMBOL AT ALL TIMES.

- REFER TO SYSTEM PERMIT #I-0071 FOR PROGRAM TIMES AND TIME-OF-DAY OPERATION
- PED RECYCLE FOR PHASE 2+6

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT #I-0071

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING OISTRICT 6-0

COUNTY: OELAWARE
MUNICIPALITY: RAONOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) & KING OF PRUSSIA RO/I-476 RAMP (S.R. 8039)

REVIEWED:
DATE
MUNICIPAL OFFICIAL DATE

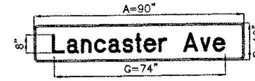
RECOMMENDED:
PAUL LUTZ 11/24/08
LOUIS R. BELMONTE P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	AS-BUILT DRAWING	McM	3/5/12	[signature]	3/14/12	[signature]	3/14/12
2							
3							
4							
5							
6							
7							
8							

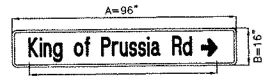
SHEET 2 OF 3 | PERMIT # 63-2530 | FILE # 2530

SIGN DETAILS

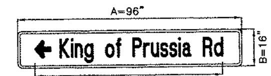
NOT TO SCALE
FONT: CLEARVIEW ONE



SIGN V
8" UPPER CASE
6" LOWER CASE



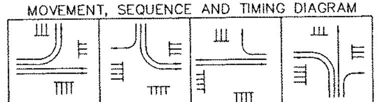
SIGN W
28% REDUCTION
8" UPPER CASE
6" LOWER CASE



SIGN X
28% REDUCTION
8" UPPER CASE
6" LOWER CASE

EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM



PHASE	2			4			6			8		
SIGNALS \ INTERVAL	20	21	22	23	24	25	26	27	28	29	30	31
1,2	R	R	R	R	R	R	G	Y(a)	R(a)	R	R	R
3,4	G	Y(a)	R(a)	R	R	R	R	R	R	R	R	R
5,6	-G	-Y	R	R	R	R	R	R	R	R	R	R
7,8,13	R	R	R	R	R	R	R	R	R	-G	-Y	R
9,10	R	R	R	G	Y	R	R	R	R	R	R	R
11,12	R	R	R	R	R	R	R	R	R	G	Y	R
14,15	R	R	R	-G	-Y	R	R	R	R	R	R	R
16,17	H	H	H	H	H	H	H	H	H	H	H	H
FIXED	**	4	2	**	4	2	**	4	2	**	4	2

** FOR DURATION OF PRE-EMPTION

NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

(a) G WHEN RETURNING TO NORMAL OPERATION

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE SOUTHBOUND APPROACH OF KING OF PRUSSIA ROAD AND THE NORTHBOUND APPROACH OF THE I-476 RAMP AND THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVE WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF SIGNAL HAS BEEN ACTUATED BY PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN "PED MAN" AND "PED HAND". THE "PED MAN" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "PED HAND" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE GOING INTO EMERGENCY PRE-EMPTION.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED. PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

GENERAL NOTES

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SYSTEM PERMIT #I-0071

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

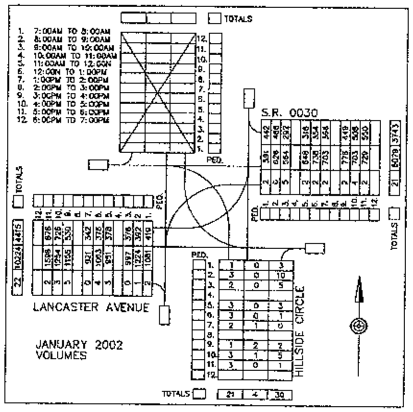
COUNTY: DELAWARE
MUNICIPALITY: RAONOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) & KING OF PRUSSIA RO/I-476 RAMP (S.R. 8039)

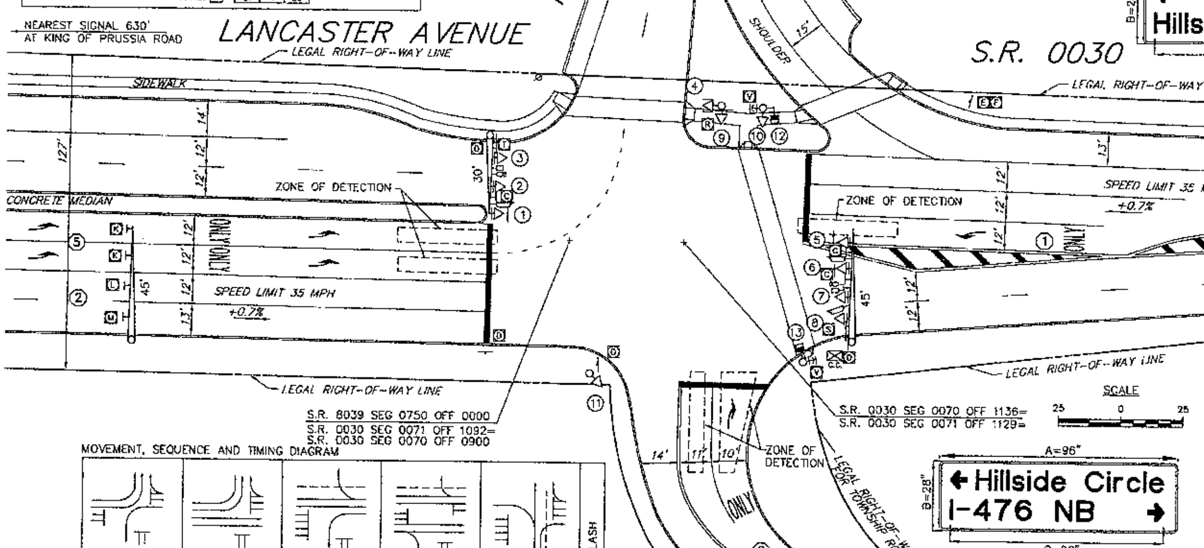
REVIEWED: ______ DATE
MUNICIPAL OFFICIAL ______ DATE

RECOMMENDED:
PAUL LUTZ 11/24/08
LOUIS R. BELMONTE P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./REVW.	DATE	REVW	DATE	RECOM.	DATE
1	AS-BUILT DRAWING	McM	3/5/12	[illegible]	3/6/12	[illegible]	[illegible]
2							
3							
4							
5							
6							
7							
8							

SHEET 3 OF 3 | PERMIT # 63-2530 | FILE # 2530





EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2				6			
SIGNALS \ INTERVAL	17	18	19		20	21	22	
1	R	R	R		←G	←Y	R	
2,3	R	R	R		G	Y⊙	R⊙	
4	R	R	R		R	R	R	
5,6	←G	←Y	R		R	R	R	
7,8	G	Y⊙	R⊙		R	R	R	
9,10,11	R	R	R		R	R	R	
12,13	H	H	H		H	H	H	
FIXED	**	4	2		**	4	2	

** FOR DURATION OF PRE-EMPTION

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⊙ G WHEN RETURNING TO NORMAL OPERATION

SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R3-7R	30X30	RIGHT LANE MUST TURN RIGHT
B	R4-7	24X30	KEEP RIGHT
C	R10-10L	30X36	LEFT TURN SIGNAL
D	R9-3A	18X18	NO PEDESTRIAN CROSSING
E	W11-2	30X30	PEDESTRIAN CROSSING
F	W16-7P	24X12	DIAGONAL DOWNWARD POINTING ARROW
O	R1-2	36X36	YIELD
K	R3-5L	30X36	LEFT TURN
L	R3-5S	30X36	STRAIGHT THROUGH
M	R3-6SR	30X36	OPTIONAL RIGHT TURN
R	D3-4	90X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
S	D3-5	96X28	OVERHEAD STREET NAME SIGN (SEE DETAIL)
T	D3-5	96X28	OVERHEAD STREET NAME SIGN (SEE DETAIL)
V	R10-3E(R)	9X15	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON

SIGN DETAILS

NOT TO SCALE
FONT: CLEARVIEW ONE

A=96"
← I-476 NB
Hillside Circle →
B=28" G=90"
SIGN S

A=72"
Lancaster Ave
6" B=12" G=64"
SIGN R
6" UPPER CASE
4.4" LOWER CASE

A=96"
← Hillside Circle
I-476 NB →
B=28" G=90"
SIGN T
8" UPPER CASE
6" LOWER CASE

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MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	1+5				2+5				1+6				2+6				8				FLASH
SIGNALS \ INTERVAL	1	2	3		4	5	6		7	8	9		10	11	12		13	14	15	16	
1	←G	←Y④	R④		R	R	R		←G	←Y	R		R	R	R		R	R	R	R	OFF
2,3	R	R	R		R	R	R		G	Y③	R③		G	Y②	R②		R	R	R	R	Y
4	R	R	R		R	R	R		G	Y	R		G	Y②	R②		R	R	R	R	OFF
5,6	←G	←Y⑤	R⑤		←G	←Y	R		R	R	R		R	R	R		R	R	R	R	OFF
7,8	R	R	R		G	Y③	R③		R	R	R		G	Y①	R①		R	R	R	R	Y
9,10,11	R	R	R		R	R	R		R	R	R		R	R	R		G	G	Y	R	R
12,13	H	H	H		H	H	H		H	H	H		H	H	H		M	FH	H	H	OFF

FIXED		4	2			4	2			4	2			4	2			4	2	
MINIMUM	3				3				3				10				3			
PASSAGE	3				3				3								3			
MAXIMUM 1	10				33				10				35				20			
MAXIMUM 2	12				33				12				62				12			
PEDESTRIAN*																	7	26		
MEMORY	NL				NL				NL				MN				NL			

*UPON PEDESTRIAN ACTUATION ONLY

- REFER TO SYSTEM PERMIT #I-0071 FOR PROGRAM TIMES AND TIME-OF-DAY OPERATION

OPERATION NOTES:
① G IF FOLLOWED BY 1+6
② G IF FOLLOWED BY 2+5
③ G IF FOLLOWED BY 2+6
④ ←G IF FOLLOWED BY 1+6
⑤ ←G IF FOLLOWED BY 2+5

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVENUE WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.

  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE COVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF SIGNAL HAS BEEN ACTUATED BY PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN "PED WALK" AND "PED CLEAR". THE "PED WALK" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "PED CLEAR" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE GOING INTO EMERGENCY PRE-EMPTION.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2, 6, OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 10 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

SIGNAL INDICATIONS

12" LENS: 1,5,6
12" LENS: 2,3,7, 9,10,12
8" LENS: 4,11
11" SYMBOLS: 12,13

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS 4
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS ON RED INDICATION 1,5,6

LEGEND

- MAST ARM/ IDENTIFYING LENGTH
- VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- SIGN/IDENTIFYING LETTER
- LUMINAIRE
- LOOP SENSOR/SIZE
- MICROWAVE PRESENCE DETECTOR
- EMERGENCY PRE-EMPTION FLASHING BEACON
- EMERGENCY PRE-EMPTION DEVICE
- CURB RAMP
- UTILITY POLE
- PHASE NUMBER
- INLET

SYSTEM PERMIT #I-0071

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

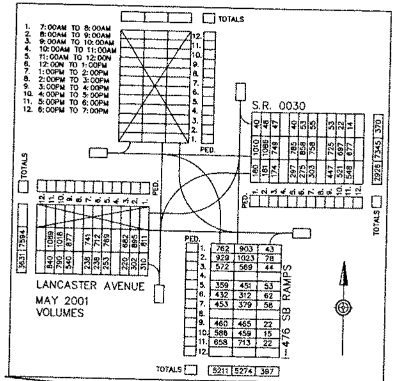
COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R 0030) & I-476 RAMP LN(S.R. 8039) & HILLSIDE CIRCLE

REVIEWED:
DATE
MUNICIPAL OFFICIAL DATE

RECOMMENDED:
PAUL LUTZ 11/24/08
LOUIS R. BELMONTE, P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	AS-BUILT DRAWING	McM	3/5/12	[illegible]	[illegible]	[illegible]	[illegible]
2							
3							
4							
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 63-2531 | FILE # 2531



EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2				6				8			
SIGNALS \ INTERVAL	10	11	12		13	14	15		16	17	18	
1,2	R	R	R		~~G~~	~~Y~~	R		R	R	R	
3,4	R	R	R		G	Y(G)	R(G)		R	R	R	
5,6	G	Y(G)	R(G)		R	R	R		R	R	R	
7,8	R	R	R		R	R	R		~~G~~	Y	R	
FIXED	**	4	2		**	4	2		**	4	2	

** FOR DURATION OF PRE-EMPTION

NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

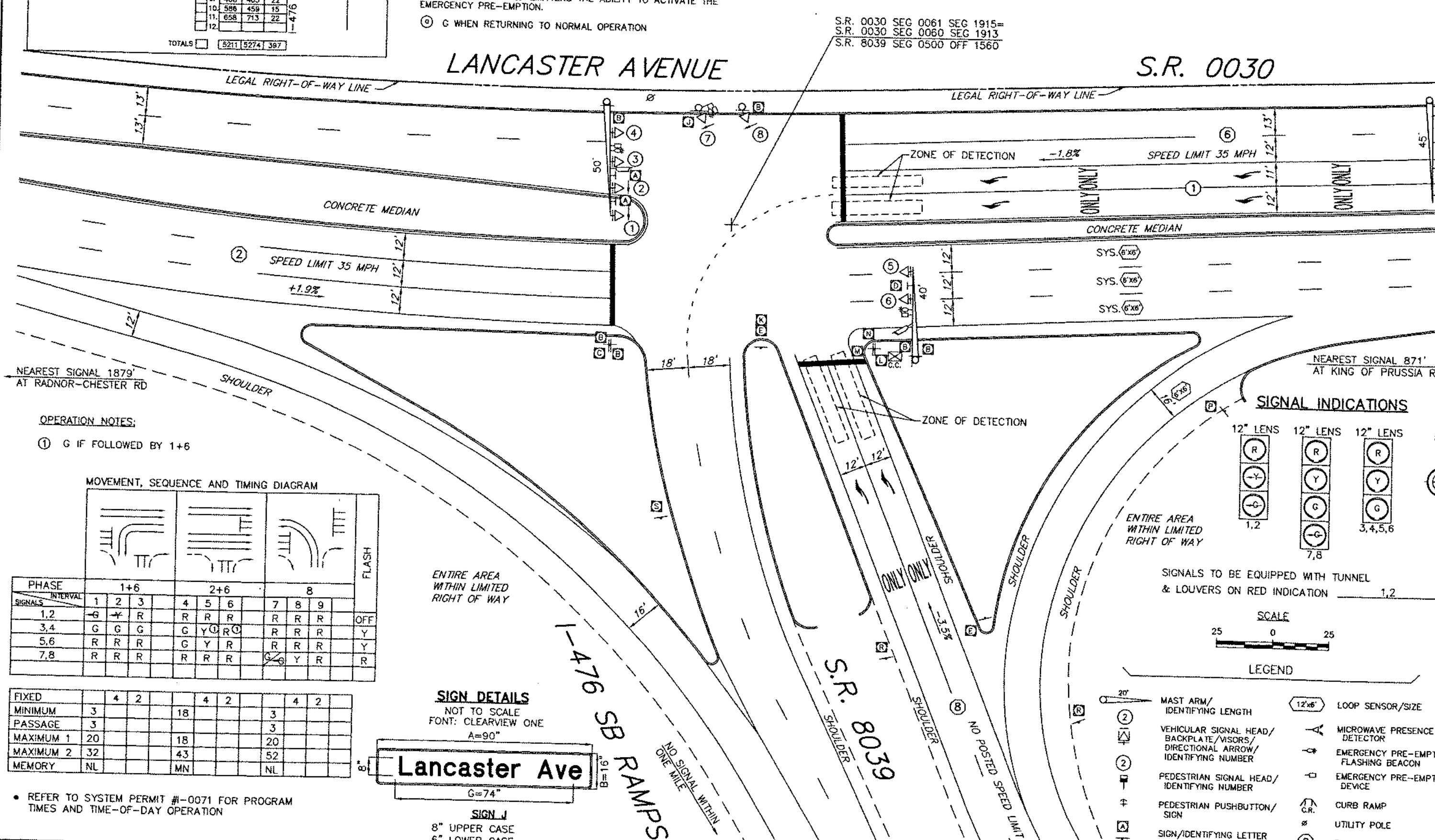
(G) G WHEN RETURNING TO NORMAL OPERATION

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE SOUTHBOUND ON AND OFF RAMPS OF I-476 AND THE EASTBOUND & WESTBOUND APPROACHES OF LANCASTER AVENUE WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY. FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R10-10L	30X30	LEFT TURN SIGNAL
B	R9-3A	18X18	NO PEDESTRIAN CROSSING
C	R3-3	24X24	NO TURNS
D	R3-3	36X36	NO TURNS
E	OM1-3	18X18	OBJECT MARKER
F	R3-5L	30X36	LEFT TURN
G	R3-5S	30X36	STRAIGHT THROUGH
J	D3-4	90X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
K	R4-7	24X30	KEEP RIGHT
L	R6-1L	36X12	HORIZONTAL LEFT ONE WAY
M	R6-1R	36X12	HORIZONTAL RIGHT ONE WAY
N	R5-1	30X30	DO NOT ENTER
P	R1-2	36X36	YIELD
R	R5-1A	48X36	WRONG WAY
S	W4-1R	36X36	MERGE RIGHT



OPERATION NOTES:

① G IF FOLLOWED BY 1+6

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	1+6				2+6				8				FLASH
SIGNALS \ INTERVAL	1	2	3		4	5	6		7	8	9		
1,2	~~G~~	~~Y~~	R		R	R	R		R	R	R		OFF
3,4	G	G	G		G	Y①	R①		R	R	R		Y
5,6	R	R	R		G	Y	R		R	R	R		Y
7,8	R	R	R		R	R	R		G/~~G~~	Y	R		R

FIXED		4	2			4	2			4	2	
MINIMUM	3				18				3			
PASSAGE	3								3			
MAXIMUM 1	20				18				20			
MAXIMUM 2	32				43				52			
MEMORY	NL				MN				NL			

- REFER TO SYSTEM PERMIT #I-0071 FOR PROGRAM TIMES AND TIME-OF-DAY OPERATION

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT #I-0071

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: LANCASTER AVENUE (S.R. 0030) AND I-476 SOUTHBOUND ON/OFF RAMPS

REVIEWED: ______ DATE
MUNICIPAL OFFICIAL ______ DATE
RECOMMENDED:
PAUL LUTZ 11/24/08
LOUIS R. BELMONTE P.E. 11/24/08
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	AS-BUILT DRAWING	MCM	3/5/12	[illegible]	3/12/12	[illegible]	3/16/12
2							
3							
4							
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 63-2532 | FILE # 2532

I:\eng\507439\Dwg\439sig11 - File 2532 - Lancaster Ave and I-476 SB Ramps.dwg, 3/5/2012 10:52:35 AM, \\extfs03\HP Designjet T1300ps HPGL2

SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R5-1	30"x30"	DO NOT ENTER
B	R9-3	18"x18"	NO PEDESTRIAN CROSSING
C	R3-7L	30"x30"	LEFT LANE MUST TURN LEFT
O	R3-7R	30"x30"	RIGHT LANE MUST TURN RIGHT
E	R10-3B	9"x12"	EDUCATIGNAL PUSH BUTTON FOR WALKING PERSON
F	R3-8LSRB	30"x30"	LANE USE CONTROL
G	R5-9	36"x24"	WRONG WAY
J	W16-1	18"x18"	HAZARD MARKER
L	D3-4	90"x16"	RADNOR-CHESTER RD
M	R1-2	36"x36"	YIELD
N	D3-4	96"x16"	KING OF PRUSSIA RD

Sign "N"

96"

King of Prussia Rd

16 | 3.5 | 6 | 8 | 4.5

HELVETICA BOLD (25% REDUCTION)
8" U.C.
6" L.C.

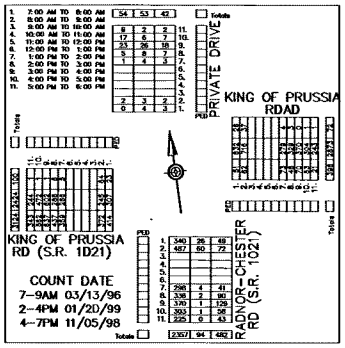
Sign "L"

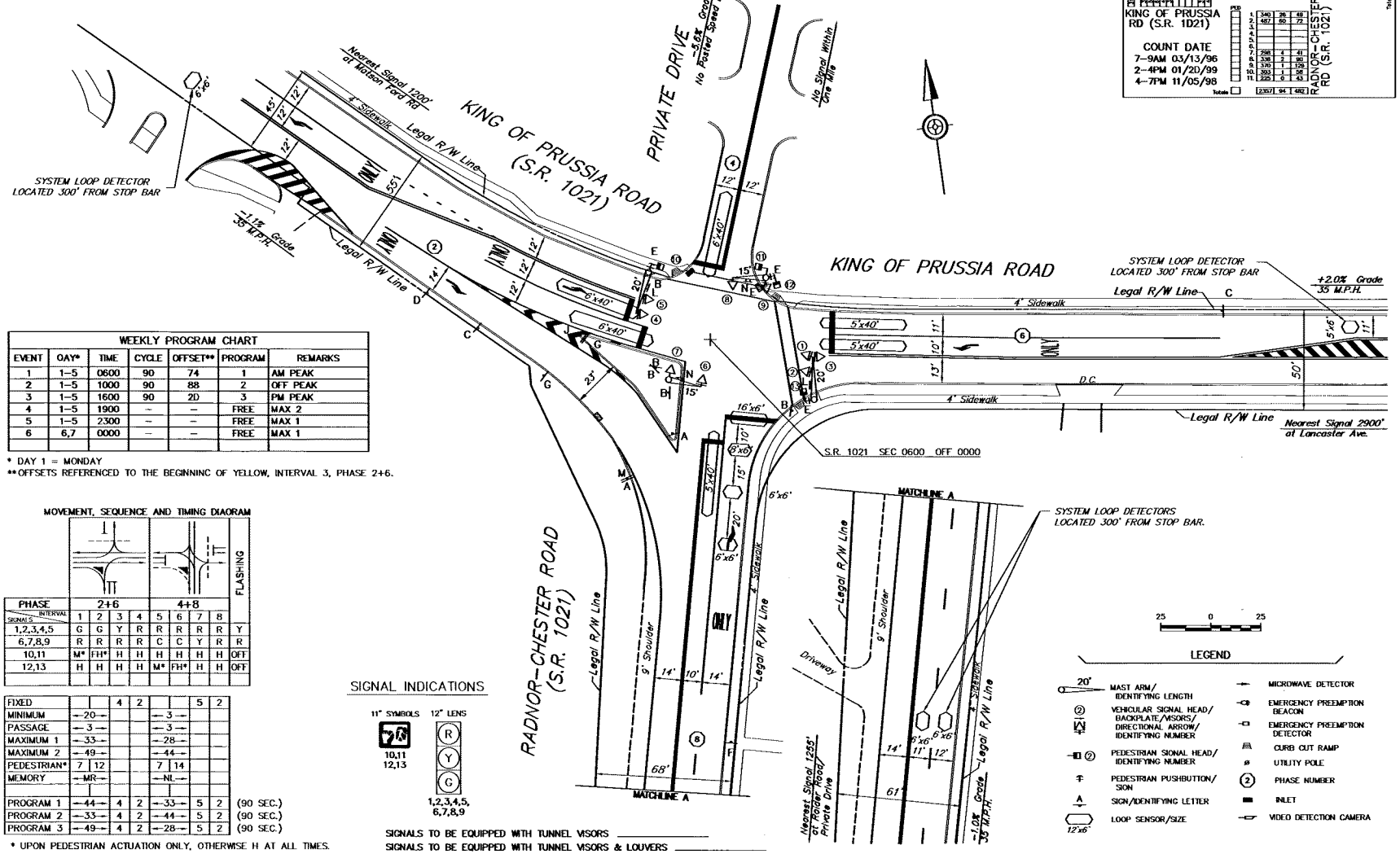
90"

Radnor-Chester Rd

3.5 | 6 | 8 | 4.5

HELVETICA BOLD (30% REDUCTION)
8" U.C.
6" L.C.





WEEKLY PROGRAM CHART						
EVENT	OAY*	TIME	CYCLE	OFFSET**	PROGRAM	REMARKS
1	1-5	0600	90	74	1	AM PEAK
2	1-5	1000	90	88	2	OFF PEAK
3	1-5	1600	90	2D	3	PM PEAK
4	1-5	1900	-	-	FREE	MAX 2
5	1-5	2300	-	-	FREE	MAX 1
6	6,7	0000	-	-	FREE	MAX 1

* DAY 1 = MONDAY
**OFFSETS REFERENCED TO THE BEGINNINC OF YELLOW, INTERVAL 3, PHASE 2+6.

MOVEMENT, SEQUENCE AND TIMING DIAORAM

PHASE	2+6				4+8				FLASHING
INTERVAL / SIGNALS	1	2	3	4	5	6	7	8	
1,2,3,4,5	G	G	Y	R	R	R	R	R	Y
6,7,8,9	R	R	R	R	C	C	Y	R	R
10,11	M*	FH*	H	H	H	H	H	H	OFF
12,13	H	H	H	H	M*	FH*	H	H	OFF

FIXED			4	2			5	2	
MINIMUM	-20-				-3-				
PASSAGE	-3-				-3-				
MAXIMUM 1	-33-				-28-				
MAXIMUM 2	-49-				-44-				
PEDESTRIAN*	7	12			7	14			
MEMORY	-MR-				-NL-				
PROGRAM 1	-44-		4	2	-33-		5	2	(90 SEC.)
PROGRAM 2	-33-		4	2	-44-		5	2	(90 SEC.)
PROGRAM 3	-49-		4	2	-28-		5	2	(90 SEC.)

* UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE H AT ALL TIMES.

SIGNAL INDICATIONS

11" SYMBOLS 12" LENS

10,11
12,13

1,2,3,4,5,
6,7,8,9

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS _____
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS _____

LEGEND

- 20' MAST ARM/ IDENTIFYING LENGTH
- ② VEHICULAR SIGNAL HEAD/ BACKPLATE/MSORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- ② PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SION
- A SIGN/IDENTIFYING LETTER
- 12'x6' LOOP SENSOR/SIZE
- MICROWAVE DETECTOR
- EMERGENCY PREEMPTION BEACON
- EMERGENCY PREEMPTION DETECTOR
- CURB CUT RAMP
- UTILITY POLE
- ② PHASE NUMBER
- INLET
- VIDEO DETECTION CAMERA

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS ORANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANOF WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIORS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANOF WITH PUBLICATION NO. 68.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDOF OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN OFMENT CONCRETE CURB OR GRANITE CURB, INSTALED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION ORAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 187, PREVENTION OF DAMAGE TO UNDERROUND UTILITIES, EFFECTIVE DATE OFCEMBER 19, 1996.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION OFOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE
MUNICIPALITY: RADNOR TOWNSHIP
INTERSECTION: KING OF PRUSSIA RD (S.R. 1021) & RADNOR-CHESTER RD (S.R. 1D21)/PRIVATE DR

REVIEWED: _____ DATE _____
MUNICIPAL OFFICIAL DATE

RECOMMENDED: _____ DATE
Werner J. Eichorn 12/19/73
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	New Desg. Added CLS, OSNL New MW MA, Island Do Not Enter/Wrong Way Signs; Replace 8" w/12" Signals, Adj Paint	NV	3/03/00	RP MK	3/06/00 3/07/00	WJE	3/18/00
2	MW MA Changed From 30' to 20', Rev Transverse Pmp	TPD RFW	8/12/01	MK	8/15/01	WJE	8/19/01
3	Added Hand/Man Pedestrian Signals	PAI	2/16/02	MLK	11/18/02	LRB	11/21/02
4	Rev ADA Ramps Rev Pedestrian Timings	HZENG	11/11/13	LUTZ	1/7/14	LRB	1/8/14
5	Rev Nearest Signal	C&A	2/9/15		2/12/15		2/13/15
6							
7							

SHEET 2 OF 2 | PERMIT # 63-1800 | FILE # 1800

PNDT 9903/30 FILE 1800 D7/16/D2

APPENDIX C

Traffic Count and Gap Data

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

Study Name King of Prussia Rd/Septa Driveway
Start Date 04/27/2016
Start Time 7:00 AM

Northbound Left from Major

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps
7:00 AM	6	2	4	4	3	3	2	3	2	0	2	2	0	11	38	285	323
7:15 AM	24	9	1	5	2	0	3	4	0	1	1	1	1	9	37	233	270
7:30 AM	19	6	3	3	2	3	4	4	0	1	0	0	1	7	34	236	270
7:45 AM	7	1	4	5	3	3	3	1	2	0	0	2	2	10	36	269	305
8:00 AM	8	3	4	4	3	2	5	2	2	2	0	2	2	8	39	264	303
8:15 AM	7	4	1	2	0	4	2	1	3	4	0	2	1	12	36	289	325
8:30 AM	10	4	2	0	2	2	2	2	0	3	2	2	0	9	30	309	339
8:45 AM	11	6	4	2	6	2	2	2	4	2	0	1	3	9	43	268	311
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	56	14	11	8	7	5	1	1	2	1	1	0	1	0	51	108	159
4:15 PM	42	15	10	5	5	3	1	2	1	2	2	1	1	2	48	133	181
4:30 PM	68	17	15	5	6	1	0	0	0	0	2	1	0	0	47	67	114
4:45 PM	73	19	14	6	6	2	3	1	1	0	0	0	1	1	51	95	146
5:00 PM	88	13	8	4	2	1	1	0	0	1	0	0	0	0	28	32	60
5:15 PM	81	17	4	2	1	4	1	2	0	0	3	0	0	0	30	63	93
5:30 PM	84	25	18	5	0	2	1	3	1	0	0	0	0	0	54	58	112
5:45 PM	50	21	17	10	2	3	1	1	3	0	0	0	0	2	53	103	156
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	58	19	12	17	10	8	15	11	4	4	1	5	6	34	146	1002	1148
PM Peak	303	76	47	21	5	10	4	6	4	1	3	0	0	2	165	256	421

Study Name King of Prussia Rd/Septa Driveway
Start Date 04/27/2016
Start Time 7:00 AM

Southbound Left from Major

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps
7:00 AM	44	9	9	2	3	2	3	2	1	2	1	3	0	5	41	166	207
7:15 AM	84	14	11	3	1	2	0	0	3	2	0	0	0	2	37	88	125
7:30 AM	95	5	8	3	0	2	1	0	0	0	0	0	0	1	19	38	57
7:45 AM	108	15	4	2	1	1	0	0	1	0	0	0	1	0	25	28	53
8:00 AM	107	16	5	3	2	0	0	2	1	0	0	0	0	1	30	41	71
8:15 AM	107	16	4	1	2	1	1	0	1	0	0	0	0	0	25	25	50
8:30 AM	90	16	5	4	3	0	2	0	2	0	0	1	0	1	34	71	105
8:45 AM	76	15	5	2	4	3	2	2	1	0	0	2	0	0	34	71	105
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	7	10	9	2	2	6	1	2	1	3	2	5	5	54	240	294
4:15 PM	14	9	5	8	3	2	5	1	1	2	4	1	1	7	49	239	288
4:30 PM	26	5	4	5	5	3	1	2	0	2	0	0	0	12	39	261	300
4:45 PM	18	11	8	4	4	0	0	2	2	2	2	1	1	10	46	237	283
5:00 PM	12	3	5	1	2	3	5	4	3	3	1	0	1	7	38	285	323
5:15 PM	17	5	4	1	3	5	2	2	1	2	5	1	1	7	38	260	298
5:30 PM	9	5	7	6	2	3	3	3	3	3	3	1	3	7	48	262	310
5:45 PM	12	8	5	7	5	2	4	2	0	1	2	1	3	7	47	249	296
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	394	50	28	11	4	5	1	2	5	2	0	0	1	4	111	195	306
PM Peak	50	21	21	15	12	13	14	11	7	9	11	3	8	28	171	1056	1227

Study Name King of Prussia Rd/Septa Driveway
Start Date 04/27/2016
Start Time 7:00 AM

Eastbound Right from Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps
7:00 AM	6	2	4	4	3	3	2	3	2	0	2	2	0	11	36	162	198
7:15 AM	24	9	1	5	2	0	3	4	0	1	1	1	1	9	28	132	160
7:30 AM	19	6	3	3	2	3	4	4	0	1	0	0	1	7	28	134	162
7:45 AM	7	1	4	5	3	3	3	1	2	0	0	2	2	10	35	151	186
8:00 AM	8	3	4	4	3	2	5	2	2	2	0	2	2	8	36	146	182
8:15 AM	7	4	1	2	0	4	2	1	3	4	0	2	1	12	32	166	198
8:30 AM	10	4	2	0	2	2	2	2	0	3	2	2	0	9	26	183	209
8:45 AM	11	6	4	2	6	2	2	2	4	2	0	1	3	9	37	150	187
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	56	14	11	8	7	5	1	1	2	1	1	0	1	0	38	44	82
4:15 PM	42	15	10	5	5	3	1	2	1	2	2	1	1	2	34	64	98
4:30 PM	68	17	15	5	6	1	0	0	0	0	2	1	0	0	28	25	53
4:45 PM	73	19	14	6	6	2	3	1	1	0	0	0	1	1	34	37	71
5:00 PM	88	13	8	4	2	1	1	0	0	1	0	0	0	0	17	9	26
5:15 PM	81	17	4	2	1	4	1	2	0	0	3	0	0	0	16	29	45
5:30 PM	84	25	18	5	0	2	1	3	1	0	0	0	0	0	29	18	47
5:45 PM	50	21	17	10	2	3	1	1	3	0	0	0	0	2	37	42	79
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	58	19	12	17	10	8	15	11	4	4	1	5	6	34	127	563	690
PM Peak	303	76	47	21	5	10	4	6	4	1	3	0	0	2	99	98	197

Study Name King of Prussia Rd/Septa Driveway
Start Date 04/27/2016
Start Time 7:00 AM

Westbound Right from Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps
7:00 AM	44	9	9	2	3	2	3	2	1	2	1	3	0	5	33	86	119
7:15 AM	84	14	11	3	1	2	0	0	3	2	0	0	0	2	24	41	65
7:30 AM	95	5	8	3	0	2	1	0	0	0	0	0	0	1	15	15	30
7:45 AM	108	15	4	2	1	1	0	0	1	0	0	0	1	0	10	12	22
8:00 AM	107	16	5	3	2	0	0	2	1	0	0	0	0	1	13	19	32
8:15 AM	107	16	4	1	2	1	1	0	1	0	0	0	0	0	9	9	18
8:30 AM	90	16	5	4	3	0	2	0	2	0	0	1	0	1	17	32	49
8:45 AM	76	15	5	2	4	3	2	2	1	0	0	2	0	0	19	31	50
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	7	10	9	2	2	6	1	2	1	3	2	5	5	46	125	171
4:15 PM	14	9	5	8	3	2	5	1	1	2	4	1	1	7	39	130	169
4:30 PM	26	5	4	5	5	3	1	2	0	2	0	0	0	12	34	148	182
4:45 PM	18	11	8	4	4	0	0	2	2	2	2	1	1	10	36	130	166
5:00 PM	12	3	5	1	2	3	5	4	3	3	1	0	1	7	34	164	198
5:15 PM	17	5	4	1	3	5	2	2	1	2	5	1	1	7	34	146	180
5:30 PM	9	5	7	6	2	3	3	3	3	3	3	1	3	7	42	139	181
5:45 PM	12	8	5	7	5	2	4	2	0	1	2	1	3	7	37	137	174
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	394	50	28	11	4	5	1	2	5	2	0	0	1	4	62	87	149
PM Peak	50	21	21	15	12	13	14	11	7	9	11	3	8	28	147	586	733

Study Name King of Prussia Rd/Septa Driveway
Start Date 04/27/2016
Start Time 7:00 AM

Through Traffic on Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Critical Gaps (6.5 sec)	Follow-up Gaps (4.0 sec)	Total Gaps
7:00 AM	41	13	11	7	7	6	1	1	3	1	0	0	0	2	35	35	70
7:15 AM	88	13	4	1	2	1	2	0	0	1	0	0	0	1	12	12	24
7:30 AM	92	7	6	1	1	1	0	0	0	0	0	0	0	0	8	2	10
7:45 AM	102	9	3	3	0	0	0	0	0	0	0	0	1	0	5	4	9
8:00 AM	97	10	4	2	1	1	0	1	1	0	0	0	0	0	8	6	14
8:15 AM	100	14	2	1	0	1	1	1	0	0	0	0	0	0	6	5	11
8:30 AM	100	19	5	3	0	0	2	0	2	1	0	0	0	0	10	13	23
8:45 AM	82	17	5	3	4	3	0	0	1	1	1	0	0	0	15	16	31
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	70	16	13	9	5	2	0	2	0	0	0	0	0	0	30	10	40
4:15 PM	56	21	12	6	3	3	4	1	2	0	0	0	0	0	26	18	44
4:30 PM	79	13	13	2	3	1	0	0	0	1	1	0	0	0	20	10	30
4:45 PM	92	21	14	5	2	0	1	1	0	0	0	0	1	1	22	15	37
5:00 PM	69	14	6	3	2	1	2	0	0	0	0	0	0	0	13	6	19
5:15 PM	87	14	5	3	1	4	2	1	0	0	0	0	0	0	13	11	24
5:30 PM	95	20	14	4	3	1	0	2	0	0	0	0	0	0	20	8	28
5:45 PM	60	18	17	7	3	2	2	0	2	1	0	0	0	0	29	17	46
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	379	39	17	7	4	3	2	1	1	1	0	0	1	1	33	24	57
PM Peak	311	66	42	17	9	8	6	3	2	1	0	0	0	0	75	42	117

Study Name King of Prussia Rd/Septa Driveway
Start Date 04/27/2016
Start Time 7:00 AM

Left from Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Critical Gaps (7.1 sec)	Follow-up Gaps (3.5 sec)	Total Gaps
7:00 AM	41	13	11	7	7	6	1	1	3	1	0	0	0	2	31	40	71
7:15 AM	88	13	4	1	2	1	2	0	0	1	0	0	0	1	10	15	25
7:30 AM	92	7	6	1	1	1	0	0	0	0	0	0	0	0	7	2	9
7:45 AM	102	9	3	3	0	0	0	0	0	0	0	0	1	0	5	5	10
8:00 AM	97	10	4	2	1	1	0	1	1	0	0	0	0	0	8	7	15
8:15 AM	100	14	2	1	0	1	1	1	0	0	0	0	0	0	4	5	9
8:30 AM	100	19	5	3	0	0	2	0	2	1	0	0	0	0	9	14	23
8:45 AM	82	17	5	3	4	3	0	0	1	1	1	0	0	0	13	17	30
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	70	16	13	9	5	2	0	2	0	0	0	0	0	0	24	10	34
4:15 PM	56	21	12	6	3	3	4	1	2	0	0	0	0	0	21	20	41
4:30 PM	79	13	13	2	3	1	0	0	0	1	1	0	0	0	16	12	28
4:45 PM	92	21	14	5	2	0	1	1	0	0	0	0	1	1	15	16	31
5:00 PM	69	14	6	3	2	1	2	0	0	0	0	0	0	0	11	7	18
5:15 PM	87	14	5	3	1	4	2	1	0	0	0	0	0	0	12	12	24
5:30 PM	95	20	14	4	3	1	0	2	0	0	0	0	0	0	15	8	23
5:45 PM	60	18	17	7	3	2	2	0	2	1	0	0	0	0	23	16	39
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	379	39	17	7	4	3	2	1	1	1	0	0	1	1	30	29	59
PM Peak	311	66	42	17	9	8	6	3	2	1	0	0	0	0	61	43	104

Study Name King of Prussia Rd South Driveway Gap
Start Date 04/27/2016
Start Time 7:00 AM

Northbound Left from Major

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps
7:00 AM	4	3	2	6	4	1	1	2	1	2	0	0	1	11	34	308	342
7:15 AM	17	10	9	5	6	3	1	0	3	1	0	0	1	9	47	237	284
7:30 AM	10	8	3	0	3	2	2	0	2	1	0	0	1	12	34	279	313
7:45 AM	9	0	3	5	2	2	4	0	3	1	2	0	0	9	31	282	313
8:00 AM	10	2	2	5	3	4	3	4	2	0	0	0	3	11	39	289	328
8:15 AM	4	3	4	2	1	3	0	3	1	2	3	0	4	10	34	283	317
8:30 AM	6	3	3	1	3	0	3	2	2	2	2	0	1	10	31	310	341
8:45 AM	12	6	1	4	2	5	1	4	5	0	1	1	1	9	40	276	316
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	55	16	10	12	4	5	3	1	1	0	2	1	0	0	53	103	156
4:15 PM	30	19	10	5	5	2	1	2	1	1	2	2	1	2	52	135	187
4:30 PM	56	12	13	4	2	1	3	0	0	1	0	2	0	2	39	102	141
4:45 PM	35	10	13	8	6	4	1	3	0	0	0	1	0	2	48	117	165
5:00 PM	73	16	4	3	2	1	0	0	0	0	0	1	0	0	27	26	53
5:15 PM	65	14	5	1	1	3	2	1	1	2	1	0	0	1	30	70	100
5:30 PM	69	24	13	9	1	3	0	3	0	0	0	0	0	0	52	53	105
5:45 PM	57	23	13	6	5	1	1	3	2	0	0	0	0	2	54	92	146
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	46	20	17	15	14	11	10	4	10	3	2	0	5	41	151	1087	1238
PM Peak	264	77	35	19	9	8	3	7	3	2	1	1	0	3	163	241	404

Study Name King of Prussia Rd South Driveway Gap
Start Date 04/27/2016
Start Time 7:00 AM

Southbound Left from Major

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (4.1 sec)	Follow-up Gaps (2.2 sec)	Total Gaps
7:00 AM	50	11	5	2	6	1	2	0	2	4	0	0	1	3	37	117	154
7:15 AM	86	8	9	3	0	1	0	0	0	0	0	0	0	0	21	19	40
7:30 AM	114	4	1	1	0	2	0	0	0	0	0	0	0	0	8	11	19
7:45 AM	127	13	2	0	1	0	0	0	0	1	0	0	0	0	16	10	26
8:00 AM	102	10	5	6	3	1	1	1	0	1	0	0	0	1	27	54	81
8:15 AM	96	12	5	2	3	1	2	0	1	0	0	1	1	0	26	55	81
8:30 AM	85	12	7	5	4	2	1	1	3	0	0	1	1	1	36	95	131
8:45 AM	72	10	8	5	2	2	2	1	3	1	1	0	1	1	36	94	130
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	14	7	4	2	3	4	2	1	3	3	1	4	5	52	219	271
4:15 PM	19	1	6	2	1	4	4	9	3	0	0	1	1	7	39	259	298
4:30 PM	30	9	6	5	2	2	2	2	1	1	1	3	0	8	41	221	262
4:45 PM	20	6	6	3	1	3	4	1	3	3	1	0	0	9	40	230	270
5:00 PM	14	5	5	1	8	1	3	5	3	5	1	0	1	6	43	245	288
5:15 PM	22	5	4	3	6	3	4	2	0	3	3	2	1	6	42	246	288
5:30 PM	16	8	5	1	3	2	5	2	3	2	2	3	1	5	42	219	261
5:45 PM	17	9	8	2	5	2	3	3	1	2	4	1	0	6	46	223	269
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	429	35	17	10	4	4	1	1	0	2	0	0	0	1	72	94	166
PM Peak	69	27	22	7	22	8	15	12	7	12	10	6	3	23	173	933	1106

Study Name King of Prussia Rd South Driveway Gap
Start Date 04/27/2016
Start Time 7:00 AM

Eastbound Right from Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps
7:00 AM	4	3	2	6	4	1	1	2	1	2	0	0	1	11	30	182	212
7:15 AM	17	10	9	5	6	3	1	0	3	1	0	0	1	9	37	131	168
7:30 AM	10	8	3	0	3	2	2	0	2	1	0	0	1	12	26	166	192
7:45 AM	9	0	3	5	2	2	4	0	3	1	2	0	0	9	30	165	195
8:00 AM	10	2	2	5	3	4	3	4	2	0	0	0	3	11	37	162	199
8:15 AM	4	3	4	2	1	3	0	3	1	2	3	0	4	10	32	165	197
8:30 AM	6	3	3	1	3	0	3	2	2	2	2	0	1	10	29	185	214
8:45 AM	12	6	1	4	2	5	1	4	5	0	1	1	1	9	33	160	193
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	55	16	10	12	4	5	3	1	1	0	2	1	0	0	36	39	75
4:15 PM	30	19	10	5	5	2	1	2	1	1	2	2	1	2	33	63	96
4:30 PM	56	12	13	4	2	1	3	0	0	1	0	2	0	2	28	47	75
4:45 PM	35	10	13	8	6	4	1	3	0	0	0	1	0	2	36	50	86
5:00 PM	73	16	4	3	2	1	0	0	0	0	0	1	0	0	10	9	19
5:15 PM	65	14	5	1	1	3	2	1	1	2	1	0	0	1	17	33	50
5:30 PM	69	24	13	9	1	3	0	3	0	0	0	0	0	0	27	17	44
5:45 PM	57	23	13	6	5	1	1	3	2	0	0	0	0	2	31	38	69
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	46	20	17	15	14	11	10	4	10	3	2	0	5	41	130	624	754
PM Peak	264	77	35	19	9	8	3	7	3	2	1	1	0	3	85	97	182

Study Name King of Prussia Rd South Driveway Gap
Start Date 04/27/2016
Start Time 7:00 AM

Westbound Right from Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (6.2 sec)	Follow-up Gaps (3.3 sec)	Total Gaps
7:00 AM	50	11	5	2	6	1	2	0	2	4	0	0	1	3	24	61	85
7:15 AM	86	8	9	3	0	1	0	0	0	0	0	0	0	0	13	3	16
7:30 AM	114	4	1	1	0	2	0	0	0	0	0	0	0	0	4	4	8
7:45 AM	127	13	2	0	1	0	0	0	0	1	0	0	0	0	4	5	9
8:00 AM	102	10	5	6	3	1	1	1	0	1	0	0	0	1	18	24	42
8:15 AM	96	12	5	2	3	1	2	0	1	0	0	1	1	0	16	24	40
8:30 AM	85	12	7	5	4	2	1	1	3	0	0	1	1	1	26	44	70
8:45 AM	72	10	8	5	2	2	2	1	3	1	1	0	1	1	26	44	70
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	14	7	4	2	3	4	2	1	3	3	1	4	5	38	118	156
4:15 PM	19	1	6	2	1	4	4	9	3	0	0	1	1	7	38	142	180
4:30 PM	30	9	6	5	2	2	2	2	1	1	1	3	0	8	33	123	156
4:45 PM	20	6	6	3	1	3	4	1	3	3	1	0	0	9	33	126	159
5:00 PM	14	5	5	1	8	1	3	5	3	5	1	0	1	6	38	136	174
5:15 PM	22	5	4	3	6	3	4	2	0	3	3	2	1	6	36	135	171
5:30 PM	16	8	5	1	3	2	5	2	3	2	2	3	1	5	34	118	152
5:45 PM	17	9	8	2	5	2	3	3	1	2	4	1	0	6	36	121	157
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	429	35	17	10	4	4	1	1	0	2	0	0	0	1	39	36	75
PM Peak	69	27	22	7	22	8	15	12	7	12	10	6	3	23	144	510	654

Study Name King of Prussia Rd South Driveway Gap
Start Date 04/27/2016
Start Time 7:00 AM

Through Traffic on Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (6.5 sec)	Follow-up Gaps (4.0 sec)	Total Gaps
7:00 AM	48	17	6	2	6	0	4	2	1	2	0	0	1	1	24	34	58
7:15 AM	77	7	6	2	0	0	0	0	0	0	0	0	0	0	7	0	7
7:30 AM	102	3	3	1	0	1	0	0	0	0	0	0	0	0	3	1	4
7:45 AM	108	12	1	1	0	0	0	0	1	0	0	0	0	0	2	3	5
8:00 AM	94	11	6	7	1	1	0	0	1	1	0	0	0	0	15	8	23
8:15 AM	90	13	6	2	2	2	1	0	0	0	1	0	1	0	14	13	27
8:30 AM	93	13	6	6	7	2	2	0	0	0	0	0	0	1	21	15	36
8:45 AM	79	15	7	9	3	0	1	3	0	0	2	0	0	0	25	17	42
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	62	23	9	9	1	2	3	0	0	1	1	0	0	0	19	15	34
4:15 PM	43	18	10	5	7	7	2	2	0	1	0	0	0	0	30	21	51
4:30 PM	66	16	12	4	3	0	1	0	0	0	1	0	0	1	18	10	28
4:45 PM	47	16	12	3	4	2	2	0	1	0	1	0	0	1	21	22	43
5:00 PM	63	11	3	3	0	1	0	0	0	0	0	1	0	0	5	5	10
5:15 PM	68	12	3	4	0	2	2	1	0	1	0	0	1	0	13	13	26
5:30 PM	81	22	9	5	2	0	1	0	0	0	0	0	0	0	13	4	17
5:45 PM	78	23	11	3	2	2	1	0	1	1	0	0	0	0	18	12	30
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	381	33	16	11	1	2	0	0	2	1	0	0	0	0	27	12	39
PM Peak	290	68	26	15	4	5	4	1	1	2	0	1	1	0	49	34	83

Study Name King of Prussia Rd South Driveway Gap
Start Date 04/27/2016
Start Time 7:00 AM

Left from Minor

	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Critical Gaps (7.1 sec)	Follow-up Gaps (3.5 sec)	Total Gaps
7:00 AM	48	17	6	2	6	0	4	2	1	2	0	0	1	1	23	39	62
7:15 AM	77	7	6	2	0	0	0	0	0	0	0	0	0	0	4	0	4
7:30 AM	102	3	3	1	0	1	0	0	0	0	0	0	0	0	2	1	3
7:45 AM	108	12	1	1	0	0	0	0	1	0	0	0	0	0	2	3	5
8:00 AM	94	11	6	7	1	1	0	0	1	1	0	0	0	0	13	8	21
8:15 AM	90	13	6	2	2	2	1	0	0	0	1	0	1	0	11	14	25
8:30 AM	93	13	6	6	7	2	2	0	0	0	0	0	0	1	20	15	35
8:45 AM	79	15	7	9	3	0	1	3	0	0	2	0	0	0	19	19	38
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	62	23	9	9	1	2	3	0	0	1	1	0	0	0	18	17	35
4:15 PM	43	18	10	5	7	7	2	2	0	1	0	0	0	0	29	22	51
4:30 PM	66	16	12	4	3	0	1	0	0	0	1	0	0	1	14	12	26
4:45 PM	47	16	12	3	4	2	2	0	1	0	1	0	0	1	15	24	39
5:00 PM	63	11	3	3	0	1	0	0	0	0	0	1	0	0	5	5	10
5:15 PM	68	12	3	4	0	2	2	1	0	1	0	0	1	0	13	16	29
5:30 PM	81	22	9	5	2	0	1	0	0	0	0	0	0	0	9	4	13
5:45 PM	78	23	11	3	2	2	1	0	1	1	0	0	0	0	15	13	28
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak	381	33	16	11	1	2	0	0	2	1	0	0	0	0	21	12	33
PM Peak	290	68	26	15	4	5	4	1	1	2	0	1	1	0	42	38	80

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Montgomery County, PA
King of Prussia Rd/Driveway (Septa)
Thursday, September 8, 2016
Location: 40.041752, -75.355913

Count Name: King of Prussia Rd / Driveway
Site Code:
Start Date: 09/08/2016

Turning Movement Data

Start Time	King of Prussia Rd Southbound					Driveway Westbound					King of Prussia Rd Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:00 AM	49	13	0	3	62	2	1	0	5	3	5	204	0	2	209	274
7:15 AM	97	13	0	5	110	5	1	0	3	6	12	245	0	0	257	373
7:30 AM	51	14	0	5	65	8	2	0	2	10	11	210	0	0	221	296
7:45 AM	52	14	0	1	66	4	0	0	3	4	13	236	0	2	249	319
Hourly Total	249	54	0	14	303	19	4	0	13	23	41	895	0	4	936	1262
8:00 AM	42	19	0	6	61	9	2	0	2	11	20	242	0	0	262	334
8:15 AM	44	9	0	3	53	5	1	0	1	6	10	246	0	0	256	315
8:30 AM	49	9	0	5	58	5	0	0	2	5	4	224	0	0	228	291
8:45 AM	54	5	0	3	59	3	0	0	1	3	3	263	0	0	266	328
Hourly Total	189	42	0	17	231	22	3	0	6	25	37	975	0	0	1012	1268
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	194	7	0	2	201	11	6	0	1	17	0	94	0	2	94	312
4:15 PM	164	5	0	1	169	9	4	0	0	13	0	89	0	0	89	271
4:30 PM	201	6	0	0	207	16	14	0	17	30	0	98	0	18	98	335
4:45 PM	191	5	0	1	196	5	8	0	3	13	0	77	0	0	77	286
Hourly Total	750	23	0	4	773	41	32	0	21	73	0	358	0	20	358	1204
5:00 PM	285	11	0	5	296	14	21	0	2	35	1	73	0	0	74	405
5:15 PM	221	6	1	0	228	8	5	0	4	13	0	90	0	7	90	331
5:30 PM	227	8	0	1	235	12	7	0	1	19	0	85	0	0	85	339
5:45 PM	207	4	0	0	211	7	0	0	1	7	0	86	0	0	86	304
Hourly Total	940	29	1	6	970	41	33	0	8	74	1	334	0	7	335	1379
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	2128	148	1	41	2277	123	72	0	48	195	79	2562	0	31	2641	5113
Approach %	93.5	6.5	0.0	-	-	63.1	36.9	0.0	-	-	3.0	97.0	0.0	-	-	-
Total %	41.6	2.9	0.0	-	44.5	2.4	1.4	0.0	-	3.8	1.5	50.1	0.0	-	51.7	-
Lights	2094	117	1	-	2212	90	70	0	-	160	77	2496	0	-	2573	4945
% Lights	98.4	79.1	100.0	-	97.1	73.2	97.2	-	-	82.1	97.5	97.4	-	-	97.4	96.7
Buses	30	30	0	-	60	33	0	0	-	33	0	55	0	-	55	148
% Buses	1.4	20.3	0.0	-	2.6	26.8	0.0	-	-	16.9	0.0	2.1	-	-	2.1	2.9
Trucks	4	1	0	-	5	0	2	0	-	2	2	11	0	-	13	20
% Trucks	0.2	0.7	0.0	-	0.2	0.0	2.8	-	-	1.0	2.5	0.4	-	-	0.5	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	41	-	-	-	-	48	-	-	-	-	31	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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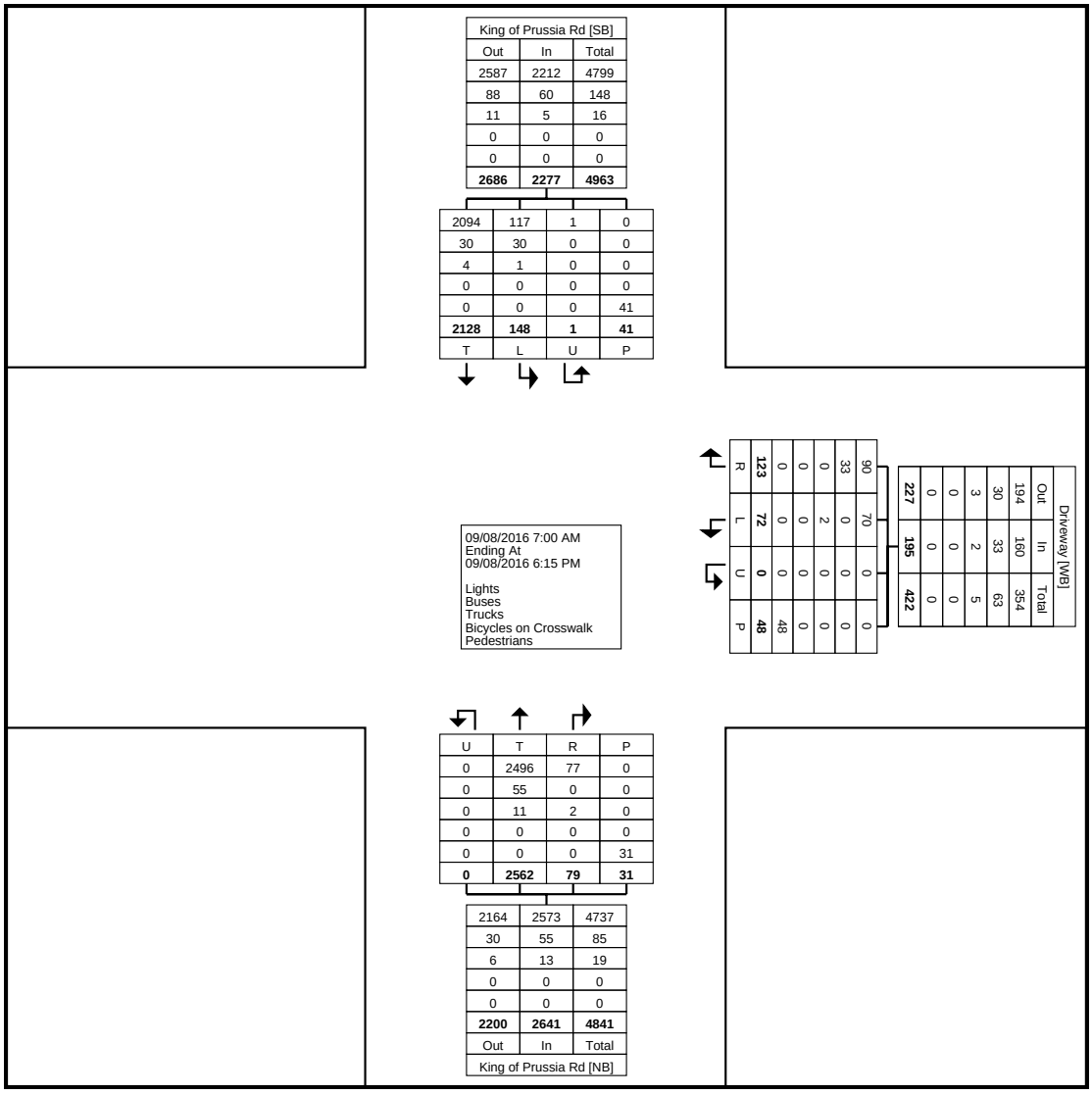
Montgomery County, PA
King of Prussia Rd/Driveway (Septa)
Thursday, September 8, 2016
Location: 40.041752, -75.355913

Count Name: King of Prussia Rd / Driveway
Site Code:
Start Date: 09/08/2016



Turning Movement Data Plot

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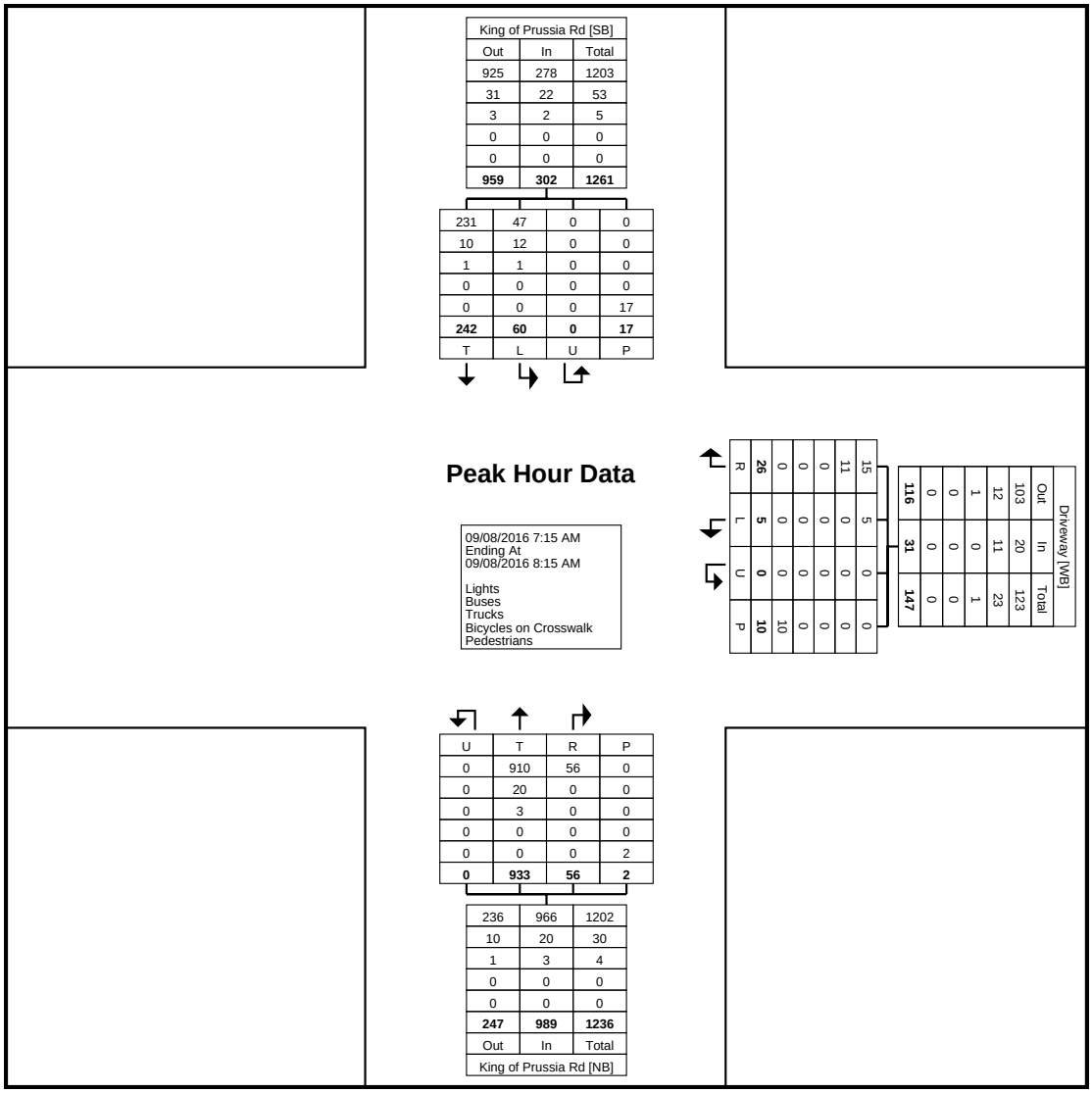
Montgomery County, PA
King of Prussia Rd/Driveway (Septa)
Thursday, September 8, 2016
Location: 40.041752, -75.355913

Count Name: King of Prussia Rd / Driveway
Site Code:
Start Date: 09/08/2016

Turning Movement Peak Hour Data (7:15 AM)

Start Time	King of Prussia Rd Southbound					Driveway Westbound					King of Prussia Rd Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:15 AM	97	13	0	5	110	5	1	0	3	6	12	245	0	0	257	373
7:30 AM	51	14	0	5	65	8	2	0	2	10	11	210	0	0	221	296
7:45 AM	52	14	0	1	66	4	0	0	3	4	13	236	0	2	249	319
8:00 AM	42	19	0	6	61	9	2	0	2	11	20	242	0	0	262	334
Total	242	60	0	17	302	26	5	0	10	31	56	933	0	2	989	1322
Approach %	80.1	19.9	0.0	-	-	83.9	16.1	0.0	-	-	5.7	94.3	0.0	-	-	-
Total %	18.3	4.5	0.0	-	22.8	2.0	0.4	0.0	-	2.3	4.2	70.6	0.0	-	74.8	-
PHF	0.624	0.789	0.000	-	0.686	0.722	0.625	0.000	-	0.705	0.700	0.952	0.000	-	0.944	0.886
Lights	231	47	0	-	278	15	5	0	-	20	56	910	0	-	966	1264
% Lights	95.5	78.3	-	-	92.1	57.7	100.0	-	-	64.5	100.0	97.5	-	-	97.7	95.6
Buses	10	12	0	-	22	11	0	0	-	11	0	20	0	-	20	53
% Buses	4.1	20.0	-	-	7.3	42.3	0.0	-	-	35.5	0.0	2.1	-	-	2.0	4.0
Trucks	1	1	0	-	2	0	0	0	-	0	0	3	0	-	3	5
% Trucks	0.4	1.7	-	-	0.7	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	17	-	-	-	-	10	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (7:15 AM)

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Montgomery County, PA
King of Prussia Rd/Driveway (Septa)
Thursday, September 8, 2016
Location: 40.041752, -75.355913

Count Name: King of Prussia Rd / Driveway
Site Code:
Start Date: 09/08/2016

Turning Movement Peak Hour Data (5:00 PM)

Start Time	King of Prussia Rd Southbound					Driveway Westbound					King of Prussia Rd Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
5:00 PM	285	11	0	5	296	14	21	0	2	35	1	73	0	0	74	405
5:15 PM	221	6	1	0	228	8	5	0	4	13	0	90	0	7	90	331
5:30 PM	227	8	0	1	235	12	7	0	1	19	0	85	0	0	85	339
5:45 PM	207	4	0	0	211	7	0	0	1	7	0	86	0	0	86	304
Total	940	29	1	6	970	41	33	0	8	74	1	334	0	7	335	1379
Approach %	96.9	3.0	0.1	-	-	55.4	44.6	0.0	-	-	0.3	99.7	0.0	-	-	-
Total %	68.2	2.1	0.1	-	70.3	3.0	2.4	0.0	-	5.4	0.1	24.2	0.0	-	24.3	-
PHF	0.825	0.659	0.250	-	0.819	0.732	0.393	0.000	-	0.529	0.250	0.928	0.000	-	0.931	0.851
Lights	935	24	1	-	960	34	33	0	-	67	1	331	0	-	332	1359
% Lights	99.5	82.8	100.0	-	99.0	82.9	100.0	-	-	90.5	100.0	99.1	-	-	99.1	98.5
Buses	4	5	0	-	9	7	0	0	-	7	0	3	0	-	3	19
% Buses	0.4	17.2	0.0	-	0.9	17.1	0.0	-	-	9.5	0.0	0.9	-	-	0.9	1.4
Trucks	1	0	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Trucks	0.1	0.0	0.0	-	0.1	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	6	-	-	-	-	8	-	-	-	-	7	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

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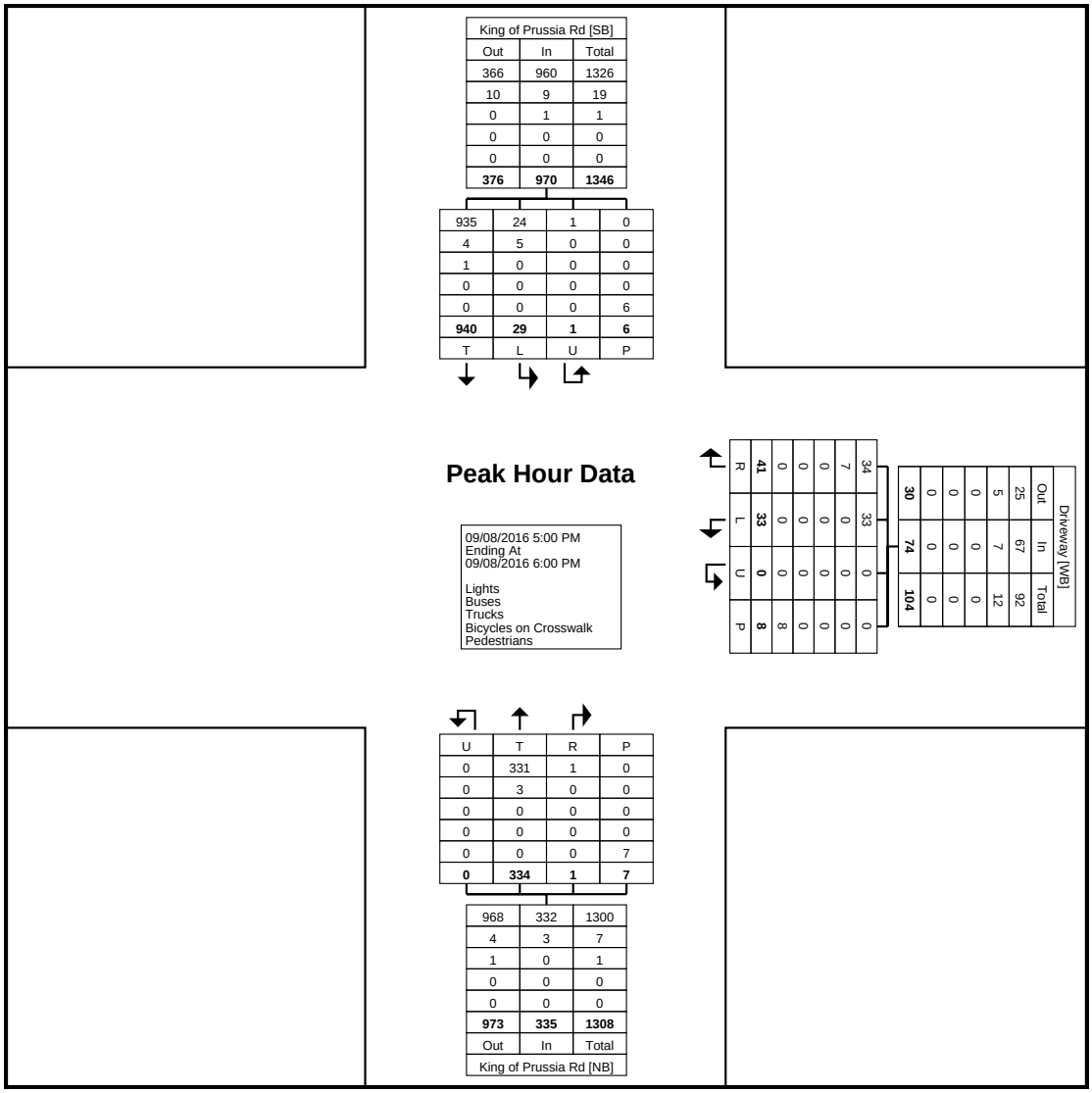
Montgomery County, PA
King of Prussia Rd/Driveway (Septa)
Thursday, September 8, 2016
Location: 40.041752, -75.355913

Count Name: King of Prussia Rd / Driveway
Site Code:
Start Date: 09/08/2016



Turning Movement Peak Hour Data Plot (5:00 PM)

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Montgomery County, PA
King of Prussia Rd Northern Driveway
Wednesday, April 27, 2016
Location: 40.0417473175836, -75.3559260070324

Count Name: King of Prussia Rd/North Driveway
Site Code:
Start Date: 04/27/2016

Combined Direction

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Total
7:00 AM	41	13	11	7	7	6	1	1	3	1	0	0	0	2	93
7:15 AM	88	13	4	1	2	1	2	0	0	1	0	0	0	1	113
7:30 AM	92	7	6	1	1	1	0	0	0	0	0	0	0	0	108
7:45 AM	102	9	3	3	0	0	0	0	0	0	0	0	1	0	118
8:00 AM	97	10	4	2	1	1	0	1	1	0	0	0	0	0	117
8:15 AM	100	14	2	1	0	1	1	1	0	0	0	0	0	0	120
8:30 AM	100	19	5	3	0	0	2	0	2	1	0	0	0	0	132
8:45 AM	82	17	5	3	4	3	0	0	1	1	1	0	0	0	117
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	70	16	13	9	5	2	0	2	0	0	0	0	0	0	117
4:15 PM	56	21	12	6	3	3	4	1	2	0	0	0	0	0	108
4:30 PM	79	13	13	2	3	1	0	0	0	1	1	0	0	0	113
4:45 PM	92	21	14	5	2	0	1	1	0	0	0	0	1	1	138
5:00 PM	69	14	6	3	2	1	2	0	0	0	0	0	0	0	97
5:15 PM	87	14	5	3	1	4	2	1	0	0	0	0	0	0	117
5:30 PM	95	20	14	4	3	1	0	2	0	0	0	0	0	0	139
5:45 PM	60	18	17	7	3	2	2	0	2	1	0	0	0	0	112
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1310	239	134	60	37	27	17	10	11	6	2	0	2	4	1859
Total %	70.5	12.9	7.2	3.2	2.0	1.5	0.9	0.5	0.6	0.3	0.1	0.0	0.1	0.2	100.0

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Montgomery County, PA
King of Prussia Rd Northern Driveway
Wednesday, April 27, 2016
Location: 40.0417473175836, -75.3559260070324

Count Name: King of Prussia Rd/North Driveway
Site Code:
Start Date: 04/27/2016

Southbound (Southbound)

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Total
7:00 AM	6	2	4	4	3	3	2	3	2	0	2	2	0	11	44
7:15 AM	24	9	1	5	2	0	3	4	0	1	1	1	1	9	61
7:30 AM	19	6	3	3	2	3	4	4	0	1	0	0	1	7	53
7:45 AM	7	1	4	5	3	3	3	1	2	0	0	2	2	10	43
8:00 AM	8	3	4	4	3	2	5	2	2	2	0	2	2	8	47
8:15 AM	7	4	1	2	0	4	2	1	3	4	0	2	1	12	43
8:30 AM	10	4	2	0	2	2	2	2	0	3	2	2	0	9	40
8:45 AM	11	6	4	2	6	2	2	2	4	2	0	1	3	9	54
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	56	14	11	8	7	5	1	1	2	1	1	0	1	0	108
4:15 PM	42	15	10	5	5	3	1	2	1	2	2	1	1	2	92
4:30 PM	68	17	15	5	6	1	0	0	0	0	2	1	0	0	115
4:45 PM	73	19	14	6	6	2	3	1	1	0	0	0	1	1	127
5:00 PM	88	13	8	4	2	1	1	0	0	1	0	0	0	0	118
5:15 PM	81	17	4	2	1	4	1	2	0	0	3	0	0	0	115
5:30 PM	84	25	18	5	0	2	1	3	1	0	0	0	0	0	139
5:45 PM	50	21	17	10	2	3	1	1	3	0	0	0	0	2	110
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	634	176	120	70	50	40	32	29	21	17	13	14	13	80	1309
Total %	48.4	13.4	9.2	5.3	3.8	3.1	2.4	2.2	1.6	1.3	1.0	1.1	1.0	6.1	100.0

TRI-STATE TRAFFIC DATA

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184 Baker Rd

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610-466-1469
Serving Transportation Professionals Since 1995

Montgomery County, PA
King of Prussia Rd Northern Driveway
Wednesday, April 27, 2016
Location: 40.0417473175836, -75.3559260070324

Count Name: King of Prussia Rd/North Driveway
Site Code:
Start Date: 04/27/2016

Northbound (Northbound)

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 131.6	Total
7:00 AM	44	9	9	2	3	2	3	2	1	2	1	3	0	5	86
7:15 AM	84	14	11	3	1	2	0	0	3	2	0	0	0	2	122
7:30 AM	95	5	8	3	0	2	1	0	0	0	0	0	0	1	115
7:45 AM	108	15	4	2	1	1	0	0	1	0	0	0	1	0	133
8:00 AM	107	16	5	3	2	0	0	2	1	0	0	0	0	1	137
8:15 AM	107	16	4	1	2	1	1	0	1	0	0	0	0	0	133
8:30 AM	90	16	5	4	3	0	2	0	2	0	0	1	0	1	124
8:45 AM	76	15	5	2	4	3	2	2	1	0	0	2	0	0	112
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	7	10	9	2	2	6	1	2	1	3	2	5	5	71
4:15 PM	14	9	5	8	3	2	5	1	1	2	4	1	1	7	63
4:30 PM	26	5	4	5	5	3	1	2	0	2	0	0	0	12	65
4:45 PM	18	11	8	4	4	0	0	2	2	2	2	1	1	10	65
5:00 PM	12	3	5	1	2	3	5	4	3	3	1	0	1	7	50
5:15 PM	17	5	4	1	3	5	2	2	1	2	5	1	1	7	56
5:30 PM	9	5	7	6	2	3	3	3	3	3	3	1	3	7	58
5:45 PM	12	8	5	7	5	2	4	2	0	1	2	1	3	7	59
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	835	159	99	61	42	31	35	23	22	20	21	13	16	72	1449
Total %	57.6	11.0	6.8	4.2	2.9	2.1	2.4	1.6	1.5	1.4	1.4	0.9	1.1	5.0	100.0

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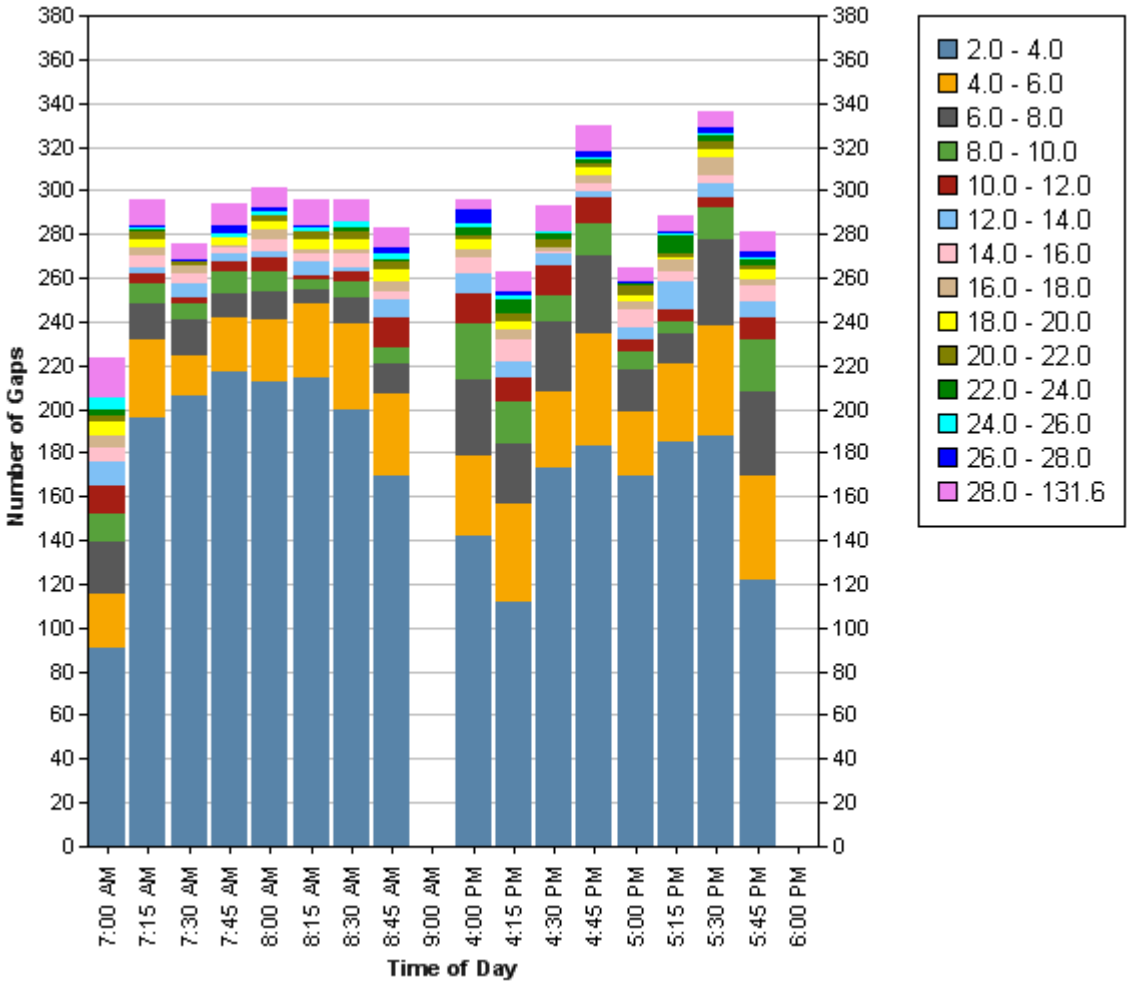
Montgomery County, PA
King of Prussia Rd Northern Driveway
Wednesday, April 27, 2016
Location: 40.0417473175836, -75.3559260070324

Count Name: King of Prussia Rd/North Driveway
Site Code:
Start Date: 04/27/2016



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Montgomery County, PA
King of Prussia Rd South
Driveway
Wednesday, April 27, 2016
Location: 40.0399194154879, -75.3558924794197

Count Name: King of Prussia Rd South Driveway Gap
Site Code:
Start Date: 04/27/2016

Combined Direction

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Total
7:00 AM	48	17	6	2	6	0	4	2	1	2	0	0	1	1	90
7:15 AM	77	7	6	2	0	0	0	0	0	0	0	0	0	0	92
7:30 AM	102	3	3	1	0	1	0	0	0	0	0	0	0	0	110
7:45 AM	108	12	1	1	0	0	0	0	1	0	0	0	0	0	123
8:00 AM	94	11	6	7	1	1	0	0	1	1	0	0	0	0	122
8:15 AM	90	13	6	2	2	2	1	0	0	0	1	0	1	0	118
8:30 AM	93	13	6	6	7	2	2	0	0	0	0	0	0	1	130
8:45 AM	79	15	7	9	3	0	1	3	0	0	2	0	0	0	119
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	62	23	9	9	1	2	3	0	0	1	1	0	0	0	111
4:15 PM	43	18	10	5	7	7	2	2	0	1	0	0	0	0	95
4:30 PM	66	16	12	4	3	0	1	0	0	0	1	0	0	1	104
4:45 PM	47	16	12	3	4	2	2	0	1	0	1	0	0	1	89
5:00 PM	63	11	3	3	0	1	0	0	0	0	0	1	0	0	82
5:15 PM	68	12	3	4	0	2	2	1	0	1	0	0	1	0	94
5:30 PM	81	22	9	5	2	0	1	0	0	0	0	0	0	0	120
5:45 PM	78	23	11	3	2	2	1	0	1	1	0	0	0	0	122
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1199	232	110	66	38	22	20	8	5	7	6	1	3	4	1721
Total %	69.7	13.5	6.4	3.8	2.2	1.3	1.2	0.5	0.3	0.4	0.3	0.1	0.2	0.2	100.0

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Montgomery County, PA
King of Prussia Rd South Driveway
Wednesday, April 27, 2016
Location: 40.0399194154879, -75.3558924794197

Count Name: King of Prussia Rd South Driveway Gap
Site Code:
Start Date: 04/27/2016

Southbound (Southbound)

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Total
7:00 AM	4	3	2	6	4	1	1	2	1	2	0	0	1	11	38
7:15 AM	17	10	9	5	6	3	1	0	3	1	0	0	1	9	65
7:30 AM	10	8	3	0	3	2	2	0	2	1	0	0	1	12	44
7:45 AM	9	0	3	5	2	2	4	0	3	1	2	0	0	9	40
8:00 AM	10	2	2	5	3	4	3	4	2	0	0	0	3	11	49
8:15 AM	4	3	4	2	1	3	0	3	1	2	3	0	4	10	40
8:30 AM	6	3	3	1	3	0	3	2	2	2	2	0	1	10	38
8:45 AM	12	6	1	4	2	5	1	4	5	0	1	1	1	9	52
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	55	16	10	12	4	5	3	1	1	0	2	1	0	0	110
4:15 PM	30	19	10	5	5	2	1	2	1	1	2	2	1	2	83
4:30 PM	56	12	13	4	2	1	3	0	0	1	0	2	0	2	96
4:45 PM	35	10	13	8	6	4	1	3	0	0	0	1	0	2	83
5:00 PM	73	16	4	3	2	1	0	0	0	0	0	1	0	0	100
5:15 PM	65	14	5	1	1	3	2	1	1	2	1	0	0	1	97
5:30 PM	69	24	13	9	1	3	0	3	0	0	0	0	0	0	122
5:45 PM	57	23	13	6	5	1	1	3	2	0	0	0	0	2	113
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	512	169	108	76	50	40	26	28	24	13	13	8	13	90	1170
Total %	43.8	14.4	9.2	6.5	4.3	3.4	2.2	2.4	2.1	1.1	1.1	0.7	1.1	7.7	100.0

Northbound (Northbound)

Start Time	2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 10.0	10.0 - 12.0	12.0 - 14.0	14.0 - 16.0	16.0 - 18.0	18.0 - 20.0	20.0 - 22.0	22.0 - 24.0	24.0 - 26.0	26.0 - 28.0	28.0 - 139.2	Total
7:00 AM	50	11	5	2	6	1	2	0	2	4	0	0	1	3	87
7:15 AM	86	8	9	3	0	1	0	0	0	0	0	0	0	0	107
7:30 AM	114	4	1	1	0	2	0	0	0	0	0	0	0	0	122
7:45 AM	127	13	2	0	1	0	0	0	0	1	0	0	0	0	144
8:00 AM	102	10	5	6	3	1	1	1	0	1	0	0	0	1	131
8:15 AM	96	12	5	2	3	1	2	0	1	0	0	1	1	0	124
8:30 AM	85	12	7	5	4	2	1	1	3	0	0	1	1	1	123
8:45 AM	72	10	8	5	2	2	2	1	3	1	1	0	1	1	109
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	16	14	7	4	2	3	4	2	1	3	3	1	4	5	69
4:15 PM	19	1	6	2	1	4	4	9	3	0	0	1	1	7	58
4:30 PM	30	9	6	5	2	2	2	2	1	1	1	3	0	8	72
4:45 PM	20	6	6	3	1	3	4	1	3	3	1	0	0	9	60
5:00 PM	14	5	5	1	8	1	3	5	3	5	1	0	1	6	58
5:15 PM	22	5	4	3	6	3	4	2	0	3	3	2	1	6	64
5:30 PM	16	8	5	1	3	2	5	2	3	2	2	3	1	5	58
5:45 PM	17	9	8	2	5	2	3	3	1	2	4	1	0	6	63
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	886	137	89	45	47	30	37	29	24	26	16	13	12	58	1449
Total %	61.1	9.5	6.1	3.1	3.2	2.1	2.6	2.0	1.7	1.8	1.1	0.9	0.8	4.0	100.0

Montgomery County, PA
King of Prussia Rd South Driveway
Wednesday, April 27, 2016
Location: 40.0399194154879, -75.3558924794197

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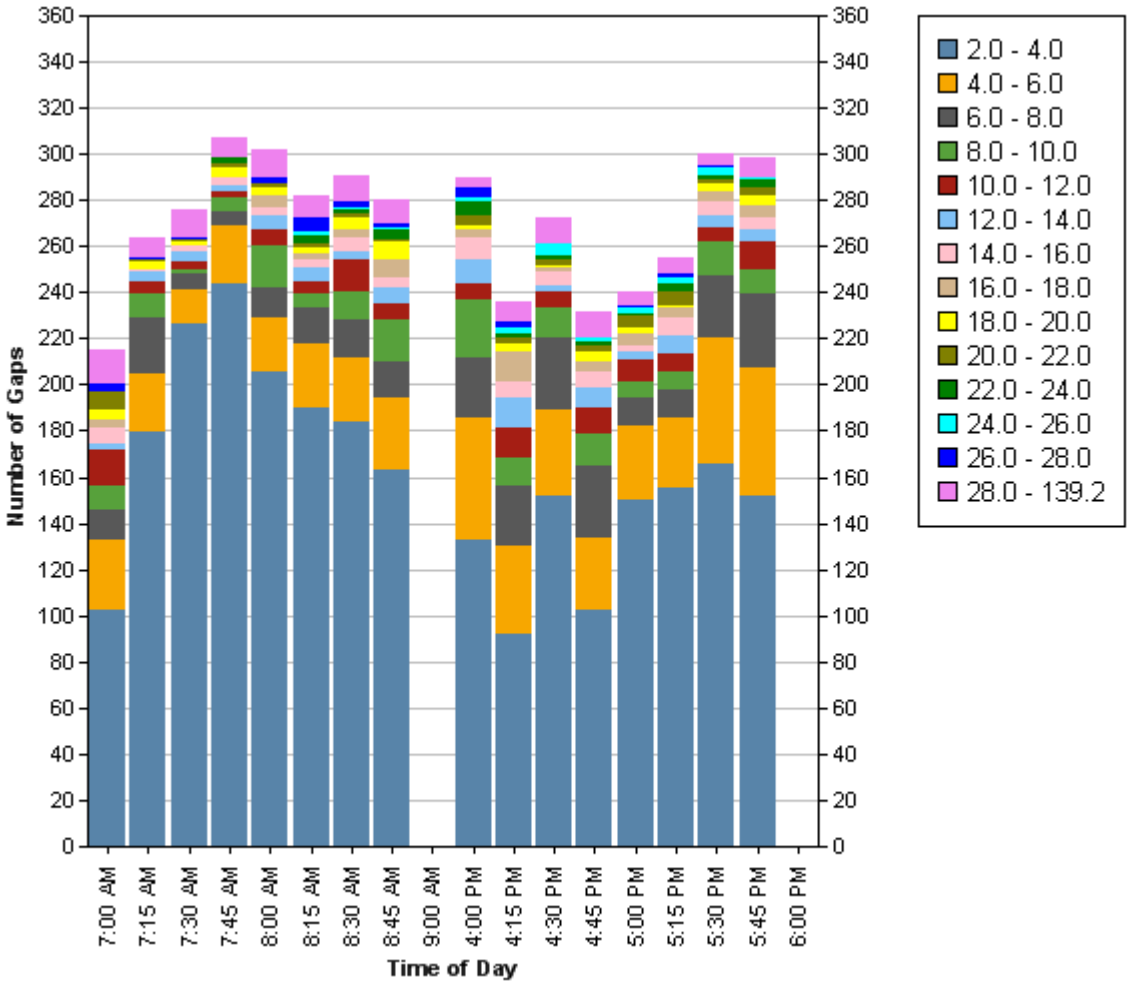
Count Name: King of Prussia Rd South Driveway Gap
Site Code:
Start Date: 04/27/2016



TRI-STATE TRAFFIC DATA

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Montgomery County, PA
Radnor-Chester Rd-King of Prussia Rd
Wednesday, April 27, 2016
Location: 40.0436560224454, -75.3591030836105

Count Name: Radnor Chester Rd/King of Prussia Rd
Site Code:
Start Date: 04/27/2016

Turning Movement Data

Start Time	Parking Lot Entrance Southbound							King of Prussia Road Westbound							Radnor Chester Road Northbound							King of Prussia Road Eastbound						
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
7:00 AM	0	0	3	0	0	3	3	1	0	149	10	0	4	160	12	1	10	58	0	0	81	69	35	5	0	0	109	353
7:15 AM	1	0	1	0	0	2	2	3	0	193	3	0	15	199	4	8	3	82	0	0	97	101	108	4	0	0	213	511
7:30 AM	2	0	0	0	0	2	2	0	0	204	5	0	2	209	5	7	5	141	0	0	158	102	86	9	0	0	197	566
7:45 AM	1	0	1	0	0	1	2	1	0	206	10	0	6	217	13	3	9	118	0	0	143	138	65	9	0	0	212	574
Hourly Total	4	0	5	0	0	8	9	5	0	752	28	0	27	785	34	19	27	399	0	0	479	410	294	27	0	0	731	2004
8:00 AM	1	0	0	1	0	0	2	2	0	192	5	0	4	199	5	2	6	117	0	0	130	103	57	4	0	0	164	495
8:15 AM	1	1	0	1	0	0	3	4	0	188	5	0	7	197	8	6	12	118	0	0	144	117	51	15	0	0	183	527
8:30 AM	1	1	1	0	0	3	3	5	0	192	11	0	1	208	11	4	12	119	0	0	146	104	54	18	0	0	176	533
8:45 AM	2	0	2	2	0	6	6	9	0	172	9	0	5	190	10	7	13	110	0	0	140	111	67	17	0	0	195	531
Hourly Total	5	2	3	4	0	9	14	20	0	744	30	0	17	794	34	19	43	464	0	0	560	435	229	54	0	0	718	2086
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0	0	2
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0	0	2
4:00 PM	1	2	2	3	0	0	8	0	0	91	11	0	2	102	21	12	0	108	0	0	141	148	142	4	0	0	294	545
4:15 PM	0	1	3	0	0	0	4	0	0	88	10	0	3	98	13	7	4	94	0	0	118	156	147	2	0	0	305	525
4:30 PM	2	4	9	9	0	2	24	0	0	92	13	0	6	105	21	14	5	83	0	0	123	138	161	6	0	0	305	557
4:45 PM	1	5	6	5	0	1	17	0	0	83	11	0	4	94	18	15	2	93	0	0	128	150	160	2	0	0	312	551
Hourly Total	4	12	20	17	0	3	53	0	0	354	45	0	15	399	73	48	11	378	0	0	510	592	610	14	0	0	1216	2178
5:00 PM	18	3	13	14	0	6	48	0	0	73	18	0	10	91	19	8	3	109	0	0	139	145	193	2	0	0	340	618
5:15 PM	8	4	7	7	0	1	26	0	0	85	13	0	1	98	21	19	0	85	0	0	125	168	183	2	0	0	353	602
5:30 PM	5	4	10	5	0	3	24	1	0	76	7	0	7	84	29	8	2	108	0	0	147	191	169	2	0	1	362	617
5:45 PM	2	3	7	3	0	0	15	1	0	73	11	0	2	85	16	8	4	69	0	0	97	144	170	1	0	0	315	512
Hourly Total	33	14	37	29	0	10	113	2	0	307	49	0	20	358	85	43	9	371	0	0	508	648	715	7	0	1	1370	2349
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
Grand Total	46	28	65	50	0	30	189	27	0	2157	152	0	79	2336	227	129	90	1613	0	0	2059	2086	1848	102	0	1	4036	8620
Approach %	24.3	14.8	34.4	26.5	0.0	-	-	1.2	0.0	92.3	6.5	0.0	-	-	11.0	6.3	4.4	78.3	0.0	-	-	51.7	45.8	2.5	0.0	-	-	-
Total %	0.5	0.3	0.8	0.6	0.0	-	2.2	0.3	0.0	25.0	1.8	0.0	-	27.1	2.6	1.5	1.0	18.7	0.0	-	23.9	24.2	21.4	1.2	0.0	-	46.8	-
Lights	46	27	63	44	0	-	180	25	0	2103	135	0	-	2263	197	116	86	1597	0	-	1996	2052	1796	99	0	-	3947	8386
% Lights	100.0	96.4	96.9	88.0	-	-	95.2	92.6	-	97.5	88.8	-	-	96.9	86.8	89.9	95.6	99.0	-	-	96.9	98.4	97.2	97.1	-	-	97.8	97.3
Other Vehicles	0	1	2	6	0	-	9	2	0	54	17	0	-	73	30	13	4	16	0	-	63	34	52	3	0	-	89	234
% Other Vehicles	0.0	3.6	3.1	12.0	-	-	4.8	7.4	-	2.5	11.2	-	-	3.1	13.2	10.1	4.4	1.0	-	-	3.1	1.6	2.8	2.9	-	-	2.2	2.7
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	30	-	-	-	-	-	-	78	-	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	98.7	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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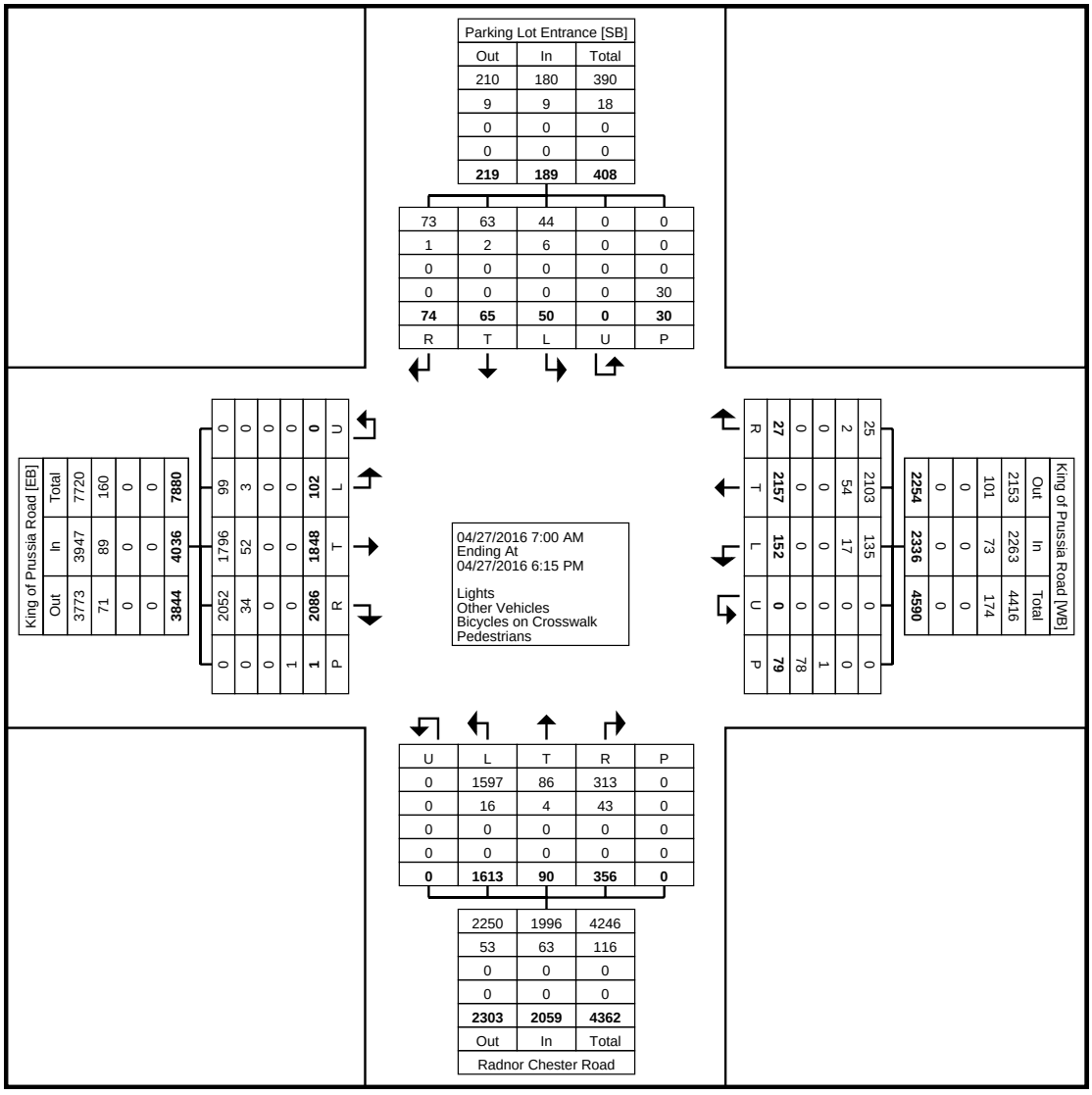

Turning Movement Data Plot

TRI-STATE TRAFFIC DATA

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Montgomery County, PA
Radnor-Chester Rd-King of Prussia Rd
Wednesday, April 27, 2016
Location: 40.0436560224454, -75.3591030836105

Count Name: Radnor Chester Rd/King of Prussia Rd
Site Code:
Start Date: 04/27/2016

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Parking Lot Entrance Southbound							King of Prussia Road Westbound							Radnor Chester Road Northbound							King of Prussia Road Eastbound						
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
7:30 AM	2	0	0	0	0	2	2	0	0	204	5	0	2	209	5	7	5	141	0	0	158	102	86	9	0	0	197	566
7:45 AM	1	0	1	0	0	1	2	1	0	206	10	0	6	217	13	3	9	118	0	0	143	138	65	9	0	0	212	574
8:00 AM	1	0	0	1	0	0	2	2	0	192	5	0	4	199	5	2	6	117	0	0	130	103	57	4	0	0	164	495
8:15 AM	1	1	0	1	0	0	3	4	0	188	5	0	7	197	8	6	12	118	0	0	144	117	51	15	0	0	183	527
Total	5	1	1	2	0	3	9	7	0	790	25	0	19	822	31	18	32	494	0	0	575	460	259	37	0	0	756	2162
Approach %	55.6	11.1	11.1	22.2	0.0	-	-	0.9	0.0	96.1	3.0	0.0	-	-	5.4	3.1	5.6	85.9	0.0	-	-	60.8	34.3	4.9	0.0	-	-	-
Total %	0.2	0.0	0.0	0.1	0.0	-	0.4	0.3	0.0	36.5	1.2	0.0	-	38.0	1.4	0.8	1.5	22.8	0.0	-	26.6	21.3	12.0	1.7	0.0	-	35.0	-
PHF	0.625	0.250	0.250	0.500	0.000	-	0.750	0.438	0.000	0.959	0.625	0.000	-	0.947	0.596	0.643	0.667	0.876	0.000	-	0.910	0.833	0.753	0.617	0.000	-	0.892	0.942
Lights	5	1	1	1	0	-	8	6	0	776	23	0	-	805	28	18	32	490	0	-	568	446	246	37	0	-	729	2110
% Lights	100.0	100.0	100.0	50.0	-	-	88.9	85.7	-	98.2	92.0	-	-	97.9	90.3	100.0	100.0	99.2	-	-	98.8	97.0	95.0	100.0	-	-	96.4	97.6
Other Vehicles	0	0	0	1	0	-	1	1	0	14	2	0	-	17	3	0	0	4	0	-	7	14	13	0	0	-	27	52
% Other Vehicles	0.0	0.0	0.0	50.0	-	-	11.1	14.3	-	1.8	8.0	-	-	2.1	9.7	0.0	0.0	0.8	-	-	1.2	3.0	5.0	0.0	-	-	3.6	2.4
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	-	19	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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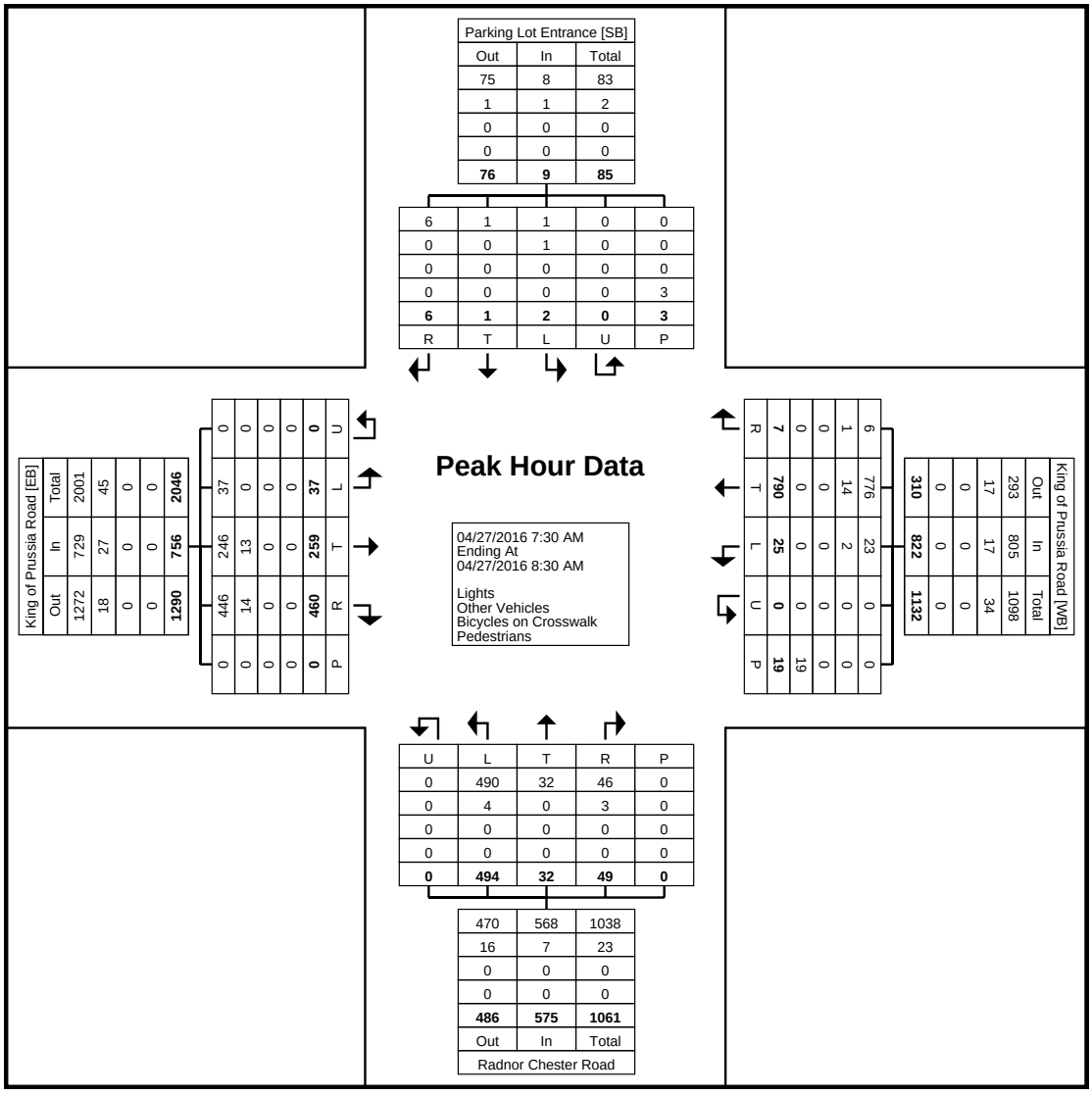

Turning Movement Peak Hour Data Plot (7:30 AM)

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Montgomery County, PA
Radnor-Chester Rd-King of Prussia Rd
Wednesday, April 27, 2016
Location: 40.0436560224454, -75.3591030836105

Count Name: Radnor Chester Rd/King of Prussia Rd
Site Code:
Start Date: 04/27/2016

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Parking Lot Entrance Southbound							King of Prussia Road Westbound							Radnor Chester Road Northbound							King of Prussia Road Eastbound						
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
4:45 PM	1	5	6	5	0	1	17	0	0	83	11	0	4	94	18	15	2	93	0	0	128	150	160	2	0	0	312	551
5:00 PM	18	3	13	14	0	6	48	0	0	73	18	0	10	91	19	8	3	109	0	0	139	145	193	2	0	0	340	618
5:15 PM	8	4	7	7	0	1	26	0	0	85	13	0	1	98	21	19	0	85	0	0	125	168	183	2	0	0	353	602
5:30 PM	5	4	10	5	0	3	24	1	0	76	7	0	7	84	29	8	2	108	0	0	147	191	169	2	0	1	362	617
Total	32	16	36	31	0	11	115	1	0	317	49	0	22	367	87	50	7	395	0	0	539	654	705	8	0	1	1367	2388
Approach %	27.8	13.9	31.3	27.0	0.0	-	-	0.3	0.0	86.4	13.4	0.0	-	-	16.1	9.3	1.3	73.3	0.0	-	-	47.8	51.6	0.6	0.0	-	-	-
Total %	1.3	0.7	1.5	1.3	0.0	-	4.8	0.0	0.0	13.3	2.1	0.0	-	15.4	3.6	2.1	0.3	16.5	0.0	-	22.6	27.4	29.5	0.3	0.0	-	57.2	-
PHF	0.444	0.800	0.692	0.554	0.000	-	0.599	0.250	0.000	0.932	0.681	0.000	-	0.936	0.750	0.658	0.583	0.906	0.000	-	0.917	0.856	0.913	1.000	0.000	-	0.944	0.966
Lights	32	15	35	30	0	-	112	0	0	313	43	0	-	356	84	48	6	393	0	-	531	651	700	8	0	-	1359	2358
% Lights	100.0	93.8	97.2	96.8	-	-	97.4	0.0	-	98.7	87.8	-	-	97.0	96.6	96.0	85.7	99.5	-	-	98.5	99.5	99.3	100.0	-	-	99.4	98.7
Other Vehicles	0	1	1	1	0	-	3	1	0	4	6	0	-	11	3	2	1	2	0	-	8	3	5	0	0	-	8	30
% Other Vehicles	0.0	6.3	2.8	3.2	-	-	2.6	100.0	-	1.3	12.2	-	-	3.0	3.4	4.0	14.3	0.5	-	-	1.5	0.5	0.7	0.0	-	-	0.6	1.3
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	4.5	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	11	-	-	-	-	-	-	21	-	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	95.5	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Montgomery County, PA
Radnor-Chester Rd-King of Prussia Rd
Wednesday, April 27, 2016
Location: 40.0436560224454, -75.3591030836105

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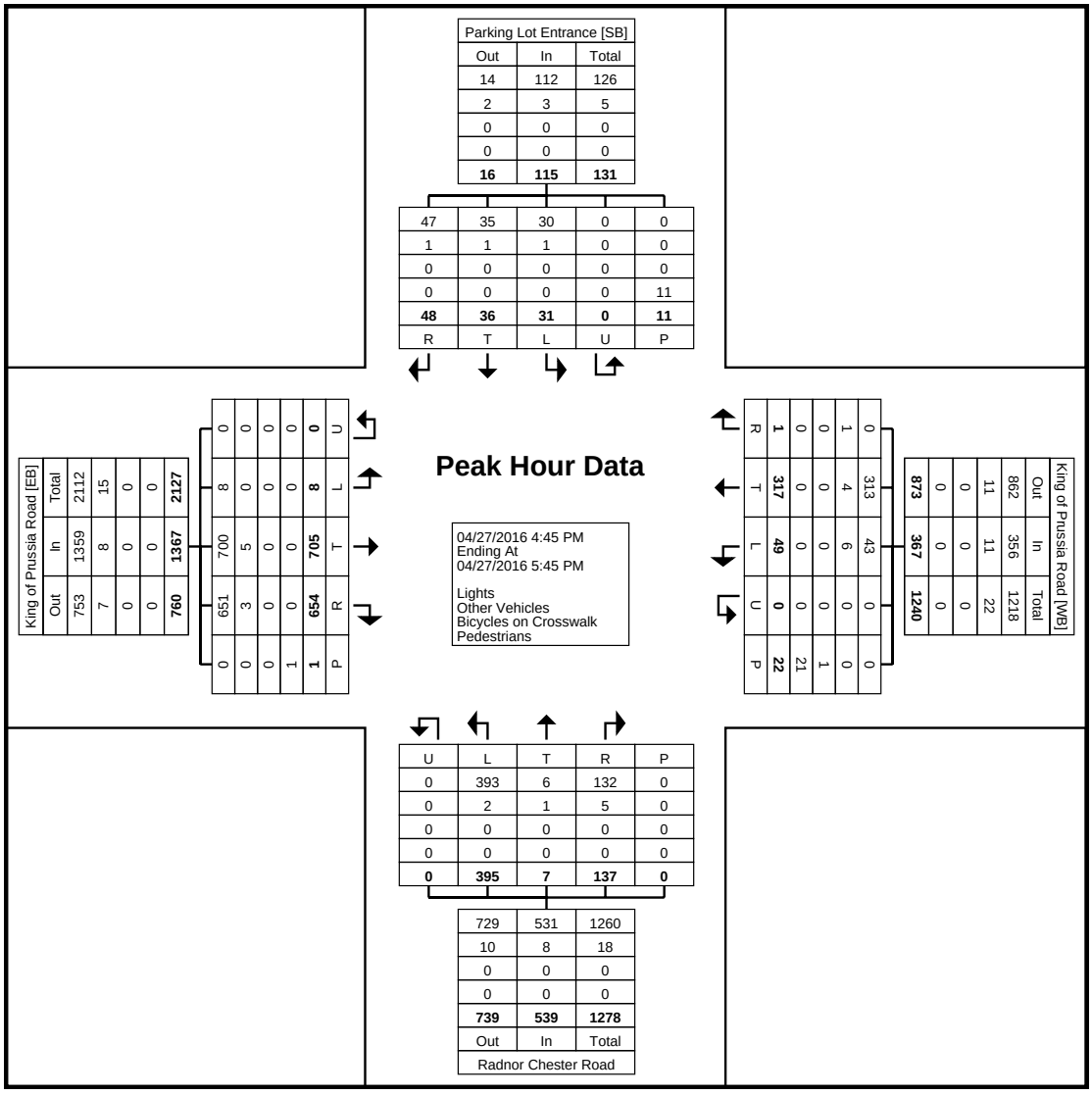
Site Code:
Start Date: 04/27/2016



Turning Movement Peak Hour Data Plot (4:45 PM)

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Montgomery County, PA
Radnor-Chester Rd/Lancaster Ave
Wednesday, April 27, 2016
Location: 40.0394916465948, -75.3656798601151

Count Name: Radnor Chester Rd/Lancaster Ave
Site Code:
Start Date: 04/27/2016

Turning Movement Data

Start Time	Radnor Chester Road Southbound							Lancaster Avenue Westbound							Radnor Chester Road Northbound							Lancaster Avenue Eastbound							Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	11	6	17	42	0	0	76	42	1	211	43	0	4	297	14	0	73	16	0	0	103	8	0	171	41	0	0	220	696
7:15 AM	30	2	40	24	0	0	96	63	0	334	49	0	1	446	16	0	118	10	0	0	144	7	0	247	49	1	0	304	990
7:30 AM	30	2	41	36	0	0	109	89	1	331	56	0	0	477	20	0	118	20	0	0	158	7	1	207	33	0	0	248	992
7:45 AM	28	1	39	27	0	1	95	109	0	378	56	0	0	543	22	0	70	24	0	0	116	17	0	249	33	0	0	299	1053
Hourly Total	99	11	137	129	0	1	376	303	2	1254	204	0	5	1763	72	0	379	70	0	0	521	39	1	874	156	1	0	1071	3731
8:00 AM	22	4	29	13	0	0	68	118	0	338	53	0	0	509	25	1	74	21	0	0	121	18	1	199	36	0	0	254	952
8:15 AM	16	2	21	19	0	0	58	114	0	387	44	0	0	545	14	0	105	26	0	0	145	8	0	234	35	0	0	277	1025
8:30 AM	14	2	27	32	0	0	75	97	0	306	35	0	0	438	23	0	110	34	0	0	167	16	0	195	38	0	0	249	929
8:45 AM	20	4	31	24	0	0	79	130	0	361	48	0	0	539	16	0	82	22	0	0	120	3	0	191	39	0	0	233	971
Hourly Total	72	12	108	88	0	0	280	459	0	1392	180	0	0	2031	78	1	371	103	0	0	553	45	1	819	148	0	0	1013	3877
9:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3
4:00 PM	40	8	66	120	0	0	234	26	1	210	41	0	0	278	43	0	39	21	0	0	103	23	2	272	31	0	0	328	943
4:15 PM	29	7	83	101	0	0	220	37	0	206	44	0	0	287	31	1	52	20	0	0	104	24	0	301	36	0	0	361	972
4:30 PM	42	3	101	103	0	0	249	30	2	210	40	0	0	282	31	2	45	16	0	0	94	21	0	279	37	0	1	337	962
4:45 PM	47	0	102	97	0	0	246	34	0	237	50	0	0	321	32	0	51	24	0	0	107	22	0	286	34	0	0	342	1016
Hourly Total	158	18	352	421	0	0	949	127	3	863	175	0	0	1168	137	3	187	81	0	0	408	90	2	1138	138	0	1	1368	3893
5:00 PM	51	2	122	98	0	1	273	23	0	254	43	0	2	320	48	0	46	24	0	0	118	25	0	299	30	0	0	354	1065
5:15 PM	50	2	118	98	0	1	268	30	0	241	52	0	1	323	35	0	60	12	0	0	107	12	0	279	30	1	0	322	1020
5:30 PM	60	0	99	111	0	1	270	37	0	297	50	1	0	385	24	0	51	20	0	0	95	33	0	270	24	0	0	327	1077
5:45 PM	37	5	75	86	0	0	203	32	3	297	62	0	2	394	33	0	44	28	0	0	105	21	0	230	41	0	0	292	994
Hourly Total	198	9	414	393	0	3	1014	122	3	1089	207	1	5	1422	140	0	201	84	0	0	425	91	0	1078	125	1	0	1295	4156
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	527	50	1011	1031	0	4	2619	1011	8	4600	766	1	10	6386	427	4	1138	338	0	0	1907	265	4	3910	567	2	1	4748	15660
Approach %	20.1	1.9	38.6	39.4	0.0	-	-	15.8	0.1	72.0	12.0	0.0	-	-	22.4	0.2	59.7	17.7	0.0	-	-	5.6	0.1	82.4	11.9	0.0	-	-	-
Total %	3.4	0.3	6.5	6.6	0.0	-	16.7	6.5	0.1	29.4	4.9	0.0	-	40.8	2.7	0.0	7.3	2.2	0.0	-	12.2	1.7	0.0	25.0	3.6	0.0	-	30.3	-
Lights	515	48	997	1015	0	-	2575	1000	7	4513	748	1	-	6269	424	4	1098	333	0	-	1859	262	4	3818	546	2	-	4632	15335
% Lights	97.7	96.0	98.6	98.4	-	-	98.3	98.9	87.5	98.1	97.7	100.0	-	98.2	99.3	100.0	96.5	98.5	-	-	97.5	98.9	100.0	97.6	96.3	100.0	-	97.6	97.9
Other Vehicles	12	2	14	16	0	-	44	11	1	87	18	0	-	117	3	0	40	5	0	-	48	3	0	92	21	0	-	116	325
% Other Vehicles	2.3	4.0	1.4	1.6	-	-	1.7	1.1	12.5	1.9	2.3	0.0	-	1.8	0.7	0.0	3.5	1.5	-	-	2.5	1.1	0.0	2.4	3.7	0.0	-	2.4	2.1
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	-	10	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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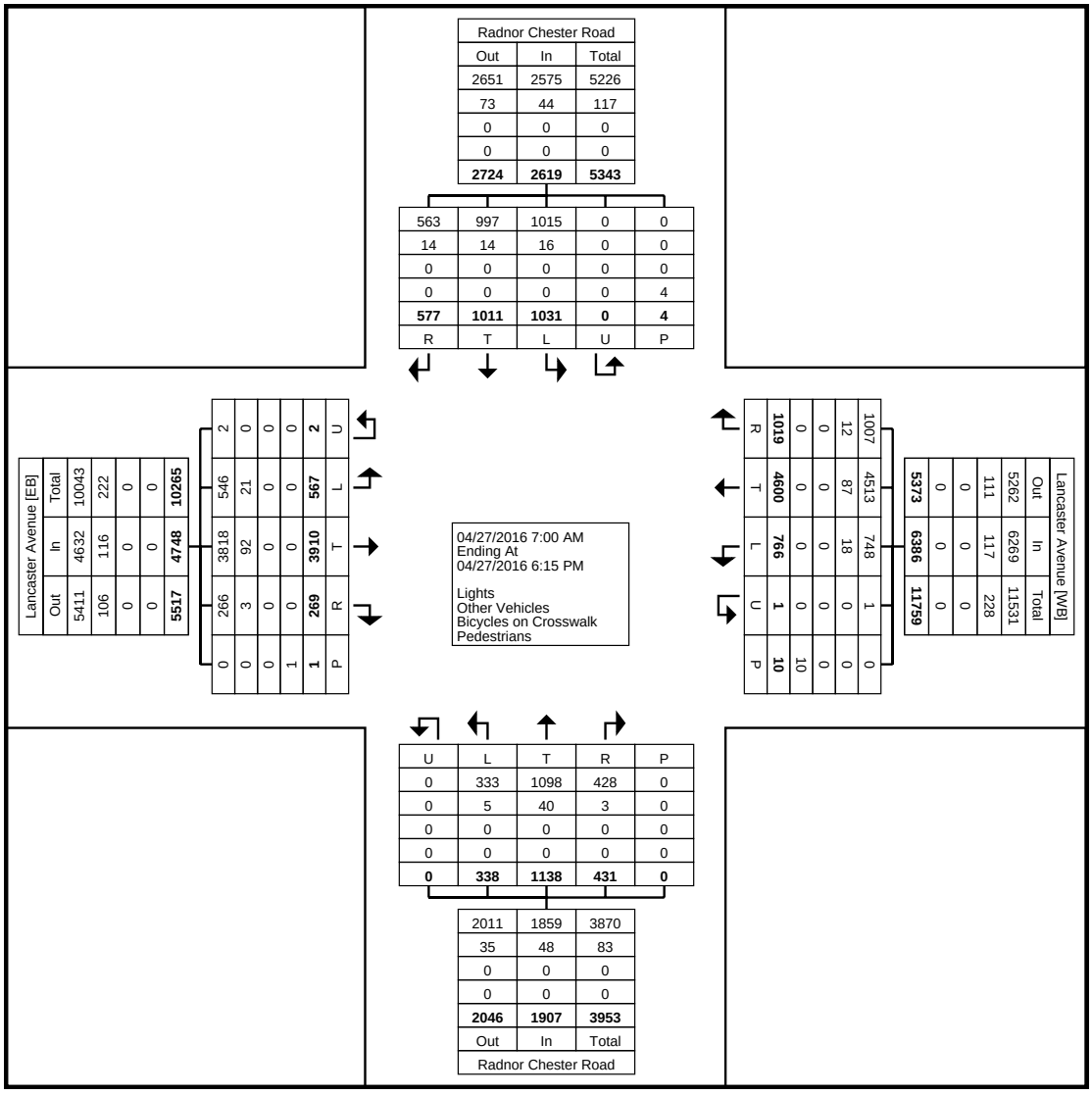

Turning Movement Data Plot

Montgomery County, PA
Radnor-Chester Rd/Lancaster Ave
Wednesday, April 27, 2016
Location: 40.0394916465948, -75.3656798601151

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Count Name: Radnor Chester Rd/Lancaster Ave
Site Code:
Start Date: 04/27/2016

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Radnor Chester Road Southbound							Lancaster Avenue Westbound							Radnor Chester Road Northbound							Lancaster Avenue Eastbound							
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Int. Total
7:30 AM	30	2	41	36	0	0	109	89	1	331	56	0	0	477	20	0	118	20	0	0	158	7	1	207	33	0	0	248	992
7:45 AM	28	1	39	27	0	1	95	109	0	378	56	0	0	543	22	0	70	24	0	0	116	17	0	249	33	0	0	299	1053
8:00 AM	22	4	29	13	0	0	68	118	0	338	53	0	0	509	25	1	74	21	0	0	121	18	1	199	36	0	0	254	952
8:15 AM	16	2	21	19	0	0	58	114	0	387	44	0	0	545	14	0	105	26	0	0	145	8	0	234	35	0	0	277	1025
Total	96	9	130	95	0	1	330	430	1	1434	209	0	0	2074	81	1	367	91	0	0	540	50	2	889	137	0	0	1078	4022
Approach %	29.1	2.7	39.4	28.8	0.0	-	-	20.7	0.0	69.1	10.1	0.0	-	-	15.0	0.2	68.0	16.9	0.0	-	-	4.6	0.2	82.5	12.7	0.0	-	-	-
Total %	2.4	0.2	3.2	2.4	0.0	-	8.2	10.7	0.0	35.7	5.2	0.0	-	51.6	2.0	0.0	9.1	2.3	0.0	-	13.4	1.2	0.0	22.1	3.4	0.0	-	26.8	-
PHF	0.800	0.563	0.793	0.660	0.000	-	0.757	0.911	0.250	0.926	0.933	0.000	-	0.951	0.810	0.250	0.778	0.875	0.000	-	0.854	0.694	0.500	0.893	0.951	0.000	-	0.901	0.955
Lights	91	9	126	89	0	-	315	425	1	1405	200	0	-	2031	81	1	366	89	0	-	537	48	2	854	132	0	-	1036	3919
% Lights	94.8	100.0	96.9	93.7	-	-	95.5	98.8	100.0	98.0	95.7	-	-	97.9	100.0	100.0	99.7	97.8	-	-	99.4	96.0	100.0	96.1	96.4	-	-	96.1	97.4
Other Vehicles	5	0	4	6	0	-	15	5	0	29	9	0	-	43	0	0	1	2	0	-	3	2	0	35	5	0	-	42	103
% Other Vehicles	5.2	0.0	3.1	6.3	-	-	4.5	1.2	0.0	2.0	4.3	-	-	2.1	0.0	0.0	0.3	2.2	-	-	0.6	4.0	0.0	3.9	3.6	-	-	3.9	2.6
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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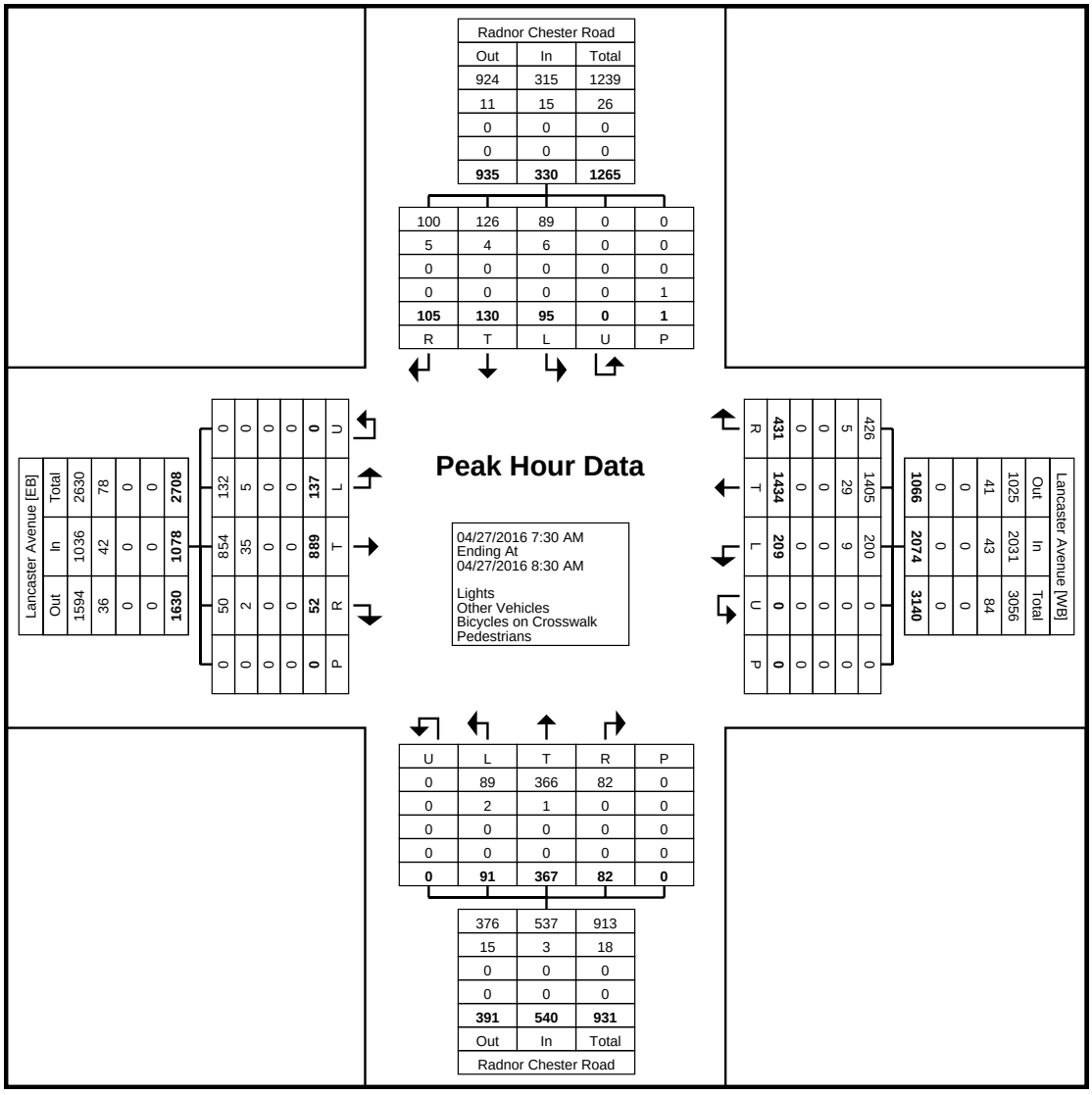

Turning Movement Peak Hour Data Plot (7:30 AM)

Montgomery County, PA
Radnor-Chester Rd/Lancaster Ave
Wednesday, April 27, 2016
Location: 40.0394916465948, -75.3656798601151

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Turning Movement Peak Hour Data (4:45 PM)

Start Time	Radnor Chester Road Southbound							Lancaster Avenue Westbound							Radnor Chester Road Northbound							Lancaster Avenue Eastbound							Int. Total
	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	Left	U-Turn	Peds	App. Total	
4:45 PM	47	0	102	97	0	0	246	34	0	237	50	0	0	321	32	0	51	24	0	0	107	22	0	286	34	0	0	342	1016
5:00 PM	51	2	122	98	0	1	273	23	0	254	43	0	2	320	48	0	46	24	0	0	118	25	0	299	30	0	0	354	1065
5:15 PM	50	2	118	98	0	1	268	30	0	241	52	0	1	323	35	0	60	12	0	0	107	12	0	279	30	1	0	322	1020
5:30 PM	60	0	99	111	0	1	270	37	0	297	50	1	0	385	24	0	51	20	0	0	95	33	0	270	24	0	0	327	1077
Total	208	4	441	404	0	3	1057	124	0	1029	195	1	3	1349	139	0	208	80	0	0	427	92	0	1134	118	1	0	1345	4178
Approach %	19.7	0.4	41.7	38.2	0.0	-	-	9.2	0.0	76.3	14.5	0.1	-	-	32.6	0.0	48.7	18.7	0.0	-	-	6.8	0.0	84.3	8.8	0.1	-	-	-
Total %	5.0	0.1	10.6	9.7	0.0	-	25.3	3.0	0.0	24.6	4.7	0.0	-	32.3	3.3	0.0	5.0	1.9	0.0	-	10.2	2.2	0.0	27.1	2.8	0.0	-	32.2	-
PHF	0.867	0.500	0.904	0.910	0.000	-	0.968	0.838	0.000	0.866	0.938	0.250	-	0.876	0.724	0.000	0.867	0.833	0.000	-	0.905	0.697	0.000	0.948	0.868	0.250	-	0.950	0.970
Lights	203	4	441	401	0	-	1049	123	0	1023	191	1	-	1338	139	0	205	79	0	-	423	92	0	1122	117	1	-	1332	4142
% Lights	97.6	100.0	100.0	99.3	-	-	99.2	99.2	-	99.4	97.9	100.0	-	99.2	100.0	-	98.6	98.8	-	-	99.1	100.0	-	98.9	99.2	100.0	-	99.0	99.1
Other Vehicles	5	0	0	3	0	-	8	1	0	6	4	0	-	11	0	0	3	1	0	-	4	0	0	12	1	0	-	13	36
% Other Vehicles	2.4	0.0	0.0	0.7	-	-	0.8	0.8	-	0.6	2.1	0.0	-	0.8	0.0	-	1.4	1.3	-	-	0.9	0.0	-	1.1	0.8	0.0	-	1.0	0.9
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	-	3	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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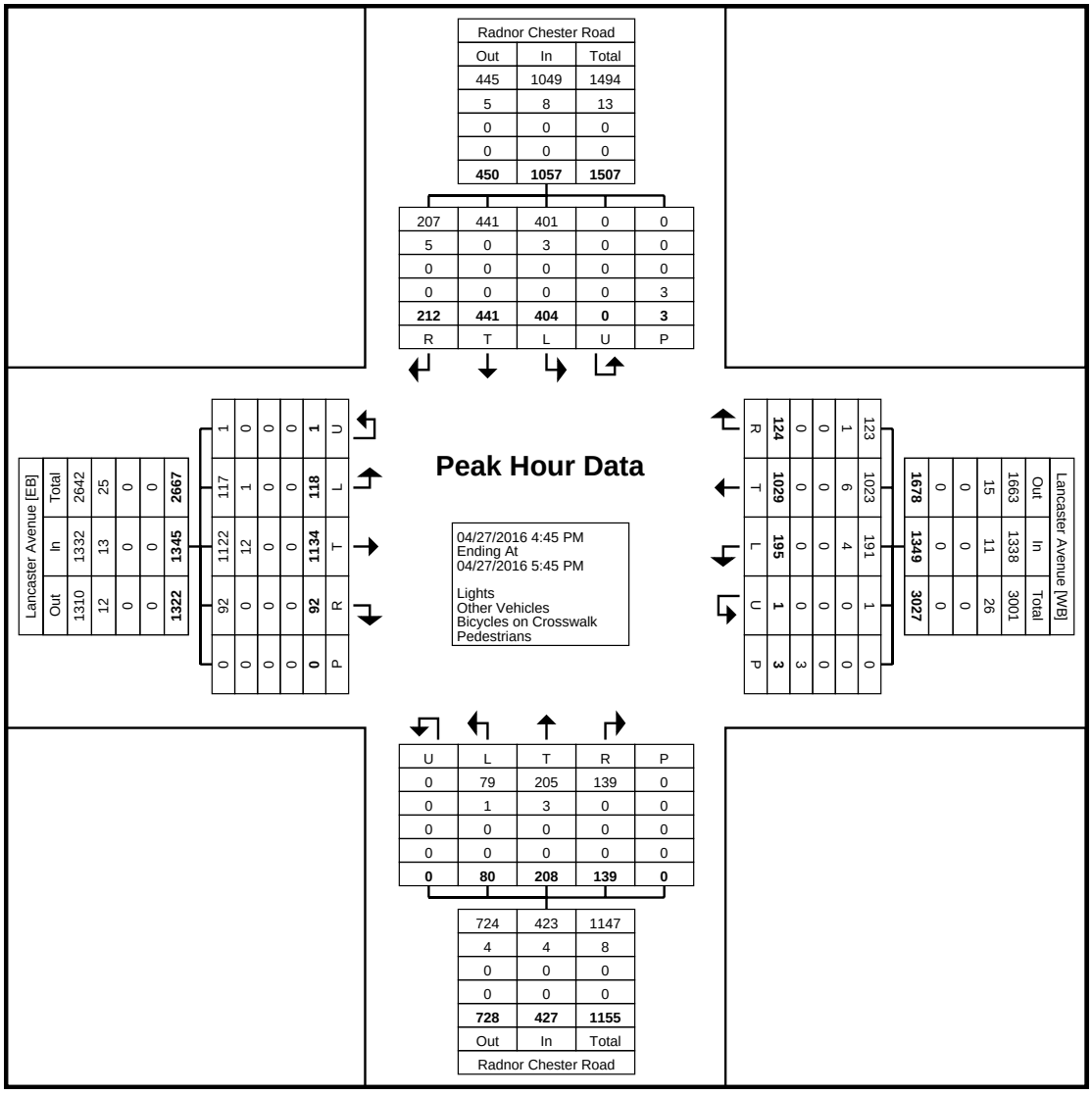

Turning Movement Peak Hour Data Plot (4:45 PM)

Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/Raider Rd
Date: Wednesday, November 18, 2015
Counter: PB

File Name : SS1118-1
Site Code :
Start Date : 11/18/2015
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Groups Printed- Cars - Heavy Vehicles

	King of Prussia Road Northbound					King of Prussia Road Southbound					Raider Road Eastbound					Driveway Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	49	191	0	0	240	0	26	12	0	38	5	0	21	0	26	0	0	0	0	0	304
07:15 AM	132	217	0	0	349	0	42	41	0	83	4	0	65	7	76	0	0	0	0	0	508
07:30 AM	29	263	0	0	292	0	60	14	0	74	3	0	52	0	55	0	0	0	0	0	421
07:45 AM	4	238	0	0	242	0	72	1	0	73	1	0	7	1	9	0	0	0	0	0	324
Total	214	909	0	0	1123	0	200	68	0	268	13	0	145	8	166	0	0	0	0	0	1557
08:00 AM	5	256	0	0	261	0	64	1	0	65	1	0	4	0	5	0	0	0	0	0	331
08:15 AM	3	298	0	0	301	0	54	1	0	55	0	0	6	1	7	0	0	0	0	0	363
08:30 AM	7	289	0	0	296	0	51	3	0	54	3	0	3	0	6	0	0	0	0	0	356
08:45 AM	9	304	0	0	313	0	56	5	0	61	2	0	5	0	7	0	0	0	0	0	381
Total	24	1147	0	0	1171	0	225	10	0	235	6	0	18	1	25	0	0	0	0	0	1431
04:00 PM	2	92	0	0	94	0	186	1	0	187	6	0	12	3	21	0	0	0	0	0	302
04:15 PM	4	86	0	0	90	0	197	0	0	197	5	0	5	2	12	0	0	0	0	0	299
04:30 PM	1	73	0	0	74	0	226	0	0	226	2	0	17	3	22	0	0	0	0	0	322
04:45 PM	11	73	0	0	84	0	206	3	0	209	2	0	12	0	14	0	0	0	0	0	307
Total	18	324	0	0	342	0	815	4	0	819	15	0	46	8	69	0	0	0	0	0	1230
05:00 PM	9	58	0	0	67	0	273	0	0	273	3	0	14	2	19	0	0	0	0	0	359
05:15 PM	3	68	0	0	71	0	281	1	0	282	1	0	13	1	15	0	0	0	0	0	368
05:30 PM	5	53	0	0	58	0	263	0	0	263	1	0	9	0	10	0	0	0	0	0	331
05:45 PM	6	90	0	0	96	0	216	4	0	220	0	0	4	0	4	0	0	0	0	0	320
Total	23	269	0	0	292	0	1033	5	0	1038	5	0	40	3	48	0	0	0	0	0	1378
Grand Total	279	2649	0	0	2928	0	2273	87	0	2360	39	0	249	20	308	0	0	0	0	0	5596
Apprch %	9.5	90.5	0	0		0	96.3	3.7	0		12.7	0	80.8	6.5		0	0	0	0		
Total %	5	47.3	0	0	52.3	0	40.6	1.6	0	42.2	0.7	0	4.4	0.4	5.5	0	0	0	0	0	
Cars	269	2603	0	0	2872	0	2229	84	0	2313	33	0	234	20	287	0	0	0	0	0	5472
% Cars	96.4	98.3	0	0	98.1	0	98.1	96.6	0	98	84.6	0	94	100	93.2	0	0	0	0	0	97.8
Heavy Vehicles																					
% Heavy Vehicles	3.6	1.7	0	0	1.9	0	1.9	3.4	0	2	15.4	0	6	0	6.8	0	0	0	0	0	2.2

Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/Raider Rd
Date: Wednesday, November 18, 2015
Counter: PB

File Name : SS1118-1
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Start Date : 11/18/2015
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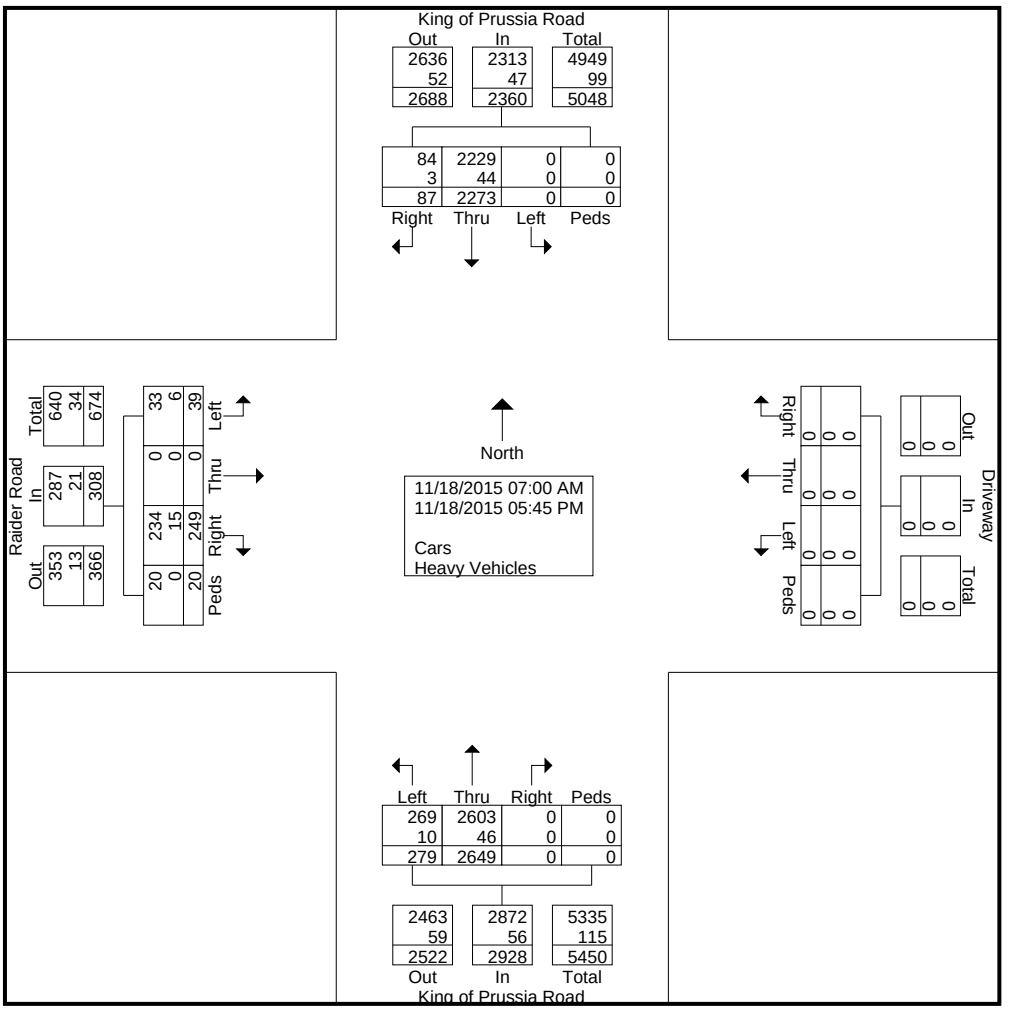

Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/Raider Rd
Date: Wednesday, November 18, 2015
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File Name : SS1118-1
Site Code :
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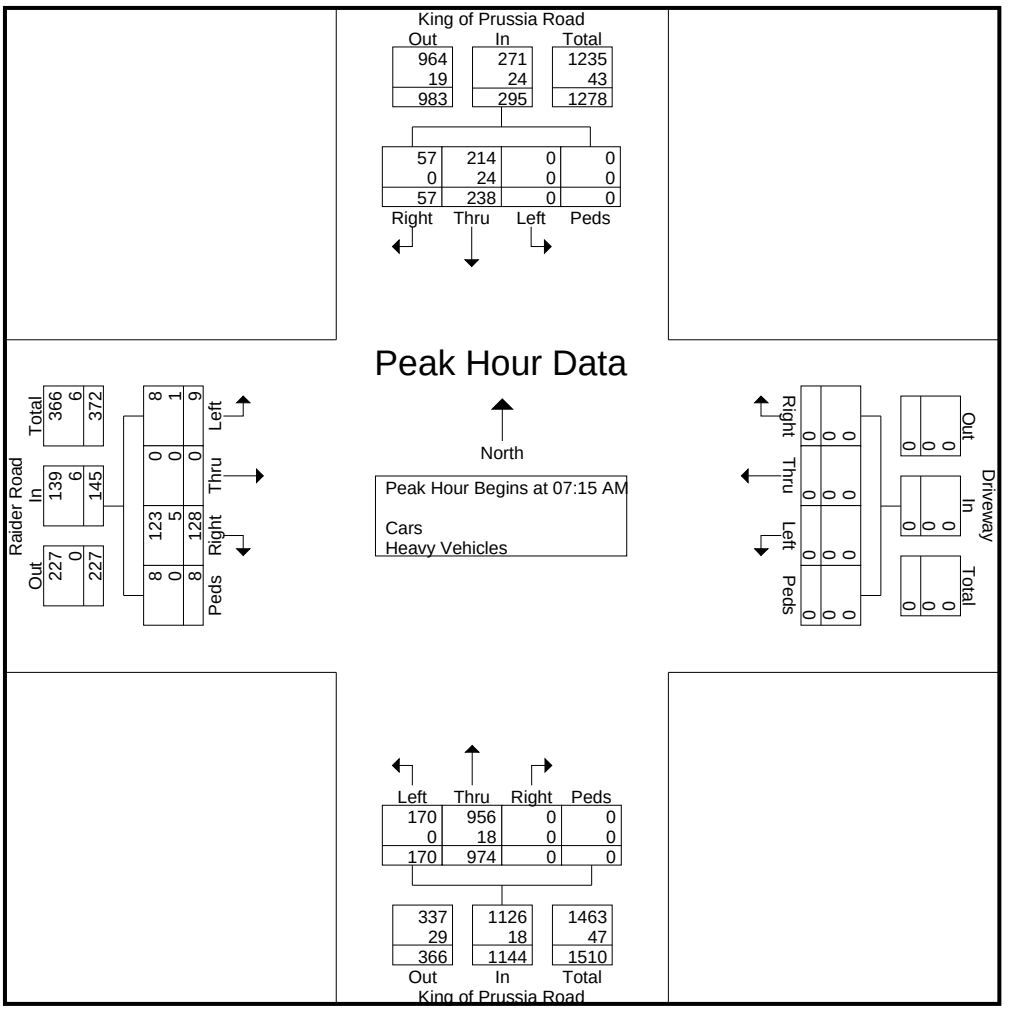
	King of Prussia Road Northbound					King of Prussia Road Southbound					Raider Road Eastbound					Driveway Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**132**				**349**	0	42	**41**		**83**	**4**		**65**	**7**	**76**	0	0	0	0	0	**508**
07:30 AM	29	**263**	0	0	292	0	60	14	0	74	3	0	52	0	55	0	0	0	0	0	421
07:45 AM	4	238	0	0	242	0	**72**	1	0	73	1	0	7	1	9	0	0	0	0	0	324
08:00 AM	5	256	0	0	261	0	64	1	0	65	1	0	4	0	5	0	0	0	0	0	331
Total Volume	170	974	0	0	1144	0	238	57	0	295	9	0	128	8	145	0	0	0	0	0	1584
% App. Total	14.9	85.1	0	0		0	80.7	19.3	0		6.2	0	88.3	5.5		0	0	0	0		
PHF	.322	.926	.000	.000	.819	.000	.826	.348	.000	.889	.563	.000	.492	.286	.477	.000	.000	.000	.000	.000	.780
Cars	170	956	0	0	1126	0	214	57	0	271	8	0	123	8	139	0	0	0	0	0	1536
% Cars	100	98.2					89.9				88.9	0	96.1	100	95.9	0	0	0	0	0	97.0
Heavy Vehicles																					
% Heavy Vehicles	0	1.8	0	0	1.6	0	10.1	0	0	8.1	11.1	0	3.9	0	4.1	0	0	0	0	0	3.0

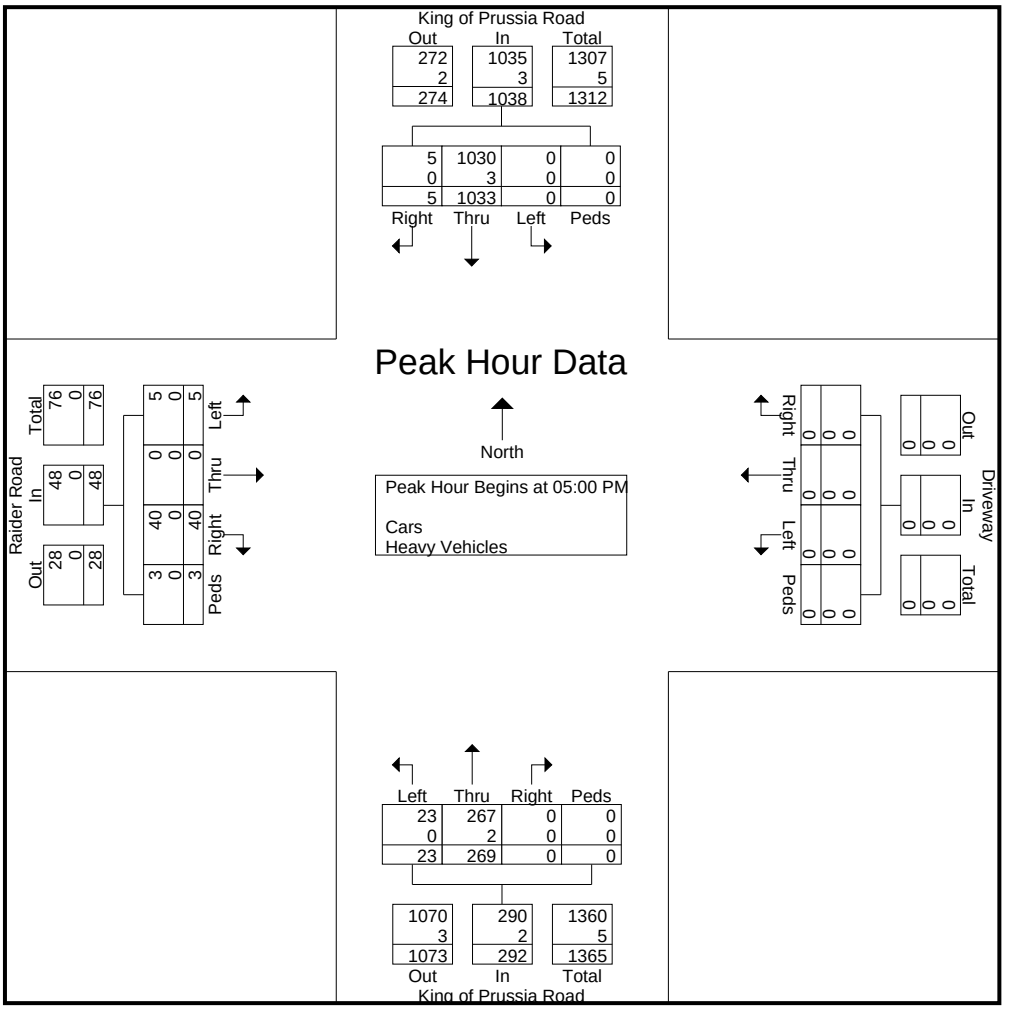


Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/Raider Rd
Date: Wednesday, November 18, 2015
Counter: PB

File Name : SS1118-1
Site Code :
Start Date : 11/18/2015
Page No : 4

	King of Prussia Road Northbound					King of Prussia Road Southbound					Raider Road Eastbound					Driveway Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**9**										**3**		**14**	**2**	**19**	0	0	0	0	0	359
05:15 PM	3	68	0	0	71	0	**281**	1	0	**282**	1	0	13	1	15	0	0	0	0	0	**368**
05:30 PM	5	53	0	0	58	0	263	0	0	263	1	0	9	0	10	0	0	0	0	0	331
05:45 PM	6	**90**	0	0	**96**	0	216	**4**													
Total Volume	23	269	0	0	292	0	1033	5	0	1038	5	0	40	3	48	0	0	0	0	0	1378
% App. Total	7.9	92.1	0	0		0	99.5	0.5	0		10.4	0	83.3	6.2		0	0	0	0		
PHF	.639	.747	.000	.000	.760	.000	.919	.313	.000	.920	.417	.000	.714	.375	.632	.000	.000	.000	.000	.000	.936
Cars	23	267	0	0	290	0	1030														
% Cars	100	99.3	0	0	99.3	0	99.7	100	0	99.7	100	0	100	100	100	0	0	0	0	0	99.6
Heavy Vehicles	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	5
% Heavy Vehicles	0	0.7	0	0	0.7	0	0.3	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0.4



Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/Matson Ford Rd
Date: Wednesday, November 18, 2015
Tech: RZ

File Name : SS1118-2
Site Code : 00000000
Start Date : 11/18/2015
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Groups Printed- Cars - Heavy Vehicles - RTOR

	KING OF PRUSSIA RD Northbound					KING OF PRUSSIA RD Southbound					Parking lot Dr. Eastbound					MATSON FORD RD Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	2	113	91	0	206	53	91	0	0	144	0	0	0	0	0	38	0	6	0	44	394
07:15 AM	2	123	133	0	258	80	144	0	0	224	0	0	0	0	0	51	0	22	0	73	555
07:30 AM	1	153	178	0	332	104	124	0	0	228	0	0	0	0	0	84	1	34	0	119	679
07:45 AM	4	162	139	0	305	95	136	1	0	232	0	0	0	0	0	75	1	26	0	102	639
Total	9	551	541	0	1101	332	495	1	0	828	0	0	0	0	0	248	2	88	0	338	2267
08:00 AM	5	154	126	0	285	82	128	1	0	211	1	0	2	0	3	53	5	18	1	77	576
08:15 AM	8	142	104	0	254	79	126	0	0	205	0	1	4	0	5	64	3	15	0	82	546
08:30 AM	4	170	127	0	301	67	136	4	0	207	0	0	2	0	2	56	1	10	0	67	577
08:45 AM	5	144	132	0	281	60	136	3	0	199	0	2	0	0	2	84	2	35	0	121	603
Total	22	610	489	0	1121	288	526	8	0	822	1	3	8	0	12	257	11	78	1	347	2302
*** BREAK ***																					
04:00 PM	2	145	40	0	187	22	157	0	0	179	1	0	4	0	5	89	0	56	0	145	516
04:15 PM	1	122	44	0	167	22	193	0	0	215	0	1	4	0	5	80	1	39	0	120	507
04:30 PM	1	123	64	0	188	18	169	1	0	188	1	0	3	0	4	110	2	70	0	182	562
04:45 PM	1	93	57	0	151	37	199	0	0	236	0	1	0	0	1	112	1	53	0	166	554
Total	5	483	205	0	693	99	718	1	0	818	2	2	11	0	15	391	4	218	0	613	2139
05:00 PM	3	106	56	2	167	27	172	1	0	200	2	2	2	2	8	126	0	57	0	183	558
05:15 PM	1	108	74	0	183	35	183	0	0	218	1	0	1	0	2	150	1	56	0	207	610
05:30 PM	0	101	51	0	152	18	172	0	0	190	0	1	1	0	2	130	0	65	0	195	539
05:45 PM	3	108	50	0	161	38	189	0	0	227	0	1	5	0	6	105	0	34	0	139	533
Total	7	423	231	2	663	118	716	1	0	835	3	4	9	2	18	511	1	212	0	724	2240
Grand Total	43	2067	1466	2	3578	837	2455	11	0	3303	6	9	28	2	45	1407	18	596	1	2022	8948
Apprch %	1.2	57.8	41	0.1		25.3	74.3	0.3	0		13.3	20	62.2	4.4		69.6	0.9	29.5	0		
Total %	0.5	23.1	16.4	0	40	9.4	27.4	0.1	0	36.9	0.1	0.1	0.3	0	0.5	15.7	0.2	6.7	0	22.6	
Cars	43	2058	1446	2	3549	825	2447	11	0	3283	6	9	24	2	41	1386	18	382	1	1787	8660
% Cars	100	99.6	98.6	100	99.2	98.6	99.7	100	0	99.4	100	100	85.7	100	91.1	98.5	100	64.1	100	88.4	96.8
Heavy Vehicles																					
% Heavy Vehicles	0	0.4	1.3	0	0.8	1.4	0.3	0	0	0.6	0	0	0	0	0	1.3	0	2.2	0	1.5	0.9
RTOR	0	0	1	0	1	0	0	0	0	0	0	0	4	0	4	3	0	201	0	204	209
% RTOR	0	0	0.1	0	0	0	0	0	0	0	0	0	14.3	0	8.9	0.2	0	33.7	0	10.1	2.3

Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/Matson Ford Rd
Date: Wednesday, November 18, 2015
Tech: RZ

File Name : SS1118-2
Site Code : 00000000
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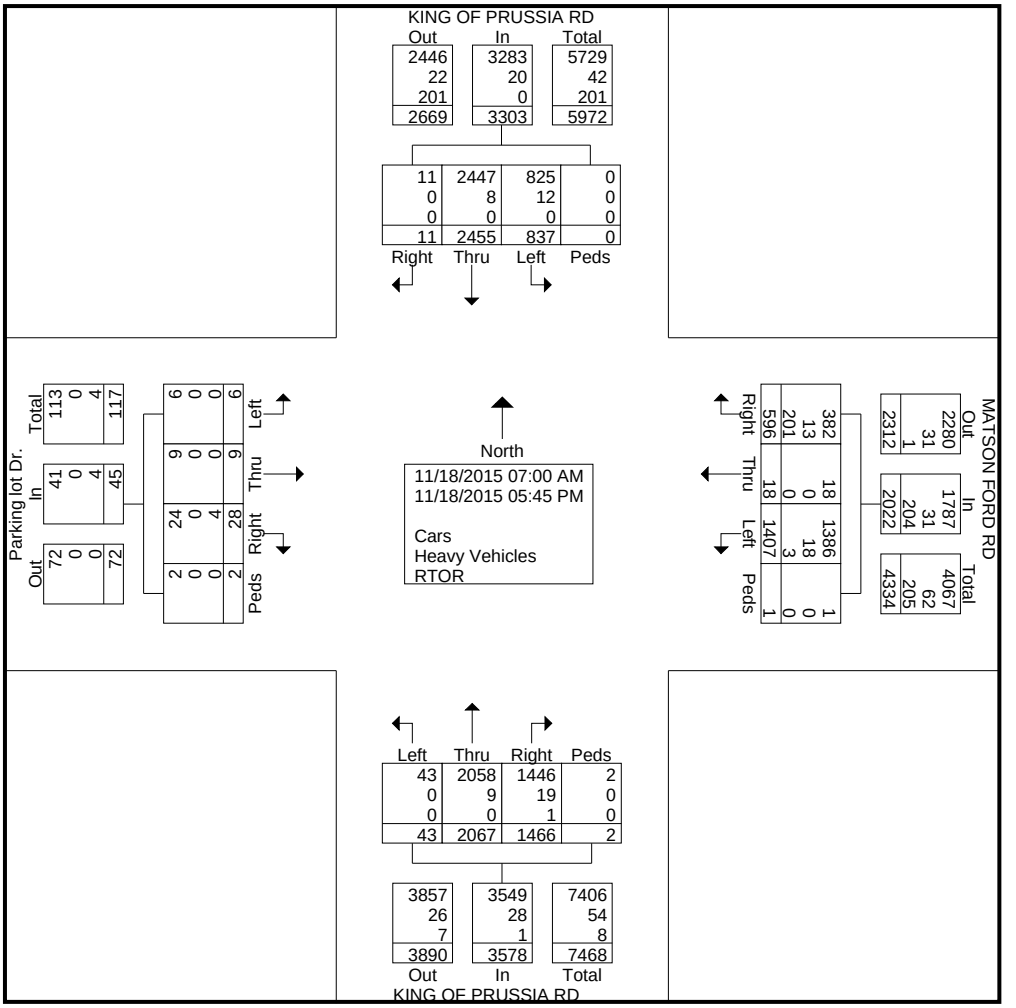

Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/Matson Ford Rd
Date: Wednesday, November 18, 2015
Tech: RZ

File Name : SS1118-2
Site Code : 00000000
Start Date : 11/18/2015
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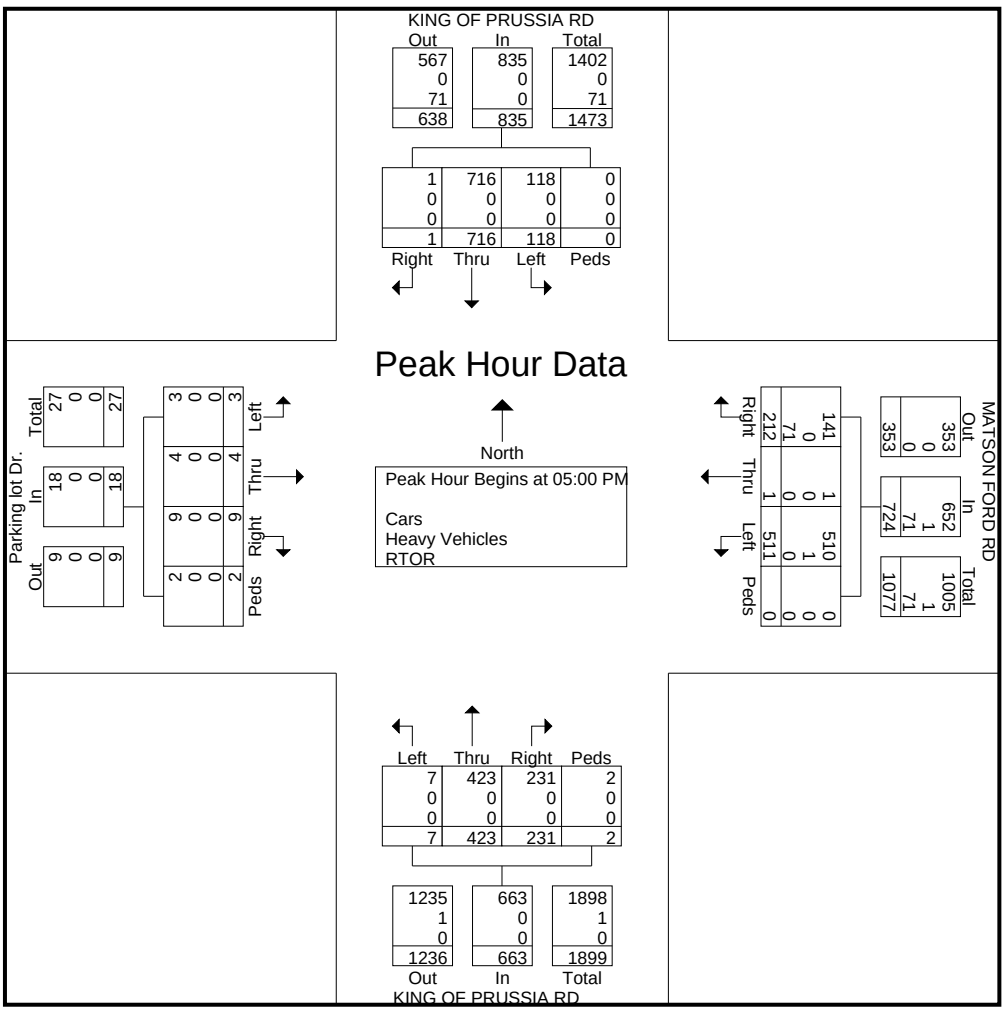
	KING OF PRUSSIA RD Northbound					KING OF PRUSSIA RD Southbound					Parking lot Dr. Eastbound					MATSON FORD RD Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	2	123	133	0	258	80	**144**														
07:30 AM	**1**	**153**	**178**	**0**	**332**	**104**	124	0	0	228	0	0	0	0	0	**84**	**1**	**34**	**0**	**119**	**679**
07:45 AM	4	**162**	139	0	305	95	136	**1**		**232**	0	0	0	0	0	75	1	26	0	102	639
08:00 AM	**5**										**1**		**2**	0	**3**	53	**5**	18	**1**		
Total Volume	12	592	576	0	1180	361	532	2	0	895	1	0	2	0	3	263	7	100	1	371	2449
% App. Total	1	50.2	48.8	0		40.3	59.4	0.2	0		33.3	0	66.7	0		70.9	1.9	27	0.3		
PHF	.600	.914	.809	.000	.889	.868	.924	.500	.000	.964	.250	.000	.250	.000	.250	.783	.350	.735	.250	.779	.902
Cars	12	588	568	0	1168	352	529	2	0	883	1	0	2	0	3	250	7	46	1	304	2358
% Cars	100	99.3	98.6	0	99.0	97.5	99.4	100	0	98.7	100	0	100	0	100	95.1	100	46.0	100	81.9	96.3
Heavy Vehicles	0	4	7	0	11	9	3	0	0	12	0	0	0	0	0	10	0	9	0	19	42
% Heavy Vehicles	0	0.7	1.2	0	0.9	2.5	0.6	0	0	1.3	0	0	0	0	0	3.8	0	9.0	0	5.1	1.7
RTOR	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	3	0	45	0	48	49
% RTOR	0	0	0.2	0	0.1	0	0	0	0	0	0	0	0	0	0	1.1	0	45.0	0	12.9	2.0

Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/Matson Ford Rd
Date: Wednesday, November 18, 2015
Tech: RZ

File Name : SS1118-2
Site Code : 00000000
Start Date : 11/18/2015
Page No : 4

	KING OF PRUSSIA RD Northbound					KING OF PRUSSIA RD Southbound					Parking lot Dr. Eastbound					MATSON FORD RD Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**3**			**2**				**1**			**2**	**2**		**2**	**8**	126	0	57	0	183	558
05:15 PM	1	**108**	**74**		**183**	35	183	0	0	218	1	0	1	0	2	**150**	**1**	56	0	**207**	**610**
05:30 PM	0	101	51	0	152	18	172	0	0	190	0	1	1	0	2	130	0	**65**			
05:45 PM	**3**	**108**	**50**	**0**	**161**	**38**	**189**	**0**	**0**	**227**	0	1	**5**	0	6	105	0	34	0	139	533
Total Volume	7	423	231	2	663	118	716	1	0	835	3	4	9	2	18	511	1	212	0	724	2240
% App. Total	1.1	63.8	34.8	0.3		14.1	85.7	0.1	0		16.7	22.2	50	11.1		70.6	0.1	29.3	0		
PHF	.583	.979	.780	.250	.906	.776	.947	.250	.000	.920	.375	.500	.450	.250	.563	.852	.250	.815	.000	.874	.918
Cars	7	423	231	2	663	118	716	1	0	835	3	4	9	2	18	510	1	141	0	652	2168
% Cars	100	100	100	100	100	100	100	100	0	100	100	100	100	100	100	99.8	100	66.5	0	90.1	96.8
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0.1	0.0
RTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	0	71	71
% RTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33.5	0	9.8	3.2



Pennoni Associates

Location: Montgomery County, PA
Intersection: I476 NB Ramp/Route 30
Date: Wednesday, November 18, 2015
Counter: ET/JT

File Name : SS1118-3
Site Code : 00000000
Start Date : 11/18/2015
Page No : 1

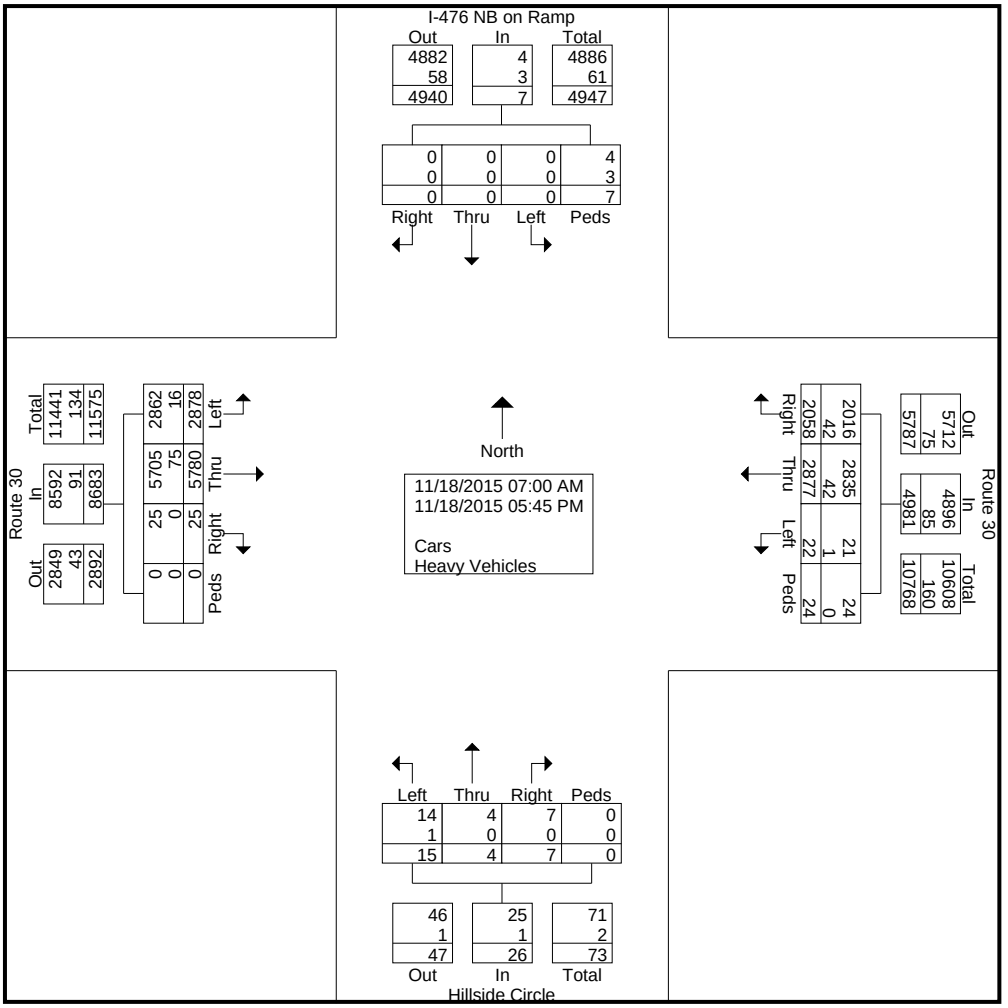
Groups Printed- Cars - Heavy Vehicles

	Hillside Circle Northbound					I-476 NB on Ramp Southbound					Route 30 Eastbound					Route 30 Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	1	0	0	0	1	0	0	0	0	0	88	243	0	0	331	2	137	89	0	228	560
07:15 AM	3	0	0	0	3	0	0	0	0	0	108	306	1	0	415	0	211	100	0	311	729
07:30 AM	1	0	0	0	1	0	0	0	2	2	152	404	1	0	557	0	157	126	11	294	854
07:45 AM	1	2	2	0	5	0	0	0	0	0	121	404	2	0	527	0	200	128	0	328	860
Total	6	2	2	0	10	0	0	0	2	2	469	1357	4	0	1830	2	705	443	11	1161	3003
08:00 AM	1	0	0	0	1	0	0	0	0	0	152	392	0	0	544	2	183	122	0	307	852
08:15 AM	0	0	0	0	0	0	0	0	0	0	117	318	2	0	437	0	188	126	4	318	755
08:30 AM	1	0	1	0	2	0	0	0	0	0	137	359	0	0	496	7	229	122	0	358	856
08:45 AM	3	0	1	0	4	0	0	0	0	0	108	372	1	0	481	0	197	92	0	289	774
Total	5	0	2	0	7	0	0	0	0	0	514	1441	3	0	1958	9	797	462	4	1272	3237
*** BREAK ***																					
04:00 PM	0	0	0	0	0	0	0	0	2	2	202	281	1	0	484	3	161	153	0	317	803
04:15 PM	0	0	1	0	1	0	0	0	0	0	216	354	1	0	571	1	159	140	0	300	872
04:30 PM	1	1	0	0	2	0	0	0	0	0	214	343	2	0	559	1	195	142	0	338	899
04:45 PM	0	0	0	0	0	0	0	0	1	1	218	357	0	0	575	0	184	145	0	329	905
Total	1	1	1	0	3	0	0	0	3	3	850	1335	4	0	2189	5	699	580	0	1284	3479
05:00 PM	0	0	0	0	0	0	0	0	0	0	270	376	1	0	647	1	165	147	3	316	963
05:15 PM	0	0	0	0	0	0	0	0	0	0	269	400	2	0	671	1	188	179	2	370	1041
05:30 PM	1	0	0	0	1	0	0	0	0	0	251	450	0	0	701	1	139	132	0	272	974
05:45 PM	2	1	2	0	5	0	0	0	2	2	255	421	11	0	687	3	184	115	4	306	1000
Total	3	1	2	0	6	0	0	0	2	2	1045	1647	14	0	2706	6	676	573	9	1264	3978
Grand Total	15	4	7	0	26	0	0	0	7	7	2878	5780	25	0	8683	22	2877	2058	24	4981	13697
Apprch %	57.7	15.4	26.9	0		0	0	0	100		33.1	66.6	0.3	0		0.4	57.8	41.3	0.5		
Total %	0.1	0	0.1	0	0.2	0	0	0	0.1	0.1	21	42.2	0.2	0	63.4	0.2	21	15	0.2	36.4	
Cars	14	4	7	0	25	0	0	0	4	4	2862	5705	25	0	8592	21	2835	2016	24	4896	13517
% Cars	93.3	100	100	0	96.2	0	0	0	57.1	57.1	99.4	98.7	100	0	99	95.5	98.5	98	100	98.3	98.7
Heavy Vehicles																					
% Heavy Vehicles	6.7	0	0	0	3.8	0	0	0	42.9	42.9	0.6	1.3	0	0	1	4.5	1.5	2	0	1.7	1.3

Pennoni Associates

Location: Montgomery County, PA
Intersection: I476 NB Ramp/Route 30
Date: Wednesday, November 18, 2015
Counter: ET/JT

File Name : SS1118-3
Site Code : 00000000
Start Date : 11/18/2015
Page No : 2

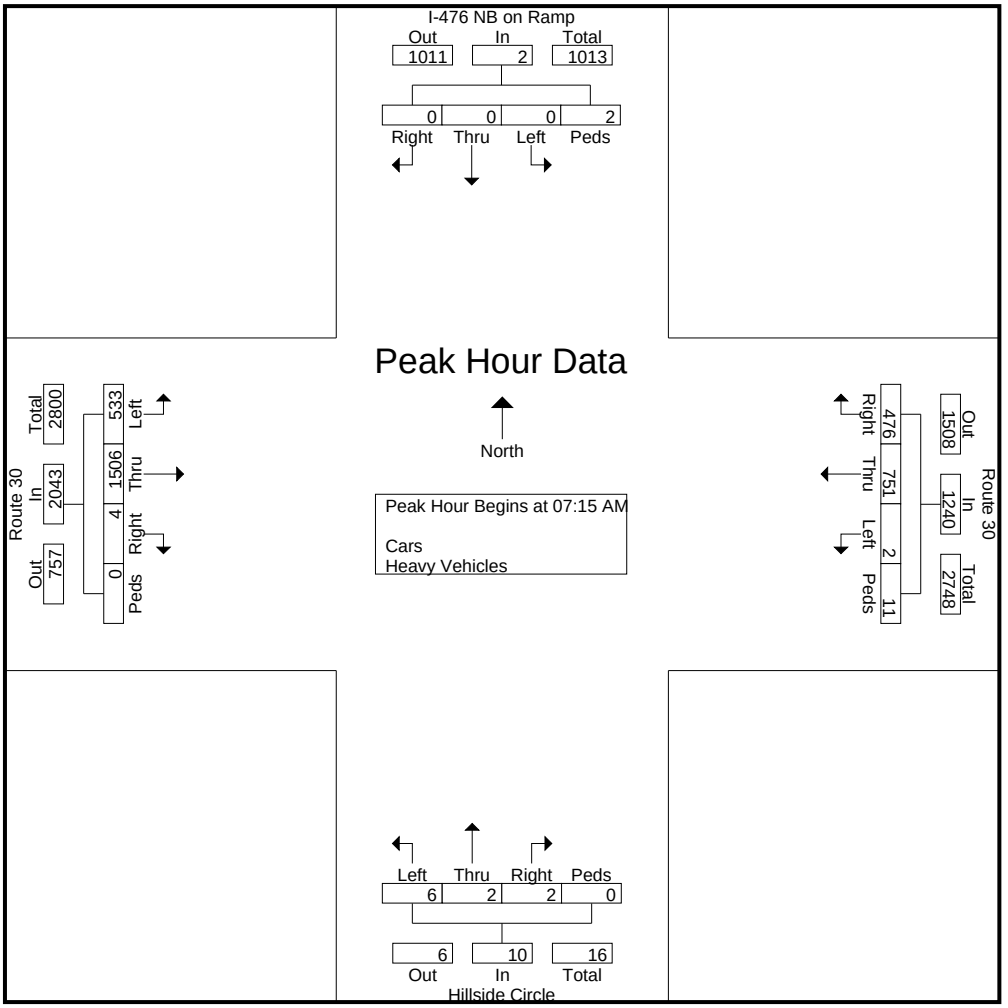


Pennoni Associates

Location: Montgomery County, PA
Intersection: I476 NB Ramp/Route 30
Date: Wednesday, November 18, 2015
Counter: ET/JT

File Name : SS1118-3
Site Code : 00000000
Start Date : 11/18/2015
Page No : 3

	Hillside Circle Northbound					I-476 NB on Ramp Southbound					Route 30 Eastbound					Route 30 Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**3**																**211**	100	0	311	729
07:30 AM	1	0	0	0	1	0	0	0	**2**	**2**	**152**	**404**			**557**	0	157	126	**11**		
07:45 AM	**1**	**2**	**2**	**0**	**5**	0	0	0	0	0	121	404	**2**	0	527	0	200	**128**	**0**	**328**	**860**
08:00 AM	1	0	0	0	1	0	0	0	0	0	152	392	0	0	544	**2**					
Total Volume	6	2	2	0	10	0	0	0	2	2	533	1506	4	0	2043	2	751	476	11	1240	3295
% App. Total																					
PHF	.500	.250	.250	.000	.500	.000	.000	.000	.250	.250	.877	.932	.500	.000	.917	.250	.890	.930	.250	.945	.958

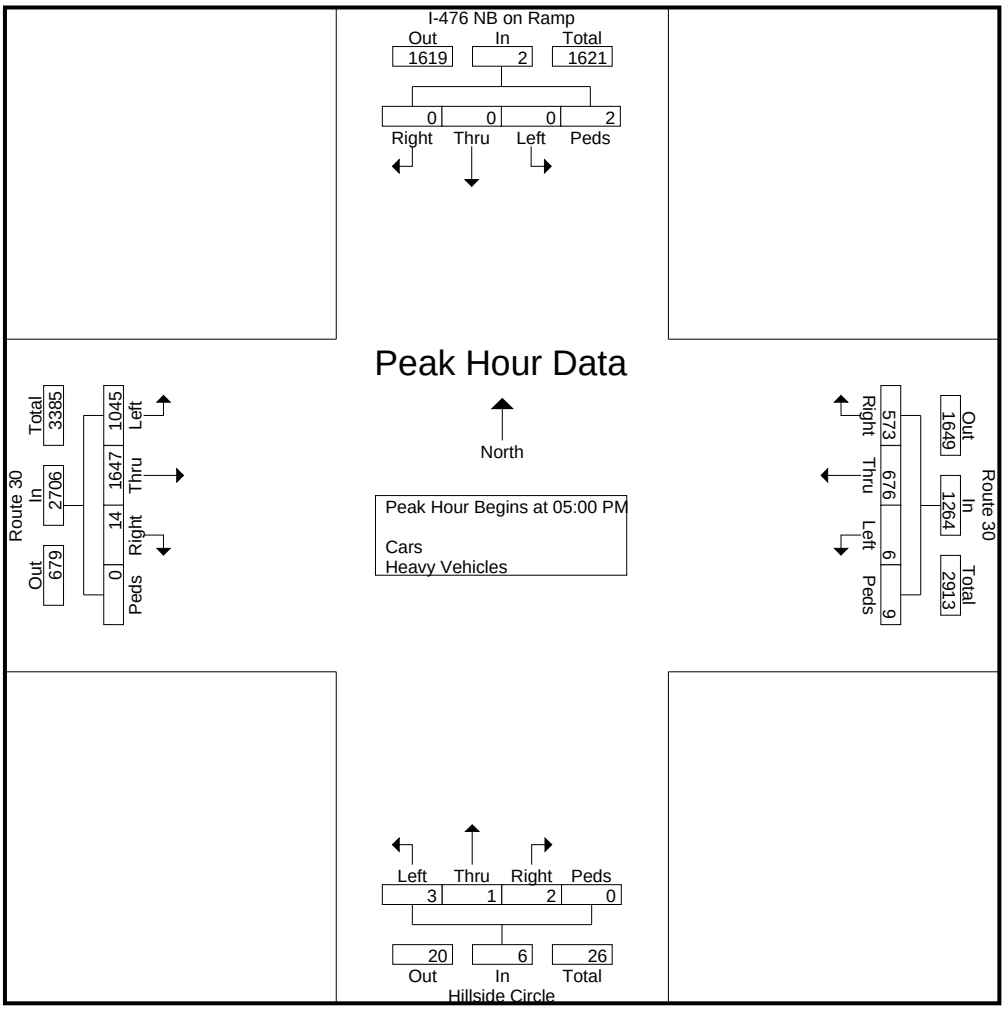


Pennoni Associates

Location: Montgomery County, PA
Intersection: I476 NB Ramp/Route 30
Date: Wednesday, November 18, 2015
Counter: ET/JT

File Name : SS1118-3
Site Code : 00000000
Start Date : 11/18/2015
Page No : 4

	Hillside Circle Northbound					I-476 NB on Ramp Southbound					Route 30 Eastbound					Route 30 Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	0	0	0	0	0	0	0	0	0	**270**										
05:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**269**	**400**	**2**	**0**	**671**	**1**	**188**	**179**	**2**	**370**	**1041**
05:30 PM	1	0	0	0	1	0	0	0	0	0	251	**450**			**701**	1	139	132	0	272	974
05:45 PM	**2**	**1**	**2**		**5**	0	0	0	**2**	**2**	255	421	**11**	0	687	**3**			**4**		
Total Volume	3	1	2	0	6	0	0	0	2	2	1045	1647	14	0	2706	6	676	573	9	1264	3978
% App. Total																					
PHF	.375	.250	.250	.000	.300	.000	.000	.000	.250	.250	.968	.915	.318	.000	.965	.500	.899	.800	.563	.854	.955



Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/North Driveway
Date: Wednesday, November 18, 2015
Counter: ACB

File Name : ss1118-4
Site Code :
Start Date : 11/18/2015
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	North Driveway Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	196	0	0	196	0	38	0	0	38	0	0	0	0	0	0	234
07:15 AM	0	221	0	0	221	0	83	0	0	83	0	0	0	0	0	0	304
07:30 AM	0	266	0	0	266	0	74	0	0	74	0	0	0	0	0	0	340
07:45 AM	0	239	0	0	239	0	73	0	0	73	0	0	0	0	0	0	312
Total	0	922	0	0	922	0	268	0	0	268	0	0	0	0	0	0	1190
08:00 AM	0	257	0	0	257	0	65	0	0	65	0	0	0	0	0	0	322
08:15 AM	0	298	0	0	298	0	55	0	0	55	0	0	0	0	0	0	353
08:30 AM	0	292	0	0	292	0	54	0	0	54	0	0	0	0	0	0	346
08:45 AM	0	306	0	0	306	0	61	0	0	61	0	0	0	0	0	0	367
Total	0	1153	0	0	1153	0	235	0	0	235	0	0	0	0	0	0	1388
04:00 PM	0	92	0	0	92	0	193	0	0	193	0	0	0	0	0	0	285
04:15 PM	0	86	0	0	86	0	202	0	0	202	0	0	0	0	0	0	288
04:30 PM	0	73	0	0	73	0	228	0	0	228	0	0	0	0	0	0	301
04:45 PM	0	73	0	0	73	0	211	0	0	211	0	0	0	0	0	0	284
Total	0	324	0	0	324	0	834	0	0	834	0	0	0	0	0	0	1158
05:00 PM	0	58	0	0	58	0	276	0	0	276	0	0	0	0	0	0	334
05:15 PM	0	68	0	0	68	0	283	0	0	283	0	0	0	0	0	0	351
05:30 PM	0	53	0	0	53	0	263	0	0	263	0	0	0	0	0	0	316
05:45 PM	0	90	0	0	90	0	220	0	0	220	0	0	0	0	0	0	310
Total	0	269	0	0	269	0	1042	0	0	1042	0	0	0	0	0	0	1311
Grand Total	0	2668	0	0	2668	0	2379	0	0	2379	0	0	0	0	0	0	5047
Apprch %	0	100	0	0		0	100	0	0			0	0	0	0		
Total %	0	52.9	0	0	52.9	0	47.1	0	0	47.1	0	0	0	0	0	0	
Cars	0	2616	0	0	2616	0	2332	0	0	2332	0	0	0	0	0	0	4948
% Cars	0	98.1	0	0	98.1	0	98	0	0	98	0	0	0	0	0	0	98
Heavy Vehicles	0	52	0	0	52	0	47	0	0	47	0	0	0	0	0	0	99
% Heavy Vehicles	0	1.9	0	0	1.9	0	2	0	0	2	0	0	0	0	0	0	2

Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/North Driveway
Date: Wednesday, November 18, 2015
Counter: ACB

File Name : ss1118-4
Site Code :
Start Date : 11/18/2015
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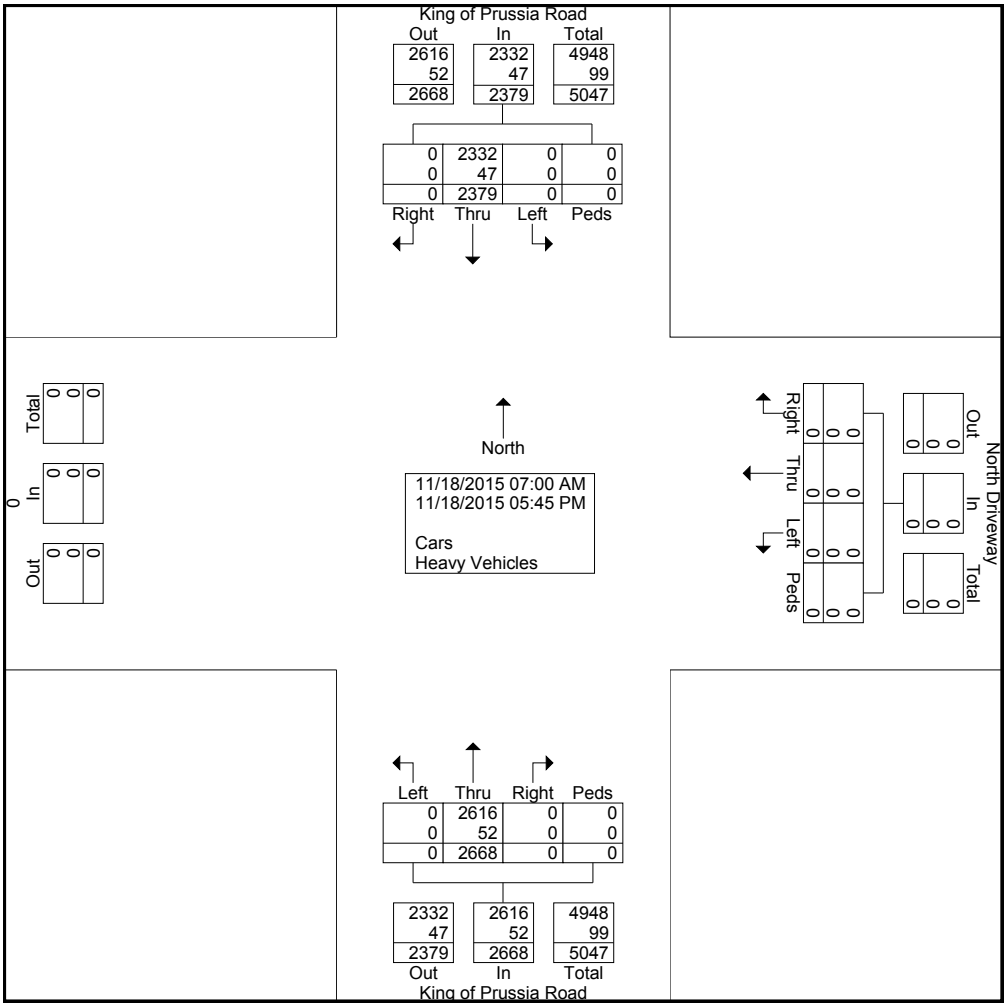
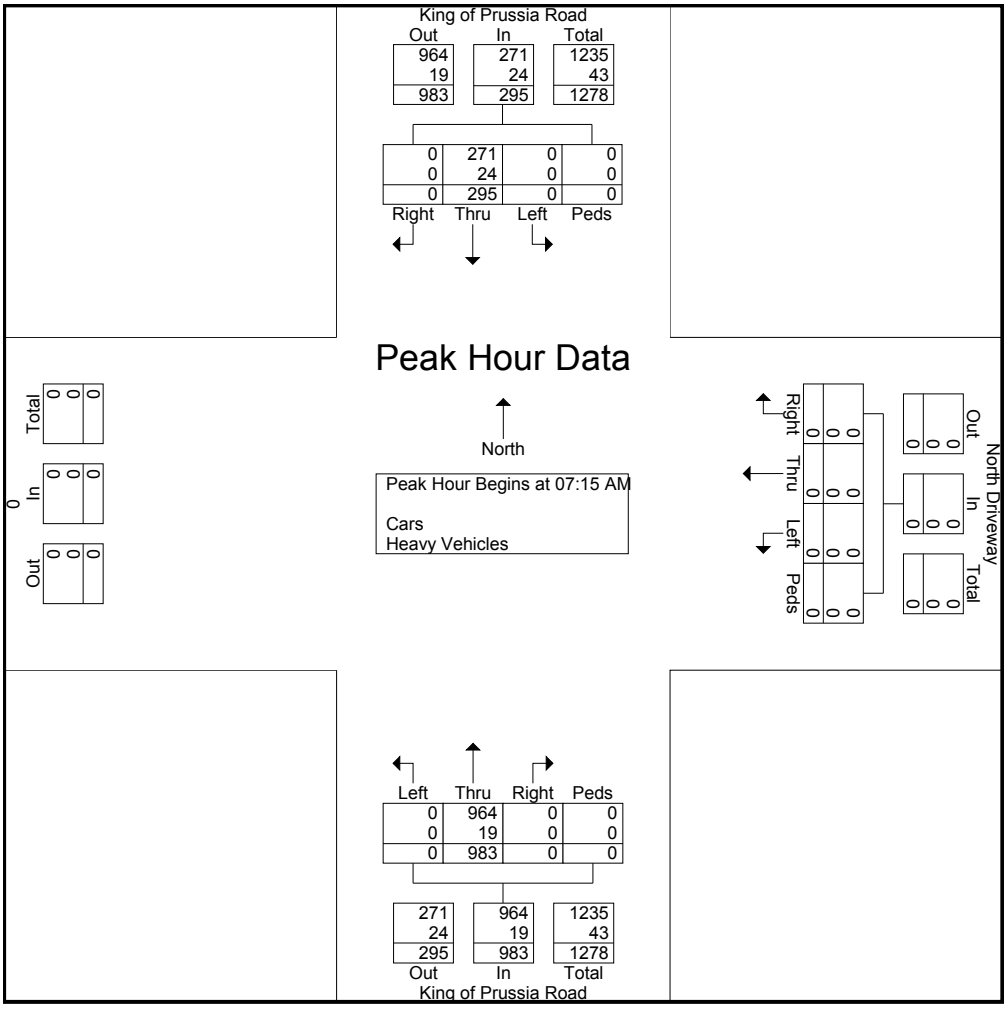


Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/North Driveway
Date: Wednesday, November 18, 2015
Counter: ACB

File Name : ss1118-4
Site Code :
Start Date : 11/18/2015
Page No : 3

	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	North Driveway Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	221	0	0	221	0	83	0	0	83	0	0	0	0	0	0	304
07:30 AM	0	266	0	0	266	0	74	0	0	74	0	0	0	0	0	0	340
07:45 AM	0	239	0	0	239	0	73	0	0	73	0	0	0	0	0	0	312
08:00 AM	0	257	0	0	257	0	65	0	0	65	0	0	0	0	0	0	322
Total Volume	0	983	0	0	983	0	295	0	0	295	0	0	0	0	0	0	1278
% App. Total	0	100	0	0		0	100	0	0			0	0	0	0		
PHF	.000	.924	.000	.000	.924	.000	.889	.000	.000	.889	.000	.000	.000	.000	.000	.000	.940
Cars	0	964	0	0	964	0	271	0	0	271	0	0	0	0	0	0	1235
% Cars	0	98.1	0	0	98.1	0	91.9	0	0	91.9	0	0	0	0	0	0	96.6
Heavy Vehicles	0	19	0	0	19	0	24	0	0	24	0	0	0	0	0	0	43
% Heavy Vehicles	0	1.9	0	0	1.9	0	8.1	0	0	8.1	0	0	0	0	0	0	3.4



Pennoni Associates

Location: Montgomery County, PA
Intersection: K of P Rd/North Driveway
Date: Wednesday, November 18, 2015
Counter: ACB

File Name : ss1118-4
Site Code :
Start Date : 11/18/2015
Page No : 4

	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	North Driveway Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	58	0	0	58	0	276	0	0	276	0	0	0	0	0	0	334
05:15 PM	0	68	0	0	68	0	283	0	0	283	0	0	0	0	0	0	351
05:30 PM	0	53	0	0	53	0	263	0	0	263	0	0	0	0	0	0	316
05:45 PM	0	90	0	0	90	0	220	0	0	220	0	0	0	0	0	0	310
Total Volume	0	269	0	0	269	0	1042	0	0	1042	0	0	0	0	0	0	1311
% App. Total	0	100	0	0		0	100	0	0			0	0	0	0		
PHF	.000	.747	.000	.000	.747	.000	.920	.000	.000	.920	.000	.000	.000	.000	.000	.000	.934
Cars	0	267	0	0	267	0	1039	0	0	1039	0	0	0	0	0	0	1306
% Cars	0	99.3	0	0	99.3	0	99.7	0	0	99.7	0	0	0	0	0	0	99.6
Heavy Vehicles	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	5
% Heavy Vehicles	0	0.7	0	0	0.7	0	0.3	0	0	0.3	0	0	0	0	0	0	0.4

Pennoni Associates

Location: Montgomery County, PA
South Driveway
Date: Wednesday, November 18, 2015
Counter: PG

File Name : SS1118-5
Site Code :
Start Date : 11/18/2015
Page No : 1

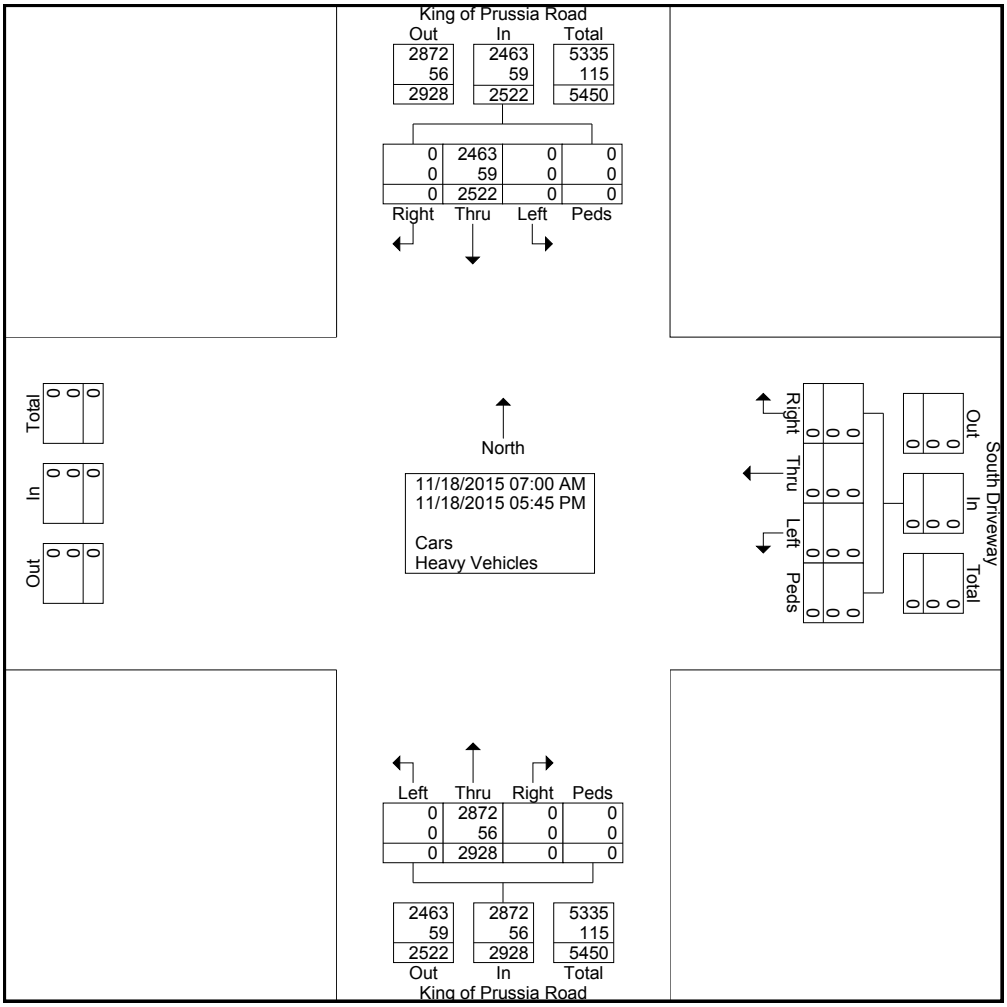
Groups Printed- Cars - Heavy Vehicles

	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	South Driveway Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	240	0	0	240	0	47	0	0	47	0	0	0	0	0	0	287
07:15 AM	0	349	0	0	349	0	107	0	0	107	0	0	0	0	0	0	456
07:30 AM	0	292	0	0	292	0	112	0	0	112	0	0	0	0	0	0	404
07:45 AM	0	242	0	0	242	0	79	0	0	79	0	0	0	0	0	0	321
Total	0	1123	0	0	1123	0	345	0	0	345	0	0	0	0	0	0	1468
08:00 AM	0	261	0	0	261	0	68	0	0	68	0	0	0	0	0	0	329
08:15 AM	0	301	0	0	301	0	60	0	0	60	0	0	0	0	0	0	361
08:30 AM	0	296	0	0	296	0	54	0	0	54	0	0	0	0	0	0	350
08:45 AM	0	313	0	0	313	0	61	0	0	61	0	0	0	0	0	0	374
Total	0	1171	0	0	1171	0	243	0	0	243	0	0	0	0	0	0	1414
04:00 PM	0	94	0	0	94	0	198	0	0	198	0	0	0	0	0	0	292
04:15 PM	0	90	0	0	90	0	202	0	0	202	0	0	0	0	0	0	292
04:30 PM	0	74	0	0	74	0	243	0	0	243	0	0	0	0	0	0	317
04:45 PM	0	84	0	0	84	0	218	0	0	218	0	0	0	0	0	0	302
Total	0	342	0	0	342	0	861	0	0	861	0	0	0	0	0	0	1203
05:00 PM	0	67	0	0	67	0	287	0	0	287	0	0	0	0	0	0	354
05:15 PM	0	71	0	0	71	0	294	0	0	294	0	0	0	0	0	0	365
05:30 PM	0	58	0	0	58	0	272	0	0	272	0	0	0	0	0	0	330
05:45 PM	0	96	0	0	96	0	220	0	0	220	0	0	0	0	0	0	316
Total	0	292	0	0	292	0	1073	0	0	1073	0	0	0	0	0	0	1365
Grand Total	0	2928	0	0	2928	0	2522	0	0	2522	0	0	0	0	0	0	5450
Apprch %	0	100	0	0		0	100	0	0			0	0	0	0		
Total %	0	53.7	0	0	53.7	0	46.3	0	0	46.3	0	0	0	0	0	0	
Cars	0	2872	0	0	2872	0	2463	0	0	2463	0	0	0	0	0	0	5335
% Cars	0	98.1	0	0	98.1	0	97.7	0	0	97.7	0	0	0	0	0	0	97.9
Heavy Vehicles	0	56	0	0	56	0	59	0	0	59	0	0	0	0	0	0	115
% Heavy Vehicles	0	1.9	0	0	1.9	0	2.3	0	0	2.3	0	0	0	0	0	0	2.1

Pennoni Associates

Location: Montgomery County, PA
South Driveway
Date: Wednesday, November 18, 2015
Counter: PG

File Name : SS1118-5
Site Code :
Start Date : 11/18/2015
Page No : 2



Pennoni Associates

Location: Montgomery County, PA
South Driveway
Date: Wednesday, November 18, 2015
Counter: PG

File Name : SS1118-5
Site Code :
Start Date : 11/18/2015
Page No : 3

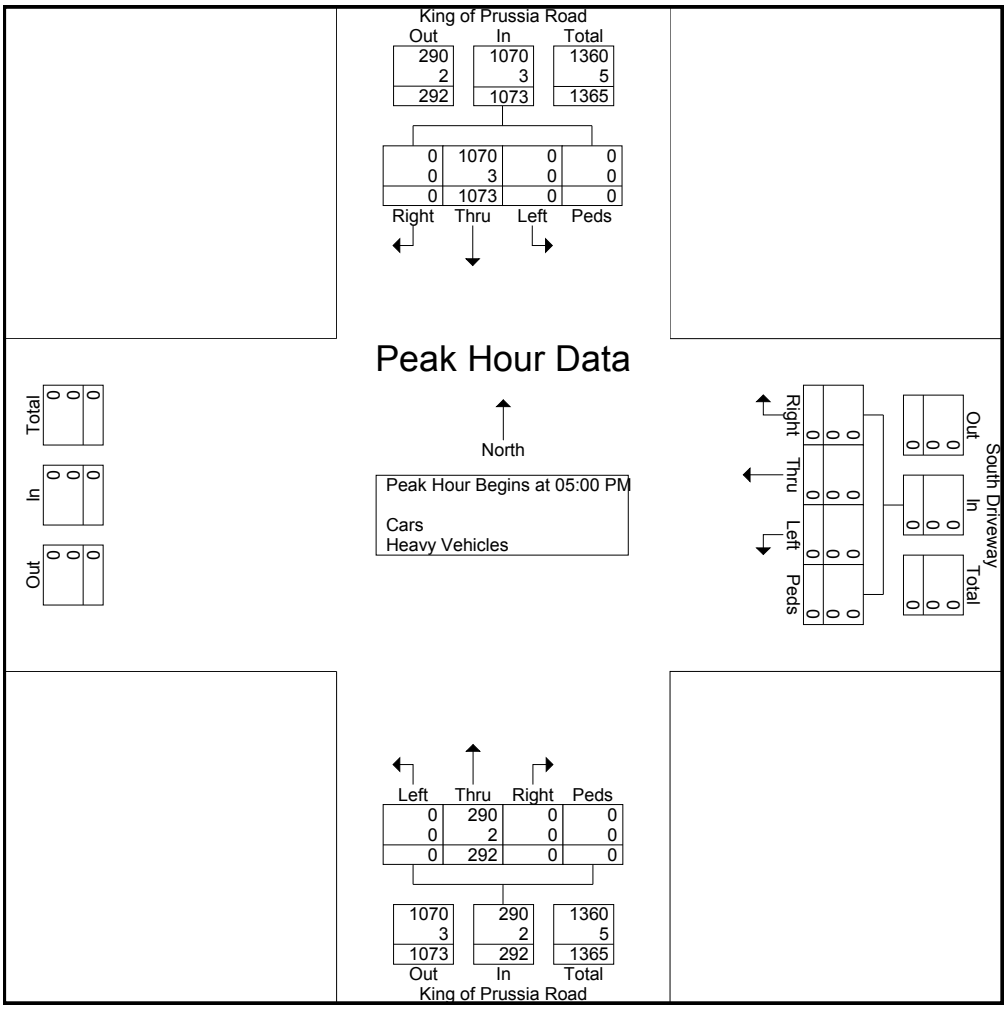
	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	South Driveway Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	349	0	0	349	0	107	0	0	107	0	0	0	0	0	0	456
07:30 AM	0	292	0	0	292	0	112	0	0	112	0	0	0	0	0	0	404
07:45 AM	0	242	0	0	242	0	79	0	0	79	0	0	0	0	0	0	321
08:00 AM	0	261	0	0	261	0	68	0	0	68	0	0	0	0	0	0	329
Total Volume	0	1144	0	0	1144	0	366	0	0	366	0	0	0	0	0	0	1510
% App. Total	0	100	0	0		0	100	0	0			0	0	0	0		
PHF	.000	.819	.000	.000	.819	.000	.817	.000	.000	.817	.000	.000	.000	.000	.000	.000	.828
Cars	0	1126	0	0	1126	0	337	0	0	337	0	0	0	0	0	0	1463
% Cars	0	98.4	0	0	98.4	0	92.1	0	0	92.1	0	0	0	0	0	0	96.9
Heavy Vehicles	0	18	0	0	18	0	29	0	0	29	0	0	0	0	0	0	47
% Heavy Vehicles	0	1.6	0	0	1.6	0	7.9	0	0	7.9	0	0	0	0	0	0	3.1

Pennoni Associates

Location: Montgomery County, PA
South Driveway
Date: Wednesday, November 18, 2015
Counter: PG

File Name : SS1118-5
Site Code :
Start Date : 11/18/2015
Page No : 4

	King of Prussia Road Northbound					King of Prussia Road Southbound					Eastbound	South Driveway Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	67	0	0	67	0	287	0	0	287	0	0	0	0	0	0	354
05:15 PM	0	71	0	0	71	0	294	0	0	294	0	0	0	0	0	0	365
05:30 PM	0	58	0	0	58	0	272	0	0	272	0	0	0	0	0	0	330
05:45 PM	0	96	0	0	96	0	220	0	0	220	0	0	0	0	0	0	316
Total Volume	0	292	0	0	292	0	1073	0	0	1073	0	0	0	0	0	0	1365
% App. Total	0	100	0	0		0	100	0	0			0	0	0	0		
PHF	.000	.760	.000	.000	.760	.000	.912	.000	.000	.912	.000	.000	.000	.000	.000	.000	.935
Cars	0	290	0	0	290	0	1070	0	0	1070	0	0	0	0	0	0	1360
% Cars	0	99.3	0	0	99.3	0	99.7	0	0	99.7	0	0	0	0	0	0	99.6
Heavy Vehicles	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	0	5
% Heavy Vehicles	0	0.7	0	0	0.7	0	0.3	0	0	0.3	0	0	0	0	0	0	0.4



Pennoni Associates

Location: Montgomery County, PA
Intersection: 476NB Off/Rt. 30/ KOP Rd.
Date: Tuesday, November 24, 2015
Counter: ET / JT

File Name : SS1124-1
Site Code : 00000000
Start Date : 11/24/2015
Page No : 1

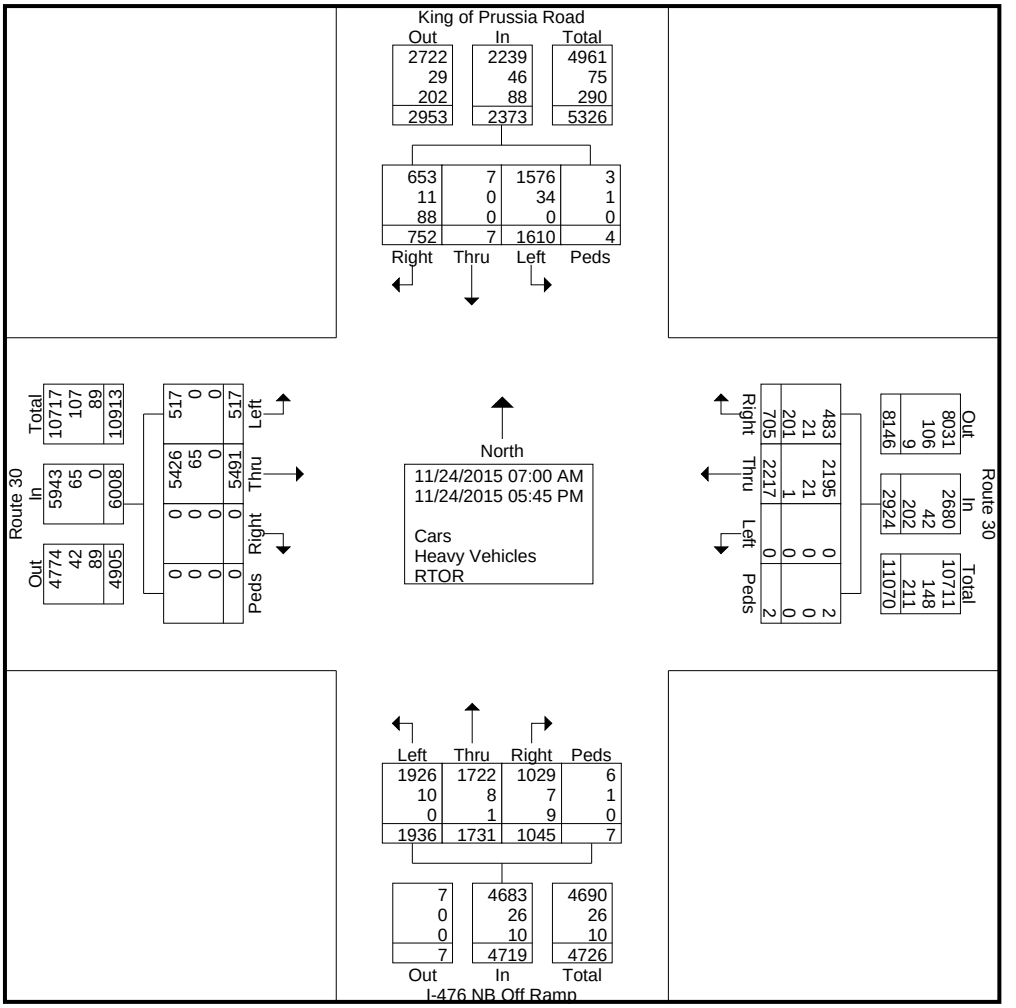
Groups Printed- Cars - Heavy Vehicles - RTOR

	I-476 NB Off Ramp Northbound					King of Prussia Road Southbound					Route 30 Eastbound					Route 30 Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	147	182	66	0	395	35	0	13	0	48	42	231	0	0	273	0	92	43	0	135	851
07:15 AM	170	186	68	0	424	59	0	42	0	101	78	278	0	0	356	0	103	110	0	213	1094
07:30 AM	192	173	85	0	450	82	0	30	0	112	29	325	0	0	354	0	148	58	0	206	1122
07:45 AM	216	153	88	0	457	58	0	16	0	74	18	321	0	0	339	0	145	53	0	198	1068
Total	725	694	307	0	1726	234	0	101	0	335	167	1155	0	0	1322	0	488	264	0	752	4135
08:00 AM	167	186	90	0	443	51	0	16	1	68	43	333	0	0	376	0	128	33	0	161	1048
08:15 AM	188	183	88	0	459	47	0	13	0	60	56	327	0	0	383	0	147	49	0	196	1098
08:30 AM	170	161	92	0	423	33	7	8	0	48	68	333	0	0	401	0	147	50	0	197	1069
08:45 AM	126	124	87	0	337	42	0	12	0	54	73	312	0	0	385	0	166	60	1	227	1003
Total	651	654	357	0	1662	173	7	49	1	230	240	1305	0	0	1545	0	588	192	1	781	4218
*** BREAK ***																					
04:00 PM	67	54	40	0	161	138	0	74	2	214	19	374	0	0	393	0	167	24	0	191	959
04:15 PM	80	52	42	1	175	114	0	59	0	173	21	383	0	0	404	0	149	29	0	178	930
04:30 PM	69	36	34	0	139	176	0	87	0	263	12	387	0	0	399	0	123	24	0	147	948
04:45 PM	77	45	55	0	177	125	0	83	1	209	12	378	0	0	390	0	135	27	0	162	938
Total	293	187	171	1	652	553	0	303	3	859	64	1522	0	0	1586	0	574	104	0	678	3775
05:00 PM	62	37	50	0	149	184	0	98	0	282	11	362	0	0	373	0	149	31	0	180	984
05:15 PM	73	49	45	0	167	180	0	87	0	267	16	394	0	0	410	0	151	39	0	190	1034
05:30 PM	77	43	62	0	182	164	0	64	0	228	10	392	0	0	402	0	124	32	1	157	969
05:45 PM	55	67	53	6	181	122	0	50	0	172	9	361	0	0	370	0	143	43	0	186	909
Total	267	196	210	6	679	650	0	299	0	949	46	1509	0	0	1555	0	567	145	1	713	3896
Grand Total	1936	1731	1045	7	4719	1610						5491	0	0	6008	0	2217				
Cars	1926	1722	1029	6	4683	1576	7	653	3	2239	517	5426	0	0	5943	0	2195	483	2	2680	15545
% Cars	99.5	99.5	98.5	85.7	99.2	97.9	100	86.8	75	94.4	100	98.8	0	0	98.9	0	99	68.5	100	91.7	97
Heavy Vehicles	10	8	7	1	26	34	0	11	1	46	0	65	0	0	65	0	21	21	0	42	179
% Heavy Vehicles	0.5	0.5	0.7	14.3	0.6	2.1	0	1.5	25	1.9	0	1.2	0	0	1.1	0	0.9	3	0	1.4	1.1
RTOR	0	1	9	0	10	0	0	88	0	88	0	0	0	0	0	0	1	201	0	202	300
% RTOR	0	0.1	0.9	0	0.2	0	0	11.7	0	3.7	0	0	0	0	0	0	0	28.5	0	6.9	1.9

Pennoni Associates

Location: Montgomery County, PA
Intersection: 476NB Off/Rt. 30/ KOP Rd.
Date: Tuesday, November 24, 2015
Counter: ET / JT

File Name : SS1124-1
Site Code : 00000000
Start Date : 11/24/2015
Page No : 2

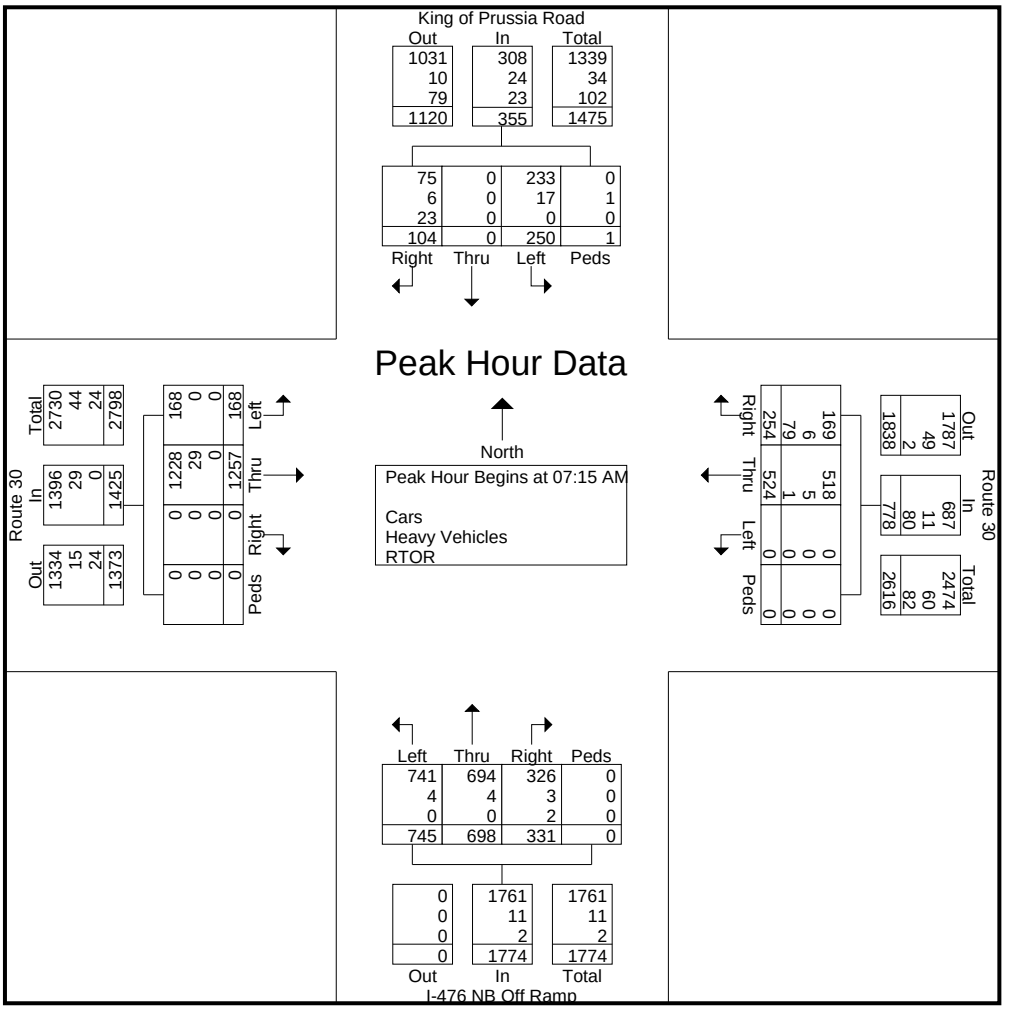


Pennoni Associates

Location: Montgomery County, PA
Intersection: 476NB Off/Rt. 30/ KOP Rd.
Date: Tuesday, November 24, 2015
Counter: ET / JT

File Name : SS1124-1
Site Code : 00000000
Start Date : 11/24/2015
Page No : 3

	I-476 NB Off Ramp Northbound					King of Prussia Road Southbound					Route 30 Eastbound					Route 30 Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	170	186	68	0	424	59	0	42	0	101	78	278	0	0	356	0	103	110	0	213	1094
07:30 AM	192	173	85	0	450	82	0	30	0	112	29	325	0	0	354	0	148	58	0	206	1122
07:45 AM	216	153	88	0	457	58	0	16	0	74	18	321	0	0	339	0	145	53	0	198	1068
08:00 AM	167	186	90	0	443	51	0	16	1	68	43	333	0	0	376	0	128	33	0	161	1048
Total Volume	745	698	331	0	1774	250	0	104	1	355	168	1257	0	0	1425	0	524	254	0	778	4332
% App. Total																					
PHF	.862	.938	.919	.000	.970	.762	.000	.619	.250	.792	.538	.944	.000	.000	.947	.000	.885	.577	.000	.913	.965
Cars	741	694	326	0	1761	233	0	75	0	308	168	1228	0	0	1396	0	518	169	0	687	4152
% Cars	99.5	99.4	98.5	0	99.3	93.2	0	72.1	0	86.8	100	97.7	0	0	98.0	0	98.9	66.5	0	88.3	95.8
Heavy Vehicles																					
% Heavy Vehicles	0.5	0.6	0.9	0	0.6	6.8	0	5.8	100	6.8	0	2.3	0	0	2.0	0	1.0	2.4	0	1.4	1.7
RTOR	0	0	2	0	2	0	0	23	0	23	0	0	0	0	0	0	1	79	0	80	105
% RTOR	0	0	0.6	0	0.1	0	0	22.1	0	6.5	0	0	0	0	0	0	0.2	31.1	0	10.3	2.4

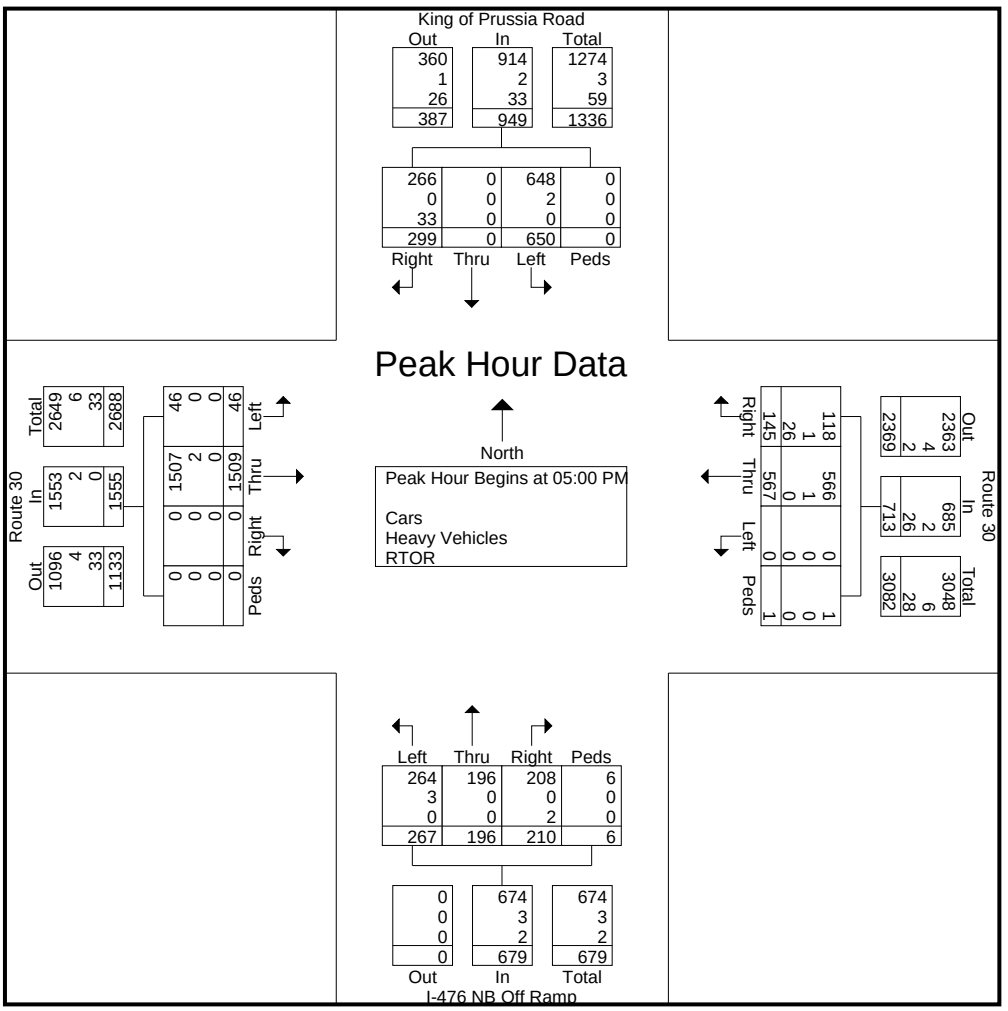


Pennoni Associates

Location: Montgomery County, PA
Intersection: 476NB Off/Rt. 30/ KOP Rd.
Date: Tuesday, November 24, 2015
Counter: ET / JT

File Name : SS1124-1
Site Code : 00000000
Start Date : 11/24/2015
Page No : 4

	I-476 NB Off Ramp Northbound					King of Prussia Road Southbound					Route 30 Eastbound					Route 30 Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 05:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	62	37	50	0	149	184	0	98	0	282	11	362	0	0	373	0	149	31	0	180	984
05:15 PM	73	49	45	0	167	180	0	87	0	267	16	394	0	0	410	0	151	39	0	190	1034
05:30 PM	77	43	62	0	182	164	0	64	0	228	10	392	0	0	402	0	124	32	1	157	969
05:45 PM	55	67	53	6	181	122	0	50	0	172	9	361	0	0	370	0	143	43	0	186	909
Total Volume	267	196	210	6	679	650	0	299	0	949	46	1509	0	0	1555	0	567	145	1	713	3896
% App. Total																					
PHF	.867	.731	.847	.250	.933	.883	.000	.763	.000	.841	.719	.957	.000	.000	.948	.000	.939	.843	.250	.938	.942
Cars	264	196	208	6	674	648	0	266	0	914	46	1507	0	0	1553	0	566	118	1	685	3826
% Cars	98.9	100	99.0	100	99.3	99.7	0	89.0	0	96.3	100	99.9	0	0	99.9	0	99.8	81.4	100	96.1	98.2
Heavy Vehicles																					
% Heavy Vehicles	1.1	0	0	0	0.4	0.3	0	0	0	0.2	0	0.1	0	0	0.1	0	0.2	0.7	0	0.3	0.2
RTOR	0	0	2	0	2	0	0	33	0	33	0	0	0	0	0	0	0	26	0	26	61
% RTOR	0	0	1.0	0	0.3	0	0	11.0	0	3.5	0	0	0	0	0	0	0	17.9	0	3.6	1.6



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Montgomery County, PA
US 30/I476 SB Ramps
Thursday, September 8, 2016
Location: 40.037391, -75.359559

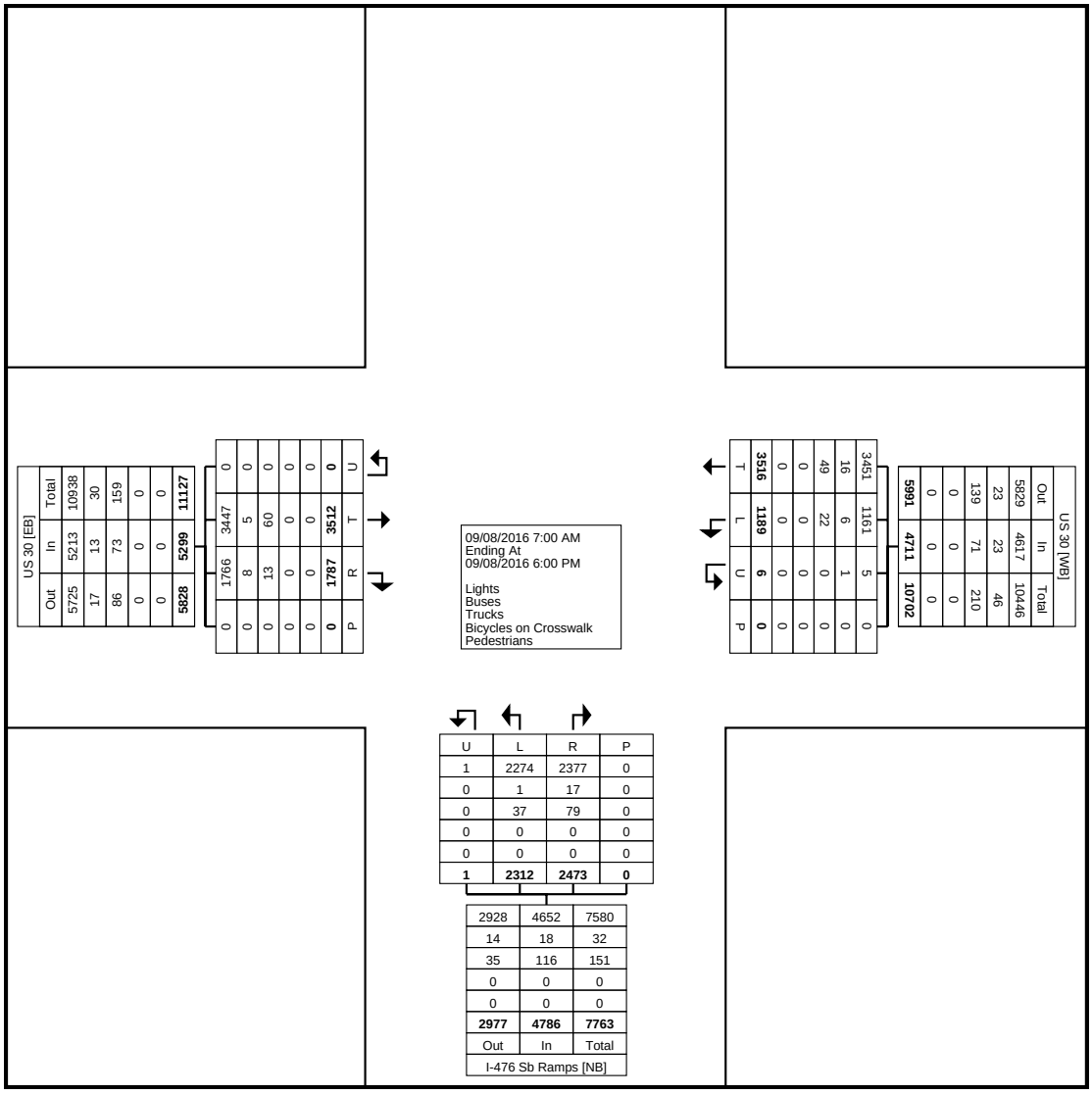
Count Name: US 30 / I-476 Sb Ramps
Site Code:
Start Date: 09/08/2016

Turning Movement Data

Start Time	US 30 Westbound					I-476 Sb Ramps Northbound						US 30 Eastbound						Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	U-Turn	Peds	App. Total	
7:00 AM	177	19	0	0	196	66	95	122	0	0	283	68	36	157	0	0	261	740
7:15 AM	245	34	0	0	279	68	90	136	0	0	294	58	45	170	0	0	273	846
7:30 AM	255	46	0	0	301	51	105	189	0	0	345	44	40	210	0	0	294	940
7:45 AM	300	39	0	0	339	99	76	197	0	0	372	27	61	184	0	0	272	983
Hourly Total	977	138	0	0	1115	284	366	644	0	0	1294	197	182	721	0	0	1100	3509
8:00 AM	308	33	0	0	341	118	58	170	0	0	346	23	58	200	0	0	281	968
8:15 AM	290	44	0	0	334	102	66	213	0	0	381	35	39	204	0	0	278	993
8:30 AM	285	37	0	0	322	120	74	200	0	0	394	32	48	165	0	0	245	961
8:45 AM	241	31	1	0	273	106	88	209	0	0	403	38	27	148	0	0	213	889
Hourly Total	1124	145	1	0	1270	446	286	792	0	0	1524	128	172	717	0	0	1017	3811
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	162	112	0	0	274	30	60	81	0	0	171	72	73	240	0	0	385	830
4:15 PM	162	109	0	0	271	56	68	95	0	0	219	70	61	257	0	0	388	878
4:30 PM	193	101	1	0	295	37	79	126	1	0	243	69	55	287	0	0	411	949
4:45 PM	204	106	0	0	310	70	85	106	0	0	261	67	66	277	0	0	410	981
Hourly Total	721	428	1	0	1150	193	292	408	1	0	894	278	255	1061	0	0	1594	3638
5:00 PM	151	131	0	0	282	59	89	105	0	0	253	58	76	272	0	0	406	941
5:15 PM	174	102	0	0	276	60	79	105	0	0	244	80	76	260	0	0	416	936
5:30 PM	179	120	2	0	301	83	82	132	0	0	297	68	77	227	0	0	372	970
5:45 PM	190	125	2	0	317	86	68	126	0	0	280	71	69	254	0	0	394	991
Hourly Total	694	478	4	0	1176	288	318	468	0	0	1074	277	298	1013	0	0	1588	3838
Grand Total	3516	1189	6	0	4711	1211	1262	2312	1	0	4786	880	907	3512	0	0	5299	14796
Approach %	74.6	25.2	0.1	-	-	25.3	26.4	48.3	0.0	-	-	16.6	17.1	66.3	0.0	-	-	-
Total %	23.8	8.0	0.0	-	31.8	8.2	8.5	15.6	0.0	-	32.3	5.9	6.1	23.7	0.0	-	35.8	-
Lights	3451	1161	5	-	4617	1162	1215	2274	1	-	4652	871	895	3447	0	-	5213	14482
% Lights	98.2	97.6	83.3	-	98.0	96.0	96.3	98.4	100.0	-	97.2	99.0	98.7	98.1	-	-	98.4	97.9
Buses	16	6	1	-	23	6	11	1	0	-	18	5	3	5	0	-	13	54
% Buses	0.5	0.5	16.7	-	0.5	0.5	0.9	0.0	0.0	-	0.4	0.6	0.3	0.1	-	-	0.2	0.4
Trucks	49	22	0	-	71	43	36	37	0	-	116	4	9	60	0	-	73	260
% Trucks	1.4	1.9	0.0	-	1.5	3.6	2.9	1.6	0.0	-	2.4	0.5	1.0	1.7	-	-	1.4	1.8
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Montgomery County, PA
US 30/I476 SB Ramps
Thursday, September 8, 2016
Location: 40.037391, -75.359559

Count Name: US 30 / I-476 Sb Ramps
Site Code:
Start Date: 09/08/2016



Turning Movement Data Plot

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Montgomery County, PA
US 30/I476 SB Ramps
Thursday, September 8, 2016
Location: 40.037391, -75.359559

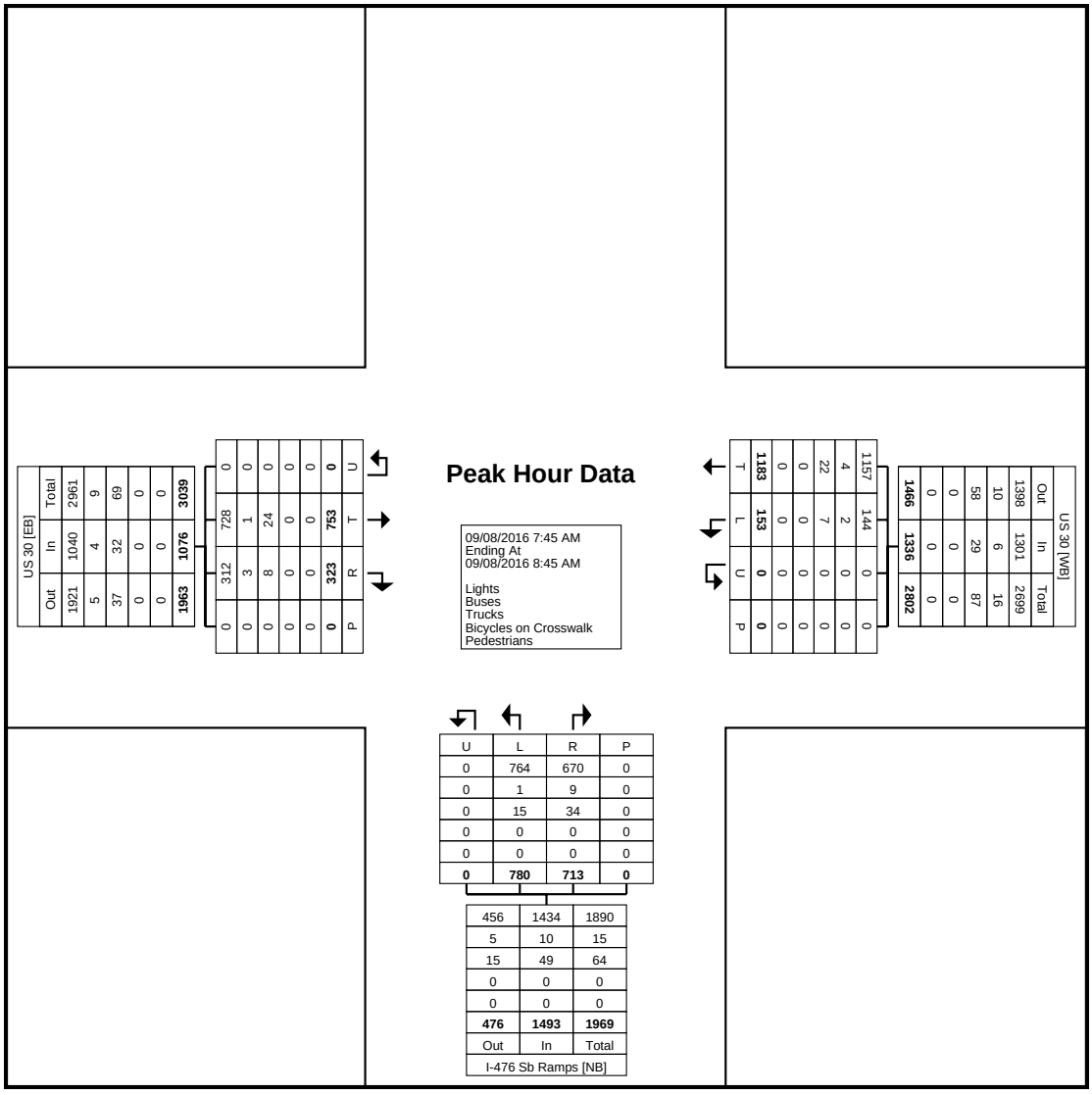
Count Name: US 30 / I-476 Sb Ramps
Site Code:
Start Date: 09/08/2016

Turning Movement Peak Hour Data (7:45 AM)

Start Time	US 30 Westbound					I-476 Sb Ramps Northbound						US 30 Eastbound						
	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	U-Turn	Peds	App. Total	Int. Total
7:45 AM	300	39	0	0	339	99	76	197	0	0	372	27	61	184	0	0	272	983
8:00 AM	308	33	0	0	341	118	58	170	0	0	346	23	58	200	0	0	281	968
8:15 AM	290	44	0	0	334	102	66	213	0	0	381	35	39	204	0	0	278	993
8:30 AM	285	37	0	0	322	120	74	200	0	0	394	32	48	165	0	0	245	961
Total	1183	153	0	0	1336	439	274	780	0	0	1493	117	206	753	0	0	1076	3905
Approach %	88.5	11.5	0.0	-	-	29.4	18.4	52.2	0.0	-	-	10.9	19.1	70.0	0.0	-	-	-
Total %	30.3	3.9	0.0	-	34.2	11.2	7.0	20.0	0.0	-	38.2	3.0	5.3	19.3	0.0	-	27.6	-
PHF	0.960	0.869	0.000	-	0.979	0.915	0.901	0.915	0.000	-	0.947	0.836	0.844	0.923	0.000	-	0.957	0.983
Lights	1157	144	0	-	1301	414	256	764	0	-	1434	113	199	728	0	-	1040	3775
% Lights	97.8	94.1	-	-	97.4	94.3	93.4	97.9	-	-	96.0	96.6	96.6	96.7	-	-	96.7	96.7
Buses	4	2	0	-	6	4	5	1	0	-	10	2	1	1	0	-	4	20
% Buses	0.3	1.3	-	-	0.4	0.9	1.8	0.1	-	-	0.7	1.7	0.5	0.1	-	-	0.4	0.5
Trucks	22	7	0	-	29	21	13	15	0	-	49	2	6	24	0	-	32	110
% Trucks	1.9	4.6	-	-	2.2	4.8	4.7	1.9	-	-	3.3	1.7	2.9	3.2	-	-	3.0	2.8
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Montgomery County, PA
US 30/I476 SB Ramps
Thursday, September 8, 2016
Location: 40.037391, -75.359559

Count Name: US 30 / I-476 Sb Ramps
Site Code:
Start Date: 09/08/2016



Turning Movement Peak Hour Data Plot (7:45 AM)

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Montgomery County, PA
US 30/I476 SB Ramps
Thursday, September 8, 2016
Location: 40.037391, -75.359559

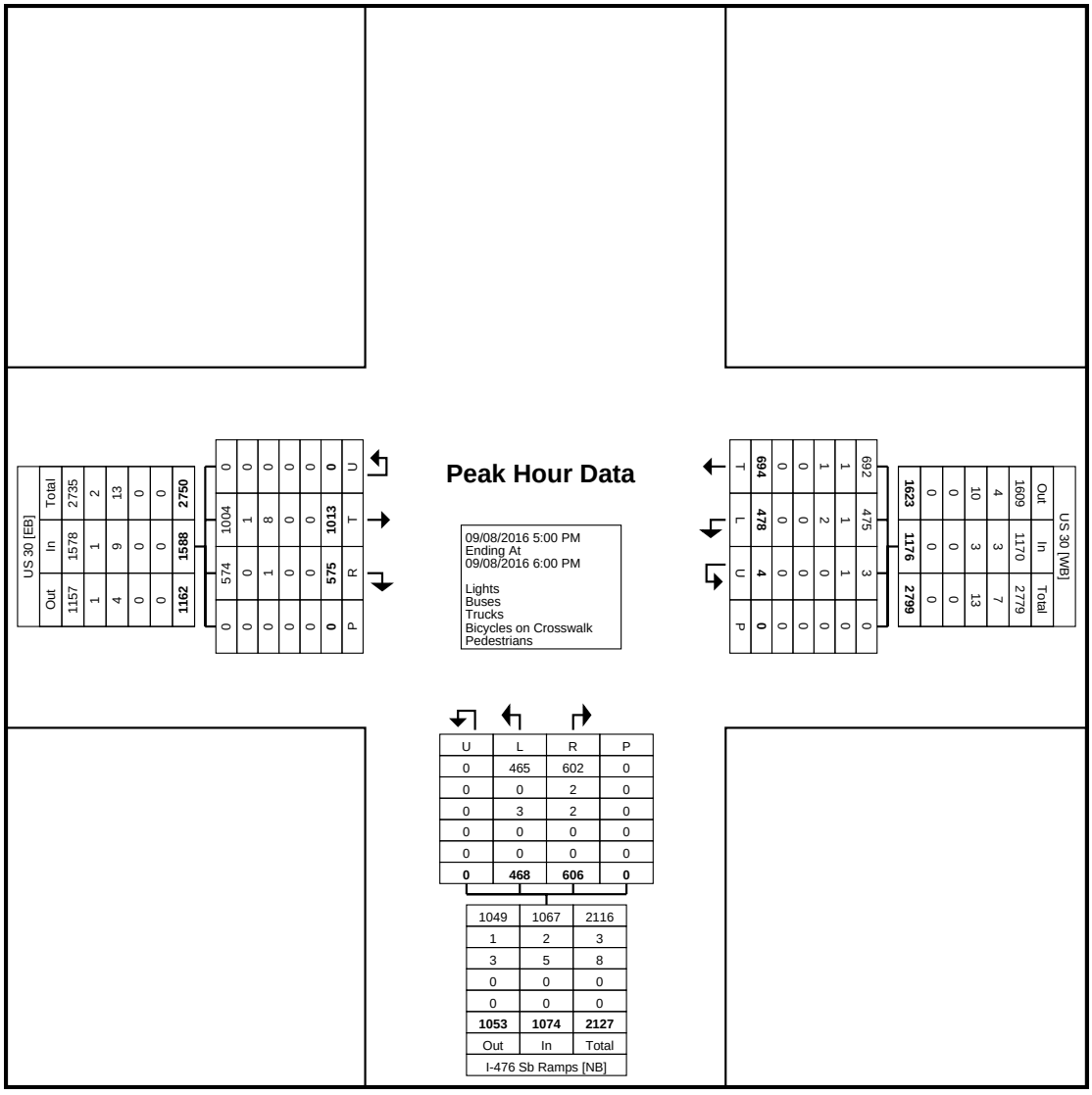
Count Name: US 30 / I-476 Sb Ramps
Site Code:
Start Date: 09/08/2016

Turning Movement Peak Hour Data (5:00 PM)

Start Time	US 30 Westbound					I-476 Sb Ramps Northbound						US 30 Eastbound						
	Thru	Left	U-Turn	Peds	App. Total	Right	Right on Red	Left	U-Turn	Peds	App. Total	Right	Right on Red	Thru	U-Turn	Peds	App. Total	Int. Total
5:00 PM	151	131	0	0	282	59	89	105	0	0	253	58	76	272	0	0	406	941
5:15 PM	174	102	0	0	276	60	79	105	0	0	244	80	76	260	0	0	416	936
5:30 PM	179	120	2	0	301	83	82	132	0	0	297	68	77	227	0	0	372	970
5:45 PM	190	125	2	0	317	86	68	126	0	0	280	71	69	254	0	0	394	991
Total	694	478	4	0	1176	288	318	468	0	0	1074	277	298	1013	0	0	1588	3838
Approach %	59.0	40.6	0.3	-	-	26.8	29.6	43.6	0.0	-	-	17.4	18.8	63.8	0.0	-	-	-
Total %	18.1	12.5	0.1	-	30.6	7.5	8.3	12.2	0.0	-	28.0	7.2	7.8	26.4	0.0	-	41.4	-
PHF	0.913	0.912	0.500	-	0.927	0.837	0.893	0.886	0.000	-	0.904	0.866	0.968	0.931	0.000	-	0.954	0.968
Lights	692	475	3	-	1170	287	315	465	0	-	1067	277	297	1004	0	-	1578	3815
% Lights	99.7	99.4	75.0	-	99.5	99.7	99.1	99.4	-	-	99.3	100.0	99.7	99.1	-	-	99.4	99.4
Buses	1	1	1	-	3	0	2	0	0	-	2	0	0	1	0	-	1	6
% Buses	0.1	0.2	25.0	-	0.3	0.0	0.6	0.0	-	-	0.2	0.0	0.0	0.1	-	-	0.1	0.2
Trucks	1	2	0	-	3	1	1	3	0	-	5	0	1	8	0	-	9	17
% Trucks	0.1	0.4	0.0	-	0.3	0.3	0.3	0.6	-	-	0.5	0.0	0.3	0.8	-	-	0.6	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Montgomery County, PA
US 30/I476 SB Ramps
Thursday, September 8, 2016
Location: 40.037391, -75.359559

Count Name: US 30 / I-476 Sb Ramps
Site Code:
Start Date: 09/08/2016



Turning Movement Peak Hour Data Plot (5:00 PM)

APPENDIX D

Existing Condition Capacity Analysis Worksheets

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	264	7	100	362	534	2	12	594	578
Future Volume (veh/h)	1	0	2	264	7	100	362	534	2	12	594	578
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1748	1744	1891	1730	1853	1853	1773	1755	1808
Adj Flow Rate, veh/h	1	0	2	293	8	111	402	593	2	13	660	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	0	0	0	1	2
Cap, veh/h	303	0	357	406	23	326	448	1210	4	391	663	580
Arrive On Green	0.23	0.00	0.23	0.23	0.23	0.23	0.22	0.66	0.66	0.38	0.38	0.00
Sat Flow, veh/h	1293	0	1530	1396	101	1397	1648	1846	6	823	1755	1537
Grp Volume(v), veh/h	1	0	2	293	0	119	402	0	595	13	660	0
Grp Sat Flow(s),veh/h/ln	1293	0	1530	1396	0	1498	1648	0	1852	823	1755	1537
Q Serve(g_s), s	0.1	0.0	0.1	18.3	0.0	6.0	16.7	0.0	14.7	0.9	33.7	0.0
Cycle Q Clear(g_c), s	5.5	0.0	0.1	18.3	0.0	6.0	16.7	0.0	14.7	0.9	33.7	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	303	0	357	406	0	349	448	0	1214	391	663	580
V/C Ratio(X)	0.00	0.00	0.01	0.72	0.00	0.34	0.90	0.00	0.49	0.03	1.00	0.00
Avail Cap(c_a), veh/h	303	0	357	406	0	349	448	0	1214	391	663	580
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.17	0.17	0.00
Uniform Delay (d), s/veh	30.8	0.0	26.5	33.5	0.0	28.7	25.1	0.0	7.9	17.7	27.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	6.2	0.0	0.6	20.3	0.0	1.4	0.0	13.4	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	0.0	0.0	0.1	12.4	0.0	4.5	17.8	0.0	12.5	0.4	21.7	0.0
LnGrp Delay(d),s/veh	30.8	0.0	26.5	39.7	0.0	29.3	45.5	0.0	9.3	17.7	41.3	0.0
LnGrp LOS	C		C	D		C	D		A	B	D	
Approach Vol, veh/h		3			412			997			673	
Approach Delay, s/veh		27.9			36.7			23.9			40.8	
Approach LOS		C			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		64.0		26.0	25.0	39.0		26.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		58.0		20.0	19.0	33.0		20.0
Max Q Clear Time (g_c+I1), s		16.7		20.8	19.2	36.2		8.0
Green Ext Time (p_c), s		11.0		0.0	0.0	0.0		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	37	259	460	25	790	7	494	32	46	2	1	6
Future Volume (veh/h)	37	259	460	25	790	7	494	32	46	2	1	6
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		0.97	1.00		0.97
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	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	39	276	0	27	840	7	526	34	49	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	124	857	772	512	899	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	661	1714	1545	1068	1798	15	393	25	1520	0	97	194
Grp Volume(v), veh/h	39	276	0	27	0	847	560	0	49	9	0	0
Grp Sat Flow(s),veh/h/ln	661	1714	1545	1068	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	5.3	8.6	0.0	1.4	0.0	39.4	0.0	0.0	1.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	44.2	8.6	0.0	10.0	0.0	39.4	34.0	0.0	1.9	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	124	857	772	512	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.31	0.32	0.00	0.05	0.00	0.93	2.38	0.00	0.09	0.06	0.00	0.00
Avail Cap(c_a), veh/h	124	857	772	512	0	907	236	0	574	159	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)	0.72	0.72	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	41.6	13.4	0.0	16.4	0.0	21.1	33.6	0.0	18.0	21.6	0.0	0.0
Incr Delay (d2), s/veh	4.7	0.7	0.0	0.2	0.0	17.7	632.5	0.0	0.1	0.1	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	2.0	7.1	0.0	0.8	0.0	32.0	85.0	0.0	1.4	0.3	0.0	0.0
LnGrp Delay(d),s/veh	46.3	14.1	0.0	16.6	0.0	38.8	666.0	0.0	18.1	21.8	0.0	0.0
LnGrp LOS	D	B		B		D	F		B	C		
Approach Vol, veh/h		315			874			609			9	
Approach Delay, s/veh		18.1			38.1			613.9			21.8	
Approach LOS		B			D			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0
Max Q Clear Time (g_c+I1), s		46.7		36.0		41.4		36.0
Green Ext Time (p_c), s		0.0		0.0		1.8		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		228.6
HCM 2010 LOS		F

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	26	933	56	60	242
Future Vol, veh/h	5	26	933	56	60	242
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	6	30	1072	64	69	278

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1540	1132	0	0	1154	0
Stage 1	1122	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398	-
Pot Cap-1 Maneuver	128	206	-	-	539	-
Stage 1	314	-	-	-	-	-
Stage 2	669	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	110	201	-	-	535	-
Mov Cap-2 Maneuver	229	-	-	-	-	-
Stage 1	310	-	-	-	-	-
Stage 2	582	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.2	0	2.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	205	535	-
HCM Lane V/C Ratio	-	-	0.174	0.129	-
HCM Control Delay (s)	-	-	26.2	12.7	-
HCM Lane LOS	-	-	D	B	-
HCM 95th %tile Q(veh)	-	-	0.6	0.4	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	983	0	0	295
Future Vol, veh/h	0	0	983	0	0	295
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	0	0	1046	0	0	314

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1360	1046	0	-	-	-
Stage 1	1046	-	-	-	-	-
Stage 2	314	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	165	280	-	0	0	-
Stage 1	341	-	-	0	0	-
Stage 2	745	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	165	280	-	-	-	-
Mov Cap-2 Maneuver	274	-	-	-	-	-
Stage 1	341	-	-	-	-	-
Stage 2	745	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	0	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	-	-

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	9	0	128	0	0	0	171	978	0	0	239	57
Future Vol, veh/h	9	0	128	0	0	0	171	978	0	0	239	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	164	0	0	0	219	1254	0	0	306	73

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	2035	2043	343	379	0	0	1262	0	0
Stage 1	343	343	-	-	-	-	-	-	-
Stage 2	1692	1700	-	-	-	-	-	-	-
Critical Hdwy	6.51	6.5	6.24	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.51	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	59	57	695	1191	-	-	558	-	-
Stage 1	699	641	-	-	-	-	-	-	-
Stage 2	156	149	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	23	0	695	1191	-	-	558	-	-
Mov Cap-2 Maneuver	23	0	-	-	-	-	-	-	-
Stage 1	699	0	-	-	-	-	-	-	-
Stage 2	61	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	53.4	1.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1191	-	-	238	558	-	-
HCM Lane V/C Ratio	0.184	-	-	0.738	-	-	-
HCM Control Delay (s)	8.7	0	-	53.4	0	-	-
HCM Lane LOS	A	A	-	F	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	5.1	0	-	-

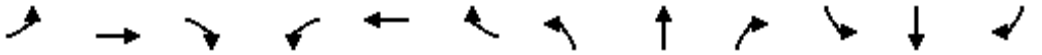
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	1144	0	0	366
Future Vol, veh/h	0	0	1144	0	0	366
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	0	0	1378	0	0	441

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1819	1378	0	0	1378	0
Stage 1	1378	-	-	-	-	-
Stage 2	441	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	86	179	-	-	504	-
Stage 1	236	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	86	179	-	-	504	-
Mov Cap-2 Maneuver	86	-	-	-	-	-
Stage 1	236	-	-	-	-	-
Stage 2	653	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	504	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	1262	0	0	526	255	748	701	332	251	0	104
Future Volume (veh/h)	169	1262	0	0	526	255	748	701	332	251	0	104
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	174	1301	0	0	542	0	771	723	342	259	0	107
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	282	1334	0	0	921	425	1660	690	586	363	0	0
Arrive On Green	0.06	0.27	0.00	0.00	0.54	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	259	
Grp Volume(v), veh/h	174	1301	0	0	542	0	771	723	342	259	57.1	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	5.7	42.5	0.0	0.0	11.8	0.0	16.7	43.0	19.8	8.0		
Cycle Q Clear(g_c), s	5.7	42.5	0.0	0.0	11.8	0.0	16.7	43.0	19.8	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	282	1334	0	0	921	425	1660	690	586	363		
V/C Ratio(X)	0.62	0.97	0.00	0.00	0.59	0.00	0.46	1.05	0.58	0.71		
Avail Cap(c_a), veh/h	451	1334	0	0	921	425	1660	690	586	363		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.92	0.92	0.00	0.00	0.94	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.1	39.7	0.0	0.0	21.2	0.0	17.4	33.5	26.4	50.7		
Incr Delay (d2), s/veh	2.0	18.4	0.0	0.0	2.6	0.0	0.2	47.6	1.5	6.4		
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		
%ile BackOfQ(95%),veh/ln	4.8	30.6	0.0	0.0	9.6	0.0	12.0	54.0	13.2	1.6		
LnGrp Delay(d),s/veh	52.1	58.1	0.0	0.0	23.8	0.0	17.6	81.1	27.9	57.1		
LnGrp LOS	D	E			C		B	F	C	E		
Approach Vol, veh/h		1475			542			1836				
Approach Delay, s/veh		57.4			23.8			44.5				
Approach LOS		E			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		49.0	61.0		14.4	34.6	13.0	48.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0
Max Q Clear Time (g_c+I1), s		45.0	19.2		8.2	14.3	10.5	45.5
Green Ext Time (p_c), s		0.0	3.0		0.2	6.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	47.2
HCM 2010 LOS	D

Notes

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	753	0	153	1183	780	713
Future Volume (veh/h)	753	0	153	1183	780	713
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785
Adj Flow Rate, veh/h	768	0	156	1207	796	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	6	2	2	7
Cap, veh/h	2356	0	256	2117	945	431
Arrive On Green	0.50	0.00	0.03	0.21	0.28	0.00
Sat Flow, veh/h	5035	0	3169	3476	3326	1517
Grp Volume(v), veh/h	768	0	156	1207	796	0
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517
Q Serve(g_s), s	10.7	0.0	5.4	35.3	24.8	0.0
Cycle Q Clear(g_c), s	10.7	0.0	5.4	35.3	24.8	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2356	0	256	2117	945	431
V/C Ratio(X)	0.33	0.00	0.61	0.57	0.84	0.00
Avail Cap(c_a), veh/h	2356	0	317	2117	1421	648
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.67	0.67	1.00	0.00
Uniform Delay (d), s/veh	16.5	0.0	51.8	30.4	37.1	0.0
Incr Delay (d2), s/veh	0.4	0.0	1.6	0.7	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.3	0.0	4.3	22.3	17.4	0.0
LnGrp Delay(d),s/veh	16.9	0.0	53.4	31.1	40.1	0.0
LnGrp LOS	B		D	C	D	
Approach Vol, veh/h	768			1363	796	
Approach Delay, s/veh	16.9			33.7	40.1	
Approach LOS	B			C	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.2	13.9	59.9				73.8
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.3	7.9	13.2				37.8
Green Ext Time (p_c), s		3.0	0.1	15.0				10.5

Intersection Summary	
HCM 2010 Ctrl Delay	31.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	535	1512	4	2	754	478	6	2	2	0	0	0
Future Volume (veh/h)	535	1512	4	2	754	478	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	557	1575	4	2	785	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	658	2843	7	18	2171	1010	21	7	22			
Arrive On Green	0.40	1.00	1.00	0.01	0.65	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	9	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	557	769	810	2	785	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	16.9	0.0	0.0	0.1	11.9	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	16.9	0.0	0.0	0.1	11.9	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	658	1389	1461	18	2171	1010	28	0	22			
V/C Ratio(X)	0.85	0.55	0.55	0.11	0.36	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2171	1010	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.25	0.25	0.25	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.5	0.0	0.0	53.9	8.9	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	1.4	0.4	0.4	2.6	0.5	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.0	0.3	0.3	0.1	9.5	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	32.9	0.4	0.4	56.5	9.4	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	A		E		E			
Approach Vol, veh/h		2136			787			10				
Approach Delay, s/veh		8.9			9.5			58.1				
Approach LOS		A			A			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.2	97.0			27.0	76.2		6.8
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0
Max Q Clear Time (g_c+I1), s	2.6	2.5			19.4	14.4		2.7
Green Ext Time (p_c), s	0.0	36.5			1.6	26.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.2
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	889	52	209	1434	431	91	367	82	95	130	105
Future Volume (veh/h)	137	889	52	209	1434	431	91	367	82	95	130	105
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	143	926	54	218	1494	449	95	382	85	99	135	109
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1382	81	297	1446	652	151	491	110	246	634	476
Arrive On Green	0.07	0.44	0.44	0.07	0.44	0.44	0.24	0.24	0.24	0.07	0.36	0.36
Sat Flow, veh/h	1657	3174	185	1632	3319	1497	454	2078	466	1609	1785	1339
Grp Volume(v), veh/h	143	482	498	218	1494	449	287	0	275	99	123	121
Grp Sat Flow(s),veh/h/ln	1657	1652	1706	1632	1660	1497	1492	0	1506	1609	1638	1486
Q Serve(g_s), s	5.1	25.6	25.6	8.0	47.9	26.6	18.2	0.0	18.7	4.8	5.8	6.3
Cycle Q Clear(g_c), s	5.1	25.6	25.6	8.0	47.9	26.6	20.0	0.0	18.7	4.8	5.8	6.3
Prop In Lane	1.00		0.11	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	720	743	297	1446	652	396	0	356	246	582	528
V/C Ratio(X)	0.77	0.67	0.67	0.73	1.03	0.69	0.73	0.00	0.77	0.40	0.21	0.23
Avail Cap(c_a), veh/h	186	720	743	297	1446	652	450	0	411	391	789	716
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	24.7	24.7	21.1	31.0	25.0	39.6	0.0	39.2	28.3	24.7	24.9
Incr Delay (d2), s/veh	17.6	4.9	4.8	9.1	32.7	5.9	5.0	0.0	7.6	1.1	0.2	0.2
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	5.7	18.5	18.9	6.2	51.2	17.7	13.6	0.0	13.3	3.9	4.7	4.7
LnGrp Delay(d),s/veh	42.6	29.6	29.5	30.2	63.7	30.9	44.6	0.0	46.9	29.4	24.9	25.1
LnGrp LOS	D	C	C	C	F	C	D		D	C	C	C
Approach Vol, veh/h		1123			2161			562			343	
Approach Delay, s/veh		31.2			53.5			45.7			26.3	
Approach LOS		C			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	52.9		44.1	13.0	52.9	13.1	31.0
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	33.0		52.0	7.0	33.0	17.0	29.0
Max Q Clear Time (g_c+I1), s	10.0	28.1		8.3	7.6	50.4	7.3	22.0
Green Ext Time (p_c), s	0.0	4.6		6.2	0.0	0.0	0.1	2.9

Intersection Summary		
HCM 2010 Ctrl Delay	44.3	
HCM 2010 LOS	D	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	513	1	213	118	719	1	7	425	232
Future Volume (veh/h)	3	4	9	513	1	213	118	719	1	7	425	232
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1782	1872	1872	1800	1872	1872	1800	1800	1835
Adj Flow Rate, veh/h	3	4	10	558	1	232	128	782	1	8	462	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	387	167	419	596	3	581	382	976	1	209	696	603
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1166	457	1142	1408	7	1585	1714	1869	2	701	1800	1560
Grp Volume(v), veh/h	3	0	14	558	0	233	128	0	783	8	462	0
Grp Sat Flow(s),veh/h/ln	1166	0	1599	1408	0	1592	1714	0	1872	701	1800	1560
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.7	0.0	30.9	0.8	19.1	0.0
Cycle Q Clear(g_c), s	9.4	0.0	0.5	33.0	0.0	9.8	3.7	0.0	30.9	19.1	19.1	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	387	0	586	596	0	584	382	0	977	209	696	603
V/C Ratio(X)	0.01	0.00	0.02	0.94	0.00	0.40	0.33	0.00	0.80	0.04	0.66	0.00
Avail Cap(c_a), veh/h	387	0	586	596	0	584	398	0	977	209	696	603
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.94	0.94	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	29.7	0.0	21.1	15.4	0.0	17.7	30.3	22.8	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	22.4	0.0	0.4	0.5	0.0	6.9	0.3	4.6	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	0.1	0.0	0.4	24.4	0.0	7.8	3.2	0.0	24.7	0.3	15.3	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	52.1	0.0	21.6	15.9	0.0	24.5	30.6	27.4	0.0
LnGrp LOS	C		B	D		C	B		C	C	C	
Approach Vol, veh/h		17			791			911			470	
Approach Delay, s/veh		19.3			43.1			23.3			27.5	
Approach LOS		B			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		52.0		38.0	12.2	39.8		38.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0
Max Q Clear Time (g_c+I1), s		32.9		35.5	6.2	21.6		11.9
Green Ext Time (p_c), s		6.8		0.0	0.0	6.2		3.2

Intersection Summary		
HCM 2010 Ctrl Delay		31.3
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	705	654	49	317	1	395	7	137	31	36	48
Future Volume (veh/h)	8	705	654	49	317	1	395	7	137	31	36	48
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		0.97	1.00		0.97
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	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	734	0	51	330	1	411	7	143	32	38	50
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	497	891	796	192	914	3	256	3	574	51	57	41
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1054	1782	1591	749	1829	6	466	8	1520	0	151	108
Grp Volume(v), veh/h	8	734	0	51	0	331	418	0	143	120	0	0
Grp Sat Flow(s),veh/h/ln	1054	1782	1591	749	0	1834	474	0	1520	258	0	0
Q Serve(g_s), s	0.4	31.5	0.0	5.6	0.0	9.9	0.0	0.0	5.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.8	31.5	0.0	37.1	0.0	9.9	34.0	0.0	5.8	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	497	891	796	192	0	917	259	0	574	148	0	0
V/C Ratio(X)	0.02	0.82	0.00	0.27	0.00	0.36	1.62	0.00	0.25	0.81	0.00	0.00
Avail Cap(c_a), veh/h	497	891	796	192	0	917	259	0	574	148	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)	0.21	0.21	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.6	19.1	0.0	34.9	0.0	13.7	33.2	0.0	19.2	23.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.9	0.0	3.3	0.0	1.1	294.7	0.0	0.2	27.4	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	0.2	18.8	0.0	2.4	0.0	9.0	49.6	0.0	4.4	5.6	0.0	0.0
LnGrp Delay(d),s/veh	16.6	21.1	0.0	38.2	0.0	14.8	328.0	0.0	19.5	50.8	0.0	0.0
LnGrp LOS	B	C		D		B	F		B	D		
Approach Vol, veh/h		742			382			561			120	
Approach Delay, s/veh		21.0			18.0			249.3			50.8	
Approach LOS		C			B			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0
Max Q Clear Time (g_c+I1), s		34.0		36.0		39.6		36.0
Green Ext Time (p_c), s		5.1		0.0		2.7		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		93.3
HCM 2010 LOS		F

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	41	334	1	29	940
Future Vol, veh/h	33	41	334	1	29	940
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	39	48	393	1	34	1106

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1587	421	0	0	411	0
Stage 1	411	-	-	-	-	-
Stage 2	1176	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	120	602	-	-	1072	-
Stage 1	674	-	-	-	-	-
Stage 2	296	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	114	589	-	-	1063	-
Mov Cap-2 Maneuver	224	-	-	-	-	-
Stage 1	664	-	-	-	-	-
Stage 2	286	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.1	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	341	1063	-
HCM Lane V/C Ratio	-	-	0.255	0.032	-
HCM Control Delay (s)	-	-	19.1	8.5	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	1	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	269	0	0	1042
Future Vol, veh/h	0	0	269	0	0	1042
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	93	94	94	93
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	289	0	0	1120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1409	289	0	-	-	-
Stage 1	289	-	-	-	-	-
Stage 2	1120	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	154	755	-	0	0	-
Stage 1	765	-	-	0	0	-
Stage 2	315	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	154	755	-	-	-	-
Mov Cap-2 Maneuver	257	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	315	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	0	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	40	0	0	0	23	270	0	0	1037	5
Future Vol, veh/h	5	0	40	0	0	0	23	270	0	0	1037	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	5	0	43	0	0	0	24	287	0	0	1103	5

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1442	1450	1106	1109	0	0	295	0	0
Stage 1	1106	1106	-	-	-	-	-	-	-
Stage 2	336	344	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	147	132	258	637	-	-	1278	-	-
Stage 1	320	289	-	-	-	-	-	-	-
Stage 2	728	640	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	140	0	258	637	-	-	1278	-	-
Mov Cap-2 Maneuver	140	0	-	-	-	-	-	-	-
Stage 1	320	0	-	-	-	-	-	-	-
Stage 2	695	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.1	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	637	-	-	236	1278	-	-
HCM Lane V/C Ratio	0.038	-	-	0.203	-	-	-
HCM Control Delay (s)	10.9	0	-	24.1	0	-	-
HCM Lane LOS	B	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0	-	-

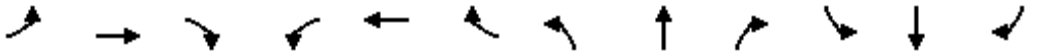
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	292	0	0	1073
Future Vol, veh/h	0	0	292	0	0	1073
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	0	0	311	0	0	1141

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1452	311	0	0	311	0
Stage 1	311	-	-	-	-	-
Stage 2	1141	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	145	734	-	-	1261	-
Stage 1	748	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	145	734	-	-	1261	-
Mov Cap-2 Maneuver	145	-	-	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	307	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1261	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	1515	0	0	569	146	268	197	211	652	0	300
Future Volume (veh/h)	46	1515	0	0	569	146	268	197	211	652	0	300
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	49	1612	0	0	605	0	285	210	224	694	0	319
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	127	1623	0	0	1361	633	1393	292	248	859	0	0
Arrive On Green	0.03	0.32	0.00	0.00	0.80	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	694	
Grp Volume(v), veh/h	49	1612	0	0	605	0	285	210	224	694	47.5	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	D	
Q Serve(g_s), s	1.6	52.5	0.0	0.0	6.1	0.0	6.0	12.3	16.0	23.0		
Cycle Q Clear(g_c), s	1.6	52.5	0.0	0.0	6.1	0.0	6.0	12.3	16.0	23.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	127	1623	0	0	1361	633	1393	292	248	859		
V/C Ratio(X)	0.39	0.99	0.00	0.00	0.44	0.00	0.20	0.72	0.90	0.81		
Avail Cap(c_a), veh/h	391	1623	0	0	1361	633	1393	292	248	859		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.90	0.90	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	52.3	37.1	0.0	0.0	7.4	0.0	19.8	43.6	45.1	41.7		
Incr Delay (d2), s/veh	1.7	19.6	0.0	0.0	1.0	0.0	0.1	8.4	32.9	5.8		
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		
%ile BackOfQ(95%),veh/ln	1.4	37.1	0.0	0.0	5.1	0.0	4.9	11.0	13.8	16.3		
LnGrp Delay(d),s/veh	54.0	56.7	0.0	0.0	8.3	0.0	19.8	52.0	78.0	47.5		
LnGrp LOS	D	E			A		B	D	E	D		
Approach Vol, veh/h		1661			605			719				
Approach Delay, s/veh		56.6			8.3			47.4				
Approach LOS		E			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		58.0	52.0		9.2	48.8	29.0	23.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0
Max Q Clear Time (g_c+I1), s		55.0	8.5		4.1	8.6	25.5	18.5
Green Ext Time (p_c), s		0.0	0.8		0.0	18.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	45.1
HCM 2010 LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1013	0	478	694	606	468
Future Volume (veh/h)	1013	0	478	694	606	468
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891
Adj Flow Rate, veh/h	1034	0	488	708	618	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	1	2	1	1
Cap, veh/h	2154	0	621	2331	742	355
Arrive On Green	0.46	0.00	0.06	0.23	0.22	0.00
Sat Flow, veh/h	5035	0	3326	3476	3359	1607
Grp Volume(v), veh/h	1034	0	488	708	618	0
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607
Q Serve(g_s), s	16.8	0.0	15.9	19.1	19.3	0.0
Cycle Q Clear(g_c), s	16.8	0.0	15.9	19.1	19.3	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2154	0	621	2331	742	355
V/C Ratio(X)	0.48	0.00	0.79	0.30	0.83	0.00
Avail Cap(c_a), veh/h	2154	0	816	2331	916	438
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.85	0.85	1.00	0.00
Uniform Delay (d), s/veh	20.8	0.0	49.4	20.6	40.9	0.0
Incr Delay (d2), s/veh	0.8	0.0	3.2	0.3	5.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.9	0.0	11.8	13.6	14.6	0.0
LnGrp Delay(d),s/veh	21.6	0.0	52.6	20.9	46.5	0.0
LnGrp LOS	C		D	C	D	
Approach Vol, veh/h	1034			1196	618	
Approach Delay, s/veh	21.6			33.9	46.5	
Approach LOS	C			C	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.3	25.6	55.2				80.7
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	26.0	37.0				69.0
Max Q Clear Time (g_c+I1), s		21.8	18.4	19.3				21.6
Green Ext Time (p_c), s		1.5	1.1	11.1				18.3

Intersection Summary	
HCM 2010 Ctrl Delay	32.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1049	1653	14	6	679	575	3	1	2	0	0	0
Future Volume (veh/h)	1049	1653	14	6	679	575	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1093	1722	15	6	707	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1018	2795	24	23	1832	852	18	6	18			
Arrive On Green	0.62	1.00	1.00	0.01	0.54	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3342	29	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1093	847	890	6	707	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	34.0	0.0	0.0	0.4	13.3	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	34.0	0.0	0.0	0.4	13.3	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1018	1376	1444	23	1832	852	24	0	18			
V/C Ratio(X)	1.07	0.62	0.62	0.26	0.39	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1018	1376	1444	109	1832	852	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.14	0.14	0.14	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.0	0.0	0.0	53.7	14.7	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	36.4	0.3	0.3	5.6	0.6	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	16.2	0.2	0.2	0.4	10.5	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	57.4	0.3	0.3	59.3	15.3	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		2830			713			6				
Approach Delay, s/veh		22.4			15.6			56.7				
Approach LOS		C			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.5	97.0			39.0	64.5		6.5
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.0	80.0			33.0	53.0		6.0
Max Q Clear Time (g_c+I1), s	2.3	2.5			36.5	15.8		2.7
Green Ext Time (p_c), s	0.0	40.2			0.0	26.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	21.1
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	118	1134	92	195	1029	124	80	208	139	404	441	212
Future Volume (veh/h)	118	1134	92	195	1029	124	80	208	139	404	441	212
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	122	1169	95	201	1061	128	82	214	143	416	455	219
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	252	1234	100	219	1315	587	147	341	231	330	851	406
Arrive On Green	0.07	0.39	0.39	0.08	0.39	0.39	0.25	0.25	0.25	0.08	0.38	0.38
Sat Flow, veh/h	1706	3190	259	1664	3352	1496	386	1348	914	1689	2221	1061
Grp Volume(v), veh/h	122	623	641	201	1061	128	215	0	224	416	345	329
Grp Sat Flow(s),veh/h/ln	1706	1703	1746	1664	1676	1496	1216	0	1432	1689	1690	1591
Q Serve(g_s), s	4.1	35.4	35.5	7.3	28.1	5.7	12.2	0.0	13.8	8.0	15.8	16.0
Cycle Q Clear(g_c), s	4.1	35.4	35.5	7.3	28.1	5.7	15.6	0.0	13.8	8.0	15.8	16.0
Prop In Lane	1.00		0.15	1.00		1.00	0.38		0.64	1.00		0.67
Lane Grp Cap(c), veh/h	252	659	676	219	1315	587	357	0	362	330	648	610
V/C Ratio(X)	0.48	0.95	0.95	0.92	0.81	0.22	0.60	0.00	0.62	1.26	0.53	0.54
Avail Cap(c_a), veh/h	278	659	676	219	1315	587	459	0	487	330	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.7	29.6	29.7	23.5	27.0	20.2	33.3	0.0	33.1	34.7	23.9	24.0
Incr Delay (d2), s/veh	1.4	24.1	24.1	38.6	5.4	0.9	1.6	0.0	1.7	139.9	0.7	0.7
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	3.7	28.6	29.2	9.6	20.1	4.5	9.4	0.0	9.5	32.7	12.0	11.5
LnGrp Delay(d),s/veh	22.2	53.7	53.7	62.2	32.4	21.0	34.9	0.0	34.8	174.7	24.6	24.7
LnGrp LOS	C	D	D	E	C	C	C		C	F	C	C
Approach Vol, veh/h		1386			1390			439			1090	
Approach Delay, s/veh		51.0			35.7			34.8			81.9	
Approach LOS		D			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	43.7		43.3	12.5	44.2	13.0	30.3
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0
Max Q Clear Time (g_c+I1), s	9.8	37.9		18.3	6.6	30.6	10.5	17.6
Green Ext Time (p_c), s	0.0	0.0		8.5	0.0	0.0	0.0	6.6

Intersection Summary		
HCM 2010 Ctrl Delay	52.2	
HCM 2010 LOS	D	

APPENDIX E

Volume Development Worksheets

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Volume Development Table

University of Pennsylvania Health Systems Weekday AM Traffic Volumes					Existing Site Trips									New Trips						AM	AM
			Count	2016	538	in	73	out		2020	2025	2020	2025	577	in	154	out	Total	2020	2025
	mvmt	mvmt no	Data	base	%	vol	%	vol		Base	Base	No Build	No Build	%	vol	%	vol	Trips	Build	Build
King of Prussia Road (N/S)	eb left	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1
and	eb thru	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking Drive/	eb right	3	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2
Matsonford Road (E/W)	wb left	4	263	264	8	43	0	0	43	268	273	311	316	8	46	0	0	46	314	319
	wb thru	5	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	7	7
	wb right	6	100	100	0	0	0	0	0	102	104	102	104	0	0	0	0	0	102	104
	nb left	7	12	12	0	0	0	0	0	12	12	12	12	0	0	0	0	0	12	12
	nb thru	8	592	594	0	0	15	11	11	603	615	614	626	0	0	15	23	23	626	638
	nb right	9	576	578	0	0	8	6	6	587	598	593	604	0	0	8	12	12	599	611
	sb left	10	361	362	0	0	0	0	0	368	375	368	375	0	0	0	0	0	368	375
	sb thru	11	532	534	15	81	0	0	81	542	553	623	633	15	87	0	0	87	629	639
	sb right	12	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2
King of Prussia Road (E/W)	eb left	1	37	37	0	0	0	0	0	38	38	38	38	0	0	0	0	0	38	38
and	eb thru	2	259	259	23	124	0	0	124	263	268	387	392	23	133	0	0	133	396	401
Radnor Chester Road (N/S)	eb right	3	460	460	0	0	0	0	0	467	476	467	476	0	0	0	0	0	467	476
	wb left	4	25	25	0	0	2	1	1	25	26	27	27	0	0	2	3	3	28	29
	wb thru	5	790	790	0	0	23	17	17	802	817	819	834	0	0	23	35	35	837	853
	wb right	6	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	7	7
	nb left	7	494	494	0	0	0	0	0	502	511	502	511	0	0	0	0	0	502	511
	nb thru	8	32	32	0	0	0	0	0	32	33	32	33	0	0	0	0	0	32	33
	nb right	9	46	46	2	11	0	0	11	47	48	57	58	2	12	0	0	12	58	59
	sb left	10	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2
	sb thru	11	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1
	sb right	12	6	6	0	0	0	0	0	6	6	6	6	0	0	0	0	0	6	6
King of Prussia Road (N/S)	wb left	1	5	5	0	0	25	18	18	5	5	23	23	0	0	10	15	15	20	21
and	wb right	2	26	26	0	0	10	7	7	26	27	34	34	0	0	10	15	15	42	42
Septa Driveway (W)	nb thru	3	933	933	0	0	15	11	11	947	965	958	976	0	0	15	23	23	970	988
	nb right	4	56	56	25	135	0	0	135	57	58	191	192	10	58	0	0	58	115	116
	sb left	5	60	60	10	54	0	0	54	61	62	115	116	15	87	0	0	87	147	149
	sb thru	6	242	242	15	81	0	0	81	246	250	326	331	10	58	0	0	58	303	308
King of Prussia Road (N/S)	wb left	1	0	0	0	0	5	4	4	0	0	4	4	0	0	0	0	0	0	0
and	wb right	2	0	0	0	0	5	4	4	0	0	4	4	0	0	0	0	0	0	0
N. Driveway (Exit Only)	nb thru	3	983	983	25	135	10	7	142	998	1017	1140	1159	10	58	15	23	81	1079	1098
	sb thru	4	295	295	15	81	25	18	99	300	305	398	404	10	58	10	15	73	373	378
King of Prussia Road (N/S)	eb left	1	9	9	0	0	0	0	0	9	9	9	9	0	0	0	0	0	9	9
and	eb thru	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Raider Road(E/W)	eb right	3	128	128	0	0	0	0	0	130	133	130	133	0	0	0	0	0	130	133
	wb left	4	0	0	0	0	0	0	0	0	0	0	0	0	0	64	99	99	99	99
	wb right	5	0	0	0	0	0	0	0	0	0	0	0	0	0	14	22	22	22	22
	nb left	6	170	171	0	0	0	0	0	173	177	173	177	0	0	0	0	0	173	177
	nb thru	7	974	978	25	135	10	7	142	993	1012	1134	1153	10	58	1	2	59	1052	1071
	nb right	8	0	0	5	27	0	0	27	0	0	27	27	64	369	0	0	369	369	369
	sb left	9	0	0	5	27	0	0	27	0	0	27	27	9	52	0	0	52	52	52
	sb thru	10	238	239	10	54	30	22	76	243	247	318	323	1	6	10	15	21	264	268
	sb right	11	57	57	0	0	0	0	0	58	59	58	59	0	0	0	0	0	58	59
King of Prussia Road (N/S)	wb left	1	0	0	0	0	45	33	33	0	0	33	33	0	0	1	2	2	2	2
and	wb right	2	0	0	0	0	10	7	7	0	0	7	7	0	0	1	2	2	2	2
Southern Driveway (E/W)	nb thru	3	1144	1144	30	161	0	0	161	1161	1184	1323	1345	74	427	0	0	427	1588	1611
	nb right	4	0	0	45	242	0	0	242	0	0	242	242	1	6	0	0	6	6	6
	sb left	5	0	0	10	54	0	0	54	0	0	54	54	1	6	0	0	6	6	6
	sb thru	6	366	366	0	0	30	22	22	372	379	393	401	0	0	74	114	114	486	493

Volume Development Table

University of Pennsylvania Health Systems Weekday AM Traffic Volumes					Existing Site Trips									New Trips						
			Count	2016	538	in	73	out		2020	2025	2020	2025	577	in	154	out	Total	AM	AM
	mvmt	mvmt no	Data	base	%	vol	%	vol		Base	Base	No Build	No Build	%	vol	%	vol	Trips	2020 Build	2025 Build
Lancaster Avenue (E/W)	eb left	1	168	169	35	188	0	0	188	171	174	360	363	35	202	0	0	202	373	376
and	eb thru	2	1257	1262	0	0	0	0	0	1281	1306	1281	1306	0	0	0	0	0	1281	1306
I-476 NB Off Ramps/	wb thru	3	524	526	0	0	0	0	0	534	544	534	544	0	0	0	0	0	534	544
King of Prussia Road (N/S)	wb right	4	254	255	20	108	0	0	108	259	264	366	371	20	115	0	0	115	374	379
	nb left	5	745	748	0	0	0	0	0	759	774	759	774	0	0	0	0	0	759	774
	nb thru	6	698	701	20	108	0	0	108	711	725	819	833	20	115	0	0	115	827	840
	nb right	7	331	332	0	0	0	0	0	337	344	337	344	0	0	0	0	0	337	344
	sb left	8	250	251	0	0	40	29	29	255	260	284	289	0	0	40	62	62	316	321
	sb right	9	104	104	0	0	35	26	26	106	108	132	134	0	0	35	54	54	160	162
Lancaster Avenue (E/W)	eb thru	1	753	753	15	81	0	0	81	765	779	845	860	15	87	0	0	87	851	866
and	eb right	2	323	323	0	0	0	0	0	328	334	328	334	0	0	0	0	0	328	334
I-476 SB Off Ramps (N/S)	wb left	3	153	153	0	0	20	15	15	155	158	170	173	0	0	20	31	31	186	189
	wb thru	4	1183	1183	0	0	15	11	11	1201	1224	1212	1235	0	0	15	23	23	1224	1247
	nb left	5	780	780	0	0	0	0	0	792	807	792	807	0	0	0	0	0	792	807
	nb right	6	713	713	20	108	0	0	108	724	738	831	845	20	115	0	0	115	839	853
Lancaster Avenue (E/W)	eb left	1	533	535	0	0	20	15	15	543	554	558	568	0	0	20	31	31	574	584
and	eb thru	2	1506	1512	0	0	20	15	15	1535	1564	1549	1579	0	0	20	31	31	1566	1595
I-476 NB On Ramp/	eb right	3	4	4	0	0	0	0	0	4	4	4	4	0	0	0	0	0	4	4
Hillside Circuit (N/S)	wb left	4	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2
	wb thru	5	751	754	20	108	0	0	108	765	780	873	888	20	115	0	0	115	881	895
	wb right	6	476	478	0	0	0	0	0	485	494	485	494	0	0	0	0	0	485	494
	nb left	7	6	6	0	0	0	0	0	6	6	6	6	0	0	0	0	0	6	6
	nb thru	8	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2
	nb right	9	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2
Lancaster Avenue (E/W)	eb left	1	137	137	0	0	0	0	0	139	142	139	142	0	0	0	0	0	139	142
and	eb thru	2	889	889	15	81	0	0	81	903	920	983	1001	15	87	0	0	87	989	1006
Radnor Chester Road (N/S)	eb right	3	52	52	0	0	0	0	0	53	54	53	54	0	0	0	0	0	53	54
	wb left	4	209	209	0	0	0	0	0	212	216	212	216	0	0	0	0	0	212	216
	wb thru	5	1434	1434	0	0	15	11	11	1456	1484	1467	1495	0	0	15	23	23	1479	1507
	wb right	6	431	431	0	0	0	0	0	438	446	438	446	0	0	0	0	0	438	446
	nb left	7	91	91	0	0	0	0	0	92	94	92	94	0	0	0	0	0	92	94
	nb thru	8	367	367	0	0	0	0	0	373	380	373	380	0	0	0	0	0	373	380
	nb right	9	82	82	0	0	0	0	0	83	85	83	85	0	0	0	0	0	83	85
	sb left	10	95	95	0	0	0	0	0	96	98	96	98	0	0	0	0	0	96	98
	sb thru	11	130	130	0	0	0	0	0	132	135	132	135	0	0	0	0	0	132	135
	sb right	12	105	105	0	0	0	0	0	107	109	107	109	0	0	0	0	0	107	109

Volume Development Table

University of Pennsylvania Health Systems Weekday PM Traffic Volumes					Existing Site Trips									New Trips						
			Count	2016	95	in	462	out		2020	2025	2020	2025	158	in	425	out	Total	PM 2020	PM 2025
	mvmt	mvmt no	Data	base	%	vol	%	vol		Base	Base	No Build	No Build	%	vol	%	vol	Trips	Build	Build
King of Prussia Road (N/S)	eb left	1	3	3	0	0	0	0	0	3	3	3	3	0	0	0	0	0	3	3
and	eb thru	2	4	4	0	0	0	0	0	4	4	4	4	0	0	0	0	0	4	4
Parking Drive/	eb right	3	9	9	0	0	0	0	0	9	9	9	9	0	0	0	0	0	9	9
Matsonford Road (E/W)	wb left	4	511	513	8	8	0	0	8	521	531	528	538	8	13	0	0	13	533	543
	wb thru	5	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1
	wb right	6	212	213	0	0	0	0	0	216	220	216	220	0	0	0	0	0	216	220
	nb left	10	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	7	7
	nb thru	11	423	425	0	0	15	69	69	431	439	500	509	0	0	15	64	64	495	503
	nb right	12	231	232	0	0	8	37	37	235	240	272	277	0	0	8	34	34	269	274
	sb left	7	118	118	0	0	0	0	0	120	123	120	123	0	0	0	0	0	120	123
	sb thru	8	716	719	15	14	0	0	14	730	744	744	758	15	24	0	0	24	753	767
	sb right	9	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1
King of Prussia Road (E/W)	eb left	1	8	8	0	0	0	0	0	8	8	8	8	0	0	0	0	0	8	8
and	eb thru	2	705	705	23	22	0	0	22	716	729	738	751	23	36	0	0	36	752	766
Radnor Chester Road (N/S)	eb right	3	654	654	0	0	0	0	0	664	677	664	677	0	0	0	0	0	664	677
	wb left	4	49	49	0	0	2	9	9	50	51	59	60	0	0	2	9	9	58	59
	wb thru	5	317	317	0	0	23	106	106	322	328	428	434	0	0	23	98	98	420	426
	wb right	6	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1
	nb left	7	395	395	0	0	0	0	0	401	409	401	409	0	0	0	0	0	401	409
	nb thru	8	7	7	0	0	0	0	0	7	7	7	7	0	0	0	0	0	7	7
	nb right	9	137	137	2	2	0	0	2	139	142	141	144	2	3	0	0	3	142	145
	sb left	10	31	31	0	0	0	0	0	31	32	31	32	0	0	0	0	0	31	32
	sb thru	11	36	36	0	0	0	0	0	37	37	37	37	0	0	0	0	0	37	37
	sb right	12	48	48	0	0	0	0	0	49	50	49	50	0	0	0	0	0	49	50
King of Prussia Road (N/S)	wb left	1	33	33	0	0	25	116	116	34	34	149	150	0	0	10	43	43	76	77
and	wb right	2	41	41	0	0	10	46	46	42	42	88	89	0	0	10	43	43	84	85
Septa Driveway (W)	nb thru	3	334	334	0	0	15	69	69	339	346	408	415	0	0	15	64	64	403	409
	nb right	4	1	1	25	24	0	0	24	1	1	25	25	10	16	0	0	16	17	17
	sb left	5	29	29	10	10	0	0	10	29	30	39	40	15	24	0	0	24	53	54
	sb thru	6	940	940	15	14	0	0	14	954	973	969	987	10	16	0	0	16	970	988
King of Prussia Road (N/S)	wb left	1	0	0	0	0	5	23	23	0	0	23	23	0	0	0	0	0	0	0
and	wb right	2	0	0	0	0	5	23	23	0	0	23	23	0	0	0	0	0	0	0
N. Driveway (Exit Only)	nb thru	3	269	269	25	24	10	46	70	273	278	343	348	10	16	15	64	80	353	358
	sb thru	4	1042	1042	15	14	25	116	130	1058	1078	1188	1208	10	16	10	43	58	1116	1136
King of Prussia Road (N/S)	eb left	1	5	5	0	0	0	0	0	5	5	5	5	0	0	0	0	0	5	5
and	eb thru	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Raider Road(E/W)	eb right	3	40	40	0	0	0	0	0	41	42	41	42	0	0	0	0	0	41	42
	wb left	4	0	0	0	0	0	0	0	0	0	0	0	0	0	64	272	272	272	272
	wb right	5	0	0	0	0	0	0	0	0	0	0	0	0	0	14	60	60	60	60
	nb left	6	23	23	0	0	0	0	0	23	24	23	24	0	0	0	0	0	23	24
	nb thru	7	269	270	25	24	10	46	70	274	279	344	349	10	16	1	4	20	294	299
	nb right	8	0	0	5	5	0	0	5	0	0	5	5	64	101	0	0	101	101	101
	sb left	9	0	0	5	5	0	0	5	0	0	5	5	9	14	0	0	14	14	14
	sb thru	10	1033	1037	10	10	30	139	148	1053	1073	1201	1221	1	2	10	43	44	1097	1117
	sb right	11	5	5	0	0	0	0	0	5	5	5	5	0	0	0	0	0	5	5
King of Prussia Road (N/S)	wb left	1	0	0	0	0	45	208	208	0	0	208	208	0	0	1	4	4	4	4
and	wb right	2	0	0	0	0	10	46	46	0	0	46	46	0	0	1	4	4	4	4
Southern Driveway (E/W)	nb thru	3	292	292	30	29	0	0	29	296	302	325	331	74	117	0	0	117	413	419
	nb right	4	0	0	45	43	0	0	43	0	0	43	43	1	2	0	0	2	2	2
	sb left	5	0	0	10	10	0	0	10	0	0	10	10	1	2	0	0	2	2	2
	sb thru	6	1073	1073	0	0	30	139	139	1089	1110	1228	1249	0	0	74	315	315	1404	1425

Volume Development Table

University of Pennsylvania Health Systems Weekday PM Traffic Volumes	mvmt	mvmt no	Count Data	2016 base	Existing Site Trips 95 %	in vol	462 %	out vol		2020 Base	2025 Base	2020 No Build	2025 No Build	New Trips 158 %	in vol	425 %	out vol	Total Trips	PM 2020 Build	PM 2025 Build
Lancaster Avenue (E/W)	eb left	1	46	46	35	33	0	0	33	47	48	80	81	35	55	0	0	55	102	103
and	eb thru	2	1509	1515	0	0	0	0	0	1538	1567	1538	1567	0	0	0	0	0	1538	1567
I-476 NB Off Ramps/	wb thru	3	567	569	0	0	0	0	0	578	589	578	589	0	0	0	0	0	578	589
King of Prussia Road (N/S)	wb right	4	145	146	20	19	0	0	19	148	151	167	170	20	32	0	0	32	179	182
	nb left	5	267	268	0	0	0	0	0	272	277	272	277	0	0	0	0	0	272	277
	nb thru	6	196	197	20	19	0	0	19	200	204	219	223	20	32	0	0	32	231	235
	nb right	7	210	211	0	0	0	0	0	214	218	214	218	0	0	0	0	0	214	218
	sb left	8	650	652	0	0	40	185	185	662	675	847	860	0	0	40	170	170	832	845
	sb right	9	299	300	0	0	35	162	162	305	311	466	472	0	0	35	149	149	453	459
Lancaster Avenue (E/W)	eb thru	1	1013	1013	15	14	0	0	14	1028	1048	1043	1062	15	24	0	0	24	1052	1072
and	eb right	2	575	575	0	0	0	0	0	584	595	584	595	0	0	0	0	0	584	595
I-476 SB Off Ramps (N/S)	wb left	3	478	478	0	0	20	92	92	485	495	578	587	0	0	20	85	85	570	580
	wb thru	4	694	694	0	0	15	69	69	705	718	774	787	0	0	15	64	64	768	782
	nb left	5	606	606	0	0	0	0	0	615	627	615	627	0	0	0	0	0	615	627
	nb right	6	468	468	20	19	0	0	19	475	484	494	503	20	32	0	0	32	507	516
Lancaster Avenue (E/W)	eb left	1	1045	1049	0	0	20	92	92	1065	1085	1157	1178	0	0	20	85	85	1150	1170
and	eb thru	2	1647	1653	0	0	20	92	92	1679	1711	1771	1803	0	0	20	85	85	1764	1796
I-476 NB On Ramp/	eb right	3	14	14	0	0	0	0	0	14	15	14	15	0	0	0	0	0	14	15
Hillside Circuit (N/S)	wb left	4	6	6	0	0	0	0	0	6	6	6	6	0	0	0	0	0	6	6
	wb thru	5	676	679	20	19	0	0	19	689	702	708	721	20	32	0	0	32	721	734
	wb right	6	573	575	0	0	0	0	0	584	595	584	595	0	0	0	0	0	584	595
	nb left	7	3	3	0	0	0	0	0	3	3	3	3	0	0	0	0	0	3	3
	nb thru	8	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1
	nb right	9	2	2	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2
Lancaster Avenue (E/W)	eb left	1	118	118	0	0	0	0	0	120	122	120	122	0	0	0	0	0	120	122
and	eb thru	2	1134	1134	15	14	0	0	14	1151	1173	1166	1188	15	24	0	0	24	1175	1197
Radnor Chester Road (N/S)	eb right	3	92	92	0	0	0	0	0	93	95	93	95	0	0	0	0	0	93	95
	wb left	4	195	195	0	0	0	0	0	198	202	198	202	0	0	0	0	0	198	202
	wb thru	5	1029	1029	0	0	15	69	69	1045	1065	1114	1134	0	0	15	64	64	1108	1128
	wb right	6	124	124	0	0	0	0	0	126	128	126	128	0	0	0	0	0	126	128
	nb left	7	80	80	0	0	0	0	0	81	83	81	83	0	0	0	0	0	81	83
	nb thru	8	208	208	0	0	0	0	0	211	215	211	215	0	0	0	0	0	211	215
	nb right	9	139	139	0	0	0	0	0	141	144	141	144	0	0	0	0	0	141	144
	sb left	10	404	404	0	0	0	0	0	410	418	410	418	0	0	0	0	0	410	418
	sb thru	11	441	441	0	0	0	0	0	448	456	448	456	0	0	0	0	0	448	456
	sb right	12	212	212	0	0	0	0	0	215	219	215	219	0	0	0	0	0	215	219

APPENDIX F

2020 and 2025 No Build Condition Capacity Analysis Worksheets

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	311	7	102	368	623	2	12	614	593
Future Volume (veh/h)	1	0	2	311	7	102	368	623	2	12	614	593
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1748	1744	1891	1730	1835	1853	1773	1755	1808
Adj Flow Rate, veh/h	1	0	2	346	8	113	409	692	2	13	682	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	333	0	391	437	25	357	392	1158	3	372	683	598
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1291	0	1530	1396	99	1398	1648	1829	5	750	1755	1537
Grp Volume(v), veh/h	1	0	2	346	0	121	409	0	694	13	682	0
Grp Sat Flow(s),veh/h/ln	1291	0	1530	1396	0	1497	1648	0	1834	750	1755	1537
Q Serve(g_s), s	0.1	0.0	0.1	22.1	0.0	5.9	17.0	0.0	20.1	1.0	34.9	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.1	22.1	0.0	5.9	17.0	0.0	20.1	1.0	34.9	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	391	437	0	383	392	0	1162	372	683	598
V/C Ratio(X)	0.00	0.00	0.01	0.79	0.00	0.32	1.04	0.00	0.60	0.03	1.00	0.00
Avail Cap(c_a), veh/h	333	0	391	437	0	383	392	0	1162	372	683	598
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.0	33.2	0.0	27.1	27.5	0.0	9.7	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	9.6	0.0	0.5	57.5	0.0	2.3	0.2	34.2	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	0.0	0.0	0.1	14.7	0.0	4.4	28.7	0.0	16.1	0.4	31.3	0.0
LnGrp Delay(d),s/veh	29.1	0.0	25.0	42.8	0.0	27.6	84.9	0.0	12.0	17.3	61.7	0.0
LnGrp LOS	C		C	D		C	F		B	B	E	
Approach Vol, veh/h		3			467			1103			695	
Approach Delay, s/veh		26.4			38.8			39.0			60.9	
Approach LOS		C			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0
Max Q Clear Time (g_c+I1), s		22.1		24.6	19.5	37.4		7.9
Green Ext Time (p_c), s		12.1		0.0	0.0	0.0		1.5

Intersection Summary		
HCM 2010 Ctrl Delay		45.7
HCM 2010 LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	387	467	27	819	7	502	32	57	2	1	6
Future Volume (veh/h)	38	387	467	27	819	7	502	32	57	2	1	6
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		0.97	1.00		0.97
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	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	412	0	29	871	7	534	34	61	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	103	857	772	402	899	7	226	9	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	642	1714	1545	943	1799	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	412	0	29	0	878	568	0	61	9	0	0
Grp Sat Flow(s),veh/h/ln	642	1714	1545	943	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	3.3	14.2	0.0	1.9	0.0	42.2	0.0	0.0	2.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.2	0.0	16.1	0.0	42.2	34.0	0.0	2.3	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	103	857	772	402	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.39	0.48	0.00	0.07	0.00	0.97	2.41	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	103	857	772	402	0	907	236	0	574	159	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)	0.59	0.59	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.1	14.8	0.0	20.1	0.0	21.8	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	6.4	1.1	0.0	0.3	0.0	23.1	648.0	0.0	0.1	0.1	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	2.1	10.2	0.0	1.0	0.0	35.3	86.8	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	50.4	16.0	0.0	20.5	0.0	45.0	681.6	0.0	18.2	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		452			907			629			9	
Approach Delay, s/veh		19.0			44.2			617.3			21.8	
Approach LOS		B			D			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0
Max Q Clear Time (g_c+I1), s		47.5		36.0		44.2		36.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	218.9
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	34	958	191	115	326
Future Vol, veh/h	23	34	958	191	115	326
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	26	39	1101	220	132	375

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1869	1238	0	0	1338	0
Stage 1	1228	-	-	-	-	-
Stage 2	641	-	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398	-
Pot Cap-1 Maneuver	80	177	-	-	455	-
Stage 1	279	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	56	173	-	-	451	-
Mov Cap-2 Maneuver	169	-	-	-	-	-
Stage 1	275	-	-	-	-	-
Stage 2	373	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.6	0	4.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	171	451	-
HCM Lane V/C Ratio	-	-	0.383	0.293	-
HCM Control Delay (s)	-	-	38.6	16.3	-
HCM Lane LOS	-	-	E	C	-
HCM 95th %tile Q(veh)	-	-	1.7	1.2	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	1140	0	0	398
Future Vol, veh/h	4	4	1140	0	0	398
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	4	4	1213	0	0	423

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1636	1213	0	-	-	-
Stage 1	1213	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	112	224	-	0	0	-
Stage 1	284	-	-	0	0	-
Stage 2	665	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	112	224	-	-	-	-
Mov Cap-2 Maneuver	222	-	-	-	-	-
Stage 1	284	-	-	-	-	-
Stage 2	665	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	223	-
HCM Lane V/C Ratio	-	0.038	-
HCM Control Delay (s)	-	21.8	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	9	0	130	0	0	0	173	1134	27	27	318	58
Future Vol, veh/h	9	0	130	0	0	0	173	1134	27	27	318	58
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	167	0	0	0	222	1454	35	35	408	74

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	2429	2454	445	482	0	0	1496	0	0
Stage 1	514	514	-	-	-	-	-	-	-
Stage 2	1915	1940	-	-	-	-	-	-	-
Critical Hdwy	6.51	6.5	6.24	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.51	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	33	31	609	1091	-	-	454	-	-
Stage 1	582	539	-	-	-	-	-	-	-
Stage 2	120	113	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	0	0	609	1091	-	-	454	-	-
Mov Cap-2 Maneuver	0	0	-	-	-	-	-	-	-
Stage 1	520	0	-	-	-	-	-	-	-
Stage 2	0	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	1.2	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1091	-	-	609	454	-	-
HCM Lane V/C Ratio	0.203	-	-	0.293	0.076	-	-
HCM Control Delay (s)	9.1	0	-	13.3	13.6	0	-
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0.8	-	-	1.2	0.2	-	-

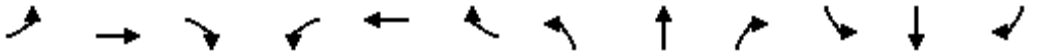
Intersection	
Int Delay, s/veh	5.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	7	1323	242	54	393
Future Vol, veh/h	33	7	1323	242	54	393
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	40	8	1594	292	65	473

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2198	1594	0	0	1594	0
Stage 1	1594	-	-	-	-	-
Stage 2	604	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	50	133	-	-	417	-
Stage 1	185	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	42	133	-	-	417	-
Mov Cap-2 Maneuver	42	-	-	-	-	-
Stage 1	185	-	-	-	-	-
Stage 2	464	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	265	0	1.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	48	417	-
HCM Lane V/C Ratio	-	-	1.004	0.156	-
HCM Control Delay (s)	-	-	265	15.2	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	4.3	0.5	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	360	1281	0	0	534	366	759	819	337	284	0	132
Future Volume (veh/h)	360	1281	0	0	534	366	759	819	337	284	0	132
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	371	1321	0	0	551	0	782	844	347	293	0	136
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	293	
Grp Volume(v), veh/h	371	1321	0	0	551	0	782	844	347	293	63.9	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.1	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Cycle Q Clear(g_c), s	12.1	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.82	0.99	0.00	0.00	0.74	0.00	0.47	1.22	0.59	0.81		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.7	40.0	0.0	0.0	48.0	0.0	17.4	33.5	26.5	51.2		
Incr Delay (d2), s/veh	10.4	20.9	0.0	0.0	5.9	0.0	0.2	113.4	1.6	12.8		
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		
%ile BackOfQ(95%),veh/ln	10.1	31.5	0.0	0.0	13.5	0.0	12.2	76.7	13.3	3.1		
LnGrp Delay(d),s/veh	59.1	60.9	0.0	0.0	53.9	0.0	17.6	146.9	28.1	63.9		
LnGrp LOS	E	E			D		B	F	C	E		
Approach Vol, veh/h		1692			551			1973				
Approach Delay, s/veh		60.5			53.9			74.8				
Approach LOS		E			D			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0
Max Q Clear Time (g_c+I1), s		45.9	19.5		14.6	19.9	10.5	45.5
Green Ext Time (p_c), s		0.0	3.0		0.0	2.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	66.2
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	845	0	170	1212	792	831
Future Volume (veh/h)	845	0	170	1212	792	831
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785
Adj Flow Rate, veh/h	862	0	173	1237	808	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	6	2	2	7
Cap, veh/h	2313	0	273	2104	957	436
Arrive On Green	0.49	0.00	0.03	0.21	0.29	0.00
Sat Flow, veh/h	5035	0	3169	3476	3326	1517
Grp Volume(v), veh/h	862	0	173	1237	808	0
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517
Q Serve(g_s), s	12.5	0.0	5.9	36.3	25.1	0.0
Cycle Q Clear(g_c), s	12.5	0.0	5.9	36.3	25.1	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2313	0	273	2104	957	436
V/C Ratio(X)	0.37	0.00	0.63	0.59	0.84	0.00
Avail Cap(c_a), veh/h	2313	0	317	2104	1421	648
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.63	0.63	1.00	0.00
Uniform Delay (d), s/veh	17.5	0.0	51.7	31.0	36.9	0.0
Incr Delay (d2), s/veh	0.5	0.0	2.0	0.8	3.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.4	0.0	4.8	22.7	17.7	0.0
LnGrp Delay(d),s/veh	18.0	0.0	53.8	31.8	40.0	0.0
LnGrp LOS	B		D	C	D	
Approach Vol, veh/h	862			1410	808	
Approach Delay, s/veh	18.0			34.5	40.0	
Approach LOS	B			C	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.6	14.5	58.9				73.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.6	8.4	15.0				38.8
Green Ext Time (p_c), s		3.0	0.1	14.9				10.3

Intersection Summary	
HCM 2010 Ctrl Delay	31.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	558	1549	4	2	873	485	6	2	2	0	0	0
Future Volume (veh/h)	558	1549	4	2	873	485	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	581	1614	4	2	909	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	680	2843	7	18	2149	1000	21	7	22			
Arrive On Green	0.41	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	581	788	830	2	909	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	17.6	0.0	0.0	0.1	14.7	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	17.6	0.0	0.0	0.1	14.7	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	680	1389	1461	18	2149	1000	28	0	22			
V/C Ratio(X)	0.85	0.57	0.57	0.11	0.42	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2149	1000	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.17	0.17	0.17	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.8	0.0	0.0	53.9	9.7	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	1.0	0.3	0.3	2.6	0.6	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.9	0.2	0.2	0.1	11.2	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	31.8	0.3	0.3	56.5	10.3	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2199			911			10				
Approach Delay, s/veh		8.6			10.4			58.1				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.2	97.0			27.7	75.5		6.8
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.8	80.0			30.0	56.0		6.0
Max Q Clear Time (g_c+I1), s	2.6	2.5			20.1	17.2		2.7
Green Ext Time (p_c), s	0.0	41.4			1.6	27.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.3
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	983	53	212	1467	438	92	373	83	96	132	107
Future Volume (veh/h)	139	983	53	212	1467	438	92	373	83	96	132	107
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	145	1024	55	221	1528	456	96	389	86	100	138	111
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1442	77	282	1501	677	151	497	111	215	606	453
Arrive On Green	0.07	0.45	0.45	0.07	0.45	0.45	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3190	171	1632	3319	1497	452	2080	464	1609	1787	1337
Grp Volume(v), veh/h	145	530	549	221	1528	456	292	0	279	100	126	123
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1489	0	1507	1609	1638	1487
Q Serve(g_s), s	5.0	28.5	28.5	8.0	49.7	26.4	18.6	0.0	19.1	5.0	6.0	6.6
Cycle Q Clear(g_c), s	5.0	28.5	28.5	8.0	49.7	26.4	20.3	0.0	19.1	5.0	6.0	6.6
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	747	773	282	1501	677	399	0	360	215	555	504
V/C Ratio(X)	0.78	0.71	0.71	0.78	1.02	0.67	0.73	0.00	0.78	0.47	0.23	0.25
Avail Cap(c_a), veh/h	186	747	773	282	1501	677	449	0	411	215	610	554
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	24.3	24.3	21.5	30.1	23.7	39.5	0.0	39.1	29.7	26.0	26.2
Incr Delay (d2), s/veh	18.9	5.7	5.5	13.5	27.9	5.3	5.3	0.0	8.0	1.6	0.2	0.3
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	5.8	20.3	20.8	7.4	51.4	17.4	13.8	0.0	13.6	4.1	5.0	4.9
LnGrp Delay(d),s/veh	43.8	30.0	29.8	35.0	58.0	29.0	44.7	0.0	47.1	31.3	26.2	26.5
LnGrp LOS	D	C	C	C	F	C	D		D	C	C	C
Approach Vol, veh/h		1224			2205			571			349	
Approach Delay, s/veh		31.5			49.7			45.9			27.8	
Approach LOS		C			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	54.7		42.3	13.0	54.7	11.0	31.3
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	45.0		40.0	7.0	45.0	5.0	29.0
Max Q Clear Time (g_c+I1), s	10.5	31.0		8.6	7.5	52.2	7.5	22.3
Green Ext Time (p_c), s	0.0	12.7		6.0	0.0	0.0	0.0	2.9

Intersection Summary	
HCM 2010 Ctrl Delay	42.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	528	1	216	120	744	1	7	500	272
Future Volume (veh/h)	3	4	9	528	1	216	120	744	1	7	500	272
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	574	1	235	130	809	1	8	543	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	386	167	419	601	2	587	317	962	1	184	687	595
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1162	457	1142	1422	7	1601	1689	1841	2	677	1782	1544
Grp Volume(v), veh/h	3	0	14	574	0	236	130	0	810	8	543	0
Grp Sat Flow(s),veh/h/ln	1162	0	1599	1422	0	1608	1689	0	1844	677	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.8	0.0	33.7	0.9	24.2	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.5	33.0	0.0	9.8	3.8	0.0	33.7	21.8	24.2	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	586	601	0	590	317	0	963	184	687	595
V/C Ratio(X)	0.01	0.00	0.02	0.95	0.00	0.40	0.41	0.00	0.84	0.04	0.79	0.00
Avail Cap(c_a), veh/h	386	0	586	601	0	590	330	0	963	184	687	595
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	30.0	0.0	21.2	17.1	0.0	18.3	32.6	24.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	25.8	0.0	0.4	0.8	0.0	8.8	0.4	9.0	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	0.1	0.0	0.4	25.6	0.0	7.8	3.3	0.0	26.4	0.3	19.7	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	55.8	0.0	21.6	18.0	0.0	27.1	33.1	33.5	0.0
LnGrp LOS	C		B	E		C	B		C	C	C	
Approach Vol, veh/h		17			810			940			551	
Approach Delay, s/veh		19.3			45.9			25.9			33.5	
Approach LOS		B			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		52.0		38.0	12.3	39.7		38.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0
Max Q Clear Time (g_c+I1), s		35.7		35.5	6.3	26.7		12.0
Green Ext Time (p_c), s		6.2		0.0	0.0	4.2		3.3

Intersection Summary	
HCM 2010 Ctrl Delay	34.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	738	664	59	428	1	401	7	141	31	37	49
Future Volume (veh/h)	8	738	664	59	428	1	401	7	141	31	37	49
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		0.98	1.00		0.98
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	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	769	0	61	446	1	418	7	147	32	39	51
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	351	812	725	111	834	2	270	3	644	50	58	42
Arrive On Green	0.46	0.46	0.00	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	948	1782	1591	725	1830	4	453	8	1525	0	138	99
Grp Volume(v), veh/h	8	769	0	61	0	447	425	0	147	122	0	0
Grp Sat Flow(s),veh/h/ln	948	1782	1591	725	0	1834	460	0	1525	237	0	0
Q Serve(g_s), s	0.5	37.2	0.0	3.8	0.0	15.8	0.0	0.0	5.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.8	37.2	0.0	41.0	0.0	15.8	38.0	0.0	5.5	38.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.26		0.42
Lane Grp Cap(c), veh/h	351	812	725	111	0	836	274	0	644	151	0	0
V/C Ratio(X)	0.02	0.95	0.00	0.55	0.00	0.53	1.55	0.00	0.23	0.81	0.00	0.00
Avail Cap(c_a), veh/h	351	812	725	111	0	836	274	0	644	151	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)	0.14	0.14	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.2	23.5	0.0	44.0	0.0	17.6	31.5	0.0	16.6	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.6	0.0	18.3	0.0	2.4	266.2	0.0	0.2	27.2	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	0.3	21.9	0.0	3.7	0.0	13.3	48.6	0.0	4.2	5.5	0.0	0.0
LnGrp Delay(d),s/veh	23.2	28.1	0.0	62.4	0.0	20.1	297.7	0.0	16.8	49.3	0.0	0.0
LnGrp LOS	C	C		E		C	F		B	D		
Approach Vol, veh/h		777			508			572			122	
Approach Delay, s/veh		28.1			25.2			225.5			49.3	
Approach LOS		C			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		44.0		46.0		44.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		40.0		37.0		40.0		37.0
Max Q Clear Time (g_c+I1), s		39.7		40.0		43.5		40.0
Green Ext Time (p_c), s		0.2		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	85.7
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	17.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	149	88	408	25	39	969
Future Vol, veh/h	149	88	408	25	39	969
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	175	104	480	29	46	1140

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1746	522	0	0	526	0
Stage 1	512	-	-	-	-	-
Stage 2	1234	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	~ 96	526	-	-	969	-
Stage 1	606	-	-	-	-	-
Stage 2	277	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 90	514	-	-	961	-
Mov Cap-2 Maneuver	200	-	-	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	263	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	120	0	0.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	259	961	-
HCM Lane V/C Ratio	-	-	1.077	0.048	-
HCM Control Delay (s)	-	-	120	8.9	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	11.5	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	23	343	0	0	1188
Future Vol, veh/h	23	23	343	0	0	1188
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	25	25	369	0	0	1277

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1646	369	0	-	-	-
Stage 1	369	-	-	-	-	-
Stage 2	1277	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	111	681	-	0	0	-
Stage 1	704	-	-	0	0	-
Stage 2	264	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	111	681	-	-	-	-
Mov Cap-2 Maneuver	212	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	264	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	323	-
HCM Lane V/C Ratio	-	0.153	-
HCM Control Delay (s)	-	18.2	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.5	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	5	0	41	0	0	0	23	344	5	5	1201	5
Future Vol, veh/h	5	0	41	0	0	0	23	344	5	5	1201	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	5	0	44	0	0	0	24	366	5	5	1278	5

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1709	1719	1280	1283	0	0	379	0	0
Stage 1	1291	1291	-	-	-	-	-	-	-
Stage 2	418	428	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	101	91	204	548	-	-	1191	-	-
Stage 1	260	236	-	-	-	-	-	-	-
Stage 2	669	588	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	94	0	204	548	-	-	1191	-	-
Mov Cap-2 Maneuver	94	0	-	-	-	-	-	-	-
Stage 1	256	0	-	-	-	-	-	-	-
Stage 2	632	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.1	0.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	548	-	-	181	1191	-	-
HCM Lane V/C Ratio	0.045	-	-	0.27	0.004	-	-
HCM Control Delay (s)	11.9	0	-	32.1	8	0	-
HCM Lane LOS	B	A	-	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0	-	-

Intersection	
Int Delay, s/veh	83.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	208	46	325	43	10	1228
Future Vol, veh/h	208	46	325	43	10	1228
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	221	49	346	46	11	1306

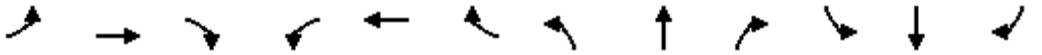
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1674	346	0	0	346	0
Stage 1	346	-	-	-	-	-
Stage 2	1328	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 106	702	-	-	1224	-
Stage 1	721	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 105	702	-	-	1224	-
Mov Cap-2 Maneuver	~ 105	-	-	-	-	-
Stage 1	721	-	-	-	-	-
Stage 2	248	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 613.8	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	124	1224	-
HCM Lane V/C Ratio	-	-	2.179	0.009	-
HCM Control Delay (s)	-	-	$ 613.8	8	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	22.7	0	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	1538	0	0	578	167	272	219	214	847	0	466
Future Volume (veh/h)	80	1538	0	0	578	167	272	219	214	847	0	466
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1800	1782	0	0	1782	1853	1782	1800	1800	1782	0	1872
Adj Flow Rate, veh/h	85	1636	0	0	615	0	289	233	228	901	0	496
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	192	1632	0	0	1282	597	1407	295	250	866	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.76	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3326	3475	0	0	3475	1575	3293	1800	1530	3293	901	
Grp Volume(v), veh/h	85	1636	0	0	615	0	289	233	228	901	85.8	
Grp Sat Flow(s),veh/h/ln	1663	1693	0	0	1693	1575	1646	1800	1530	1646	F	
Q Serve(g_s), s	2.7	53.0	0.0	0.0	7.6	0.0	6.1	13.7	16.1	24.0		
Cycle Q Clear(g_c), s	2.7	53.0	0.0	0.0	7.6	0.0	6.1	13.7	16.1	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	192	1632	0	0	1282	597	1407	295	250	866		
V/C Ratio(X)	0.44	1.00	0.00	0.00	0.48	0.00	0.21	0.79	0.91	1.04		
Avail Cap(c_a), veh/h	393	1632	0	0	1282	597	1407	295	250	866		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.88	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	51.1	37.2	0.0	0.0	9.2	0.0	19.8	44.2	45.2	44.2		
Incr Delay (d2), s/veh	1.4	21.5	0.0	0.0	1.1	0.0	0.1	13.6	34.1	41.6		
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		
%ile BackOfQ(95%),veh/ln	2.3	53.4	0.0	0.0	6.5	0.0	4.9	12.5	14.1	13.1		
LnGrp Delay(d),s/veh	52.5	58.8	0.0	0.0	10.3	0.0	19.8	57.8	79.3	85.8		
LnGrp LOS	D	F			B		B	E	E	F		
Approach Vol, veh/h		1721			615			750				
Approach Delay, s/veh		58.5			10.3			49.7				
Approach LOS		E			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		58.0	52.0		11.3	46.7	29.0	23.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0
Max Q Clear Time (g_c+I1), s		55.5	8.6		5.2	10.1	26.5	18.6
Green Ext Time (p_c), s		0.0	0.8		0.1	17.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	55.6
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1043	0	578	774	615	494
Future Volume (veh/h)	1043	0	578	774	615	494
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891
Adj Flow Rate, veh/h	1064	0	590	790	628	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	1	2	1	1
Cap, veh/h	1998	0	722	2322	751	359
Arrive On Green	0.42	0.00	0.07	0.23	0.22	0.00
Sat Flow, veh/h	5035	0	3326	3476	3359	1607
Grp Volume(v), veh/h	1064	0	590	790	628	0
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607
Q Serve(g_s), s	18.5	0.0	19.2	21.5	19.6	0.0
Cycle Q Clear(g_c), s	18.5	0.0	19.2	21.5	19.6	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1998	0	722	2322	751	359
V/C Ratio(X)	0.53	0.00	0.82	0.34	0.84	0.00
Avail Cap(c_a), veh/h	1998	0	847	2322	916	438
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.76	0.76	1.00	0.00
Uniform Delay (d), s/veh	23.6	0.0	48.9	21.7	40.8	0.0
Incr Delay (d2), s/veh	1.0	0.0	4.2	0.3	5.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.9	0.0	13.7	14.8	14.8	0.0
LnGrp Delay(d),s/veh	24.6	0.0	53.1	22.0	46.6	0.0
LnGrp LOS	C		D	C	D	
Approach Vol, veh/h	1064			1380	628	
Approach Delay, s/veh	24.6			35.3	46.6	
Approach LOS	C			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.6	28.9	51.5				80.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+I1), s		22.1	21.7	21.0				24.0
Green Ext Time (p_c), s		1.4	1.1	10.4				19.7

Intersection Summary	
HCM 2010 Ctrl Delay	33.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1157	1771	14	6	708	584	3	1	2	0	0	0
Future Volume (veh/h)	1157	1771	14	6	708	584	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1205	1845	15	6	738	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1197	2797	23	23	1647	766	18	6	18			
Arrive On Green	0.73	1.00	1.00	0.01	0.49	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3344	27	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1205	906	954	6	738	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	40.0	0.0	0.0	0.4	15.7	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	40.0	0.0	0.0	0.4	15.7	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1197	1376	1444	23	1647	766	24	0	18			
V/C Ratio(X)	1.01	0.66	0.66	0.26	0.45	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1197	1376	1444	109	1647	766	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.0	0.0	0.0	53.7	18.6	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	9.4	0.2	0.2	5.6	0.9	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	33.7	0.2	0.2	0.4	12.1	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	24.4	0.2	0.2	59.3	19.4	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		3065			744			6				
Approach Delay, s/veh		9.7			19.8			56.7				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.5	97.0			45.0	58.5		6.5
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.0	80.0			39.0	47.0		6.0
Max Q Clear Time (g_c+I1), s	2.4	2.5			42.5	18.2		2.7
Green Ext Time (p_c), s	0.0	45.7			0.0	22.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.8
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1166	93	198	1114	126	81	211	141	410	448	215
Future Volume (veh/h)	120	1166	93	198	1114	126	81	211	141	410	448	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	124	1202	96	204	1148	130	84	218	145	423	462	222
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	230	1220	97	209	1294	578	149	345	234	331	863	412
Arrive On Green	0.08	0.38	0.38	0.08	0.39	0.39	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3195	255	1664	3352	1496	385	1338	906	1689	2222	1060
Grp Volume(v), veh/h	124	640	658	204	1148	130	218	0	229	423	351	333
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1195	0	1433	1689	1690	1591
Q Serve(g_s), s	4.3	37.2	37.4	7.6	32.0	5.8	12.6	0.0	14.1	8.0	16.0	16.2
Cycle Q Clear(g_c), s	4.3	37.2	37.4	7.6	32.0	5.8	16.1	0.0	14.1	8.0	16.0	16.2
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	230	650	667	209	1294	578	359	0	370	331	656	618
V/C Ratio(X)	0.54	0.98	0.99	0.98	0.89	0.23	0.61	0.00	0.62	1.28	0.53	0.54
Avail Cap(c_a), veh/h	255	650	667	209	1294	578	453	0	487	331	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	30.6	30.7	24.3	28.7	20.6	33.1	0.0	32.7	34.5	23.6	23.7
Incr Delay (d2), s/veh	2.0	31.7	31.9	55.0	9.2	0.9	1.7	0.0	1.7	145.8	0.7	0.7
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	3.8	31.0	31.8	13.7	23.0	4.6	9.5	0.0	9.7	33.9	12.0	11.7
LnGrp Delay(d),s/veh	24.3	62.3	62.5	79.4	37.9	21.5	34.8	0.0	34.4	180.3	24.3	24.4
LnGrp LOS	C	E	E	E	D	C	C		C	F	C	C
Approach Vol, veh/h		1422			1482			447			1107	
Approach Delay, s/veh		59.1			42.2			34.6			83.9	
Approach LOS		E			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	43.2		43.8	12.6	43.6	13.0	30.8
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0
Max Q Clear Time (g_c+I1), s	10.1	39.7		18.5	6.8	34.5	10.5	18.1
Green Ext Time (p_c), s	0.0	0.0		8.7	0.0	0.0	0.0	6.6

Intersection Summary		
HCM 2010 Ctrl Delay	57.2	
HCM 2010 LOS	E	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	316	7	104	375	633	2	12	626	604
Future Volume (veh/h)	1	0	2	316	7	104	375	633	2	12	626	604
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	351	8	116	417	703	2	13	696	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	330	0	391	437	25	358	390	1152	3	370	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1287	0	1530	1396	97	1400	1639	1820	5	747	1764	1544
Grp Volume(v), veh/h	1	0	2	351	0	124	417	0	705	13	696	0
Grp Sat Flow(s),veh/h/ln	1287	0	1530	1396	0	1497	1639	0	1825	747	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.5	0.0	6.1	17.0	0.0	20.8	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.1	22.5	0.0	6.1	17.0	0.0	20.8	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	391	437	0	383	390	0	1156	370	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.80	0.00	0.32	1.07	0.00	0.61	0.04	1.01	0.00
Avail Cap(c_a), veh/h	330	0	391	437	0	383	390	0	1156	370	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	0.0	25.0	33.3	0.0	27.2	27.5	0.0	9.9	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.4	0.0	0.5	65.5	0.0	2.4	0.2	38.0	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	0.0	0.0	0.1	15.1	0.0	4.6	30.1	0.0	16.6	0.4	43.6	0.0
LnGrp Delay(d),s/veh	29.3	0.0	25.0	43.8	0.0	27.7	93.0	0.0	12.3	17.3	65.5	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			475			1122			709	
Approach Delay, s/veh		26.4			39.6			42.3			64.6	
Approach LOS		C			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0
Max Q Clear Time (g_c+I1), s		22.8		25.0	19.5	37.5		8.1
Green Ext Time (p_c), s		12.4		0.0	0.0	0.0		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	48.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	392	476	27	834	7	511	33	58	2	1	6
Future Volume (veh/h)	38	392	476	27	834	7	511	33	58	2	1	6
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		0.97	1.00		0.97
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	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	417	0	29	887	7	544	35	62	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	92	857	772	399	900	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	632	1714	1545	939	1799	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	417	0	29	0	894	579	0	62	9	0	0
Grp Sat Flow(s),veh/h/ln	632	1714	1545	939	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	1.7	14.5	0.0	1.9	0.0	43.8	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.5	0.0	16.4	0.0	43.8	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	92	857	772	399	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.43	0.49	0.00	0.07	0.00	0.99	2.46	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	92	857	772	399	0	907	236	0	574	159	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)	0.57	0.57	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.7	14.9	0.0	20.3	0.0	22.2	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	8.3	1.1	0.0	0.4	0.0	26.7	668.6	0.0	0.1	0.1	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	2.2	10.4	0.0	1.0	0.0	37.1	89.2	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.0	16.0	0.0	20.6	0.0	48.9	702.2	0.0	18.2	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		457			923			641			9	
Approach Delay, s/veh		19.2			48.0			636.0			21.8	
Approach LOS		B			D			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0
Max Q Clear Time (g_c+I1), s		47.5		36.0		45.8		36.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	227.1
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	34	976	192	116	331
Future Vol, veh/h	23	34	976	192	116	331
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	26	39	1122	221	133	380

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1898	1259	0	0	1360	0
Stage 1	1249	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398	-
Pot Cap-1 Maneuver	77	172	-	-	446	-
Stage 1	273	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	53	168	-	-	442	-
Mov Cap-2 Maneuver	165	-	-	-	-	-
Stage 1	269	-	-	-	-	-
Stage 2	366	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	39.8	0	4.3
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	167	442	-
HCM Lane V/C Ratio	-	-	0.392	0.302	-
HCM Control Delay (s)	-	-	39.8	16.6	-
HCM Lane LOS	-	-	E	C	-
HCM 95th %tile Q(veh)	-	-	1.7	1.3	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	1159	0	0	404
Future Vol, veh/h	4	4	1159	0	0	404
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	4	4	1233	0	0	430

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1663	1233	0	-	-	-
Stage 1	1233	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	108	218	-	0	0	-
Stage 1	278	-	-	0	0	-
Stage 2	660	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	108	218	-	-	-	-
Mov Cap-2 Maneuver	217	-	-	-	-	-
Stage 1	278	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	217	-
HCM Lane V/C Ratio	-	0.039	-
HCM Control Delay (s)	-	22.3	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	9	0	133	0	0	0	177	1153	27	27	323	59
Future Vol, veh/h	9	0	133	0	0	0	177	1153	27	27	323	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	171	0	0	0	227	1478	35	35	414	76

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	2470	2496	452	490	0	0	1521	0	0
Stage 1	521	521	-	-	-	-	-	-	-
Stage 2	1949	1975	-	-	-	-	-	-	-
Critical Hdwy	6.51	6.5	6.24	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.51	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	31	29	603	1084	-	-	445	-	-
Stage 1	578	535	-	-	-	-	-	-	-
Stage 2	115	109	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	0	0	603	1084	-	-	445	-	-
Mov Cap-2 Maneuver	0	0	-	-	-	-	-	-	-
Stage 1	515	0	-	-	-	-	-	-	-
Stage 2	0	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	1.2	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1084	-	-	603	445	-	-
HCM Lane V/C Ratio	0.209	-	-	0.302	0.078	-	-
HCM Control Delay (s)	9.2	0	-	13.5	13.8	0	-
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0.8	-	-	1.3	0.3	-	-

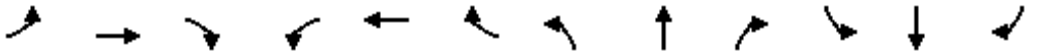
Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	7	1345	242	54	401
Future Vol, veh/h	33	7	1345	242	54	401
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	40	8	1620	292	65	483

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2233	1620	0	0	1620	0
Stage 1	1620	-	-	-	-	-
Stage 2	613	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	48	129	-	-	407	-
Stage 1	180	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	40	129	-	-	407	-
Mov Cap-2 Maneuver	40	-	-	-	-	-
Stage 1	180	-	-	-	-	-
Stage 2	457	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	298	0	1.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	45	407	-
HCM Lane V/C Ratio	-	-	1.071	0.16	-
HCM Control Delay (s)	-	-	298	15.5	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	4.5	0.6	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	363	1306	0	0	544	371	774	833	344	289	0	134
Future Volume (veh/h)	363	1306	0	0	544	371	774	833	344	289	0	134
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	374	1346	0	0	561	0	798	859	355	298	0	138
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	298	
Grp Volume(v), veh/h	374	1346	0	0	561	0	798	859	355	298	65.3	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.2	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Cycle Q Clear(g_c), s	12.2	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.83	1.01	0.00	0.00	0.75	0.00	0.48	1.25	0.61	0.82		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.7	40.3	0.0	0.0	48.1	0.0	17.6	33.5	26.7	51.2		
Incr Delay (d2), s/veh	10.9	25.2	0.0	0.0	6.3	0.0	0.2	122.4	1.8	14.1		
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		
%ile BackOfQ(95%),veh/ln	10.1	44.9	0.0	0.0	13.7	0.0	12.5	79.8	13.8	3.3		
LnGrp Delay(d),s/veh	59.6	65.4	0.0	0.0	54.4	0.0	17.8	155.9	28.5	65.3		
LnGrp LOS	E	F			D		B	F	C	E		
Approach Vol, veh/h		1720			561			2012				
Approach Delay, s/veh		64.2			54.4			78.6				
Approach LOS		E			D			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0
Max Q Clear Time (g_c+I1), s		46.5	20.0		14.7	20.2	10.5	45.5
Green Ext Time (p_c), s		0.0	3.1		0.0	2.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	69.4
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	860	0	173	1235	807	845
Future Volume (veh/h)	860	0	173	1235	807	845
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785
Adj Flow Rate, veh/h	878	0	177	1260	823	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	6	2	2	7
Cap, veh/h	2286	0	277	2089	972	443
Arrive On Green	0.48	0.00	0.03	0.20	0.29	0.00
Sat Flow, veh/h	5035	0	3169	3476	3326	1517
Grp Volume(v), veh/h	878	0	177	1260	823	0
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517
Q Serve(g_s), s	13.0	0.0	6.1	37.2	25.6	0.0
Cycle Q Clear(g_c), s	13.0	0.0	6.1	37.2	25.6	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2286	0	277	2089	972	443
V/C Ratio(X)	0.38	0.00	0.64	0.60	0.85	0.00
Avail Cap(c_a), veh/h	2286	0	317	2089	1421	648
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.62	0.62	1.00	0.00
Uniform Delay (d), s/veh	18.0	0.0	51.7	31.6	36.6	0.0
Incr Delay (d2), s/veh	0.5	0.0	2.2	0.8	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.6	0.0	4.9	23.1	18.0	0.0
LnGrp Delay(d),s/veh	18.5	0.0	53.9	32.4	39.9	0.0
LnGrp LOS	B		D	C	D	
Approach Vol, veh/h	878			1437	823	
Approach Delay, s/veh	18.5			35.0	39.9	
Approach LOS	B			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		37.1	14.6	58.2				72.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		28.1	8.6	15.5				39.7
Green Ext Time (p_c), s		3.0	0.1	14.9				9.9

Intersection Summary	
HCM 2010 Ctrl Delay	31.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	568	1579	4	2	888	494	6	2	2	0	0	0
Future Volume (veh/h)	568	1579	4	2	888	494	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1765	1800	1800	1800			
Adj Flow Rate, veh/h	592	1645	4	2	925	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	690	2843	7	18	2138	957	21	7	22			
Arrive On Green	0.42	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1500	1301	434	1345			
Grp Volume(v), veh/h	592	804	845	2	925	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1500	1735	0	1345			
Q Serve(g_s), s	17.9	0.0	0.0	0.1	15.2	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	17.9	0.0	0.0	0.1	15.2	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	690	1389	1461	18	2138	957	28	0	22			
V/C Ratio(X)	0.86	0.58	0.58	0.11	0.43	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2138	957	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.12	0.12	0.12	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.5	0.0	0.0	53.9	10.0	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.8	0.2	0.2	2.6	0.6	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.8	0.2	0.2	0.1	11.5	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	31.3	0.2	0.2	56.5	10.6	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2241			927			10				
Approach Delay, s/veh		8.4			10.7			58.1				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.2	97.0			28.1	75.2		6.8
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.6	80.0			30.0	56.0		6.0
Max Q Clear Time (g_c+I1), s	2.6	2.5			20.4	17.7		2.7
Green Ext Time (p_c), s	0.0	42.9			1.6	27.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.2
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	1001	54	216	1495	446	94	380	85	98	135	109
Future Volume (veh/h)	142	1001	54	216	1495	446	94	380	85	98	135	109
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	148	1043	56	225	1557	465	98	396	89	102	141	114
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	2	1	1	1	1	6	3	3
Cap, veh/h	169	1472	79	267	1532	691	153	499	113	211	607	457
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3190	171	1632	3319	1497	453	2068	469	1609	1782	1341
Grp Volume(v), veh/h	148	540	559	225	1557	465	297	0	286	102	129	126
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1485	0	1506	1609	1638	1486
Q Serve(g_s), s	5.4	29.0	29.0	7.0	51.2	26.9	19.3	0.0	19.7	5.1	6.2	6.8
Cycle Q Clear(g_c), s	5.4	29.0	29.0	7.0	51.2	26.9	21.0	0.0	19.7	5.1	6.2	6.8
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	169	762	788	267	1532	691	401	0	363	211	557	506
V/C Ratio(X)	0.87	0.71	0.71	0.84	1.02	0.67	0.74	0.00	0.79	0.48	0.23	0.25
Avail Cap(c_a), veh/h	169	762	788	267	1532	691	444	0	407	211	590	535
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	23.9	23.9	25.6	29.9	23.4	39.8	0.0	39.4	30.0	26.2	26.4
Incr Delay (d2), s/veh	36.1	5.5	5.3	21.0	27.2	5.2	5.9	0.0	8.9	1.7	0.2	0.3
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	10.3	20.6	21.1	9.1	52.5	17.8	14.3	0.0	14.0	4.3	5.1	5.1
LnGrp Delay(d),s/veh	63.1	29.4	29.3	46.6	57.1	28.5	45.7	0.0	48.3	31.7	26.4	26.6
LnGrp LOS	E	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1247			2247			583			357	
Approach Delay, s/veh		33.3			50.1			47.0			28.0	
Approach LOS		C			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	56.2		42.8	12.0	56.2	11.0	31.8
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	47.0		39.0	6.0	47.0	5.0	29.0
Max Q Clear Time (g_c+I1), s	9.5	31.5		8.8	7.9	53.7	7.6	23.0
Green Ext Time (p_c), s	0.0	14.0		6.2	0.0	0.0	0.0	2.7

Intersection Summary	
HCM 2010 Ctrl Delay	43.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	538	1	220	123	758	1	7	509	277
Future Volume (veh/h)	3	4	9	538	1	220	123	758	1	7	509	277
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	585	1	239	134	824	1	8	553	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	413	178	444	633	3	623	284	921	1	147	641	556
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.50	0.50	0.36	0.36	0.00
Sat Flow, veh/h	1158	457	1142	1422	7	1601	1689	1841	2	668	1782	1544
Grp Volume(v), veh/h	3	0	14	585	0	240	134	0	825	8	553	0
Grp Sat Flow(s),veh/h/ln	1158	0	1599	1422	0	1608	1689	0	1844	668	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	35.0	0.0	9.6	4.1	0.0	36.4	1.0	25.9	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.5	35.0	0.0	9.6	4.1	0.0	36.4	24.3	25.9	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	622	633	0	625	284	0	922	147	641	556
V/C Ratio(X)	0.01	0.00	0.02	0.92	0.00	0.38	0.47	0.00	0.90	0.05	0.86	0.00
Avail Cap(c_a), veh/h	413	0	622	633	0	625	292	0	922	147	641	556
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.9	0.0	17.0	28.5	0.0	19.8	18.9	0.0	20.4	36.8	26.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	19.5	0.0	0.4	1.2	0.0	13.0	0.7	14.3	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	0.1	0.0	0.4	24.8	0.0	7.7	3.6	0.0	29.3	0.4	21.7	0.0
LnGrp Delay(d),s/veh	22.9	0.0	17.0	47.9	0.0	20.1	20.2	0.0	33.4	37.5	41.0	0.0
LnGrp LOS	C		B	D		C	C		C	D	D	
Approach Vol, veh/h		17			825			959			561	
Approach Delay, s/veh		18.0			39.8			31.6			41.0	
Approach LOS		B			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		50.0		40.0	12.6	37.4		40.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		44.0		34.0	7.0	31.0		34.0
Max Q Clear Time (g_c+I1), s		38.4		37.5	6.6	28.4		11.8
Green Ext Time (p_c), s		3.8		0.0	0.0	1.9		3.5

Intersection Summary	
HCM 2010 Ctrl Delay	36.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	751	677	60	434	1	409	7	144	32	37	50
Future Volume (veh/h)	8	751	677	60	434	1	409	7	144	32	37	50
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		0.98	1.00		0.98
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	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	782	0	62	452	1	426	7	150	33	39	52
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	319	772	690	80	793	2	282	3	678	51	57	41
Arrive On Green	0.43	0.43	0.00	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	943	1782	1591	716	1830	4	455	7	1526	0	128	93
Grp Volume(v), veh/h	8	782	0	62	0	453	433	0	150	124	0	0
Grp Sat Flow(s),veh/h/ln	943	1782	1591	716	0	1834	463	0	1526	221	0	0
Q Serve(g_s), s	0.6	39.0	0.0	0.0	0.0	16.7	0.0	0.0	5.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.8	39.0	0.0	39.0	0.0	16.7	40.0	0.0	5.4	40.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	319	772	690	80	0	795	285	0	678	149	0	0
V/C Ratio(X)	0.03	1.01	0.00	0.77	0.00	0.57	1.52	0.00	0.22	0.83	0.00	0.00
Avail Cap(c_a), veh/h	319	772	690	80	0	795	285	0	678	149	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)	0.11	0.11	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.3	25.5	0.0	45.0	0.0	19.2	30.6	0.0	15.4	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	14.1	0.0	51.4	0.0	3.0	250.7	0.0	0.2	31.4	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	0.3	39.7	0.0	4.8	0.0	14.0	48.4	0.0	4.2	5.7	0.0	0.0
LnGrp Delay(d),s/veh	25.3	39.7	0.0	96.4	0.0	22.1	281.3	0.0	15.6	53.0	0.0	0.0
LnGrp LOS	C	F		F		C	F		B	D		
Approach Vol, veh/h		790			515			583			124	
Approach Delay, s/veh		39.5			31.1			212.9			53.0	
Approach LOS		D			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		44.0		46.0		44.0		46.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		38.0		39.0		38.0		39.0
Max Q Clear Time (g_c+I1), s		41.5		42.0		41.5		42.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	88.4
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	18.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	150	89	415	25	40	987
Future Vol, veh/h	150	89	415	25	40	987
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	176	105	488	29	47	1161

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1777	530	0	0	535	0
Stage 1	520	-	-	-	-	-
Stage 2	1257	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	~ 92	521	-	-	961	-
Stage 1	601	-	-	-	-	-
Stage 2	270	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 86	509	-	-	953	-
Mov Cap-2 Maneuver	195	-	-	-	-	-
Stage 1	592	-	-	-	-	-
Stage 2	256	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	132.3	0	0.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	253	953	-
HCM Lane V/C Ratio	-	-	1.111	0.049	-
HCM Control Delay (s)	-	-	132.3	9	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	12.2	0.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	23	348	0	0	1208
Future Vol, veh/h	23	23	348	0	0	1208
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	25	25	374	0	0	1299

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1673	374	0	-	-	-
Stage 1	374	-	-	-	-	-
Stage 2	1299	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	-	-
Pot Cap-1 Maneuver	106	677	-	0	0	-
Stage 1	700	-	-	0	0	-
Stage 2	258	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	106	677	-	-	-	-
Mov Cap-2 Maneuver	207	-	-	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	258	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	317	-
HCM Lane V/C Ratio	-	0.156	-
HCM Control Delay (s)	-	18.4	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.5	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	5	0	42	0	0	0	24	349	5	5	1221	5
Future Vol, veh/h	5	0	42	0	0	0	24	349	5	5	1221	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	5	0	45	0	0	0	26	371	5	5	1299	5

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1737	1748	1302	1304	0	0	385	0	0
Stage 1	1312	1312	-	-	-	-	-	-	-
Stage 2	425	436	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	97	87	198	538	-	-	1185	-	-
Stage 1	254	230	-	-	-	-	-	-	-
Stage 2	664	583	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	90	0	198	538	-	-	1185	-	-
Mov Cap-2 Maneuver	90	0	-	-	-	-	-	-	-
Stage 1	250	0	-	-	-	-	-	-	-
Stage 2	623	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33.4	0.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	538	-	-	176	1185	-	-
HCM Lane V/C Ratio	0.047	-	-	0.284	0.004	-	-
HCM Control Delay (s)	12	0	-	33.4	8.1	0	-
HCM Lane LOS	B	A	-	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0	-	-

Intersection	
Int Delay, s/veh	87.3

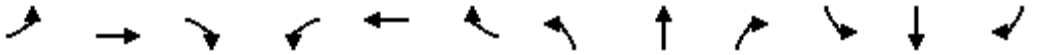
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	208	46	331	43	10	1249
Future Vol, veh/h	208	46	331	43	10	1249
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	221	49	352	46	11	1329

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1702	352	0	0	352	0
Stage 1	352	-	-	-	-	-
Stage 2	1350	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	~ 102	696	-	-	1218	-
Stage 1	716	-	-	-	-	-
Stage 2	244	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 101	696	-	-	1218	-
Mov Cap-2 Maneuver	~ 101	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	242	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 647.9	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	120	1218	-
HCM Lane V/C Ratio	-	-	2.252	0.009	-
HCM Control Delay (s)	-	-	$ 647.9	8	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	23.2	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	1567	0	0	589	170	277	223	218	860	0	472
Future Volume (veh/h)	81	1567	0	0	589	170	277	223	218	860	0	472
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	86	1667	0	0	627	0	295	237	232	915	0	502
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	181	1623	0	0	1305	607	1393	292	248	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.76	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	915	
Grp Volume(v), veh/h	86	1667	0	0	627	0	295	237	232	915	94.1	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	F	
Q Serve(g_s), s	2.8	53.0	0.0	0.0	7.5	0.0	6.3	14.1	16.6	24.0		
Cycle Q Clear(g_c), s	2.8	53.0	0.0	0.0	7.5	0.0	6.3	14.1	16.6	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	181	1623	0	0	1305	607	1393	292	248	858		
V/C Ratio(X)	0.48	1.03	0.00	0.00	0.48	0.00	0.21	0.81	0.94	1.07		
Avail Cap(c_a), veh/h	391	1623	0	0	1305	607	1393	292	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.87	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	51.4	37.2	0.0	0.0	8.9	0.0	19.8	44.4	45.4	44.2		
Incr Delay (d2), s/veh	1.7	28.0	0.0	0.0	1.1	0.0	0.1	15.9	40.0	49.9		
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		
%ile BackOfQ(95%),veh/ln	2.4	55.7	0.0	0.0	6.6	0.0	5.1	12.9	14.8	14.7		
LnGrp Delay(d),s/veh	53.1	65.2	0.0	0.0	10.0	0.0	19.9	60.3	85.4	94.1		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1753			627			764				
Approach Delay, s/veh		64.6			10.0			52.3				
Approach LOS		E			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		58.0	52.0		11.0	47.0	29.0	23.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0
Max Q Clear Time (g_c+I1), s		55.5	8.8		5.3	10.0	26.5	19.1
Green Ext Time (p_c), s		0.0	0.8		0.1	18.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.5
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1062	0	587	787	627	503
Future Volume (veh/h)	1062	0	587	787	627	503
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891
Adj Flow Rate, veh/h	1084	0	599	803	640	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	1	2	1	1
Cap, veh/h	1971	0	730	2311	762	364
Arrive On Green	0.42	0.00	0.07	0.23	0.23	0.00
Sat Flow, veh/h	5035	0	3326	3476	3359	1607
Grp Volume(v), veh/h	1084	0	599	803	640	0
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607
Q Serve(g_s), s	19.1	0.0	19.5	21.9	20.0	0.0
Cycle Q Clear(g_c), s	19.1	0.0	19.5	21.9	20.0	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1971	0	730	2311	762	364
V/C Ratio(X)	0.55	0.00	0.82	0.35	0.84	0.00
Avail Cap(c_a), veh/h	1971	0	847	2311	916	438
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.74	0.74	1.00	0.00
Uniform Delay (d), s/veh	24.2	0.0	48.9	22.0	40.6	0.0
Incr Delay (d2), s/veh	1.1	0.0	4.3	0.3	6.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.2	0.0	13.8	14.9	15.0	0.0
LnGrp Delay(d),s/veh	25.3	0.0	53.2	22.3	46.7	0.0
LnGrp LOS	C		D	C	D	
Approach Vol, veh/h	1084			1402	640	
Approach Delay, s/veh	25.3			35.5	46.7	
Approach LOS	C			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.9	29.1	50.9				80.1
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+I1), s		22.5	22.0	21.6				24.4
Green Ext Time (p_c), s		1.4	1.1	10.2				20.2

Intersection Summary	
HCM 2010 Ctrl Delay	34.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1178	1803	15	6	721	595	3	1	2	0	0	0
Future Volume (veh/h)	1178	1803	15	6	721	595	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1227	1878	16	6	751	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1227	2795	24	23	1616	752	18	6	18			
Arrive On Green	0.75	1.00	1.00	0.01	0.48	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3343	28	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1227	923	971	6	751	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	41.0	0.0	0.0	0.4	16.4	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	41.0	0.0	0.0	0.4	16.4	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1227	1376	1444	23	1616	752	24	0	18			
V/C Ratio(X)	1.00	0.67	0.67	0.26	0.46	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1227	1376	1444	109	1616	752	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	14.0	0.0	0.0	53.7	19.3	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	7.6	0.2	0.2	5.6	1.0	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	21.2	0.2	0.2	0.4	12.4	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	21.6	0.2	0.2	59.3	20.3	0.0	56.9	0.0	56.2			
LnGrp LOS	C	A	A	E	C		E		E			
Approach Vol, veh/h		3121			757			6				
Approach Delay, s/veh		8.7			20.6			56.7				
Approach LOS		A			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.5	97.0			46.0	57.5		6.5
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.6	80.0			40.0	46.0		6.0
Max Q Clear Time (g_c+I1), s	2.4	2.5			43.5	18.9		2.7
Green Ext Time (p_c), s	0.0	47.3			0.0	22.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.1
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	1188	95	202	1134	128	83	215	144	418	456	219
Future Volume (veh/h)	122	1188	95	202	1134	128	83	215	144	418	456	219
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	126	1225	98	208	1169	132	86	222	148	431	470	226
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	223	1201	96	205	1271	567	151	349	238	333	875	418
Arrive On Green	0.08	0.38	0.38	0.08	0.38	0.38	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3194	255	1664	3352	1496	383	1324	902	1689	2221	1061
Grp Volume(v), veh/h	126	652	671	208	1169	132	221	0	235	431	357	339
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1174	0	1434	1689	1690	1591
Q Serve(g_s), s	4.4	37.6	37.6	8.0	33.2	6.0	13.0	0.0	14.5	8.0	16.2	16.4
Cycle Q Clear(g_c), s	4.4	37.6	37.6	8.0	33.2	6.0	16.7	0.0	14.5	8.0	16.2	16.4
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	223	640	657	205	1271	567	360	0	379	333	666	627
V/C Ratio(X)	0.56	1.02	1.02	1.01	0.92	0.23	0.61	0.00	0.62	1.29	0.54	0.54
Avail Cap(c_a), veh/h	246	640	657	205	1271	567	447	0	488	333	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.9	31.2	31.2	25.5	29.6	21.1	32.9	0.0	32.4	34.3	23.3	23.3
Incr Delay (d2), s/veh	2.4	40.3	40.7	66.5	12.1	1.0	1.7	0.0	1.7	152.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	44.6	45.9	17.0	24.2	4.7	9.6	0.0	9.8	35.4	12.2	11.7
LnGrp Delay(d),s/veh	25.3	71.5	71.9	92.1	41.7	22.1	34.6	0.0	34.1	187.1	24.0	24.1
LnGrp LOS	C	F	F	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1449			1509			456			1127	
Approach Delay, s/veh		67.7			47.0			34.3			86.4	
Approach LOS		E			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	42.6		44.4	12.7	42.9	13.0	31.4
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0
Max Q Clear Time (g_c+I1), s	10.5	40.1		18.7	6.9	35.7	10.5	18.7
Green Ext Time (p_c), s	0.0	0.0		8.9	0.0	0.0	0.0	6.6

Intersection Summary	
HCM 2010 Ctrl Delay	62.1
HCM 2010 LOS	E

APPENDIX G

Trip Generation

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

The following is a description of the development of a trip generation rate for the proposed Penn Medicine mixed use medical facility at 145 King of Prussia Road. The development of the trip rate is based on the trips generated by the existing facilities.

The Institute of Transportation Engineers' Trip Generation Manual, 9th Edition describes a medical-dental office building as follows:

> A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility.

For the AM Peak of the adjacent roadway, the Trip Generation Rate was derived based on 23 studies. For 22 of the 23 studies, the gross floor area of the buildings was less than 70,000 SF. For the PM Peak of the adjacent roadway, the Trip Generation Rate was derived based on 43 studies. For 41 of the 43 studies, the gross floor area of the buildings was less than 70,000 SF.

The proposed Penn Medicine facility for 145 King of Prussia Road has a gross floor area of 250,000 SF, more than triple the size of 90% of the facilities used by ITE to derive trip generation data. Therefore, the proposed facility is very different from those used to derive ITE trip generation data.

Furthermore, unlike private physician practices, the proposed Penn Medicine facility will include a number of treatment facilities that are uncommon in a typical medical office and that occupy are larger portion of the gross square floor area of the building, while not accommodating a larger number of patients. These facilities include ambulatory operating rooms, endoscopy rooms, chemotherapy treatment areas, radiological imaging rooms and radiation oncology treatment areas.

It is for these reasons, that the ITE trip generation is not appropriate to use for the proposed Penn Medicine site at 145 King of Prussia Road.

Proposed Trip Generation for 145 King of Prussia.

The following is a proposal for the development of a trip generation rate for the proposed 250,000 SF Penn Medicine mixed medical facility at 145 King of Prussia Road. The development of the trip rate is based on the trips generated by three existing ambulatory care facilities and it is for the peak hour of the adjacent street (King of Prussia Road) which, based on traffic counts, is 7:15-8:15 AM and 5:00–6:00 PM.

EXISTING RADNOR PENN MEDICINE

Penn currently operates an existing 171,000 square foot ambulatory care facility at 250 King of Prussia Road. The facility has 2 parking structures and multiple surface lots that provide 317 parking spaces. The facility also leases 41 parking spaces in the adjacent Radnor Court parking lot and there are 195 spaces available for employee parking at the lot located at 145 King of Prussia Road (near the Septa station). Traffic counts were performed at the parking lot driveways to

record the entry and exit trips generated by the existing Penn Medicine facility and develop a trip generation rate. The east side of the parking lot at 145 King of Prussia Road is also utilized by Septa employees and by commuters accessing the adjacent Septa station. In addition to the driveway counts, we counted the number of vehicles that parked near King of Prussia Road, and those that parked near the SEPTA facility. Based on these observations of the occupancy of the lot and the location of parked vehicles it is estimated that approximately 53% of the vehicles utilizing the lot are employees of the Penn Medicine mixed use facility. The following is a summary of trip data collected through driveway counts:

RADNOR PENN MEDICINE DRIVEWAY COUNTS

Location	AM PEAK		PM PEAK		DAILY	
	IN	OUT	IN	OUT	IN	OUT
On-Site Parking	215	91	83	119	2,134	2,134
Off-Site Parking	55	13	5	70	159	159
Total	270	104	88	189	2,293	2,293

The existing Penn Medicine ambulatory care facility is 171,000 SF with 165 exam or treatment rooms. For the purpose of this exercise, each exam room and each treatment room regardless of type will be considered a “patient position.” The top two floors (approximately 46,700 SF) of the existing Radnor Penn Medicine facility are general office. The trip generation for the office portion of the existing facility was calculated using the ITE Trip Generation Manual.

RADNOR PENN MEDICINE OFFICE TRIPS

Land Use	Size	Daily Trips	Peak Hour Trips		
			Inbound	Outbound	Total
Office (710)	46.7 ksf	515	64(AM)	9(AM)	73
			12(PM)	58(PM)	70

The trips associated with the ambulatory care portion of the Radnor Penn Medicine facility were calculated using the driveway data and subtracting the calculated trips generated by the office portion of the development:

Total trips at Radnor (driveway + offsite) - ITE trip generation for office portion = Trips associated with medical practice (TAMP)

RADNOR PENN MEDICINE MEDICAL MIXED USE TRIPS

Location	AM PEAK		PM PEAK		DAILY	
	IN	OUT	IN	OUT	IN	OUT
Total recorded trips	270	104	88	189	2,293	2,293
Office Trips (ITE)	64	9	12	58	258	257
Remaining Trips (TAMP)	206	95	76	131	2,035	2,036

The trips generation rate for the ambulatory care portion of the Radnor Penn Medicine facility was calculated for the independent variable" patient positions" using the trips associated with medical practice (TAMP) and dividing by the number of patient positions:

TAMP/ patient positions = Trip generation rate per patient position

Land Use	Size	Average Daily Trips Rate	Average Peak Hour Trip Rate	
			AM	PM
Medical/Mixed Use	189 Patient Positions	21.54	1.59 (.68 in/.32 out)	1.09 (.37 in/.63 out)

Driveway counts were also conducted at the Valley Forge Penn Medicine ambulatory care facility located at 1001 Chesterbrook Blvd. in Berwyn PA. The Valley Forge Penn Medical Center has 149 exam or treatment rooms (patient positions) and all of the trips generated by the site are related to the medical uses. The recorded driveway trips are summarized below:

VALLY FORGE PENN MEDICINE DRIVEWAY COUNTS

Location	AM PEAK		PM PEAK		DAILY	
	IN	OUT	IN	OUT	IN	OUT
Valley Forge Penn Medicine	88	8	14	58	638	638

The trip generation rates for the Valley Forge Penn Medicine ambulatory care facility was calculated using the collected driveway data for the independent variable "patient position" using the driveway data:

VALLEY FORGE PENN MEDICINE TRIPS

Land Use	Size	Average Daily Trips Rate	Peak Hour Trip Rate	
			AM	PM
Medical/Mixed Use	149 Patient Positions	8.56	0.64 (.92 in/.08 out)	0.48 (.20 in/.80 out)

Driveway counts were also conducted at the Fern Hill Medical Campus located at 915 Old Fern Hill Road in West Chester, PA. Fern Hill Medical Campus is 154,826 SF with 239 patient positions and all of the trips generated by the site are related to the medical uses. The recorded driveway trips are summarized below:

FERN HILL MEDICAL CAMPUS DRIVEWAY COUNTS

Location	AM PEAK		PM PEAK		DAILY	
	IN	OUT	IN	OUT	IN	OUT
Fern Hill Medical Campus	395	105	85	227	2382	2382

The trip generation rates for the ambulatory care facility mixed use/medical portion of the Fern Hill Medical Campus ambulatory care facility was calculated using the collected driveway data for the independent variable "patient positions" using the driveway data:

FERN HILL MEDICAL CAMPUS MIXED USE TRIPS

Independent Variable – Patient Positions

Land Use	Size	Average Daily Trips Rate	Peak Hour Trip Rate	
			AM	PM
Medical/Mixed Use	223 positions	21.36	2.24 (.79 in/.21 out)	1.40 (.27 in/.73 out)

The following is a comparison of the trip generation rates calculated for the Radnor Penn Medicine ambulatory care facility, the Valley Forge Penn Medicine ambulatory care facility, The Fern Hill ambulatory care facility and the average of the three:

COMPARISON OF CALCULATED TRIP RATES FOR MEDICAL MIXED USE

(Trips/Patient Position)

Location	Avg. Daily Trip Rate	Peak Hour Trips Rates	
		AM	PM
Radnor (124,300 SF/ 189 PP)	21.54	1.59 (.68 in/.32 out)	1.09 (.37 in/.63 out)
Valley Forge (88,300 SF/ 149 PP)	8.56	0.64 (.92 in/.08 out)	0.48 (.20 in/.80 out)
Fern Hill (154,826 SF/ 223 PP)	21.36	2.24 (.79 in/.21 out)	1.40 (.27 in/.73 out)
Average	18.02 (.50 in/.50 out)	1.60 (.77 in/.23 out)	1.06 (.29 in/.71 out)

PROPOSED PENN MEDICINE MEDICAL MIXED USE

The proposed 470,000 SF Penn Medicine development at 145 King of Prussia Road will have a 250,000 SF building dedicated to mixed medical use with 271 patient positions. The following is a comparison of the trips generated by the 250,000 SF medical portion of the site using patient positions as an independent variable:

Method (Land Use)	Size	AM Rate	AM Trips	PM Rate	PM Trips
Calculated - Medical Use (Trips/Patient Position) (Average Rate)	271 Patient Pos.	1.60	434	1.06	287

Trip Generation Calculations
Using Developed rates for Mixed Medical Use

Land Use Code	Size	Unit of Measure	Weekday Trips			AM Trips			PM Trips		
			In	Out	Total	In	Out	Total	In	Out	Total
Medical Mixed Use*	250,000 SF (271 PP)	Patient Positions	2,442	2,442	4,883	334	100	434	83	204	287
General Office Building (ITE Land Use 710)	150,000 SF	1,000 SF GFA	827	827	1,655	206	28	234	38	186	224
Hotel (ITE Land Use 310)	75,000 SF (120 rooms)	Rooms	490	490	980	38	26	64	37	35	72
Total			**3,759**	**3,759**	**7,518**	**577**	**154**	**731**	**158**	**425**	**583**

* Trip generation calculated using calculated trip rates for Medical Mixed Use based on observations of similar facilities

APPENDIX H

Turn Lane Evaluation

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	177	0.0%	177
	Through	-	1071	2.0%	1104
	Right	Yes	369	0.0%	369
Opposing	Left	Yes	52	0.0%	52
	Through	-	268	9.0%	305
	Right	Yes	59	0.0%	59

Advancing Volume:	1650
Opposing Volume:	416
Left Turn Volume:	177
% Left Turns in Advancing Volume:	10.73%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	177	0.0%	N/A
	Through	-	1069	2.0%	N/A
	Right	-	369	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	177
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40

Average # of Vehicles/Cycle: 4.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

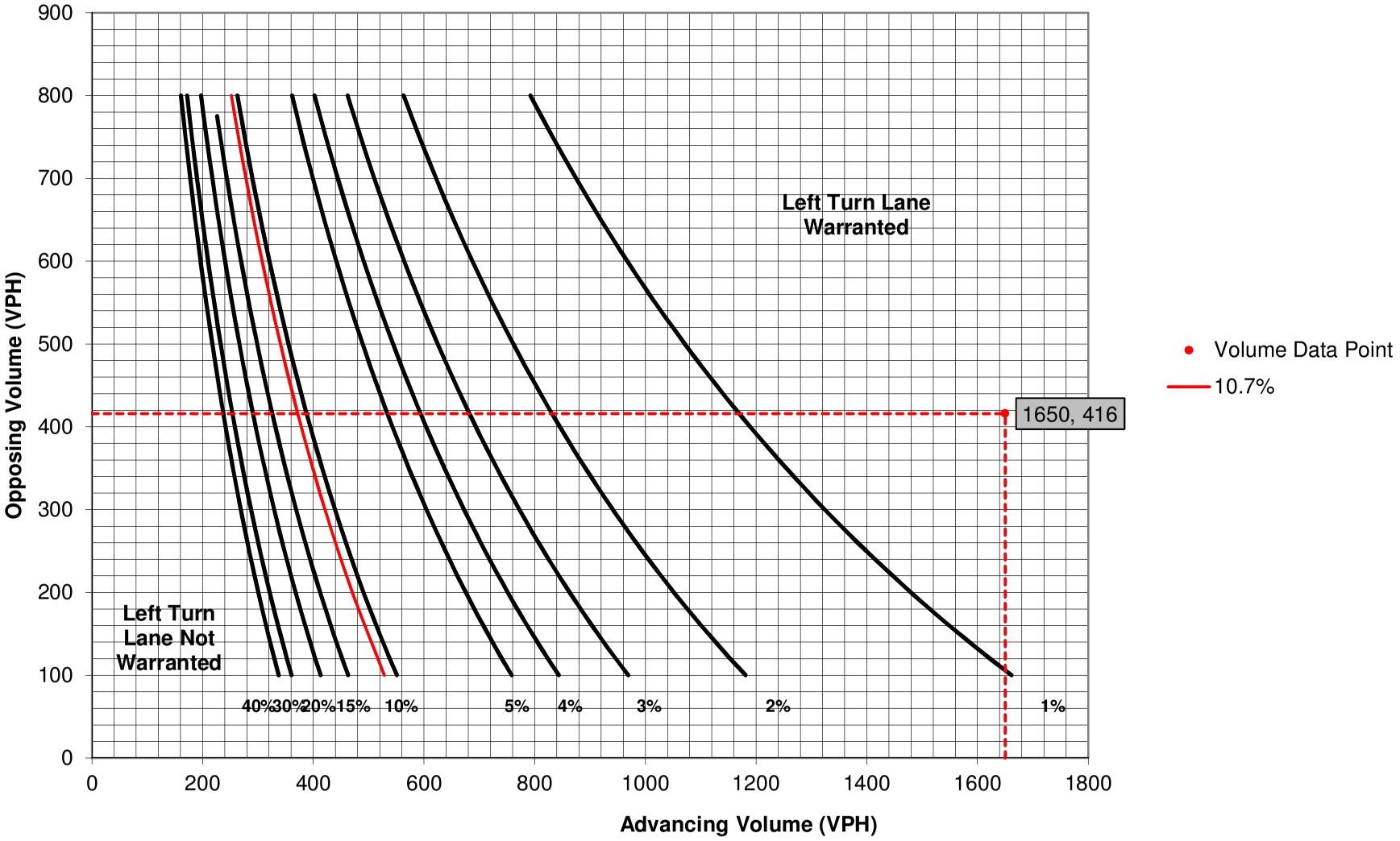
Left Turn Lane Storage Length, Condition A:	175	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	175	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

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County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	24	0.0%	24
	Through	-	299	1.0%	304
	Right	Yes	101	0.0%	101
Opposing	Left	Yes	14	0.0%	14
	Through	-	1117	0.0%	1117
	Right	Yes	5	0.0%	5

Advancing Volume:	429
Opposing Volume:	1136
Left Turn Volume:	24
% Left Turns in Advancing Volume:	5.59%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	24	0.0%	N/A
	Through	-	299	1.0%	N/A
	Right	-	101	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	24
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

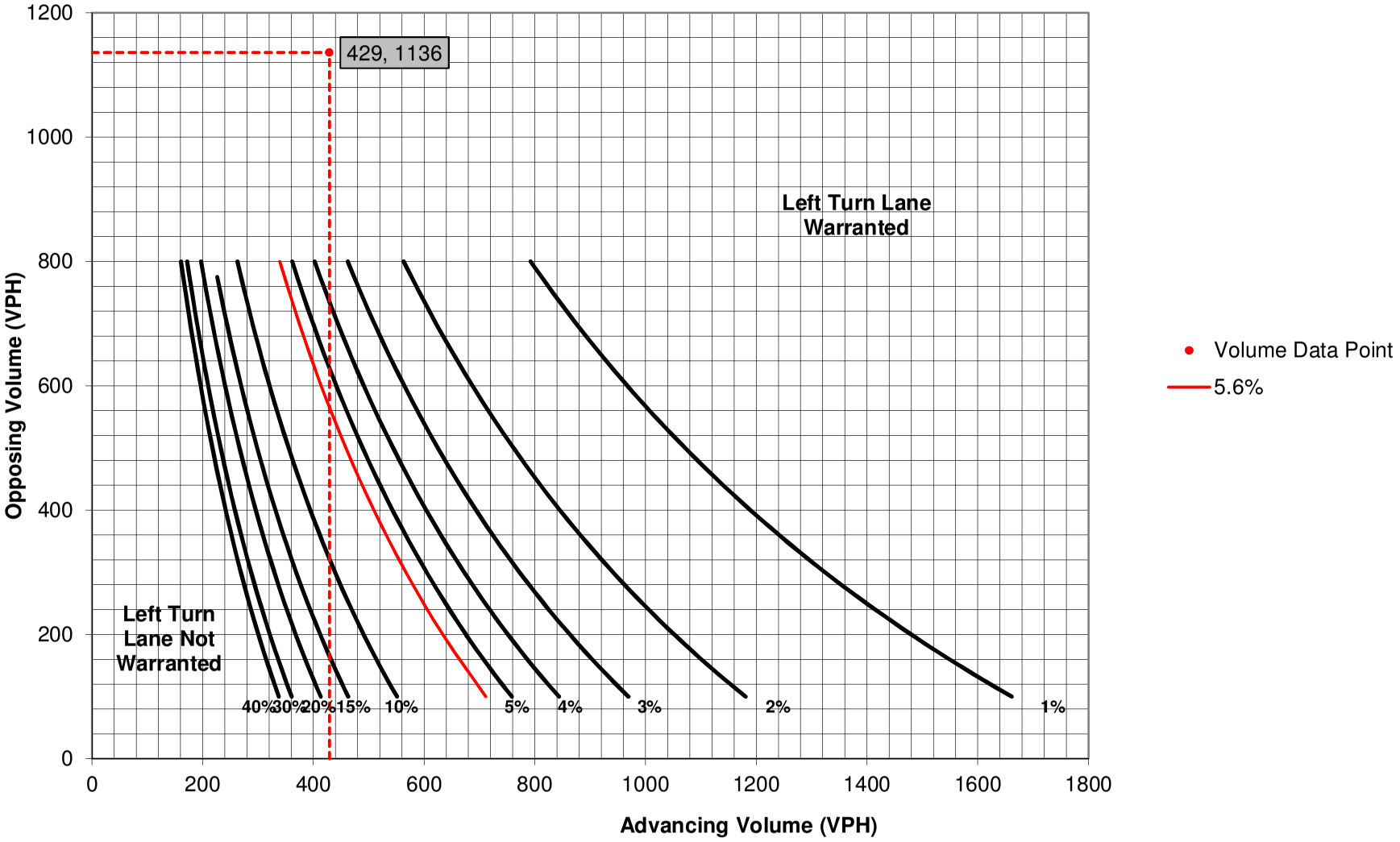
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	75	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	75	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



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PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road SB at Raider Road/Site Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	52	0.0%	52
	Through	-	268	9.0%	305
	Right	Yes	59	0.0%	59
Opposing	Left	Yes	177	0.0%	177
	Through	-	1071	2.0%	1104
	Right	Yes	369	0.0%	369

Advancing Volume:	416
Opposing Volume:	1650
Left Turn Volume:	52
% Left Turns in Advancing Volume:	12.50%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	52	0.0%	N/A
	Through	-	268	9.0%	N/A
	Right	-	59	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	52
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

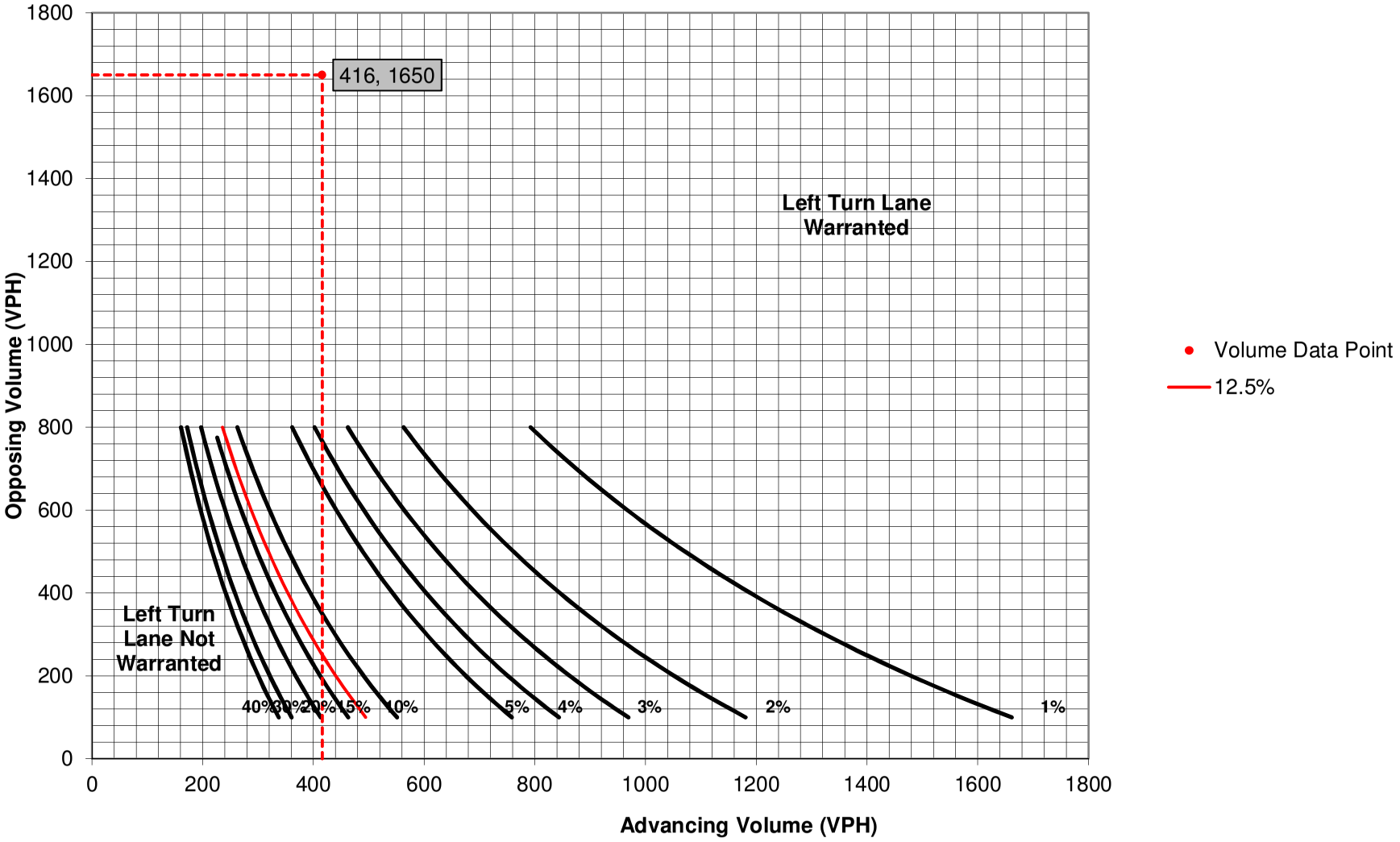
Left Turn Lane Storage Length, Condition A:	75	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	75	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

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County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road SB at Raider Road/Site Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	14	0.0%	14
	Through	-	1117	0.0%	1133
	Right	Yes	5	0.0%	5
Opposing	Left	Yes	24	0.0%	24
	Through	-	299	1.0%	304
	Right	Yes	101	0.0%	99

Advancing Volume:	1152
Opposing Volume:	427
Left Turn Volume:	14
% Left Turns in Advancing Volume:	1.22%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	14	0.0%	N/A
	Through	-	1117	0.0%	N/A
	Right	-	5	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	14
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

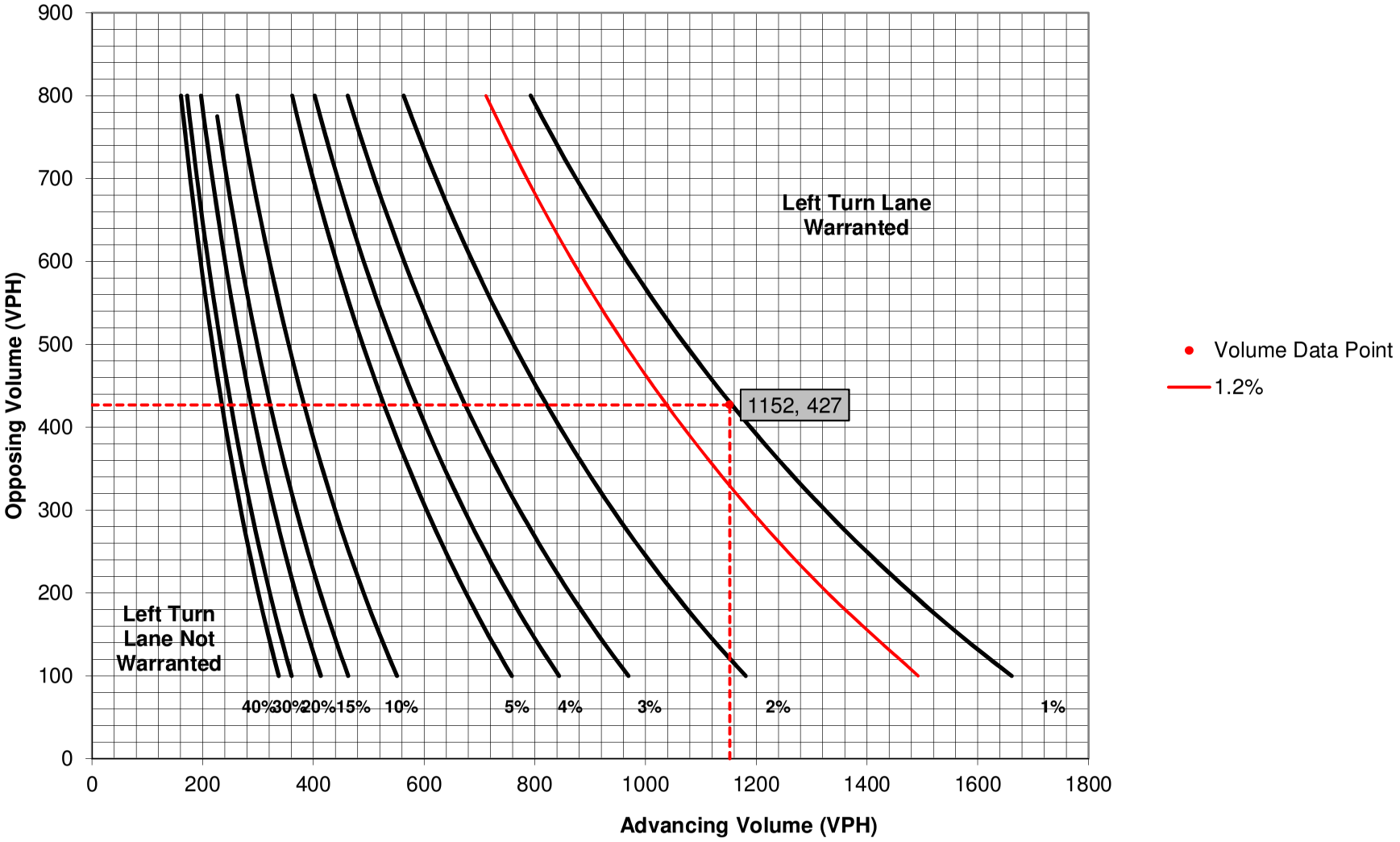
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	75	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	75	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

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County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	35		Type of Analysis
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	177	0.0%	N/A
	Through	-	1071	2.0%	N/A
	Right	Yes	369	0.0%	N/A
Opposing	Left	Yes	52	0.0%	N/A
	Through	-	268	9.0%	N/A
	Right	Yes	59	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	177	0.0%	177
	Through	-	1069	2.0%	1102
	Right	-	369	0.0%	369

Advancing Volume:	1648
Right Turn Volume:	369

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 9**

Warrant Met?: **Yes**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	369
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40

Average # of Vehicles/Cycle: 9.0

PennDOT Publication 46, Exhibit 11-6

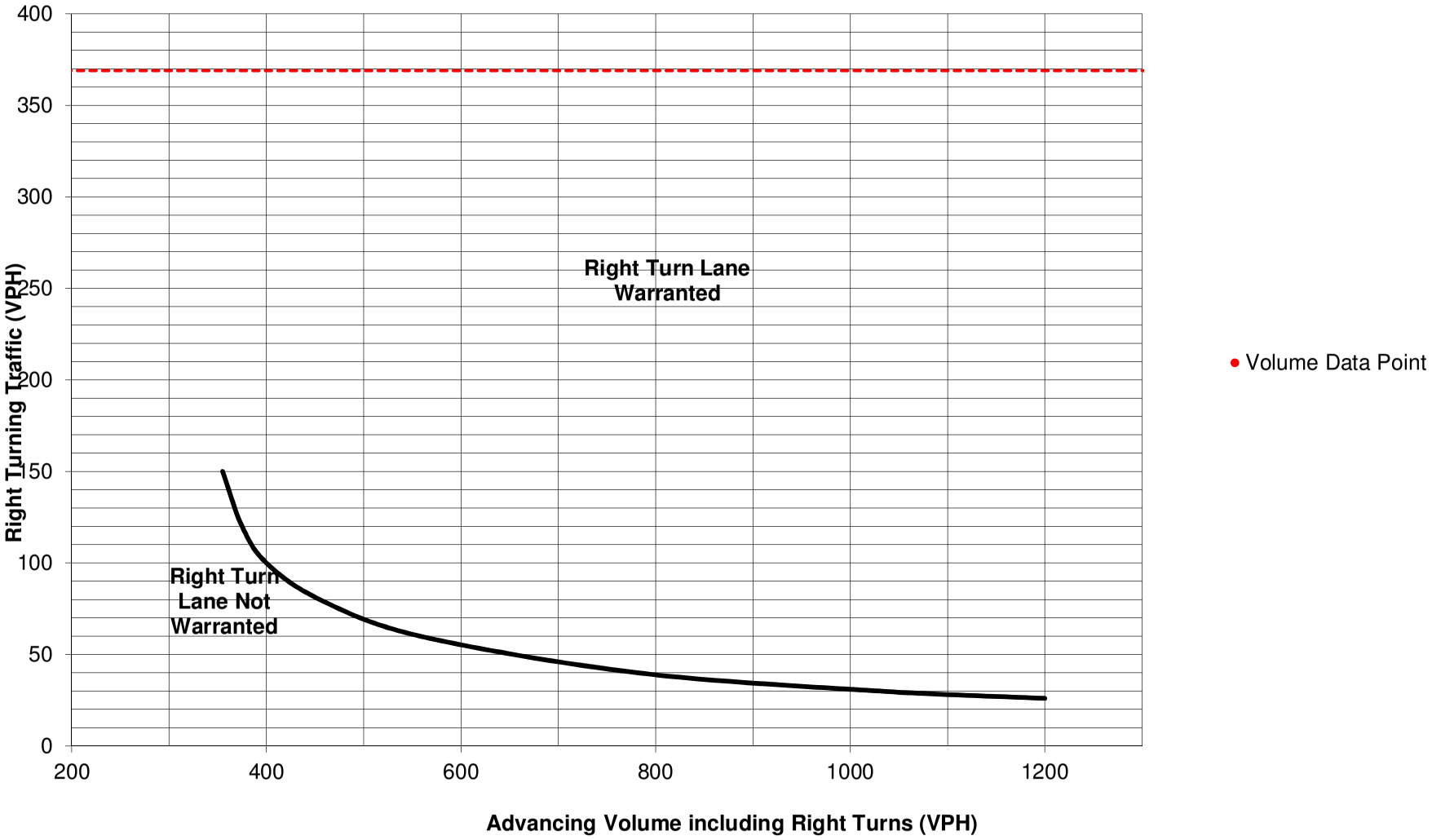
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	350	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	350	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

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County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road NB at Raider Road/Site Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	24	0.0%	N/A
	Through	-	299	1.0%	N/A
	Right	Yes	101	0.0%	N/A
Opposing	Left	Yes	14	0.0%	N/A
	Through	-	1117	0.0%	N/A
	Right	Yes	5	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	24	0.0%	24
	Through	-	299	1.0%	304
	Right	-	101	0.0%	101

Advancing Volume:	429
Right Turn Volume:	101

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 9**

Warrant Met?: **Yes**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	101
Cycles Per Hour (Assumed):	40
Cycles Per Hour (If Known):	40

Average # of Vehicles/Cycle: 3.0

PennDOT Publication 46, Exhibit 11-6

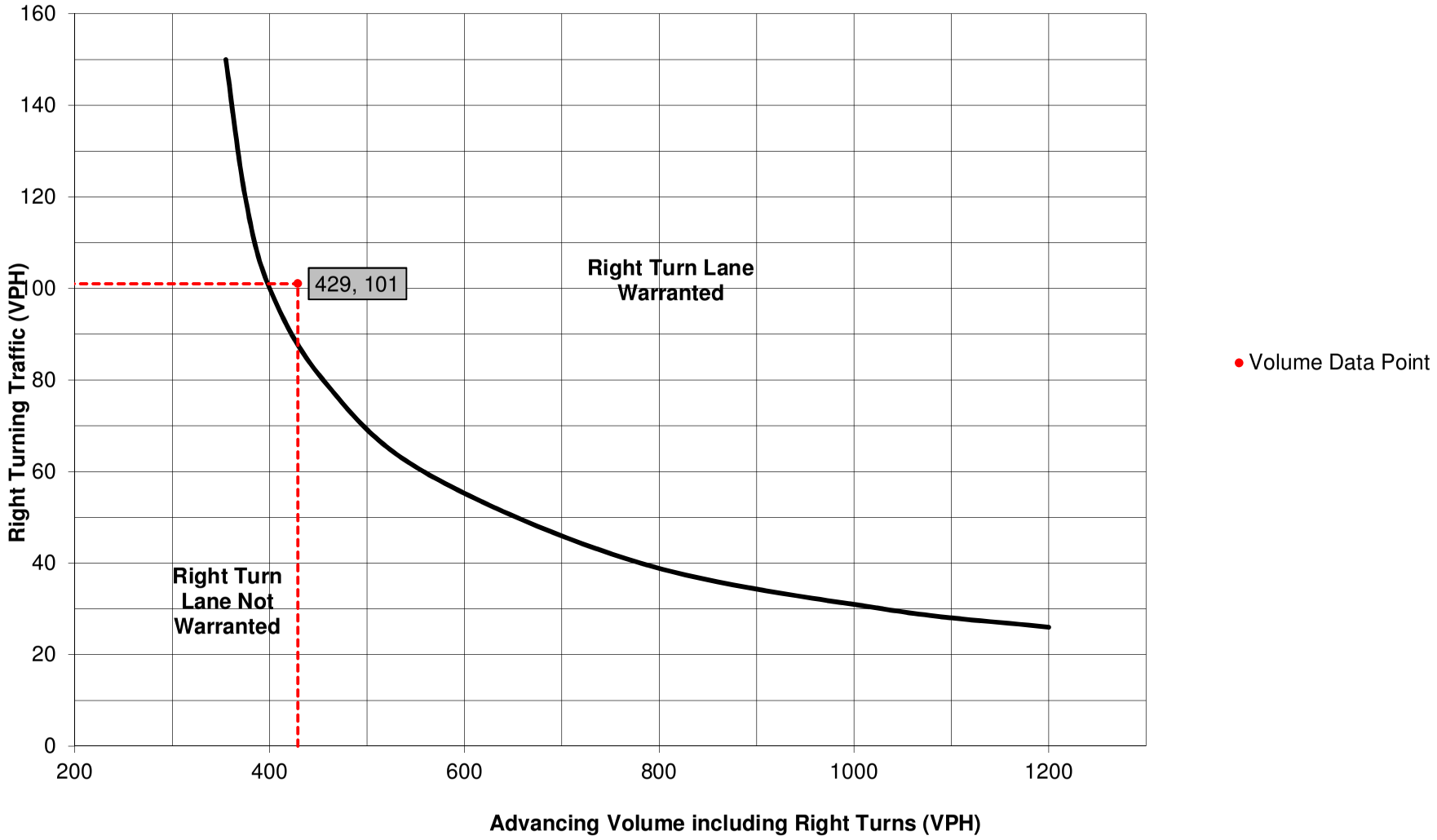
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	150	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	150	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



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County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road NB at Septa Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	149	9.0%	170
	Through	-	308	4.0%	327
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	988	2.0%	1018
	Right	Yes	116	0.0%	116

Advancing Volume:	497
Opposing Volume:	1134
Left Turn Volume:	170
% Left Turns in Advancing Volume:	34.21%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	149	9.0%	N/A
	Through	-	308	4.0%	N/A
	Right	-	0	5.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	170
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: 3.0

PennDOT Publication 46, Exhibit 11-6

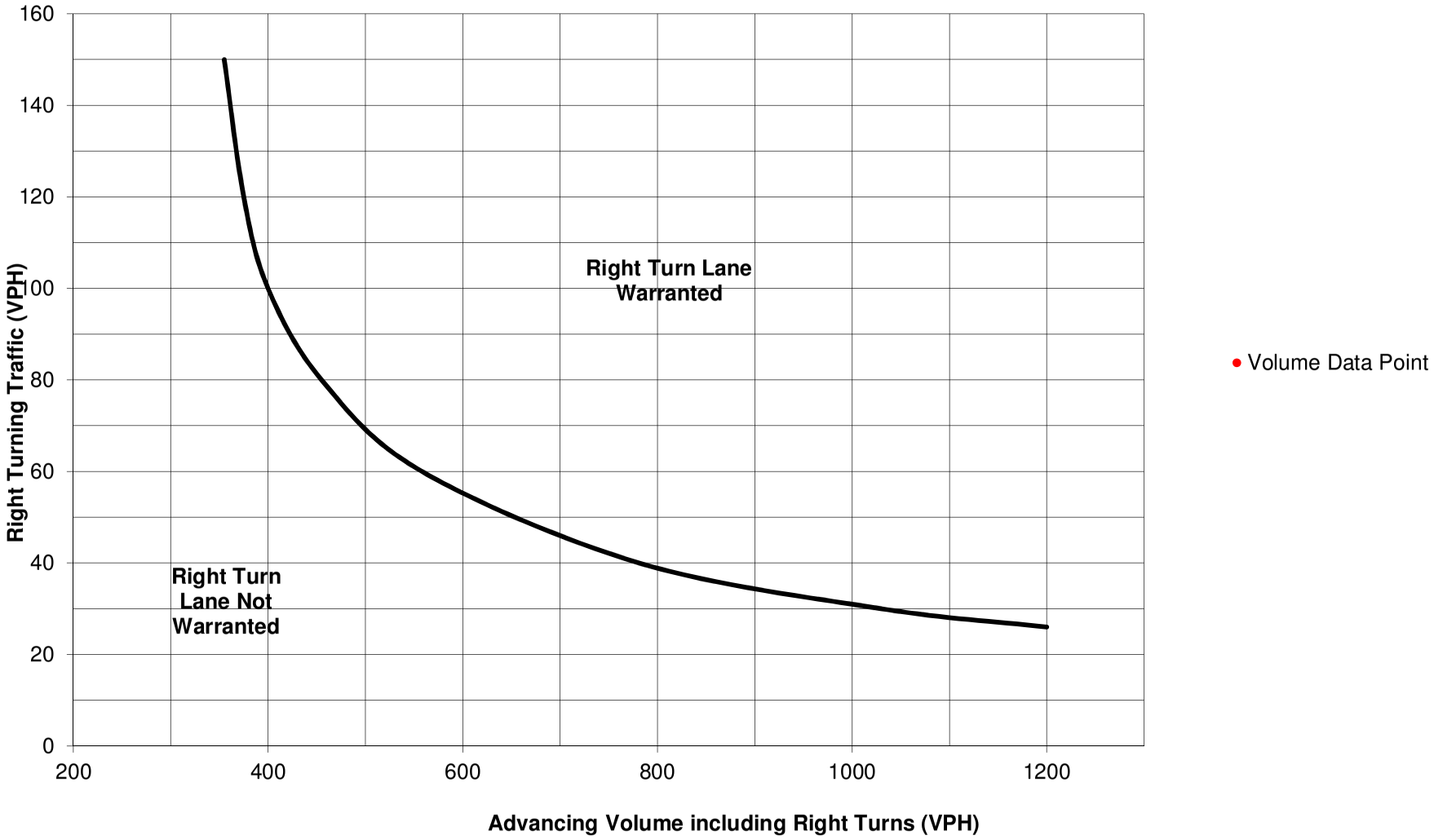
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	150	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	150	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road SB at Septa Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	54	10.0%	63
	Through	-	988	10.0%	1137
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	409	1.0%	416
	Right	Yes	17	0.0%	17

Advancing Volume:	1200
Opposing Volume:	433
Left Turn Volume:	63
% Left Turns in Advancing Volume:	5.25%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	54	10.0%	N/A
	Through	-	988	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	63
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

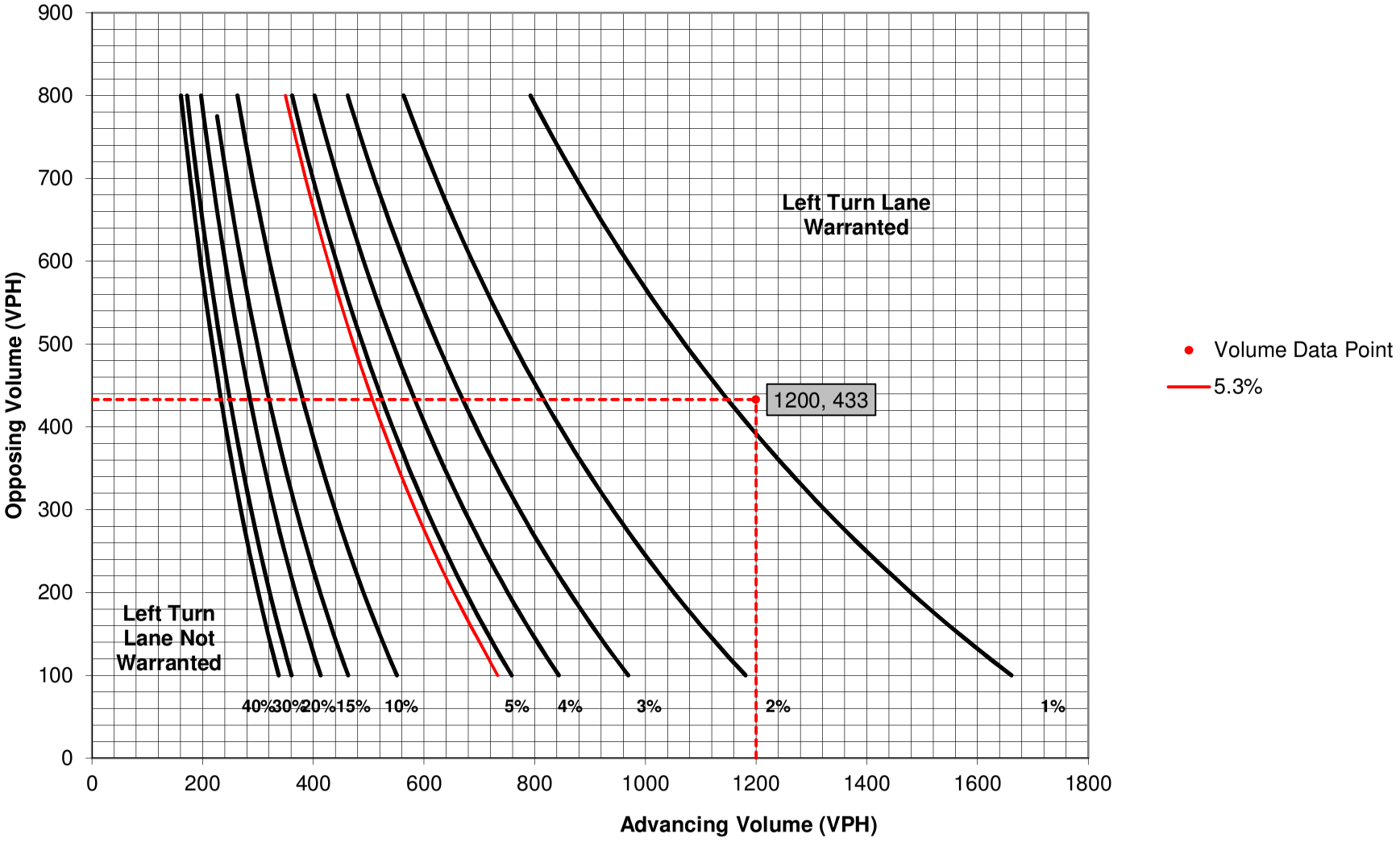
Left Turn Lane Storage Length, Condition A:	75	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	75	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road NB at Septa Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	988	2.0%	N/A
	Right	Yes	116	0.0%	N/A
Opposing	Left	Yes	149	9.0%	N/A
	Through	-	308	4.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	988	2.0%	1018
	Right	-	116	0.0%	116

Advancing Volume:	1134
Right Turn Volume:	116

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 9**

Warrant Met?: **Yes**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	116
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: 2.0

PennDOT Publication 46, Exhibit 11-6

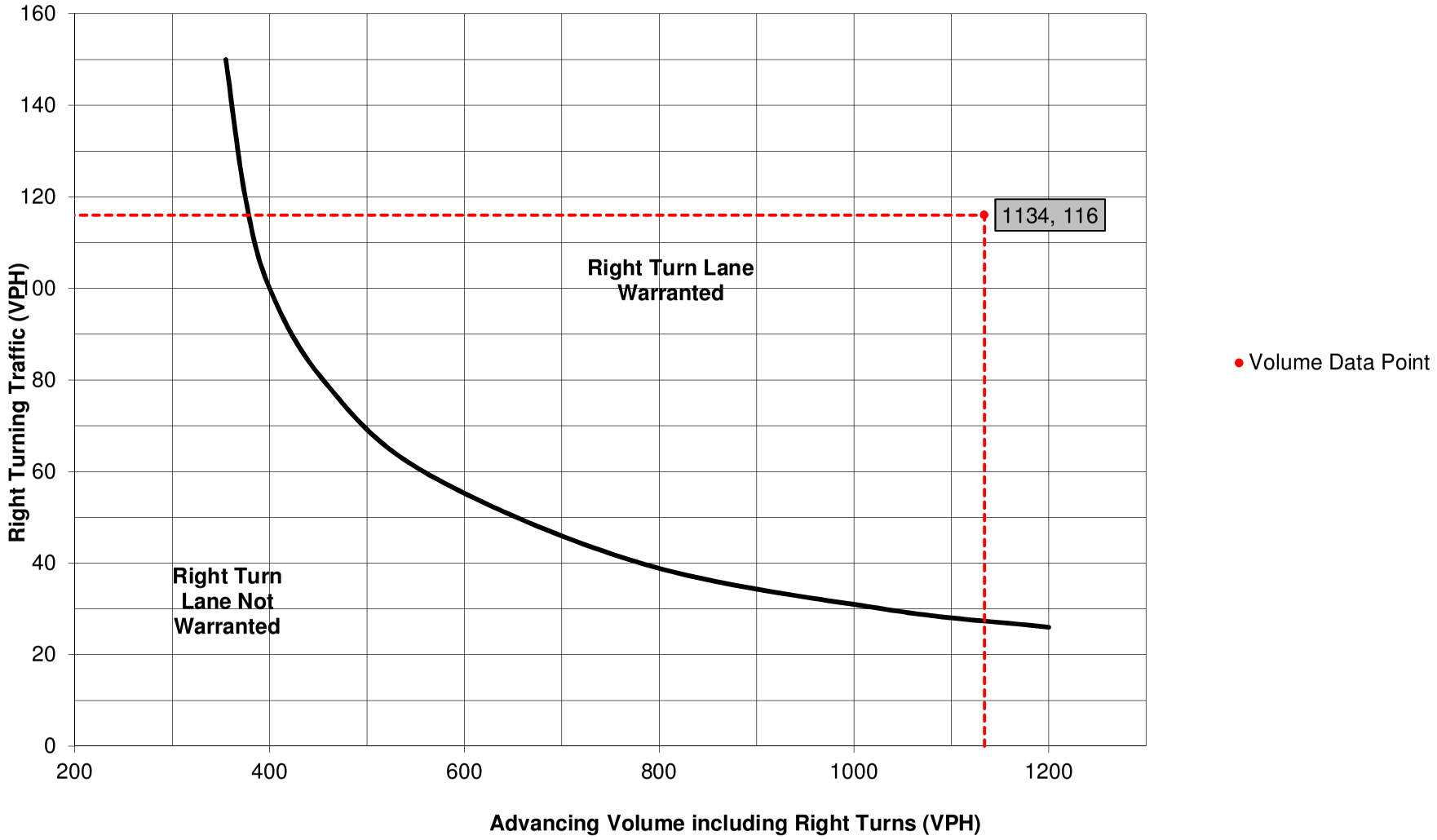
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	100	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	100	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

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Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road NB at Septa Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	409	1.0%	N/A
	Right	Yes	17	0.0%	N/A
Opposing	Left	Yes	54	9.0%	N/A
	Through	-	988	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	409	1.0%	416
	Right	-	17	0.0%	17

Advancing Volume:	433
Right Turn Volume:	17

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 9**

Warrant Met?: **No**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	17
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

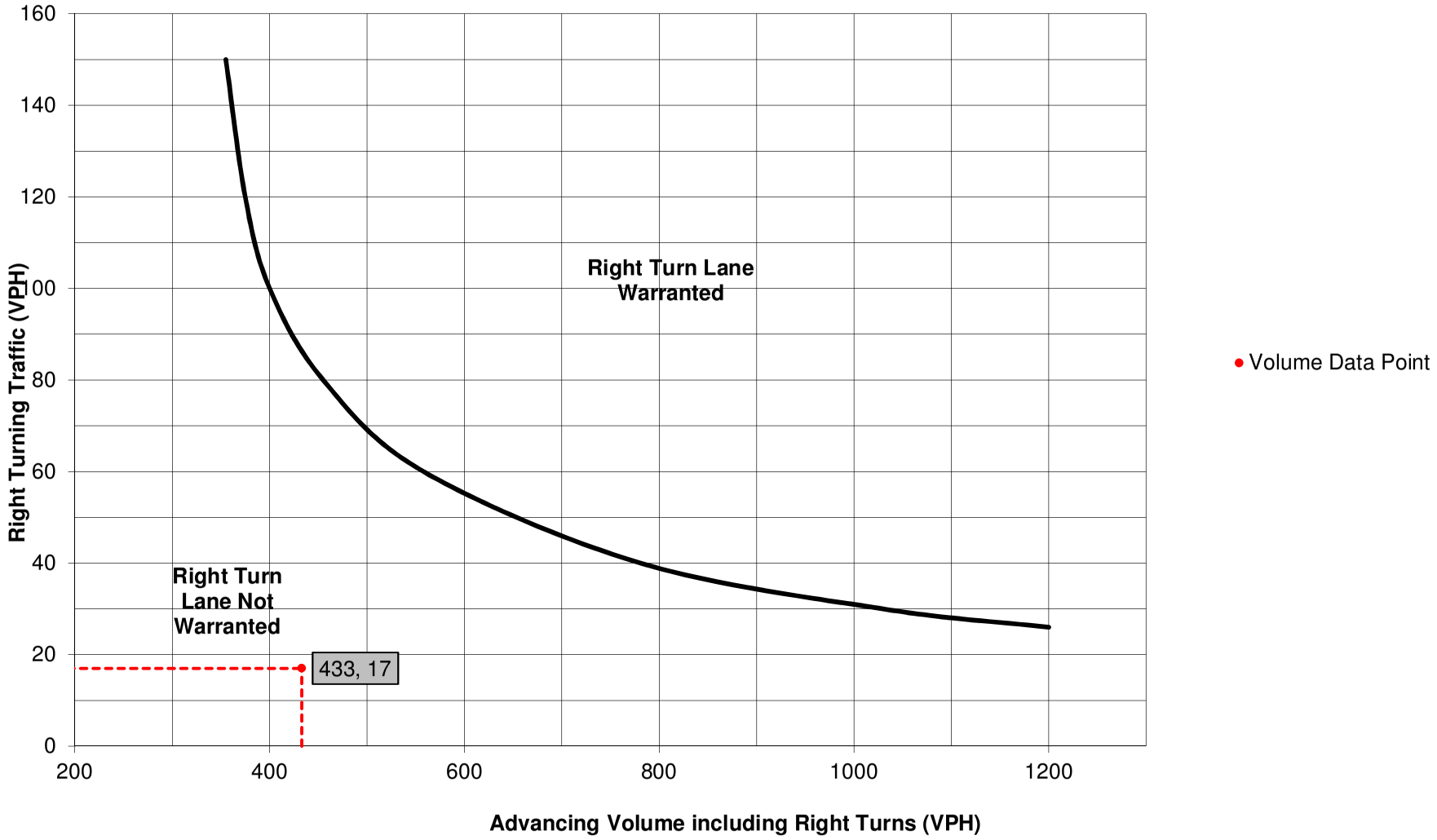
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road SB at South Site Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	6	0.0%	6
	Through	-	493	6.0%	538
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	1611	1.0%	1636
	Right	Yes	6	0.0%	6

Advancing Volume:	544
Opposing Volume:	1642
Left Turn Volume:	6
% Left Turns in Advancing Volume:	1.10%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	6	0.0%	N/A
	Through	-	493	6.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	6
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

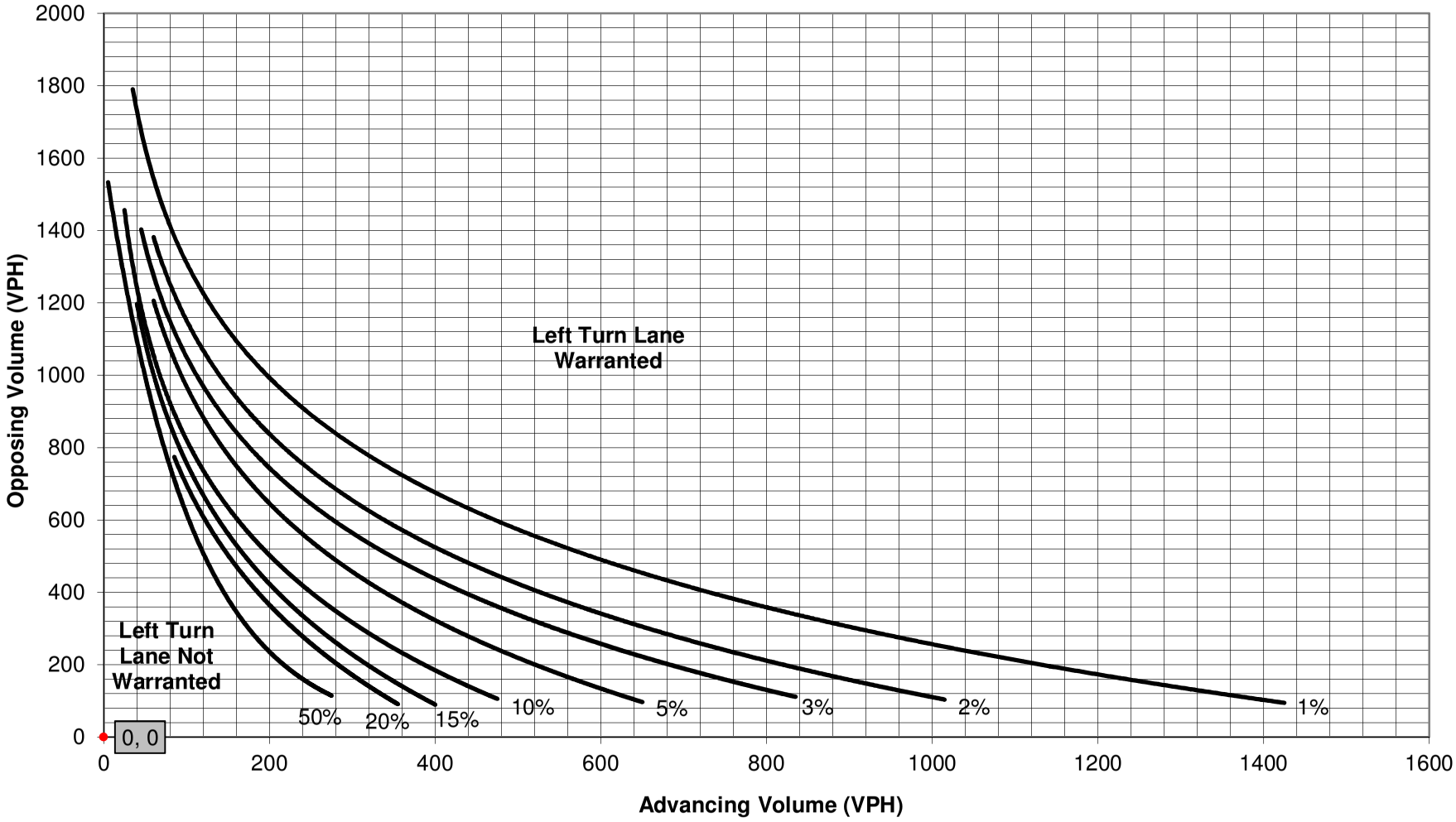
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	75	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	75	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 7. Warrant for left turn lanes on four-lane, undivided highways (unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road SB at South Site Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	2	0.0%	2
	Through	-	1425	0.0%	1425
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	419	1.0%	426
	Right	Yes	2	0.0%	2

Advancing Volume:	1427
Opposing Volume:	428
Left Turn Volume:	2
% Left Turns in Advancing Volume:	0.14%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	2	0.0%	N/A
	Through	-	1425	0.0%	N/A
	Right	-	0	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 1**

Warrant Met?: **No**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	2
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

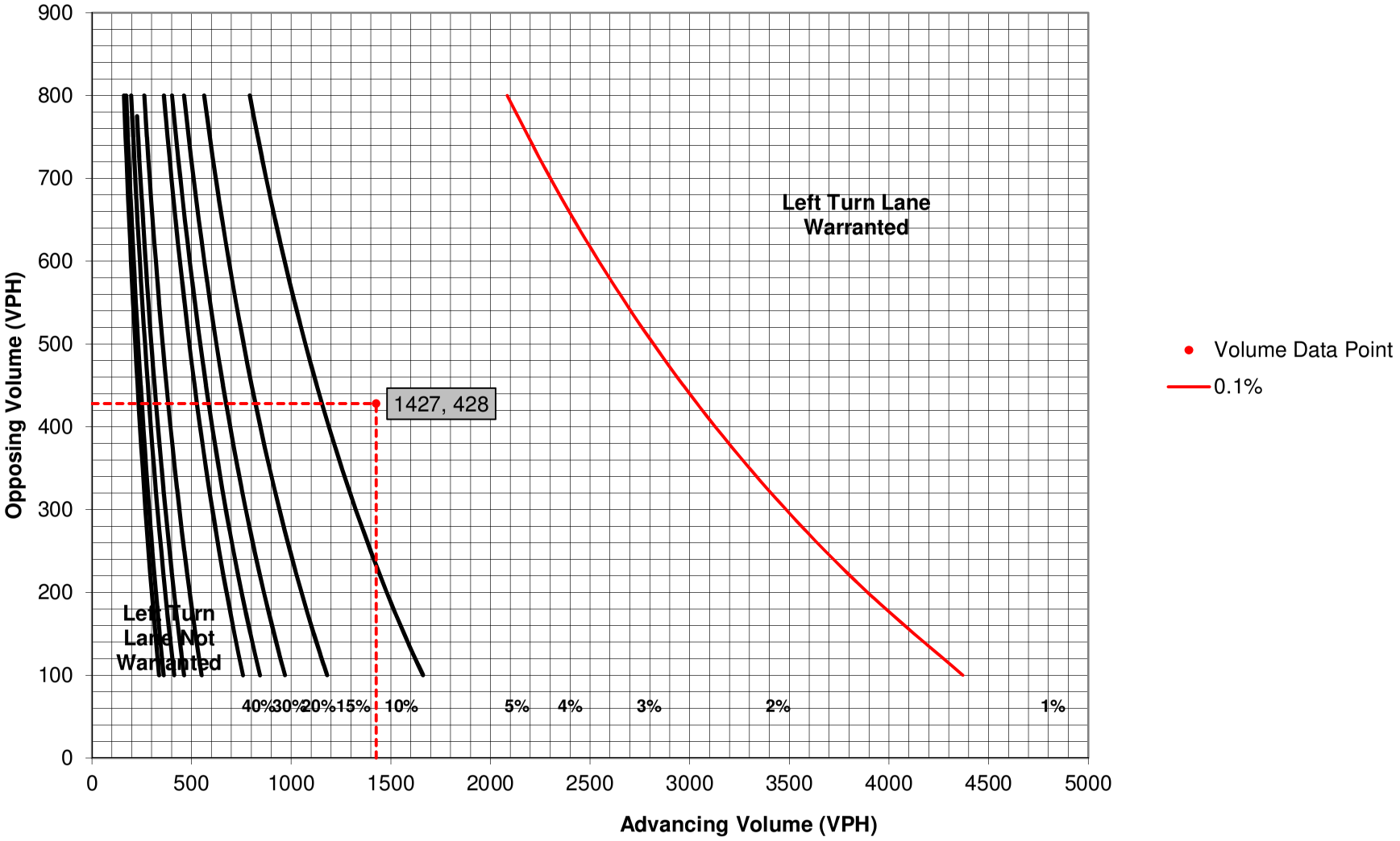
Left Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Radnor Township	Analysis Date:	11/30/2016
County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road NB at South Site Driveway

Analysis Period:	2025 Build	Number of Approach Lanes:	2
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	1611	1.0%	N/A
	Right	Yes	6	0.0%	N/A
Opposing	Left	Yes	6	0.0%	N/A
	Through	-	493	6.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	1611	1.0%	1648
	Right	-	6	0.0%	6

Advancing Volume:	1654
Right Turn Volume:	6

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 11**

Warrant Met?: **No**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	6
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

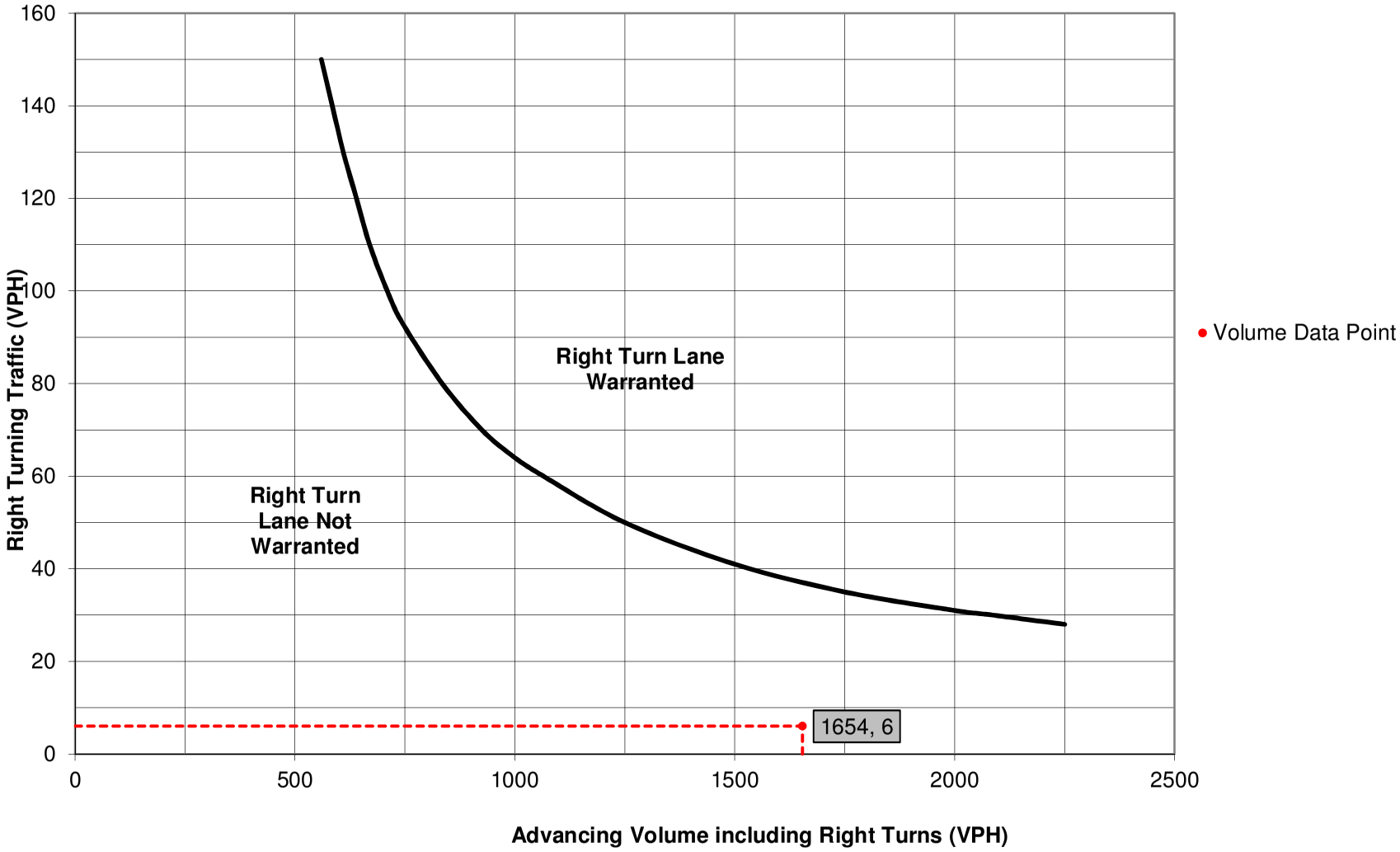
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 11. Warrant for right turn lanes on four-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



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County:	Delaware County	Conducted By:	SDS
PennDOT Engineering District:	6	Checked By:	ACB
		Agency/Company Name:	Pennoni

Intersection & Approach Description: King of Prussia Road NB at South Site Driveway

Analysis Period:	2020 Build	Number of Approach Lanes:	2
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	35	Type of Analysis	
Type of Terrain:	Rolling	Left or Right-Turn Lane Analysis?:	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	419	1.0%	N/A
	Right	Yes	2	0.0%	N/A
Opposing	Left	Yes	2	0.0%	N/A
	Through	-	1425	0.0%	N/A
	Right	Yes	0	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	419	1.0%	426
	Right	-	2	0.0%	2

Advancing Volume:	428
Right Turn Volume:	2

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 11**

Warrant Met?: **No**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	2
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

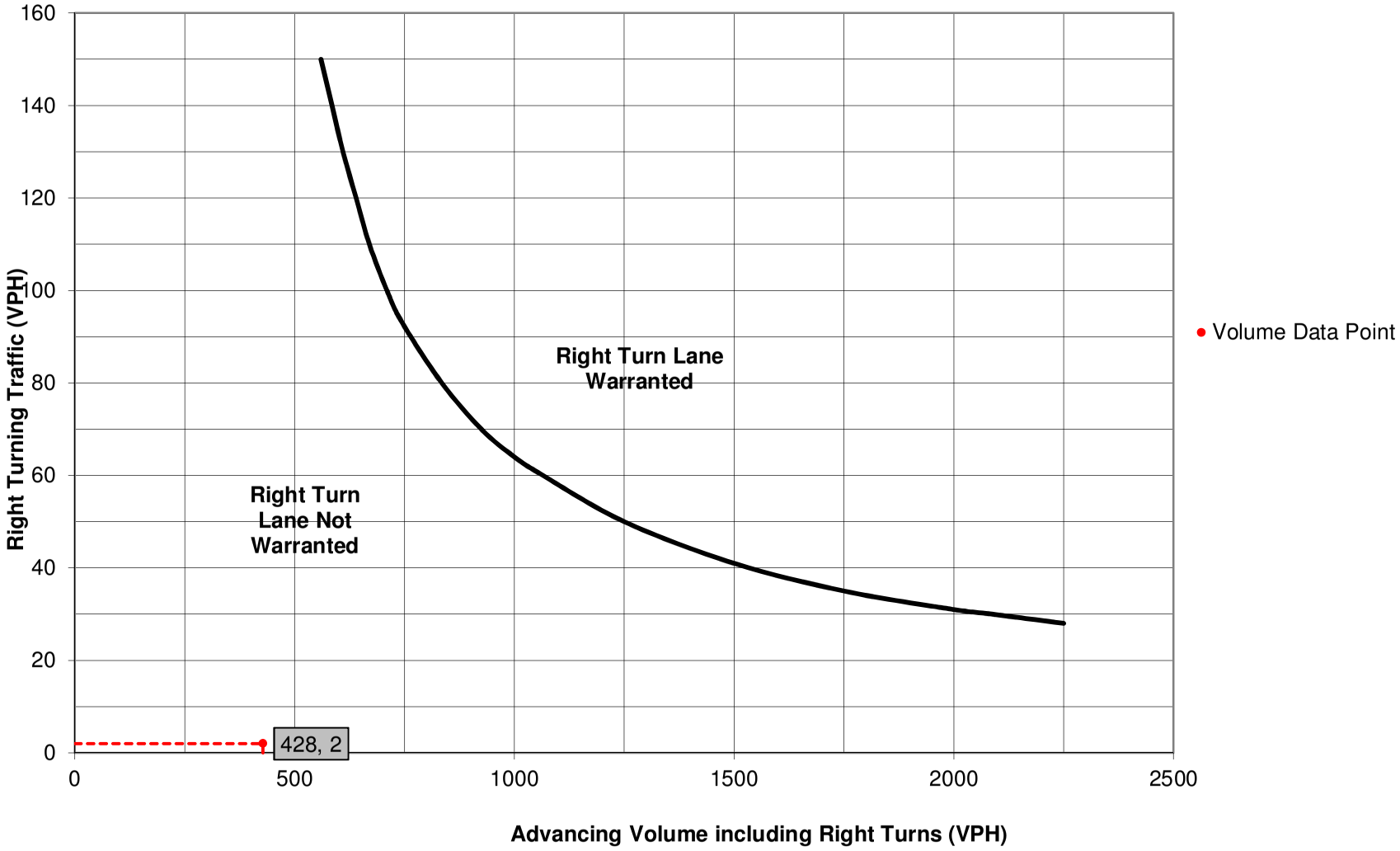
Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings: N/A

Additional Comments / Justifications:

Figure 11. Warrant for right turn lanes on four-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



APPENDIX I

2020 and 2025 Build Condition without Improvements

Capacity Analysis Worksheets

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Future Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	349	8	113	409	699	2	13	696	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	333	0	391	437	25	357	390	1152	3	371	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1291	0	1530	1396	99	1398	1639	1820	5	749	1764	1544
Grp Volume(v), veh/h	1	0	2	349	0	121	409	0	701	13	696	0
Grp Sat Flow(s),veh/h/ln	1291	0	1530	1396	0	1497	1639	0	1825	749	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.80	0.00	0.32	1.05	0.00	0.61	0.04	1.01	0.00
Avail Cap(c_a), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.0	33.3	0.0	27.1	27.5	0.0	9.8	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.1	0.0	0.5	59.2	0.0	2.4	0.2	38.0	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	0.0	0.0	0.1	15.0	0.0	4.4	28.9	0.0	16.3	0.4	43.6	0.0
LnGrp Delay(d),s/veh	29.1	0.0	25.0	43.4	0.0	27.6	86.7	0.0	12.2	17.3	65.5	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			470			1110			709	
Approach Delay, s/veh		26.4			39.3			39.6			64.6	
Approach LOS		C			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0
Max Q Clear Time (g_c+I1), s		22.6		24.8	19.5	37.5		7.9
Green Ext Time (p_c), s		12.3		0.0	0.0	0.0		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	47.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Future Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
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		0.97	1.00		0.97
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	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	421	0	30	890	7	534	34	62	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	90	857	772	395	900	7	226	9	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	630	1714	1545	935	1799	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	421	0	30	0	897	568	0	62	9	0	0
Grp Sat Flow(s),veh/h/ln	630	1714	1545	935	0	1813	418	0	1520	290	0	0
Q Serve(g_s), s	1.5	14.6	0.0	2.0	0.0	44.0	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.6	0.0	16.6	0.0	44.0	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	90	857	772	395	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.44	0.49	0.00	0.08	0.00	0.99	2.41	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	90	857	772	395	0	907	236	0	574	159	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)	0.58	0.58	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.8	14.9	0.0	20.4	0.0	22.3	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	8.9	1.2	0.0	0.4	0.0	27.4	648.0	0.0	0.1	0.1	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	2.2	10.5	0.0	1.0	0.0	37.6	86.8	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.7	16.1	0.0	20.8	0.0	49.7	681.6	0.0	18.2	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		461			927			630			9	
Approach Delay, s/veh		19.3			48.7			616.3			21.8	
Approach LOS		B			D			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0
Max Q Clear Time (g_c+I1), s		47.5		36.0		46.0		36.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	218.3
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	42	970	115	147	303
Future Vol, veh/h	20	42	970	115	147	303
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	23	48	1115	132	169	348

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1886	1208	0	0	1264	0
Stage 1	1198	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398	-
Pot Cap-1 Maneuver	79	185	-	-	487	-
Stage 1	289	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	51	181	-	-	483	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	285	-	-	-	-	-
Stage 2	326	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	39.3	0	5.4
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	174	483	-
HCM Lane V/C Ratio	-	-	0.41	0.35	-
HCM Control Delay (s)	-	-	39.3	16.4	-
HCM Lane LOS	-	-	E	C	-
HCM 95th %tile Q(veh)	-	-	1.8	1.6	-

Intersection	
Int Delay, s/veh	282.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	130	99	0	22	173	1052	369	52	264	58
Future Vol, veh/h	9	0	130	99	0	22	173	1052	369	52	264	58
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	167	127	0	28	222	1349	473	67	338	74

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2552	2782	376	2629	2583	1593	413	0	0	1830	0	0
Stage 1	509	509	-	2037	2037	-	-	-	-	-	-	-
Stage 2	2043	2273	-	592	546	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	17	19	666	~ 16	26	133	1157	-	-	338	-	-
Stage 1	530	541	-	~ 75	101	-	-	-	-	-	-	-
Stage 2	69	77	-	496	521	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 11	14	666	~ 10	19	132	1157	-	-	338	-	-
Mov Cap-2 Maneuver	~ 11	14	-	~ 10	19	-	-	-	-	-	-	-
Stage 1	530	400	-	~ 75	100	-	-	-	-	-	-	-
Stage 2	54	76	-	275	386	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	240.2	$ 4909.7	1	2.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1157	-	-	137	10	132	338	-	-
HCM Lane V/C Ratio	0.192	-	-	1.301	12.692	0.214	0.197	-	-
HCM Control Delay (s)	8.8	0	-	240.2	$ 5992	39.5	18.2	0	-
HCM Lane LOS	A	A	-	F	F	E	C	A	-
HCM 95th %tile Q(veh)	0.7	-	-	11.1	17.4	0.8	0.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

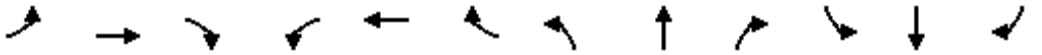
Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	1588	6	6	486
Future Vol, veh/h	2	2	1588	6	6	486
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1913	7	7	586

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2513	1913	0	0	1913	0
Stage 1	1913	-	-	-	-	-
Stage 2	600	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	32	86	-	-	314	-
Stage 1	129	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	31	86	-	-	314	-
Mov Cap-2 Maneuver	31	-	-	-	-	-
Stage 1	129	-	-	-	-	-
Stage 2	540	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	92.2	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	46	314	-
HCM Lane V/C Ratio	-	-	0.105	0.023	-
HCM Control Delay (s)	-	-	92.2	16.7	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Future Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	385	1321	0	0	551	0	782	853	347	326	0	165
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	326	
Grp Volume(v), veh/h	385	1321	0	0	551	0	782	853	347	326	75.9	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.6	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Cycle Q Clear(g_c), s	12.6	43.4	0.0	0.0	17.4	0.0	17.0	43.0	20.2	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.85	0.99	0.00	0.00	0.74	0.00	0.47	1.24	0.59	0.90		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.9	40.0	0.0	0.0	48.0	0.0	17.4	33.5	26.5	51.6		
Incr Delay (d2), s/veh	13.1	20.8	0.0	0.0	5.9	0.0	0.2	118.8	1.6	24.3		
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		
%ile BackOfQ(95%),veh/ln	10.5	31.4	0.0	0.0	13.5	0.0	12.2	78.5	13.3	5.0		
LnGrp Delay(d),s/veh	62.0	60.9	0.0	0.0	53.9	0.0	17.6	152.3	28.1	75.9		
LnGrp LOS	E	E			D		B	F	C	E		
Approach Vol, veh/h		1706			551			1982				
Approach Delay, s/veh		61.1			53.9			77.4				
Approach LOS		E			D			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0
Max Q Clear Time (g_c+I1), s		45.9	19.5		15.1	19.9	10.5	45.5
Green Ext Time (p_c), s		0.0	3.0		0.0	2.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	68.4
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	851	0	186	1224	792	839
Future Volume (veh/h)	851	0	186	1224	792	839
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785
Adj Flow Rate, veh/h	868	0	190	1249	808	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	6	2	2	7
Cap, veh/h	2288	0	290	2104	957	436
Arrive On Green	0.48	0.00	0.03	0.21	0.29	0.00
Sat Flow, veh/h	5035	0	3169	3476	3326	1517
Grp Volume(v), veh/h	868	0	190	1249	808	0
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517
Q Serve(g_s), s	12.8	0.0	6.5	36.7	25.1	0.0
Cycle Q Clear(g_c), s	12.8	0.0	6.5	36.7	25.1	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2288	0	290	2104	957	436
V/C Ratio(X)	0.38	0.00	0.66	0.59	0.84	0.00
Avail Cap(c_a), veh/h	2288	0	317	2104	1421	648
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.63	0.63	1.00	0.00
Uniform Delay (d), s/veh	17.9	0.0	51.6	31.1	36.9	0.0
Incr Delay (d2), s/veh	0.5	0.0	2.7	0.8	3.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.5	0.0	5.2	22.9	17.7	0.0
LnGrp Delay(d),s/veh	18.4	0.0	54.4	31.9	40.0	0.0
LnGrp LOS	B		D	C	D	
Approach Vol, veh/h	868			1439	808	
Approach Delay, s/veh	18.4			34.9	40.0	
Approach LOS	B			C	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.6	15.1	58.3				73.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.6	9.0	15.3				39.2
Green Ext Time (p_c), s		3.0	0.1	14.8				10.1

Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Future Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	598	1631	4	2	918	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	696	2843	7	18	2133	992	21	7	22			
Arrive On Green	0.42	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	598	797	838	2	918	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	696	1389	1461	18	2133	992	28	0	22			
V/C Ratio(X)	0.86	0.57	0.57	0.11	0.43	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2133	992	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.3	0.0	0.0	53.9	10.0	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.7	0.2	0.2	2.6	0.6	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.6	0.1	0.1	0.1	11.4	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.9	0.2	0.2	56.5	10.7	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2233			920			10				
Approach Delay, s/veh		8.4			10.8			58.1				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.2	97.0			28.2	75.0		6.8
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.8	80.0			30.0	56.0		6.0
Max Q Clear Time (g_c+I1), s	2.6	2.5			20.6	17.6		2.7
Green Ext Time (p_c), s	0.0	42.2			1.6	27.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.2
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Future Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	145	1030	55	221	1541	456	96	389	86	100	138	111
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1381	74	266	1436	648	151	497	111	246	640	479
Arrive On Green	0.07	0.43	0.43	0.07	0.43	0.43	0.24	0.24	0.24	0.07	0.36	0.36
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	452	2080	464	1609	1787	1337
Grp Volume(v), veh/h	145	533	552	221	1541	456	292	0	279	100	126	123
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1489	0	1507	1609	1638	1487
Q Serve(g_s), s	5.2	29.7	29.7	8.0	47.6	27.3	18.6	0.0	19.1	4.8	5.9	6.4
Cycle Q Clear(g_c), s	5.2	29.7	29.7	8.0	47.6	27.3	20.3	0.0	19.1	4.8	5.9	6.4
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	715	740	266	1436	648	399	0	360	246	587	532
V/C Ratio(X)	0.78	0.75	0.75	0.83	1.07	0.70	0.73	0.00	0.78	0.41	0.21	0.23
Avail Cap(c_a), veh/h	186	715	740	266	1436	648	449	0	411	390	789	716
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	26.1	26.1	24.0	31.2	25.5	39.5	0.0	39.1	28.2	24.5	24.7
Incr Delay (d2), s/veh	18.9	7.0	6.8	19.6	45.9	6.3	5.3	0.0	8.0	1.1	0.2	0.2
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	6.0	21.2	21.8	8.0	55.6	18.1	13.8	0.0	13.6	4.0	4.8	4.8
LnGrp Delay(d),s/veh	43.9	33.1	32.9	43.5	77.1	31.8	44.7	0.0	47.1	29.3	24.7	24.9
LnGrp LOS	D	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1230			2218			571			349	
Approach Delay, s/veh		34.3			64.5			45.9			26.1	
Approach LOS		C			E			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	52.6		44.4	13.0	52.6	13.1	31.3
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	33.0		52.0	7.0	33.0	17.0	29.0
Max Q Clear Time (g_c+I1), s	10.5	32.2		8.4	7.7	50.1	7.3	22.3
Green Ext Time (p_c), s	0.0	0.7		6.3	0.0	0.0	0.1	2.9

Intersection Summary	
HCM 2010 Ctrl Delay	50.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Future Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	579	1	235	130	818	1	8	538	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	386	167	419	601	2	587	321	962	1	178	687	595
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1162	457	1142	1422	7	1601	1689	1841	2	671	1782	1544
Grp Volume(v), veh/h	3	0	14	579	0	236	130	0	819	8	538	0
Grp Sat Flow(s),veh/h/ln	1162	0	1599	1422	0	1608	1689	0	1844	671	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	0.9	23.9	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	22.5	23.9	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	586	601	0	590	321	0	963	178	687	595
V/C Ratio(X)	0.01	0.00	0.02	0.96	0.00	0.40	0.41	0.00	0.85	0.04	0.78	0.00
Avail Cap(c_a), veh/h	386	0	586	601	0	590	334	0	963	178	687	595
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	30.1	0.0	21.2	17.0	0.0	18.5	33.2	24.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	27.6	0.0	0.4	0.8	0.0	9.4	0.4	7.3	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	0.1	0.0	0.4	26.1	0.0	7.8	3.3	0.0	27.1	0.3	18.4	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	57.7	0.0	21.6	17.8	0.0	27.8	33.6	31.6	0.0
LnGrp LOS	C		B	E		C	B		C	C	C	
Approach Vol, veh/h		17			815			949			546	
Approach Delay, s/veh		19.3			47.3			26.5			31.6	
Approach LOS		B			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		52.0		38.0	12.3	39.7		38.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0
Max Q Clear Time (g_c+I1), s		36.4		35.5	6.3	26.4		12.0
Green Ext Time (p_c), s		5.9		0.0	0.0	4.4		3.3

Intersection Summary	
HCM 2010 Ctrl Delay	34.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Future Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
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		0.98	1.00		0.98
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	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	783	0	60	438	1	418	7	148	32	39	51
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	357	812	725	101	834	2	270	3	644	50	58	42
Arrive On Green	0.46	0.46	0.00	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	955	1782	1591	715	1830	4	453	8	1525	0	138	99
Grp Volume(v), veh/h	8	783	0	60	0	439	425	0	148	122	0	0
Grp Sat Flow(s),veh/h/ln	955	1782	1591	715	0	1834	460	0	1525	237	0	0
Q Serve(g_s), s	0.5	38.4	0.0	2.6	0.0	15.4	0.0	0.0	5.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.5	38.4	0.0	41.0	0.0	15.4	38.0	0.0	5.6	38.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.26		0.42
Lane Grp Cap(c), veh/h	357	812	725	101	0	836	274	0	644	151	0	0
V/C Ratio(X)	0.02	0.96	0.00	0.60	0.00	0.53	1.55	0.00	0.23	0.81	0.00	0.00
Avail Cap(c_a), veh/h	357	812	725	101	0	836	274	0	644	151	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)	0.12	0.12	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.9	23.8	0.0	44.6	0.0	17.5	31.5	0.0	16.6	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.3	0.0	23.4	0.0	2.4	266.2	0.0	0.2	27.2	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	0.3	22.4	0.0	3.8	0.0	13.1	48.6	0.0	4.3	5.5	0.0	0.0
LnGrp Delay(d),s/veh	22.9	29.1	0.0	67.9	0.0	19.9	297.7	0.0	16.8	49.3	0.0	0.0
LnGrp LOS	C	C		E		B	F		B	D		
Approach Vol, veh/h		791			499			573			122	
Approach Delay, s/veh		29.0			25.7			225.1			49.3	
Approach LOS		C			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		44.0		46.0		44.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		40.0		37.0		40.0		37.0
Max Q Clear Time (g_c+I1), s		40.9		40.0		43.5		40.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	86.0
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	76	84	403	17	53	970
Future Vol, veh/h	76	84	403	17	53	970
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	89	99	474	20	62	1141

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1769	511	0	0	511	0
Stage 1	501	-	-	-	-	-
Stage 2	1268	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	93	534	-	-	982	-
Stage 1	613	-	-	-	-	-
Stage 2	267	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 86	522	-	-	974	-
Mov Cap-2 Maneuver	192	-	-	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	250	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.6	0	0.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	287	974	-
HCM Lane V/C Ratio	-	-	0.656	0.064	-
HCM Control Delay (s)	-	-	38.6	8.9	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	4.3	0.2	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	260.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	41	272	0	60	23	294	101	14	1097	5
Future Vol, veh/h	5	0	41	272	0	60	23	294	101	14	1097	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	5	0	44	289	0	64	24	313	107	15	1167	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1646	1676	1170	1644	1625	374	1172	0	0	428	0	0
Stage 1	1199	1199	-	423	423	-	-	-	-	-	-	-
Stage 2	447	477	-	1221	1202	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	80	96	237	~ 81	103	677	603	-	-	1142	-	-
Stage 1	228	261	-	613	591	-	-	-	-	-	-	-
Stage 2	595	559	-	~ 222	260	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	67	87	237	~ 61	93	672	603	-	-	1142	-	-
Mov Cap-2 Maneuver	67	87	-	~ 61	93	-	-	-	-	-	-	-
Stage 1	216	251	-	577	556	-	-	-	-	-	-	-
Stage 2	510	526	-	~ 174	250	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.1	$ 1493.4	0.6	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	603	-	-	186	61	672	1142	-	-
HCM Lane V/C Ratio	0.041	-	-	0.263	4.744	0.095	0.013	-	-
HCM Control Delay (s)	11.2	0	-	31.3	$ 1820.4	10.9	8.2	0	-
HCM Lane LOS	B	A	-	D	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	31.9	0.3	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	413	2	2	1404
Future Vol, veh/h	4	4	413	2	2	1404
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	439	2	2	1494

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1937	439	0	0	439	0
Stage 1	439	-	-	-	-	-
Stage 2	1498	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	73	622	-	-	1132	-
Stage 1	654	-	-	-	-	-
Stage 2	206	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	73	622	-	-	1132	-
Mov Cap-2 Maneuver	73	-	-	-	-	-
Stage 1	654	-	-	-	-	-
Stage 2	206	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	34.4	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	131	1132	-
HCM Lane V/C Ratio	-	-	0.065	0.002	-
HCM Control Delay (s)	-	-	34.4	8.2	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Future Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	109	1636	0	0	615	0	289	246	228	885	0	482
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	216	1623	0	0	1269	591	1393	292	248	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	885	
Grp Volume(v), veh/h	109	1636	0	0	615	0	289	246	228	885	83.2	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	F	
Q Serve(g_s), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	14.7	16.3	24.0		
Cycle Q Clear(g_c), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	14.7	16.3	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	216	1623	0	0	1269	591	1393	292	248	858		
V/C Ratio(X)	0.51	1.01	0.00	0.00	0.48	0.00	0.21	0.84	0.92	1.03		
Avail Cap(c_a), veh/h	391	1623	0	0	1269	591	1393	292	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.88	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.9	37.2	0.0	0.0	9.9	0.0	19.8	44.6	45.3	44.2		
Incr Delay (d2), s/veh	1.6	22.8	0.0	0.0	1.2	0.0	0.1	19.6	36.3	39.0		
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		
%ile BackOfQ(95%),veh/ln	3.0	53.6	0.0	0.0	6.8	0.0	5.0	13.7	14.4	12.4		
LnGrp Delay(d),s/veh	52.5	60.0	0.0	0.0	11.1	0.0	19.9	64.3	81.6	83.2		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1745			615			763				
Approach Delay, s/veh		59.6			11.1			52.6				
Approach LOS		E			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0
Max Q Clear Time (g_c+I1), s		55.5	8.6		6.0	10.5	26.5	18.8
Green Ext Time (p_c), s		0.0	0.8		0.1	17.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	56.0
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1052	0	570	768	615	507
Future Volume (veh/h)	1052	0	570	768	615	507
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891
Adj Flow Rate, veh/h	1073	0	582	784	628	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	1	2	1	1
Cap, veh/h	2009	0	714	2322	751	359
Arrive On Green	0.43	0.00	0.07	0.23	0.22	0.00
Sat Flow, veh/h	5035	0	3326	3476	3359	1607
Grp Volume(v), veh/h	1073	0	582	784	628	0
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607
Q Serve(g_s), s	18.6	0.0	19.0	21.3	19.6	0.0
Cycle Q Clear(g_c), s	18.6	0.0	19.0	21.3	19.6	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2009	0	714	2322	751	359
V/C Ratio(X)	0.53	0.00	0.81	0.34	0.84	0.00
Avail Cap(c_a), veh/h	2009	0	847	2322	916	438
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.76	0.76	1.00	0.00
Uniform Delay (d), s/veh	23.5	0.0	48.9	21.6	40.8	0.0
Incr Delay (d2), s/veh	1.0	0.0	4.1	0.3	5.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.9	0.0	13.5	14.7	14.8	0.0
LnGrp Delay(d),s/veh	24.5	0.0	53.1	21.9	46.6	0.0
LnGrp LOS	C		D	C	D	
Approach Vol, veh/h	1073			1366	628	
Approach Delay, s/veh	24.5			35.2	46.6	
Approach LOS	C			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.6	28.6	51.8				80.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+I1), s		22.1	21.5	21.1				23.8
Green Ext Time (p_c), s		1.4	1.1	10.3				19.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Future Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1782	1800	1800	1800			
Adj Flow Rate, veh/h	1198	1838	15	6	751	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1197	2797	23	23	1647	737	18	6	18			
Arrive On Green	0.73	1.00	1.00	0.01	0.49	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3344	27	1714	3386	1515	1301	434	1345			
Grp Volume(v), veh/h	1198	903	950	6	751	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1515	1735	0	1345			
Q Serve(g_s), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1197	1376	1444	23	1647	737	24	0	18			
V/C Ratio(X)	1.00	0.66	0.66	0.26	0.46	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1197	1376	1444	109	1647	737	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.0	0.0	0.0	53.7	18.6	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	7.9	0.2	0.2	5.6	0.9	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	13.3	0.2	0.2	0.4	12.3	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	22.9	0.2	0.2	59.3	19.6	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		3051			757			6				
Approach Delay, s/veh		9.1			19.9			56.7				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.5	97.0			45.0	58.5		6.5
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.6	80.0			39.0	47.0		6.0
Max Q Clear Time (g_c+I1), s	2.4	2.5			42.5	18.6		2.7
Green Ext Time (p_c), s	0.0	45.8			0.0	22.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.3
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Future Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	124	1211	96	204	1142	130	84	218	145	423	462	222
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	231	1220	97	207	1294	578	149	345	234	331	863	412
Arrive On Green	0.08	0.38	0.38	0.08	0.39	0.39	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3197	253	1664	3352	1496	385	1338	906	1689	2222	1060
Grp Volume(v), veh/h	124	644	663	204	1142	130	218	0	229	423	351	333
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1195	0	1433	1689	1690	1591
Q Serve(g_s), s	4.3	37.6	37.8	7.8	31.7	5.8	12.6	0.0	14.1	8.0	16.0	16.2
Cycle Q Clear(g_c), s	4.3	37.6	37.8	7.8	31.7	5.8	16.1	0.0	14.1	8.0	16.0	16.2
Prop In Lane	1.00		0.14	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	231	650	667	207	1294	578	359	0	370	331	656	618
V/C Ratio(X)	0.54	0.99	0.99	0.98	0.88	0.23	0.61	0.00	0.62	1.28	0.53	0.54
Avail Cap(c_a), veh/h	256	650	667	207	1294	578	453	0	487	331	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	30.7	30.8	24.9	28.6	20.6	33.1	0.0	32.7	34.5	23.6	23.7
Incr Delay (d2), s/veh	1.9	33.2	33.4	57.6	8.9	0.9	1.7	0.0	1.7	145.8	0.7	0.7
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	3.8	31.5	32.5	13.8	22.8	4.6	9.5	0.0	9.7	33.9	12.0	11.7
LnGrp Delay(d),s/veh	24.2	63.9	64.2	82.5	37.5	21.5	34.8	0.0	34.4	180.3	24.3	24.4
LnGrp LOS	C	E	E	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1431			1476			447			1107	
Approach Delay, s/veh		60.6			42.3			34.6			83.9	
Approach LOS		E			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	43.2		43.8	12.6	43.6	13.0	30.8
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0
Max Q Clear Time (g_c+I1), s	10.3	40.1		18.5	6.8	34.2	10.5	18.1
Green Ext Time (p_c), s	0.0	0.0		8.7	0.0	0.0	0.0	6.6

Intersection Summary	
HCM 2010 Ctrl Delay	57.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	319	7	104	375	639	2	12	638	611
Future Volume (veh/h)	1	0	2	319	7	104	375	639	2	12	638	611
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	354	8	116	417	710	2	13	709	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	330	0	391	437	25	358	390	1152	3	368	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1287	0	1530	1396	97	1400	1639	1820	5	742	1764	1544
Grp Volume(v), veh/h	1	0	2	354	0	124	417	0	712	13	709	0
Grp Sat Flow(s),veh/h/ln	1287	0	1530	1396	0	1497	1639	0	1825	742	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.8	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.1	22.8	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.81	0.00	0.32	1.07	0.00	0.62	0.04	1.03	0.00
Avail Cap(c_a), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	0.0	25.0	33.4	0.0	27.2	27.5	0.0	9.9	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	11.0	0.0	0.5	65.5	0.0	2.5	0.2	43.2	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	0.0	0.0	0.1	15.3	0.0	4.6	30.1	0.0	16.8	0.4	45.4	0.0
LnGrp Delay(d),s/veh	29.3	0.0	25.0	44.4	0.0	27.7	93.0	0.0	12.4	17.3	70.7	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			478			1129			722	
Approach Delay, s/veh		26.4			40.1			42.2			69.8	
Approach LOS		C			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0
Max Q Clear Time (g_c+I1), s		23.1		25.3	19.5	37.5		8.1
Green Ext Time (p_c), s		12.6		0.0	0.0	0.0		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	50.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Future Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
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		0.97	1.00		0.97
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	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	427	0	31	907	7	544	35	63	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	83	857	772	391	900	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	621	1714	1545	930	1800	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	427	0	31	0	914	579	0	63	9	0	0
Grp Sat Flow(s),veh/h/ln	621	1714	1545	930	0	1814	418	0	1520	290	0	0
Q Serve(g_s), s	0.5	14.9	0.0	2.1	0.0	45.0	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.9	0.0	17.0	0.0	45.0	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.48	0.50	0.00	0.08	0.00	1.01	2.46	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	83	857	772	391	0	907	236	0	574	159	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)	0.56	0.56	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.0	15.0	0.0	20.6	0.0	22.5	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	10.7	1.2	0.0	0.4	0.0	31.9	668.6	0.0	0.1	0.1	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	2.2	10.6	0.0	1.0	0.0	54.8	89.2	0.0	1.9	0.3	0.0	0.0
LnGrp Delay(d),s/veh	55.6	16.1	0.0	21.0	0.0	54.4	702.2	0.0	18.3	21.8	0.0	0.0
LnGrp LOS	E	B		C		F	F		B	C		
Approach Vol, veh/h		467			945			642			9	
Approach Delay, s/veh		19.5			53.3			635.1			21.8	
Approach LOS		B			D			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0
Max Q Clear Time (g_c+I1), s		47.5		36.0		47.0		36.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	226.5
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	42	988	116	149	308
Future Vol, veh/h	21	42	988	116	149	308
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	24	48	1136	133	171	354

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1918	1229	0	0	1286	0
Stage 1	1219	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398	-
Pot Cap-1 Maneuver	75	179	-	-	478	-
Stage 1	282	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	47	175	-	-	474	-
Mov Cap-2 Maneuver	157	-	-	-	-	-
Stage 1	278	-	-	-	-	-
Stage 2	317	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.4	0	5.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	169	474	-
HCM Lane V/C Ratio	-	-	0.428	0.361	-
HCM Control Delay (s)	-	-	41.4	16.8	-
HCM Lane LOS	-	-	E	C	-
HCM 95th %tile Q(veh)	-	-	1.9	1.6	-

Intersection	
Int Delay, s/veh	313.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	133	99	0	22	177	1071	369	52	268	59
Future Vol, veh/h	9	0	133	99	0	22	177	1071	369	52	268	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	11	0	4	0	0	0	0	2	0	0	10	0
Mvmt Flow	12	0	171	127	0	28	227	1373	473	67	344	76

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2593	2823	381	2671	2624	1618	419	0	0	1854	0	0
Stage 1	515	515	-	2071	2071	-	-	-	-	-	-	-
Stage 2	2078	2308	-	600	553	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	16	18	662	~ 15	24	129	1151	-	-	331	-	-
Stage 1	526	538	-	~ 72	97	-	-	-	-	-	-	-
Stage 2	66	74	-	491	518	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 10	13	662	~ 9	17	128	1151	-	-	331	-	-
Mov Cap-2 Maneuver	~ 10	13	-	~ 9	17	-	-	-	-	-	-	-
Stage 1	526	394	-	~ 72	96	-	-	-	-	-	-	-
Stage 2	51	74	-	267	380	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	287.6	$ 5492.6	1	2.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1151	-	-	129	9	128	331	-	-
HCM Lane V/C Ratio	0.197	-	-	1.411	14.103	0.22	0.201	-	-
HCM Control Delay (s)	8.9	0	-	287.5	$ 6704.1	40.9	18.6	0	-
HCM Lane LOS	A	A	-	F	F	E	C	A	-
HCM 95th %tile Q(veh)	0.7	-	-	12.2	17.5	0.8	0.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

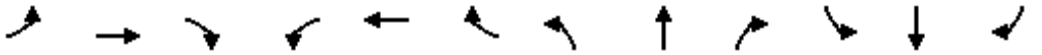
Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	1611	6	6	493
Future Vol, veh/h	2	2	1611	6	6	493
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1941	7	7	594

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2549	1941	0	0	1941	0
Stage 1	1941	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	30	83	-	-	306	-
Stage 1	124	-	-	-	-	-
Stage 2	547	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	29	83	-	-	306	-
Mov Cap-2 Maneuver	29	-	-	-	-	-
Stage 1	124	-	-	-	-	-
Stage 2	534	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	99	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	43	306	-
HCM Lane V/C Ratio	-	-	0.112	0.024	-
HCM Control Delay (s)	-	-	99	17	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	1306	0	0	544	379	774	840	344	321	0	162
Future Volume (veh/h)	376	1306	0	0	544	379	774	840	344	321	0	162
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1756	0	0	1800	1854	1764	1764	1764	1665	0	1748
Adj Flow Rate, veh/h	388	1346	0	0	561	0	798	866	355	331	0	167
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	451	1334	0	0	746	344	1660	690	586	362	0	0
Arrive On Green	0.09	0.27	0.00	0.00	0.07	0.00	0.51	0.39	0.39	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	1764	1500	3077	331	
Grp Volume(v), veh/h	388	1346	0	0	561	0	798	866	355	331	78.5	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1764	1500	1539	E	
Q Serve(g_s), s	12.7	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Cycle Q Clear(g_c), s	12.7	44.0	0.0	0.0	17.7	0.0	17.5	43.0	20.8	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	451	1334	0	0	746	344	1660	690	586	362		
V/C Ratio(X)	0.86	1.01	0.00	0.00	0.75	0.00	0.48	1.26	0.61	0.91		
Avail Cap(c_a), veh/h	451	1334	0	0	746	344	1660	690	586	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.90	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.9	40.3	0.0	0.0	48.1	0.0	17.6	33.5	26.7	51.6		
Incr Delay (d2), s/veh	13.7	25.1	0.0	0.0	6.2	0.0	0.2	126.7	1.8	26.9		
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		
%ile BackOfQ(95%),veh/ln	10.6	44.9	0.0	0.0	13.7	0.0	12.5	81.3	13.8	5.4		
LnGrp Delay(d),s/veh	62.6	65.4	0.0	0.0	54.3	0.0	17.8	160.2	28.5	78.5		
LnGrp LOS	E	F			D		B	F	C	E		
Approach Vol, veh/h		1734			561			2019				
Approach Delay, s/veh		64.8			54.3			80.7				
Approach LOS		E			D			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		49.0	61.0		20.0	29.0	13.0	48.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		43.0	42.0		14.0	23.0	7.0	42.0
Max Q Clear Time (g_c+I1), s		46.5	20.0		15.2	20.2	10.5	45.5
Green Ext Time (p_c), s		0.0	3.1		0.0	2.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	71.4
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	866	0	189	1247	807	853
Future Volume (veh/h)	866	0	189	1247	807	853
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785
Adj Flow Rate, veh/h	884	0	193	1272	823	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	6	2	2	7
Cap, veh/h	2263	0	293	2089	972	443
Arrive On Green	0.48	0.00	0.03	0.20	0.29	0.00
Sat Flow, veh/h	5035	0	3169	3476	3326	1517
Grp Volume(v), veh/h	884	0	193	1272	823	0
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517
Q Serve(g_s), s	13.2	0.0	6.6	37.6	25.6	0.0
Cycle Q Clear(g_c), s	13.2	0.0	6.6	37.6	25.6	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2263	0	293	2089	972	443
V/C Ratio(X)	0.39	0.00	0.66	0.61	0.85	0.00
Avail Cap(c_a), veh/h	2263	0	317	2089	1421	648
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.62	0.62	1.00	0.00
Uniform Delay (d), s/veh	18.4	0.0	51.6	31.7	36.6	0.0
Incr Delay (d2), s/veh	0.5	0.0	2.8	0.8	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.8	0.0	5.3	23.3	18.0	0.0
LnGrp Delay(d),s/veh	18.9	0.0	54.4	32.6	39.9	0.0
LnGrp LOS	B		D	C	D	
Approach Vol, veh/h	884			1465	823	
Approach Delay, s/veh	18.9			35.5	39.9	
Approach LOS	B			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		37.1	15.2	57.7				72.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		28.1	9.1	15.7				40.1
Green Ext Time (p_c), s		3.0	0.1	14.8				9.6

Intersection Summary	
HCM 2010 Ctrl Delay	32.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	583	1595	4	2	895	494	6	2	2	0	0	0
Future Volume (veh/h)	583	1595	4	2	895	494	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	607	1661	4	2	932	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	704	2843	7	18	2124	988	21	7	25			
Arrive On Green	0.43	1.00	1.00	0.01	0.63	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1513			
Grp Volume(v), veh/h	607	811	854	2	932	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1513			
Q Serve(g_s), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.1			
Cycle Q Clear(g_c), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.1			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	704	1389	1461	18	2124	988	28	0	25			
V/C Ratio(X)	0.86	0.58	0.58	0.11	0.44	0.00	0.28	0.00	0.08			
Avail Cap(c_a), veh/h	928	1389	1461	109	2124	988	110	0	96			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.0	0.0	0.0	53.9	10.2	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.7	0.2	0.2	2.6	0.7	0.0	5.4	0.0	1.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.7	0.1	0.1	0.1	11.7	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.7	0.2	0.2	56.5	10.9	0.0	58.8	0.0	54.7			
LnGrp LOS	C	A	A	E	B		E		D			
Approach Vol, veh/h		2272			934			10				
Approach Delay, s/veh		8.3			11.0			58.0				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.2	97.0			28.5	74.7		6.8
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.6	80.0			30.0	56.0		6.0
Max Q Clear Time (g_c+I1), s	2.6	2.5			20.9	18.0		2.6
Green Ext Time (p_c), s	0.0	43.6			1.6	27.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.2
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Future Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	148	1048	56	225	1570	465	98	396	89	102	141	114
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	2	1	1	1	1	6	3	3
Cap, veh/h	171	1461	78	264	1520	685	153	501	114	213	610	459
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	453	2069	469	1609	1782	1341
Grp Volume(v), veh/h	148	543	561	225	1570	465	297	0	286	102	129	126
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1485	0	1506	1609	1638	1486
Q Serve(g_s), s	5.3	29.2	29.2	7.0	50.4	26.9	19.1	0.0	19.5	5.1	6.2	6.7
Cycle Q Clear(g_c), s	5.3	29.2	29.2	7.0	50.4	26.9	20.8	0.0	19.5	5.1	6.2	6.7
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	171	756	782	264	1520	685	403	0	365	213	560	508
V/C Ratio(X)	0.87	0.72	0.72	0.85	1.03	0.68	0.74	0.00	0.78	0.48	0.23	0.25
Avail Cap(c_a), veh/h	171	756	782	264	1520	685	448	0	411	213	610	554
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	24.1	24.1	25.7	29.8	23.5	39.3	0.0	39.0	29.6	25.8	26.0
Incr Delay (d2), s/veh	34.3	5.8	5.6	22.3	32.1	5.3	5.7	0.0	8.6	1.7	0.2	0.3
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	10.1	20.7	21.3	9.1	53.6	17.8	14.1	0.0	13.9	4.2	5.1	5.1
LnGrp Delay(d),s/veh	60.6	29.8	29.7	48.0	61.9	28.8	45.0	0.0	47.6	31.2	26.0	26.3
LnGrp LOS	E	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1252			2260			583			357	
Approach Delay, s/veh		33.4			53.7			46.2			27.6	
Approach LOS		C			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	55.4		42.6	12.0	55.4	11.0	31.6
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	46.0		40.0	6.0	46.0	5.0	29.0
Max Q Clear Time (g_c+I1), s	9.5	31.7		8.7	7.8	52.9	7.6	22.8
Green Ext Time (p_c), s	0.0	13.1		6.2	0.0	0.0	0.0	2.8

Intersection Summary		
HCM 2010 Ctrl Delay	44.9	
HCM 2010 LOS	D	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Future Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	590	1	239	134	834	1	8	547	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	413	178	444	633	3	623	288	921	1	141	641	556
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.50	0.50	0.36	0.36	0.00
Sat Flow, veh/h	1158	457	1142	1422	7	1601	1689	1841	2	661	1782	1544
Grp Volume(v), veh/h	3	0	14	590	0	240	134	0	835	8	547	0
Grp Sat Flow(s),veh/h/ln	1158	0	1599	1422	0	1608	1689	0	1844	661	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	1.0	25.5	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	25.2	25.5	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	622	633	0	625	288	0	922	141	641	556
V/C Ratio(X)	0.01	0.00	0.02	0.93	0.00	0.38	0.46	0.00	0.91	0.06	0.85	0.00
Avail Cap(c_a), veh/h	413	0	622	633	0	625	296	0	922	141	641	556
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.79	0.79	0.00
Uniform Delay (d), s/veh	22.9	0.0	17.0	28.6	0.0	19.8	18.8	0.0	20.6	37.6	26.6	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	20.8	0.0	0.4	1.2	0.0	14.1	0.6	11.1	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	0.1	0.0	0.4	25.2	0.0	7.7	3.6	0.0	30.2	0.4	20.0	0.0
LnGrp Delay(d),s/veh	22.9	0.0	17.0	49.4	0.0	20.1	19.9	0.0	34.7	38.2	37.7	0.0
LnGrp LOS	C		B	D		C	B		C	D	D	
Approach Vol, veh/h		17			830			969			555	
Approach Delay, s/veh		18.0			40.9			32.6			37.7	
Approach LOS		B			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		50.0		40.0	12.6	37.4		40.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		44.0		34.0	7.0	31.0		34.0
Max Q Clear Time (g_c+I1), s		39.3		37.5	6.6	28.0		11.8
Green Ext Time (p_c), s		3.4		0.0	0.0	2.2		3.5

Intersection Summary	
HCM 2010 Ctrl Delay	36.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Future Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
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		0.98	1.00		0.98
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	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	798	0	61	444	1	426	7	151	33	39	52
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	325	772	690	80	793	2	282	3	678	51	57	41
Arrive On Green	0.43	0.43	0.00	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	950	1782	1591	705	1830	4	455	7	1526	0	128	93
Grp Volume(v), veh/h	8	798	0	61	0	445	433	0	151	124	0	0
Grp Sat Flow(s),veh/h/ln	950	1782	1591	705	0	1834	463	0	1526	221	0	0
Q Serve(g_s), s	0.6	39.0	0.0	0.0	0.0	16.3	0.0	0.0	5.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.4	39.0	0.0	39.0	0.0	16.3	40.0	0.0	5.5	40.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	325	772	690	80	0	795	285	0	678	149	0	0
V/C Ratio(X)	0.02	1.03	0.00	0.76	0.00	0.56	1.52	0.00	0.22	0.83	0.00	0.00
Avail Cap(c_a), veh/h	325	772	690	80	0	795	285	0	678	149	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)	0.09	0.09	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.0	25.5	0.0	45.0	0.0	19.1	30.6	0.0	15.4	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	19.9	0.0	49.4	0.0	2.8	250.7	0.0	0.2	31.4	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	0.3	41.5	0.0	4.7	0.0	13.8	48.4	0.0	4.2	5.7	0.0	0.0
LnGrp Delay(d),s/veh	25.0	45.4	0.0	94.4	0.0	21.9	281.3	0.0	15.6	53.0	0.0	0.0
LnGrp LOS	C	F		F		C	F		B	D		
Approach Vol, veh/h		806			506			584			124	
Approach Delay, s/veh		45.2			30.7			212.6			53.0	
Approach LOS		D			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		44.0		46.0		44.0		46.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		38.0		39.0		38.0		39.0
Max Q Clear Time (g_c+I1), s		41.5		42.0		41.5		42.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	90.4
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	4.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	77	85	409	17	54	988
Future Vol, veh/h	77	85	409	17	54	988
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	91	100	481	20	64	1162

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1799	518	0	0	518	0
Stage 1	508	-	-	-	-	-
Stage 2	1291	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	~ 89	529	-	-	976	-
Stage 1	608	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 82	517	-	-	968	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	599	-	-	-	-	-
Stage 2	242	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.4	0	0.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	280	968	-
HCM Lane V/C Ratio	-	-	0.681	0.066	-
HCM Control Delay (s)	-	-	41.4	9	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	4.5	0.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	278.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	42	272	0	60	24	299	101	14	1117	5
Future Vol, veh/h	5	0	42	272	0	60	24	299	101	14	1117	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	8	8	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	5	0	45	289	0	64	26	318	107	15	1188	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1676	1706	1191	1674	1654	380	1194	0	0	434	0	0
Stage 1	1221	1221	-	431	431	-	-	-	-	-	-	-
Stage 2	455	485	-	1243	1223	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	76	92	231	~ 77	99	671	592	-	-	1136	-	-
Stage 1	222	255	-	607	586	-	-	-	-	-	-	-
Stage 2	589	555	-	~ 216	254	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	64	83	231	~ 57	89	667	592	-	-	1136	-	-
Mov Cap-2 Maneuver	64	83	-	~ 57	89	-	-	-	-	-	-	-
Stage 1	209	245	-	568	548	-	-	-	-	-	-	-
Stage 2	502	519	-	~ 167	244	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.3	$ 1622.6	0.6	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	592	-	-	181	57	667	1136	-	-
HCM Lane V/C Ratio	0.043	-	-	0.276	5.077	0.096	0.013	-	-
HCM Control Delay (s)	11.4	0	-	32.3	$ 1978.1	11	8.2	0	-
HCM Lane LOS	B	A	-	D	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	32.4	0.3	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

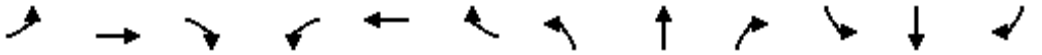
Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	419	2	2	1425
Future Vol, veh/h	4	4	419	2	2	1425
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	446	2	2	1516

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1966	446	0	0	446	0
Stage 1	446	-	-	-	-	-
Stage 2	1520	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	70	617	-	-	1125	-
Stage 1	649	-	-	-	-	-
Stage 2	201	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	70	617	-	-	1125	-
Mov Cap-2 Maneuver	70	-	-	-	-	-
Stage 1	649	-	-	-	-	-
Stage 2	201	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	35.6	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	126	1125	-
HCM Lane V/C Ratio	-	-	0.068	0.002	-
HCM Control Delay (s)	-	-	35.6	8.2	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Future Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	110	1667	0	0	627	0	295	250	232	899	0	488
Adj No. of Lanes	2	2	0	0	2	1	2	1	1	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	217	1623	0	0	1268	590	1393	292	248	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1782	1515	3260	899	
Grp Volume(v), veh/h	110	1667	0	0	627	0	295	250	232	899	88.1	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1782	1515	1630	F	
Q Serve(g_s), s	3.6	53.0	0.0	0.0	8.2	0.0	6.3	15.0	16.6	24.0		
Cycle Q Clear(g_c), s	3.6	53.0	0.0	0.0	8.2	0.0	6.3	15.0	16.6	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	217	1623	0	0	1268	590	1393	292	248	858		
V/C Ratio(X)	0.51	1.03	0.00	0.00	0.49	0.00	0.21	0.86	0.94	1.05		
Avail Cap(c_a), veh/h	391	1623	0	0	1268	590	1393	292	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.86	0.86	0.00	0.00	0.86	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.9	37.2	0.0	0.0	10.0	0.0	19.8	44.8	45.4	44.2		
Incr Delay (d2), s/veh	1.6	27.9	0.0	0.0	1.2	0.0	0.1	21.6	40.0	43.9		
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		
%ile BackOfQ(95%),veh/ln	3.0	55.7	0.0	0.0	6.8	0.0	5.1	14.1	14.8	9.4		
LnGrp Delay(d),s/veh	52.4	65.2	0.0	0.0	11.2	0.0	19.9	66.3	85.4	88.1		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1777			627			777				
Approach Delay, s/veh		64.4			11.2			54.4				
Approach LOS		E			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0
Max Q Clear Time (g_c+I1), s		55.5	8.8		6.1	10.7	26.5	19.1
Green Ext Time (p_c), s		0.0	0.8		0.1	17.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	59.5
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1072	0	580	782	627	516
Future Volume (veh/h)	1072	0	580	782	627	516
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891
Adj Flow Rate, veh/h	1094	0	592	798	640	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	1	2	1	1
Cap, veh/h	1980	0	724	2311	762	364
Arrive On Green	0.42	0.00	0.07	0.23	0.23	0.00
Sat Flow, veh/h	5035	0	3326	3476	3359	1607
Grp Volume(v), veh/h	1094	0	592	798	640	0
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607
Q Serve(g_s), s	19.3	0.0	19.3	21.8	20.0	0.0
Cycle Q Clear(g_c), s	19.3	0.0	19.3	21.8	20.0	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1980	0	724	2311	762	364
V/C Ratio(X)	0.55	0.00	0.82	0.35	0.84	0.00
Avail Cap(c_a), veh/h	1980	0	847	2311	916	438
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.75	0.75	1.00	0.00
Uniform Delay (d), s/veh	24.1	0.0	48.9	22.0	40.6	0.0
Incr Delay (d2), s/veh	1.1	0.0	4.2	0.3	6.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.3	0.0	13.7	14.9	15.0	0.0
LnGrp Delay(d),s/veh	25.3	0.0	53.1	22.3	46.7	0.0
LnGrp LOS	C		D	C	D	
Approach Vol, veh/h	1094			1390	640	
Approach Delay, s/veh	25.3			35.4	46.7	
Approach LOS	C			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.9	28.9	51.1				80.1
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+I1), s		22.5	21.8	21.8				24.3
Green Ext Time (p_c), s		1.4	1.1	10.1				20.3

Intersection Summary	
HCM 2010 Ctrl Delay	34.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Future Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1219	1871	16	6	765	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1227	2795	24	23	1616	752	18	6	18			
Arrive On Green	0.75	1.00	1.00	0.01	0.48	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3342	29	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1219	919	968	6	765	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1227	1376	1444	23	1616	752	24	0	18			
V/C Ratio(X)	0.99	0.67	0.67	0.26	0.47	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1227	1376	1444	109	1616	752	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	13.9	0.0	0.0	53.7	19.4	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	6.3	0.2	0.2	5.6	1.0	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	20.4	0.2	0.2	0.4	12.7	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	20.1	0.2	0.2	59.3	20.4	0.0	56.9	0.0	56.2			
LnGrp LOS	C	A	A	E	C		E		E			
Approach Vol, veh/h		3106			771			6				
Approach Delay, s/veh		8.0			20.7			56.7				
Approach LOS		A			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.5	97.0			46.0	57.5		6.5
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.6	80.0			40.0	46.0		6.0
Max Q Clear Time (g_c+I1), s	2.4	2.5			42.4	19.3		2.7
Green Ext Time (p_c), s	0.0	47.4			0.0	22.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	10.6
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Future Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	126	1234	98	208	1163	132	86	222	148	431	470	226
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	224	1202	95	205	1271	567	151	349	238	333	875	418
Arrive On Green	0.08	0.38	0.38	0.08	0.38	0.38	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3196	253	1664	3352	1496	383	1324	902	1689	2221	1061
Grp Volume(v), veh/h	126	656	676	208	1163	132	221	0	235	431	357	339
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1174	0	1434	1689	1690	1591
Q Serve(g_s), s	4.4	37.6	37.6	8.0	33.0	6.0	13.0	0.0	14.5	8.0	16.2	16.4
Cycle Q Clear(g_c), s	4.4	37.6	37.6	8.0	33.0	6.0	16.7	0.0	14.5	8.0	16.2	16.4
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	224	640	657	205	1271	567	360	0	379	333	666	627
V/C Ratio(X)	0.56	1.03	1.03	1.01	0.92	0.23	0.61	0.00	0.62	1.29	0.54	0.54
Avail Cap(c_a), veh/h	247	640	657	205	1271	567	447	0	488	333	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	31.2	31.2	25.5	29.5	21.1	32.9	0.0	32.4	34.3	23.3	23.3
Incr Delay (d2), s/veh	2.4	42.1	42.6	66.5	11.7	1.0	1.7	0.0	1.7	152.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	45.2	46.5	17.0	24.1	4.7	9.6	0.0	9.8	35.4	12.2	11.7
LnGrp Delay(d),s/veh	25.2	73.3	73.8	92.1	41.2	22.1	34.6	0.0	34.1	187.1	24.0	24.1
LnGrp LOS	C	F	F	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1458			1503			456			1127	
Approach Delay, s/veh		69.4			46.6			34.3			86.4	
Approach LOS		E			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	42.6		44.4	12.7	42.9	13.0	31.4
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	29.0		46.0	8.0	28.0	7.0	33.0
Max Q Clear Time (g_c+I1), s	10.5	40.1		18.7	6.9	35.5	10.5	18.7
Green Ext Time (p_c), s	0.0	0.0		8.9	0.0	0.0	0.0	6.6

Intersection Summary		
HCM 2010 Ctrl Delay	62.5	
HCM 2010 LOS	E	

APPENDIX J

Signal Warrant Evaluation

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

TRAFFIC SIGNAL WARRANT ANALYSIS
TRAFFIC VOLUMES SUMMARIES

King of Prussia & Raider Manual Count

Manual Traffic Counts

Start Time	KOP Rd NB Left/Thru	KOP Rd SB Thru/Right	Raider Rd EB Left/Right
7:00 AM	1,123	268	166
8:00 AM	1,171	235	25
4:00 PM	342	819	69
5:00 PM	292	1,038	48

Mixed Use Weekday Trips

		AM			PM			WEEKDAY		
Land Use :	Variable:	Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting	Total
Mixed Use Weekday Trips	475,000 SF	571	148	719	158	425	583	3,759	3,759	7,518

	Mixed Use Entering Trips		Mixed Use Exiting Trips	
Start Time	Est. % Daily Entering	Trips	Est. % Daily Exiting	Trips
7:00 AM	11.4%	428	2.4%	89
8:00 AM	15.2%	571	3.9%	148
4:00 PM	4.2%	158	11.3%	425
5:00 PM	3.2%	119	8.5%	319

For the purposes of this evalutaion, the 8 AM and 4 PM hours were the peak hours for the AM and PM peak periods respectively. For 7-8 AM and 5-6 PM, a 50% reduction was taken from the trips from the peak periods to obtain these trips for entering and exiting vehicles.

	King of Prussia Rd						Site Driveway/Raider Rd	
Start Time	King of Prussia Rd NB Left/Thru (Existing)	King of Prussia Rd NB Right [1] (Proposed)	King of Prussia Rd Site NB Thru[2] (Proposed)	King of Prussia Rd SB Thru/Right (Existing)	King of Prussia SB left [3] (Proposed)	King of Prussia Site SB Thru[4] (Proposed)	Raider Road	Site Driveway[5]
7:00 AM	1,123	274	44	268	39	13	166	69
8:00 AM	1,171	365	59	235	51	21	25	115
4:00 PM	342	101	20	819	14	44	69	332
5:00 PM	292	76	15	1,038	11	33	48	249

[1] Aprox. 64% of entering site trips

[2] Aprox. 10 % of entering trips + 1% of exiting trips

[3] Aprox. 9% of entering site trips

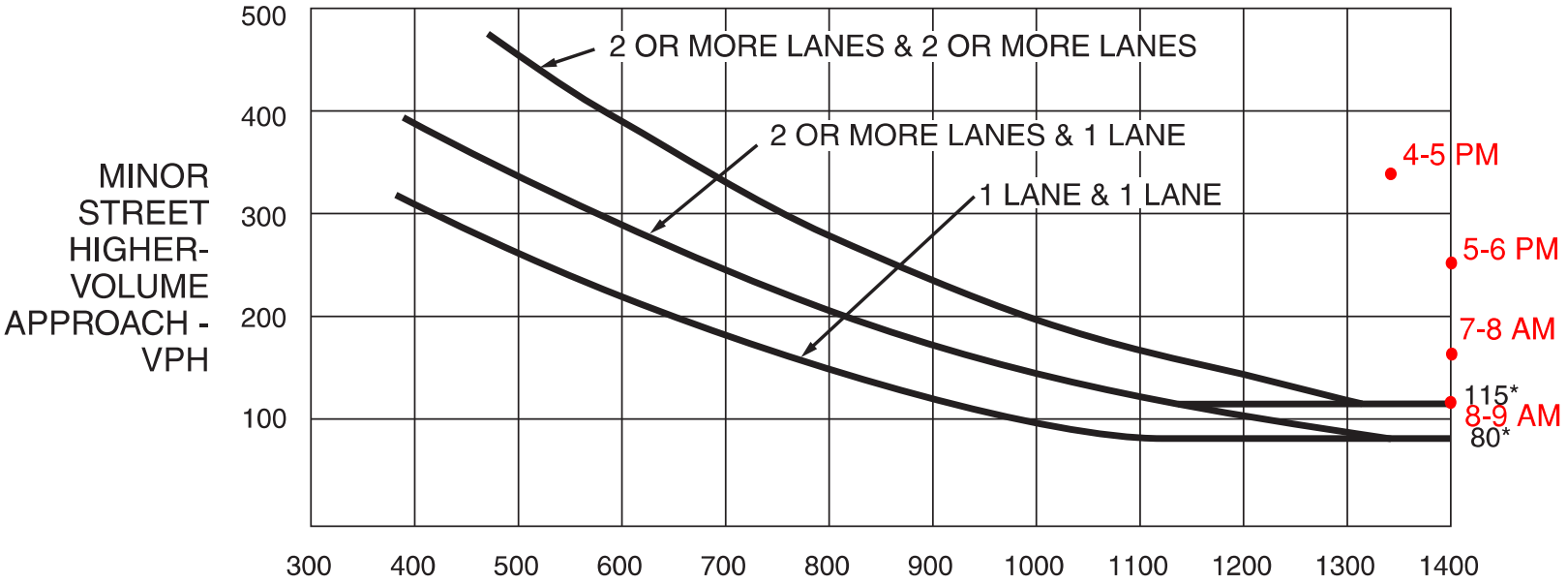
[4] Aprox. 1 % of entering trips + 10% of exiting trips

[5] Aprox. 78 % of exiting trips

King of Prussia Rd & Site Driveway/Raider Road Warrant Volumes

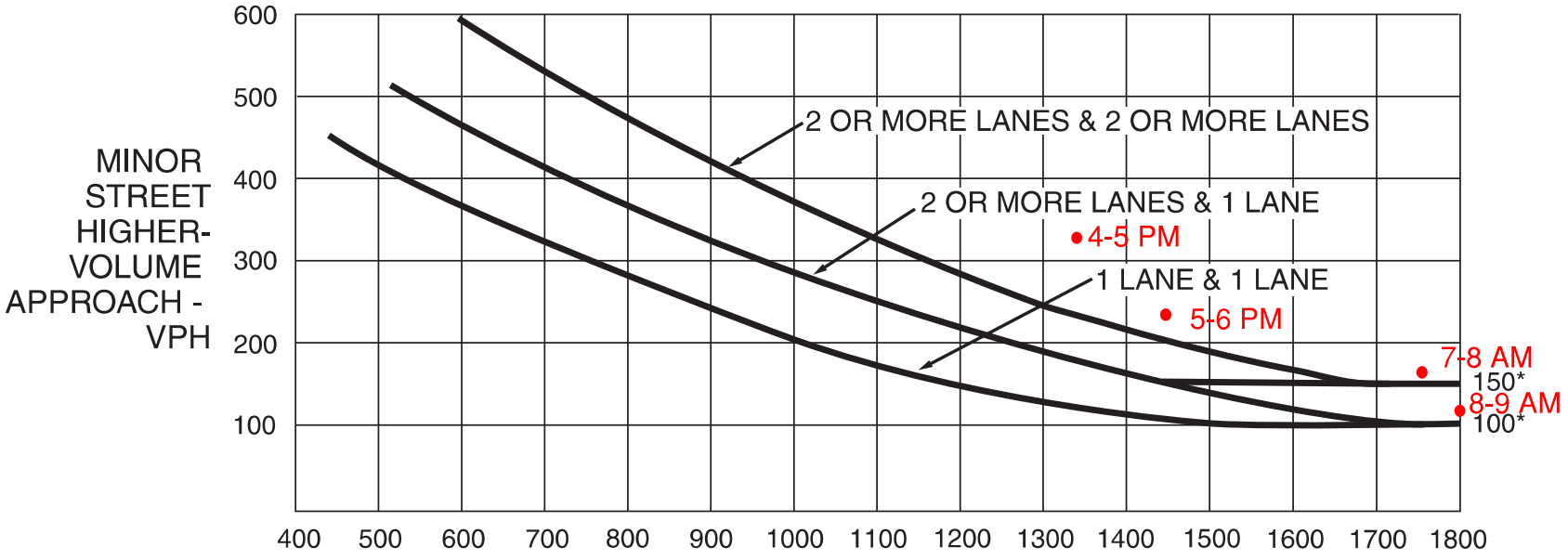
	Major Street		Minor Streets					
Start Time	King of Prussia Rd NB Left/Thru/Right	King of Prussia Rd SB Left/Thru/Right	Raider Road	Site Driveway	Minor Street	Major Street	4 Hr Warrant Met	Peak Hr Warrant Met
7:00 AM	1,441	320	166	69	166	1,760	Y	Y
8:00 AM	1,595	307	25	115	115	1,902	Y	Y
4:00 PM	463	877	69	332	332	1,340	Y	Y
5:00 PM	383	1,082	48	249	249	1,465	Y	Y

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

TRAFFIC SIGNAL WARRANT ANALYSIS
TRAFFIC VOLUMES SUMMARIES

King of Prussia & Septa Driveway Count

Manual Traffic Counts

Start Time	KOP Rd NB Thru/Right	KOP Rd SB Left/Thru	Septa Driveway WB Left/Right
7:00 AM	936	303	23
8:00 AM	1,012	231	25
4:00 PM	358	773	73
5:00 PM	335	970	74

Mixed Use Weekday Trips

		AM			PM			WEEKDAY		
Land Use :	Variable:	Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting	Total
Mixed Use Weekday Trips	475,000 SF	571	148	719	158	425	583	3,759	3,759	7,518

	Mixed Use Entering Trips		Mixed Use Exiting Trips	
Start Time	Est. % Daily Entering	Trips	Est. % Daily Exiting	Trips
7:00 AM	11.4%	428	2.4%	89
8:00 AM	15.2%	571	3.9%	148
4:00 PM	4.2%	158	11.3%	425
5:00 PM	3.2%	119	8.5%	319

For the purposes of this evalutaion, the 8 AM and 4 PM hours were the peak hours for the AM and PM peak periods respectively. For 7-8 AM and 5-6 PM, a reduction was taken from the trips from the peak periods to obtain these trips for entering and exiting vehicles.

	King of Prussia Rd						Site Driveway
Start Time	King of Prussia Rd NB Thru/Right (Existing)	King of Prussia Rd NB Right [1] (Proposed)	King of Prussia Rd Site NB Thru[2] (Proposed)	King of Prussia Rd SB Left/Thru (Existing)	King of Prussia SB Left [3] (Proposed)	King of Prussia Site SB Thru[4] (Proposed)	Site Driveway[5]
7:00 AM	936	43	13	303	64	43	41
8:00 AM	1,012	57	22	231	86	57	55
4:00 PM	358	16	64	773	24	16	158
5:00 PM	335	12	48	970	18	12	138

[1] Aprox. 10% of entering site trips

[2] Aprox. 15% of exiting trips

[3] Aprox. 15% of entering site trips

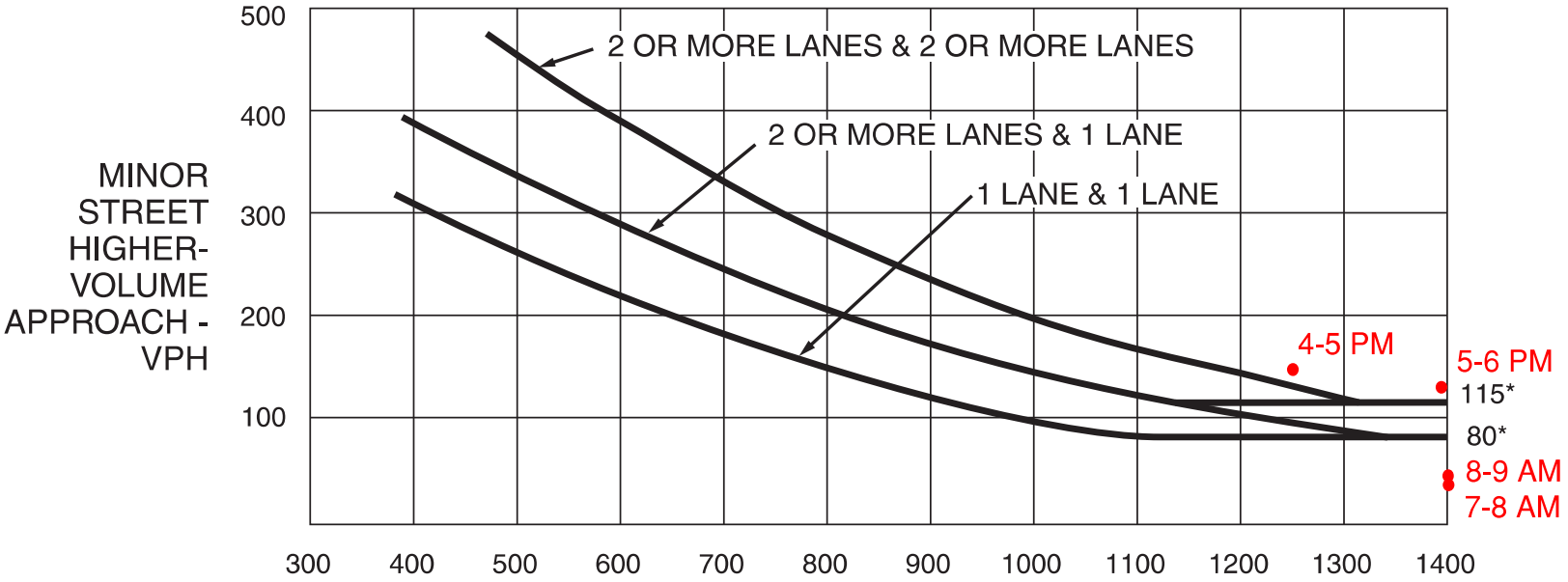
[4] Aprox. 10 % of entering trips

[5] Aprox. 20 % of exiting trips

King of Prussia Rd & Septa Driveway Warrant Volumes

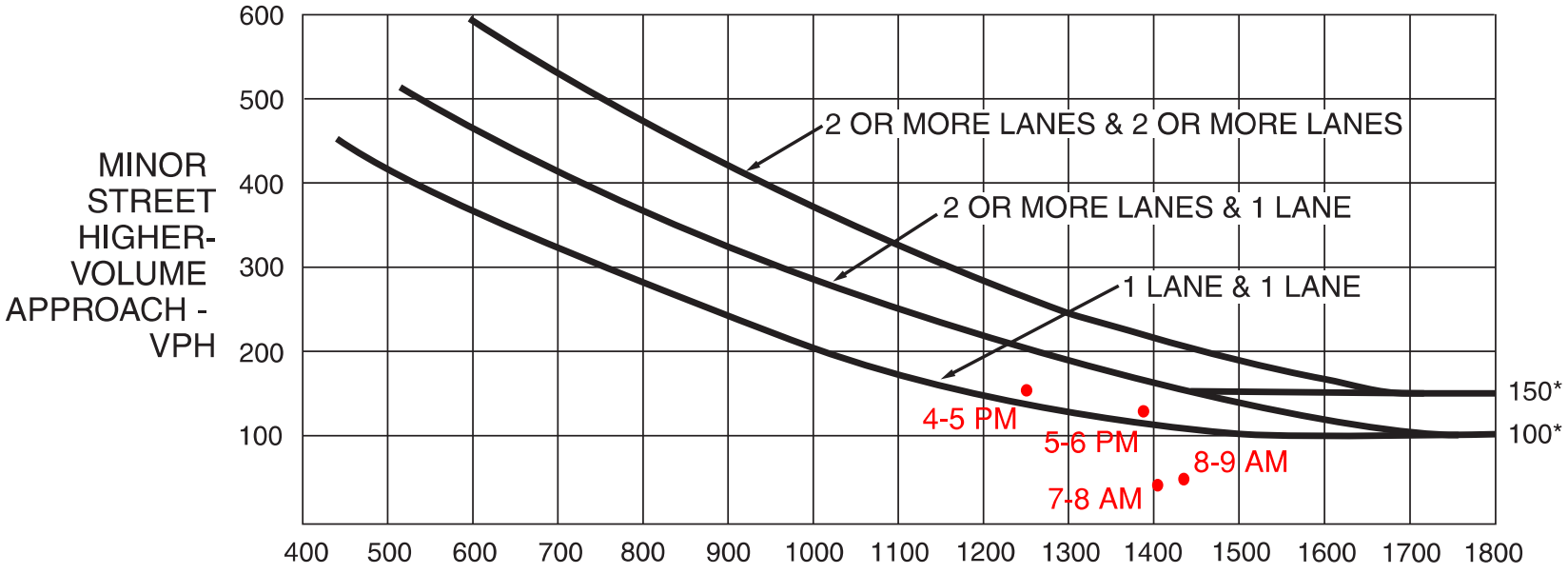
	Major Street		Minor Street				
Start Time	King of Prussia Rd NB Left/Thru/Right	King of Prussia Rd SB Left/Thru/Right	Septa Driveway	Minor Street	Major Street	4 Hr Warrant Met	Peak Hr Warrant Met
7:00 AM	992	410	41	41	1,402	N	N
8:00 AM	1,091	374	55	55	1,465	N	N
4:00 PM	438	813	158	158	1,250	Y	Y
5:00 PM	395	1,000	138	138	1,394	Y	Y

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

APPENDIX K

Left Turn Phase Evaluation

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

LEFT TURN SIGNALIZATION

COUNTY: **Delaware County**
MUNICIPALITY: **Radnor Twp**

INTERSECTION: **King of Prussia Road and Raider Road/Site Driveway**
YEAR: **2020 Build Conditions**

Time	Left Turn				Opposing		Calculated Conflict Factor	Meet Warrants?
	Direction	Exclusive Lane	Volume	Per Cycle	Through Volume	Number of Lanes		
AM PEAK	EB	N	9	0.23	0	1	0	No
	WB	N	99	2.48	0	1	0	No
	NB	Y	173	4.33	264	1	45,672	**No**
	SB	Y	52	1.30	1052	1	54,704	**Yes**
PM PEAK	EB	N	5	0.13	0	1	0	No
	WB	N	272	6.8	0	1	0	No
	NB	Y	23	0.575	1097	1	25,231	**No**
	SB	Y	14	0.35	294	1	4,116	**No**

Comments: A conflict factor of 50,000 is required for advanced left turn phasing for 2 - one hour periods

AM Peak Cycle Length (seconds): 90
Midday Peak Cycle Length (seconds): 90
PM Peak Cycle Length (seconds): 90

Conflict Factors:
1.1 Protected/Permitted Left Turn Phase

A. Without separate turning lanes
1 opposing lane; CF = 35,000
2 opposing lanes; CF = 45,000

B. With separate turning lane
1 opposing lane; CF = 50,000
2 opposing lanes; CF = 65,000

1.2 Protected/Prohibited Left Turn Phase
(must have a separate turning lane)
1 opposing lane; CF = 67,500
2 opposing lanes; CF = 90,000

Calculations completed in accordance with PennDOT Publication 149, Chapter 3

LEFT TURN SIGNALIZATION

COUNTY: **Delaware County**
MUNICIPALITY: **Radnor Twp**

INTERSECTION: **King of Prussia Road and Raider Road/Site Driveway**
YEAR: **2025 Build Conditions**

Time	Left Turn				Opposing		Calculated Conflict Factor	Meet Warrants?
	Direction	Exclusive Lane	Volume	Per Cycle	Through Volume	Number of Lanes		
AM PEAK	EB	N	9	0.23	0	1	0	No
	WB	N	99	2.48	0	1	0	No
	NB	Y	177	4.43	268	1	47,436	**No**
	SB	Y	52	1.30	1071	1	55,692	**Yes**
PM PEAK	EB	N	5	0.13	0	1	0	No
	WB	N	272	6.8	0	1	0	No
	NB	Y	24	0.6	1117	1	26,808	**No**
	SB	Y	14	0.35	299	1	4,186	**No**

Comments: A conflict factor of 50,000 is required for advanced left turn phasing for 2 - one hour periods

AM Peak Cycle Length (seconds): 90
Midday Peak Cycle Length (seconds): 90
PM Peak Cycle Length (seconds): 90

Conflict Factors:
1.1 Protected/Permitted Left Turn Phase

A. Without separate turning lanes
1 opposing lane; CF = 35,000
2 opposing lanes; CF = 45,000

B. With separate turning lane
1 opposing lane; CF = 50,000
2 opposing lanes; CF = 65,000

1.2 Protected/Prohibited Left Turn Phase
(must have a separate turning lane)
1 opposing lane; CF = 67,500
2 opposing lanes; CF = 90,000

Calculations completed in accordance with PennDOT Publication 149, Chapter 3

APPENDIX L

Pedestrian and Vehicle Clearance Calculations

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

VEHICLE CHANGE AND CLEARANCE INTERVALS

Assumptions and Calibration Inputs

Change and Clearance Intervals (CCI, seconds)

$$CCI = Y + AR$$

Yellow Change Interval (Y, seconds)

$$Y = t + \frac{1.47V}{2a \pm 64.4(g/100)}$$ (typ. 3-6 seconds)

- t = Perception-reaction time, s (1 second) ← 1
- V = Approach speed, MPH
- a = Deceleration rate (10 ft/s^2) ← 10
- g = Grade of approach, %

All-Red Clearance Interval (AR, seconds)

$$AR = \frac{(W + L)}{1.47V}$$

- W = Width of the intersection, ft (from the stop bar to the end of the farthest traveled lane)
- L = Length of Vehicle (20 ft) ← 20
- V = Approach speed, MPH

Calculations

Through Movement Phases								
Approach Description	**Direction**	**V**	**g (%)**	**W**	**Y**	**AR**	**CCI**	**Comments**
King of Prussia Road SB	SB	35	-2	75	3.8	1.9	5.7	
King of Prussia Road NB	NB	35	2	75	3.5	1.9	5.4	
Raider Road	EB	25	-2	60	3.0	2.2	5.2	
Site Driveway	WB	25	2	60	2.8	2.2	5.0	
Left-Turn Movement Phases								
Approach Description	**Direction**	**V**	**g (%)**	**W**	**Y**	**AR**	**CCI**	**Comments**
King of Prussia Road SB	SB	35	-2	60	3.8	1.6	5.4	
King of Prussia Road NB	NB	35	2	60	3.5	1.6	5.1	

PEDESTRIAN INTERVALS

Assumptions and Calibration Inputs

Walk Interval[1] (T_w, seconds)

$$T_w = \frac{\left(\frac{1}{2}L\right)}{S_w} + 3$$

Pedestrian Change Interval (T_{pc}, seconds)

$$T_{PC} = \frac{L}{S_w}$$

Minimum Duration ($(T_w+T_{pc})_{min}$, seconds)

$$\left(T_w + T_{pc}\right)_{min} = \frac{(L+6)}{3}$$

1) The walk interval should be at least 7 seconds, but where justified, a minimum 4 second interval may be used.

Pedestrian Interval Variables

L = Pedestrian walking distance from the curb or edge of shoulder to the far edge of the traveled way, ft

S_w = Walking Speed, ft/s (3.5 ft/s) ← 3.5

Minimum Green Interval[2] (T_p, seconds)

$$T_p = \frac{L}{S_w} + 3$$

2) Minimum green interval when no pedestrian signals are present or proposed

Calculations

Description of Pedestrian Crossing	Ped Signal	L	T_w	T_{pc}	$(T_w+T_{pc})_{min}$	T_p	Comments
Crossing of N King of Prussia	Yes	45	9.5	12.9	17.0	N/A	Using 6 sec. M and 13 sec FH
Crossing of S. King of Prussia	Yes	45	9.5	12.9	17.0	N/A	Using 6 sec. M and 13 sec FH
Crossing Raider Road	Yes	30	7.3	8.6	12.0	N/A	
Crossing Site Driveway	Yes	30	7.3	8.6	12.0	N/A	

APPENDIX M

2020 and 2025 Build Condition with Improvements

Capacity Analysis Worksheets

TRAFFIC IMPACT STUDY

MIXED MEDICAL FACILITY

145 KING OF PRUSSIA ROAD
RADNOR TOWNSHIP
DELAWARE COUNTY, PA

UPHS1507

Pennoni

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Future Volume (veh/h)	1	0	2	314	7	102	368	629	2	12	626	599
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	349	8	113	409	699	2	13	696	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	333	0	391	437	25	357	390	1152	3	371	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1291	0	1530	1396	99	1398	1639	1820	5	749	1764	1544
Grp Volume(v), veh/h	1	0	2	349	0	121	409	0	701	13	696	0
Grp Sat Flow(s),veh/h/ln	1291	0	1530	1396	0	1497	1639	0	1825	749	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.4	0.0	0.1	22.3	0.0	5.9	17.0	0.0	20.6	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.93	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.80	0.00	0.32	1.05	0.00	0.61	0.04	1.01	0.00
Avail Cap(c_a), veh/h	333	0	391	437	0	383	390	0	1156	371	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.1	0.0	25.0	33.3	0.0	27.1	27.5	0.0	9.8	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.1	0.0	0.5	59.2	0.0	2.4	0.2	38.0	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	0.0	0.0	0.1	15.0	0.0	4.4	28.9	0.0	16.3	0.4	43.6	0.0
LnGrp Delay(d),s/veh	29.1	0.0	25.0	43.4	0.0	27.6	86.7	0.0	12.2	17.3	65.5	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			470			1110			709	
Approach Delay, s/veh		26.4			39.3			39.6			64.6	
Approach LOS		C			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0
Max Q Clear Time (g_c+I1), s		22.6		24.8	19.5	37.5		7.9
Green Ext Time (p_c), s		12.3		0.0	0.0	0.0		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	47.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
Future Volume (veh/h)	38	396	467	28	837	7	502	32	58	2	1	6
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		0.97	1.00		0.97
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	1800	1714	1817	1717	1816	1854	1782	1629	1716	1809	1628	1809
Adj Flow Rate, veh/h	40	421	0	30	890	7	534	34	62	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	8	0	0	0
Cap, veh/h	90	857	772	395	900	7	226	9	537	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	630	1714	1545	935	1799	14	393	25	1422	0	97	194
Grp Volume(v), veh/h	40	421	0	30	0	897	568	0	62	9	0	0
Grp Sat Flow(s),veh/h/ln	630	1714	1545	935	0	1813	418	0	1422	290	0	0
Q Serve(g_s), s	1.5	14.6	0.0	2.0	0.0	44.0	0.0	0.0	2.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.6	0.0	16.6	0.0	44.0	34.0	0.0	2.6	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	90	857	772	395	0	907	236	0	537	159	0	0
V/C Ratio(X)	0.44	0.49	0.00	0.08	0.00	0.99	2.41	0.00	0.12	0.06	0.00	0.00
Avail Cap(c_a), veh/h	90	857	772	395	0	907	236	0	537	159	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)	0.58	0.58	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.8	14.9	0.0	20.4	0.0	22.3	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	8.9	1.2	0.0	0.4	0.0	27.4	648.0	0.0	0.1	0.1	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	2.2	10.5	0.0	1.0	0.0	37.6	86.8	0.0	1.8	0.3	0.0	0.0
LnGrp Delay(d),s/veh	53.7	16.1	0.0	20.8	0.0	49.7	681.6	0.0	18.3	21.8	0.0	0.0
LnGrp LOS	D	B		C		D	F		B	C		
Approach Vol, veh/h		461			927			630			9	
Approach Delay, s/veh		19.3			48.7			616.3			21.8	
Approach LOS		B			D			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0
Max Q Clear Time (g_c+I1), s		47.5		36.0		46.0		36.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	218.3
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	42	970	115	147	303
Future Vol, veh/h	20	42	970	115	147	303
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	23	48	1115	132	169	348

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1886	1208	0	0	1264	0
Stage 1	1198	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398	-
Pot Cap-1 Maneuver	79	185	-	-	487	-
Stage 1	289	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	51	181	-	-	483	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	285	-	-	-	-	-
Stage 2	326	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	39.3	0	5.4
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	174	483	-
HCM Lane V/C Ratio	-	-	0.41	0.35	-
HCM Control Delay (s)	-	-	39.3	16.4	-
HCM Lane LOS	-	-	E	C	-
HCM 95th %tile Q(veh)	-	-	1.8	1.6	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	130	99	0	22	173	1052	369	52	264	58
Future Volume (veh/h)	9	0	130	99	0	22	173	1052	369	52	264	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.99
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	1872	1792	1872	1800	1800	1800	1800	1765	1800	1800	1664	1800
Adj Flow Rate, veh/h	12	0	167	127	0	28	222	1349	473	67	338	74
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	0	0	10	10
Cap, veh/h	54	10	264	259	0	283	677	1233	1063	84	923	202
Arrive On Green	0.19	0.00	0.19	0.19	0.00	0.19	0.70	0.70	0.70	0.70	0.70	0.70
Sat Flow, veh/h	50	52	1424	1238	0	1530	988	1765	1521	260	1321	289
Grp Volume(v), veh/h	179	0	0	127	0	28	222	1349	473	67	0	412
Grp Sat Flow(s),veh/h/ln	1526	0	0	1238	0	1530	988	1765	1521	260	0	1611
Q Serve(g_s), s	1.2	0.0	0.0	2.9	0.0	1.3	9.9	60.0	11.7	0.0	0.0	8.9
Cycle Q Clear(g_c), s	9.2	0.0	0.0	12.1	0.0	1.3	18.3	60.0	11.7	60.0	0.0	8.9
Prop In Lane	0.07		0.93	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	327	0	0	259	0	283	677	1233	1063	84	0	1125
V/C Ratio(X)	0.55	0.00	0.00	0.49	0.00	0.10	0.33	1.09	0.45	0.80	0.00	0.37
Avail Cap(c_a), veh/h	400	0	0	318	0	356	677	1233	1063	84	0	1125
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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.3	0.0	0.0	34.1	0.0	29.1	8.8	12.9	5.7	42.9	0.0	5.2
Incr Delay (d2), s/veh	1.4	0.0	0.0	1.4	0.0	0.2	1.3	55.4	1.4	53.7	0.0	0.9
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	7.3	0.0	0.0	5.4	0.0	1.0	5.3	85.3	9.0	5.1	0.0	7.5
LnGrp Delay(d),s/veh	33.7	0.0	0.0	35.5	0.0	29.2	10.1	68.4	7.0	96.6	0.0	6.2
LnGrp LOS	C			D		C	B	F	A	F		A
Approach Vol, veh/h		179			155			2044			479	
Approach Delay, s/veh		33.7			34.4			47.9			18.8	
Approach LOS		C			C			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		65.0		20.9		65.0		20.9
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		59.0		19.0		59.0		19.0
Max Q Clear Time (g_c+I1), s		62.5		11.2		62.5		14.1
Green Ext Time (p_c), s		0.0		1.1		0.0		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	41.4
HCM 2010 LOS	D

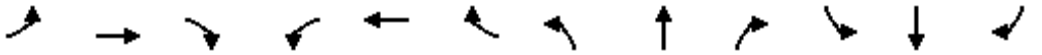
Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	1588	6	6	486
Future Vol, veh/h	2	2	1588	6	6	486
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1913	7	7	586

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2517	960	0	0	1920	0
Stage 1	1917	-	-	-	-	-
Stage 2	600	-	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	27	261	-	-	312	-
Stage 1	103	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	26	261	-	-	312	-
Mov Cap-2 Maneuver	26	-	-	-	-	-
Stage 1	103	-	-	-	-	-
Stage 2	540	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	90.2	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	47	312	-
HCM Lane V/C Ratio	-	-	0.103	0.023	-
HCM Control Delay (s)	-	-	90.2	16.8	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Future Volume (veh/h)	373	1281	0	0	534	374	759	827	337	316	0	160
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1756	0	0	1800	1854	1764	1764	1782	1665	0	1748
Adj Flow Rate, veh/h	385	1321	0	0	551	0	782	853	347	326	0	165
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	481	1365	0	0	746	344	1630	890	361	362	0	0
Arrive On Green	0.10	0.27	0.00	0.00	0.07	0.00	0.50	0.38	0.38	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	2330	944	3077	326	
Grp Volume(v), veh/h	385	1321	0	0	551	0	782	613	587	326	75.9	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1676	1598	1539	E	
Q Serve(g_s), s	12.5	43.0	0.0	0.0	17.4	0.0	17.4	39.2	39.5	8.0		
Cycle Q Clear(g_c), s	12.5	43.0	0.0	0.0	17.4	0.0	17.4	39.2	39.5	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.59	1.00		
Lane Grp Cap(c), veh/h	481	1365	0	0	746	344	1630	640	610	362		
V/C Ratio(X)	0.80	0.97	0.00	0.00	0.74	0.00	0.48	0.96	0.96	0.90		
Avail Cap(c_a), veh/h	481	1365	0	0	746	344	1630	640	610	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.91	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.1	39.2	0.0	0.0	48.0	0.0	18.1	33.1	33.2	51.6		
Incr Delay (d2), s/veh	8.3	16.4	0.0	0.0	5.9	0.0	0.2	25.4	27.3	24.3		
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		
%ile BackOfQ(95%),veh/ln	10.1	30.3	0.0	0.0	13.5	0.0	12.5	30.4	29.6	5.0		
LnGrp Delay(d),s/veh	56.3	55.6	0.0	0.0	53.9	0.0	18.3	58.5	60.5	75.9		
LnGrp LOS	E	E			D		B	E	E	E		
Approach Vol, veh/h		1706			551			1982				
Approach Delay, s/veh		55.8			53.9			43.2				
Approach LOS		E			D			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		50.0	60.0		21.0	29.0	13.0	47.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		44.0	41.0		15.0	23.0	7.0	41.0
Max Q Clear Time (g_c+I1), s		45.5	19.9		15.0	19.9	10.5	41.7
Green Ext Time (p_c), s		0.0	3.0		0.0	2.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	51.5
HCM 2010 LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	851	0	186	1224	792	839
Future Volume (veh/h)	851	0	186	1224	792	839
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785
Adj Flow Rate, veh/h	868	0	190	1249	808	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	6	2	2	7
Cap, veh/h	2288	0	290	2104	957	436
Arrive On Green	0.48	0.00	0.03	0.21	0.29	0.00
Sat Flow, veh/h	5035	0	3169	3476	3326	1517
Grp Volume(v), veh/h	868	0	190	1249	808	0
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517
Q Serve(g_s), s	12.8	0.0	6.5	36.7	25.1	0.0
Cycle Q Clear(g_c), s	12.8	0.0	6.5	36.7	25.1	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2288	0	290	2104	957	436
V/C Ratio(X)	0.38	0.00	0.66	0.59	0.84	0.00
Avail Cap(c_a), veh/h	2288	0	317	2104	1421	648
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.63	0.63	1.00	0.00
Uniform Delay (d), s/veh	17.9	0.0	51.6	31.1	36.9	0.0
Incr Delay (d2), s/veh	0.5	0.0	2.7	0.8	3.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.5	0.0	5.2	23.0	17.7	0.0
LnGrp Delay(d),s/veh	18.4	0.0	54.4	31.9	40.0	0.0
LnGrp LOS	B		D	C	D	
Approach Vol, veh/h	868			1439	808	
Approach Delay, s/veh	18.4			34.9	40.0	
Approach LOS	B			C	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		36.6	15.1	58.3				73.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		27.6	9.0	15.3				39.2
Green Ext Time (p_c), s		3.0	0.1	14.8				10.1

Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Future Volume (veh/h)	574	1566	4	2	881	485	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.90			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	598	1631	4	2	918	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	696	2843	7	18	2133	992	21	7	22			
Arrive On Green	0.42	1.00	1.00	0.01	0.64	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1375			
Grp Volume(v), veh/h	598	797	838	2	918	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1375			
Q Serve(g_s), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	18.1	0.0	0.0	0.1	15.1	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	696	1389	1461	18	2133	992	28	0	22			
V/C Ratio(X)	0.86	0.57	0.57	0.11	0.43	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2133	992	110	0	87			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.3	0.0	0.0	53.9	10.0	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.6	0.2	0.1	2.6	0.6	0.0	5.4	0.0	1.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.6	0.1	0.1	0.1	11.4	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.9	0.2	0.1	56.5	10.7	0.0	58.8	0.0	55.0			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2233			920			10				
Approach Delay, s/veh		8.4			10.8			58.1				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.2	97.0			28.2	75.0		6.8
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.0	80.0			30.0	56.0		6.0
Max Q Clear Time (g_c+I1), s	2.6	2.5			20.6	17.6		2.7
Green Ext Time (p_c), s	0.0	42.2			1.6	27.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.2
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Future Volume (veh/h)	139	989	53	212	1479	438	92	373	83	96	132	107
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	145	1030	55	221	1541	456	96	389	86	100	138	111
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	2	1	1	1	1	6	3	3
Cap, veh/h	186	1381	74	266	1436	648	151	497	111	246	640	479
Arrive On Green	0.07	0.43	0.43	0.07	0.43	0.43	0.24	0.24	0.24	0.07	0.36	0.36
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	452	2080	464	1609	1787	1337
Grp Volume(v), veh/h	145	533	552	221	1541	456	292	0	279	100	126	123
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1489	0	1507	1609	1638	1487
Q Serve(g_s), s	5.2	29.7	29.7	8.0	47.6	27.3	18.6	0.0	19.1	4.8	5.9	6.4
Cycle Q Clear(g_c), s	5.2	29.7	29.7	8.0	47.6	27.3	20.3	0.0	19.1	4.8	5.9	6.4
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	186	715	740	266	1436	648	399	0	360	246	587	532
V/C Ratio(X)	0.78	0.75	0.75	0.83	1.07	0.70	0.73	0.00	0.78	0.41	0.21	0.23
Avail Cap(c_a), veh/h	186	715	740	266	1436	648	449	0	411	390	789	716
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	26.1	26.1	24.0	31.2	25.5	39.5	0.0	39.1	28.2	24.5	24.7
Incr Delay (d2), s/veh	18.9	7.0	6.8	19.6	45.9	6.3	5.3	0.0	8.0	1.1	0.2	0.2
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	6.0	21.2	21.8	8.0	55.6	18.1	13.8	0.0	13.6	4.0	4.8	4.8
LnGrp Delay(d),s/veh	43.9	33.1	32.9	43.5	77.1	31.8	44.7	0.0	47.1	29.3	24.7	24.9
LnGrp LOS	D	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1230			2218			571			349	
Approach Delay, s/veh		34.3			64.5			45.9			26.1	
Approach LOS		C			E			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	52.6		44.4	13.0	52.6	13.1	31.3
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	33.0		52.0	7.0	33.0	17.0	29.0
Max Q Clear Time (g_c+I1), s	10.5	32.2		8.4	7.7	50.1	7.3	22.3
Green Ext Time (p_c), s	0.0	0.7		6.3	0.0	0.0	0.1	2.9

Intersection Summary		
HCM 2010 Ctrl Delay	50.5	
HCM 2010 LOS	D	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Future Volume (veh/h)	3	4	9	533	1	216	120	753	1	7	495	269
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1817
Adj Flow Rate, veh/h	3	4	10	579	1	235	130	818	1	8	538	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	2
Cap, veh/h	386	167	419	601	2	587	321	962	1	178	687	595
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.08	0.52	0.52	0.39	0.39	0.00
Sat Flow, veh/h	1162	457	1142	1422	7	1601	1689	1841	2	671	1782	1544
Grp Volume(v), veh/h	3	0	14	579	0	236	130	0	819	8	538	0
Grp Sat Flow(s),veh/h/ln	1162	0	1599	1422	0	1608	1689	0	1844	671	1782	1544
Q Serve(g_s), s	0.2	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	0.9	23.9	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.5	33.0	0.0	9.8	3.8	0.0	34.4	22.5	23.9	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	586	601	0	590	321	0	963	178	687	595
V/C Ratio(X)	0.01	0.00	0.02	0.96	0.00	0.40	0.41	0.00	0.85	0.04	0.78	0.00
Avail Cap(c_a), veh/h	386	0	586	601	0	590	334	0	963	178	687	595
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	24.5	0.0	18.2	30.1	0.0	21.2	17.0	0.0	18.5	33.2	24.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	27.6	0.0	0.4	0.8	0.0	9.4	0.4	7.3	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	0.1	0.0	0.4	26.1	0.0	7.8	3.3	0.0	27.1	0.3	18.4	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.2	57.7	0.0	21.6	17.8	0.0	27.8	33.6	31.6	0.0
LnGrp LOS	C		B	E		C	B		C	C	C	
Approach Vol, veh/h		17			815			949			546	
Approach Delay, s/veh		19.3			47.3			26.5			31.6	
Approach LOS		B			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		52.0		38.0	12.3	39.7		38.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		46.0		32.0	7.0	33.0		32.0
Max Q Clear Time (g_c+I1), s		36.4		35.5	6.3	26.4		12.0
Green Ext Time (p_c), s		5.9		0.0	0.0	4.4		3.3

Intersection Summary	
HCM 2010 Ctrl Delay	34.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
Future Volume (veh/h)	8	752	664	58	420	1	401	7	142	31	37	49
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		0.98	1.00		0.98
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	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	783	0	60	438	1	418	7	148	32	39	51
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	357	812	725	101	834	2	270	3	644	50	58	42
Arrive On Green	0.46	0.46	0.00	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	955	1782	1591	715	1830	4	453	8	1525	0	138	99
Grp Volume(v), veh/h	8	783	0	60	0	439	425	0	148	122	0	0
Grp Sat Flow(s),veh/h/ln	955	1782	1591	715	0	1834	460	0	1525	237	0	0
Q Serve(g_s), s	0.5	38.4	0.0	2.6	0.0	15.4	0.0	0.0	5.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.5	38.4	0.0	41.0	0.0	15.4	38.0	0.0	5.6	38.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.26		0.42
Lane Grp Cap(c), veh/h	357	812	725	101	0	836	274	0	644	151	0	0
V/C Ratio(X)	0.02	0.96	0.00	0.60	0.00	0.53	1.55	0.00	0.23	0.81	0.00	0.00
Avail Cap(c_a), veh/h	357	812	725	101	0	836	274	0	644	151	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)	0.12	0.12	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.9	23.8	0.0	44.6	0.0	17.5	31.5	0.0	16.6	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.3	0.0	23.4	0.0	2.4	266.2	0.0	0.2	27.2	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	0.3	22.4	0.0	3.8	0.0	13.1	48.6	0.0	4.3	5.5	0.0	0.0
LnGrp Delay(d),s/veh	22.9	29.1	0.0	67.9	0.0	19.9	297.7	0.0	16.8	49.3	0.0	0.0
LnGrp LOS	C	C		E		B	F		B	D		
Approach Vol, veh/h		791			499			573			122	
Approach Delay, s/veh		29.0			25.7			225.1			49.3	
Approach LOS		C			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		44.0		46.0		44.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		40.0		37.0		40.0		37.0
Max Q Clear Time (g_c+I1), s		40.9		40.0		43.5		40.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	86.0
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	76	84	403	17	53	970
Future Vol, veh/h	76	84	403	17	53	970
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	89	99	474	20	62	1141

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1769	511	0	0	511	0
Stage 1	501	-	-	-	-	-
Stage 2	1268	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	93	534	-	-	982	-
Stage 1	613	-	-	-	-	-
Stage 2	267	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 86	522	-	-	974	-
Mov Cap-2 Maneuver	192	-	-	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	250	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.6	0	0.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	287	974	-
HCM Lane V/C Ratio	-	-	0.656	0.064	-
HCM Control Delay (s)	-	-	38.6	8.9	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	4.3	0.2	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	41	272	0	60	23	294	101	14	1097	5
Future Volume (veh/h)	5	0	41	272	0	60	23	294	101	14	1097	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.99
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	1872	1872	1872	1800	1800	1800	1800	1782	1800	1800	1782	1800
Adj Flow Rate, veh/h	5	0	44	289	0	64	24	313	107	15	1167	5
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	1	0	0	1	1
Cap, veh/h	59	21	319	396	0	340	95	1188	1014	664	1182	5
Arrive On Green	0.22	0.00	0.22	0.22	0.00	0.22	0.67	0.67	0.67	0.67	0.67	0.67
Sat Flow, veh/h	67	96	1434	1384	0	1530	486	1782	1521	980	1773	8
Grp Volume(v), veh/h	49	0	0	289	0	64	24	313	107	15	0	1172
Grp Sat Flow(s),veh/h/ln	1597	0	0	1384	0	1530	486	1782	1521	980	0	1781
Q Serve(g_s), s	0.0	0.0	0.0	15.6	0.0	3.1	2.8	6.4	2.3	0.6	0.0	57.7
Cycle Q Clear(g_c), s	2.2	0.0	0.0	17.8	0.0	3.1	60.0	6.4	2.3	7.0	0.0	57.7
Prop In Lane	0.10		0.90	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	399	0	0	396	0	340	95	1188	1014	664	0	1187
V/C Ratio(X)	0.12	0.00	0.00	0.73	0.00	0.19	0.25	0.26	0.11	0.02	0.00	0.99
Avail Cap(c_a), veh/h	399	0	0	396	0	340	95	1188	1014	664	0	1187
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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	0.0	33.9	0.0	28.4	44.1	6.1	5.4	7.5	0.0	14.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	6.8	0.0	0.3	6.3	0.5	0.2	0.1	0.0	23.2
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	1.8	0.0	0.0	12.3	0.0	2.4	1.4	6.0	1.8	0.3	0.0	45.1
LnGrp Delay(d),s/veh	28.2	0.0	0.0	40.7	0.0	28.7	50.5	6.6	5.6	7.5	0.0	37.8
LnGrp LOS	C			D		C	D	A	A	A		D
Approach Vol, veh/h		49			353			444			1187	
Approach Delay, s/veh		28.2			38.5			8.7			37.5	
Approach LOS		C			D			A			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		65.0		25.0		65.0		25.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		59.0		19.0		59.0		19.0
Max Q Clear Time (g_c+I1), s		62.5		4.2		59.7		19.8
Green Ext Time (p_c), s		0.0		1.4		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	31.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	413	2	2	1404
Future Vol, veh/h	4	4	413	2	2	1404
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	439	2	2	1494

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1938	221	0	0	441	0
Stage 1	440	-	-	-	-	-
Stage 2	1498	-	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	65	789	-	-	1130	-
Stage 1	622	-	-	-	-	-
Stage 2	206	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	65	789	-	-	1130	-
Mov Cap-2 Maneuver	65	-	-	-	-	-
Stage 1	622	-	-	-	-	-
Stage 2	206	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	37.3	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	120	1130	-
HCM Lane V/C Ratio	-	-	0.071	0.002	-
HCM Control Delay (s)	-	-	37.3	8.2	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Future Volume (veh/h)	102	1538	0	0	578	179	272	231	214	832	0	453
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	109	1636	0	0	615	0	289	246	228	885	0	477
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.95
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	216	1623	0	0	1269	591	1393	278	247	858	0	0
Arrive On Green	0.04	0.32	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1697	1511	3260	885	
Grp Volume(v), veh/h	109	1636	0	0	615	0	289	245	229	885	83.2	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1693	1515	1630	F	
Q Serve(g_s), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	15.6	16.3	24.0		
Cycle Q Clear(g_c), s	3.5	53.0	0.0	0.0	8.0	0.0	6.1	15.6	16.3	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	216	1623	0	0	1269	591	1393	277	248	858		
V/C Ratio(X)	0.51	1.01	0.00	0.00	0.48	0.00	0.21	0.89	0.92	1.03		
Avail Cap(c_a), veh/h	391	1623	0	0	1269	591	1393	277	248	858		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.88	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	50.9	37.2	0.0	0.0	9.9	0.0	19.8	45.0	45.3	44.2		
Incr Delay (d2), s/veh	1.6	22.8	0.0	0.0	1.2	0.0	0.1	27.1	36.8	39.0		
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		
%ile BackOfQ(95%),veh/ln	3.0	53.6	0.0	0.0	6.8	0.0	5.0	14.4	14.4	12.4		
LnGrp Delay(d),s/veh	52.5	60.0	0.0	0.0	11.1	0.0	19.9	72.1	82.1	83.2		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1745			615			763				
Approach Delay, s/veh		59.6			11.1			55.3				
Approach LOS		E			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0
Max Q Clear Time (g_c+I1), s		55.5	8.6		6.0	10.5	26.5	18.3
Green Ext Time (p_c), s		0.0	0.8		0.1	17.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	56.5
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1052	0	570	768	615	507
Future Volume (veh/h)	1052	0	570	768	615	507
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1800	1782	1818	1891
Adj Flow Rate, veh/h	1073	0	582	784	628	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.97	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	1	2	1	1
Cap, veh/h	2009	0	714	2322	751	359
Arrive On Green	0.43	0.00	0.07	0.23	0.22	0.00
Sat Flow, veh/h	5035	0	3326	3476	3359	1607
Grp Volume(v), veh/h	1073	0	582	784	628	0
Grp Sat Flow(s),veh/h/ln	1574	0	1663	1693	1679	1607
Q Serve(g_s), s	18.6	0.0	19.0	21.3	19.6	0.0
Cycle Q Clear(g_c), s	18.6	0.0	19.0	21.3	19.6	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2009	0	714	2322	751	359
V/C Ratio(X)	0.53	0.00	0.81	0.34	0.84	0.00
Avail Cap(c_a), veh/h	2009	0	847	2322	916	438
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.77	0.77	1.00	0.00
Uniform Delay (d), s/veh	23.5	0.0	48.9	21.6	40.8	0.0
Incr Delay (d2), s/veh	1.0	0.0	4.1	0.3	5.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.9	0.0	13.5	14.7	14.8	0.0
LnGrp Delay(d),s/veh	24.5	0.0	53.1	21.9	46.6	0.0
LnGrp LOS	C		D	C	D	
Approach Vol, veh/h	1073			1366	628	
Approach Delay, s/veh	24.5			35.2	46.6	
Approach LOS	C			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		29.6	28.6	51.8				80.4
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+I1), s		22.1	21.5	21.1				23.8
Green Ext Time (p_c), s		1.4	1.1	10.3				19.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Future Volume (veh/h)	1150	1764	14	6	721	584	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1198	1838	15	6	751	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1197	2797	23	23	1647	766	18	6	18			
Arrive On Green	0.73	1.00	1.00	0.01	0.49	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3344	27	1714	3386	1575	1301	434	1345			
Grp Volume(v), veh/h	1198	903	950	6	751	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1345			
Q Serve(g_s), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	40.0	0.0	0.0	0.4	16.1	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1197	1376	1444	23	1647	766	24	0	18			
V/C Ratio(X)	1.00	0.66	0.66	0.26	0.46	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1197	1376	1444	109	1647	766	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.0	0.0	0.0	53.7	18.6	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	7.9	0.2	0.2	5.6	0.9	0.0	3.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	13.3	0.2	0.2	0.4	12.3	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	22.9	0.2	0.2	59.3	19.6	0.0	56.9	0.0	56.2			
LnGrp LOS	F	A	A	E	B		E		E			
Approach Vol, veh/h		3051			757			6				
Approach Delay, s/veh		9.1			19.9			56.7				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.5	97.0			45.0	58.5		6.5
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.6	80.0			39.0	47.0		6.0
Max Q Clear Time (g_c+I1), s	2.4	2.5			42.5	18.6		2.7
Green Ext Time (p_c), s	0.0	45.8			0.0	22.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.3
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Future Volume (veh/h)	120	1175	93	198	1108	126	81	211	141	410	448	215
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	124	1211	96	204	1142	130	84	218	145	423	462	222
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	215	1284	102	187	1347	601	149	345	234	331	863	412
Arrive On Green	0.06	0.40	0.40	0.06	0.40	0.40	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3197	253	1664	3352	1496	385	1338	906	1689	2222	1060
Grp Volume(v), veh/h	124	644	663	204	1142	130	218	0	229	423	351	333
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1195	0	1433	1689	1690	1591
Q Serve(g_s), s	4.2	36.4	36.6	6.0	30.9	5.7	12.6	0.0	14.1	8.0	16.0	16.2
Cycle Q Clear(g_c), s	4.2	36.4	36.6	6.0	30.9	5.7	16.1	0.0	14.1	8.0	16.0	16.2
Prop In Lane	1.00		0.14	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	215	684	702	187	1347	601	359	0	370	331	656	618
V/C Ratio(X)	0.58	0.94	0.94	1.09	0.85	0.22	0.61	0.00	0.62	1.28	0.53	0.54
Avail Cap(c_a), veh/h	215	684	702	187	1347	601	453	0	487	331	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	28.8	28.8	26.9	27.1	19.6	33.1	0.0	32.7	34.5	23.6	23.7
Incr Delay (d2), s/veh	3.8	22.8	22.8	91.2	6.8	0.8	1.7	0.0	1.7	145.8	0.7	0.7
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	3.9	28.9	29.6	12.9	22.0	4.5	9.5	0.0	9.7	33.9	12.0	11.7
LnGrp Delay(d),s/veh	25.9	51.5	51.6	118.0	33.9	20.4	34.8	0.0	34.4	180.3	24.3	24.4
LnGrp LOS	C	D	D	F	C	C	C		C	F	C	C
Approach Vol, veh/h		1431			1476			447			1107	
Approach Delay, s/veh		49.4			44.4			34.6			83.9	
Approach LOS		D			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	45.2		43.8	11.0	45.2	13.0	30.8
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	5.0	31.0		46.0	5.0	31.0	7.0	33.0
Max Q Clear Time (g_c+I1), s	8.2	38.9		18.5	6.7	33.4	10.5	18.1
Green Ext Time (p_c), s	0.0	0.0		8.7	0.0	0.0	0.0	6.6

Intersection Summary		
HCM 2010 Ctrl Delay	54.8	
HCM 2010 LOS	D	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	318	7	104	375	639	2	12	638	611
Future Volume (veh/h)	1	0	2	318	7	104	375	639	2	12	638	611
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1748	1744	1891	1721	1826	1844	1782	1764	1817
Adj Flow Rate, veh/h	1	0	2	353	8	116	417	710	2	13	709	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	4	0	0	3	1	1	0	1	2
Cap, veh/h	330	0	391	437	25	358	390	1152	3	368	686	601
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.19	0.63	0.63	0.39	0.39	0.00
Sat Flow, veh/h	1287	0	1530	1396	97	1400	1639	1820	5	742	1764	1544
Grp Volume(v), veh/h	1	0	2	353	0	124	417	0	712	13	709	0
Grp Sat Flow(s),veh/h/ln	1287	0	1530	1396	0	1497	1639	0	1825	742	1764	1544
Q Serve(g_s), s	0.1	0.0	0.1	22.7	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.1	22.7	0.0	6.1	17.0	0.0	21.1	1.0	35.0	0.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
V/C Ratio(X)	0.00	0.00	0.01	0.81	0.00	0.32	1.07	0.00	0.62	0.04	1.03	0.00
Avail Cap(c_a), veh/h	330	0	391	437	0	383	390	0	1156	368	686	601
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	0.0	25.0	33.4	0.0	27.2	27.5	0.0	9.9	17.1	27.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	10.8	0.0	0.5	65.5	0.0	2.5	0.2	43.2	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	0.0	0.0	0.1	15.2	0.0	4.6	30.1	0.0	16.8	0.4	45.4	0.0
LnGrp Delay(d),s/veh	29.3	0.0	25.0	44.2	0.0	27.7	93.0	0.0	12.4	17.3	70.7	0.0
LnGrp LOS	C		C	D		C	F		B	B	F	
Approach Vol, veh/h		3			477			1129			722	
Approach Delay, s/veh		26.4			39.9			42.2			69.8	
Approach LOS		C			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		62.0		28.0	22.0	40.0		28.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		56.0		22.0	16.0	34.0		22.0
Max Q Clear Time (g_c+I1), s		23.1		25.2	19.5	37.5		8.1
Green Ext Time (p_c), s		12.6		0.0	0.0	0.0		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	50.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
Future Volume (veh/h)	38	401	476	29	853	7	511	33	59	2	1	6
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		0.97	1.00		0.97
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	1800	1714	1817	1717	1816	1854	1782	1629	1835	1809	1628	1809
Adj Flow Rate, veh/h	40	427	0	31	907	7	544	35	63	2	1	6
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	5	3	8	2	2	0	0	1	0	0	0
Cap, veh/h	83	857	772	391	900	7	226	10	574	49	37	73
Arrive On Green	0.50	0.50	0.00	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	621	1714	1545	930	1800	14	393	25	1520	0	97	194
Grp Volume(v), veh/h	40	427	0	31	0	914	579	0	63	9	0	0
Grp Sat Flow(s),veh/h/ln	621	1714	1545	930	0	1814	418	0	1520	290	0	0
Q Serve(g_s), s	0.5	14.9	0.0	2.1	0.0	45.0	0.0	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	45.0	14.9	0.0	17.0	0.0	45.0	34.0	0.0	2.4	34.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	0.94		1.00	0.22		0.67
Lane Grp Cap(c), veh/h	83	857	772	391	0	907	236	0	574	159	0	0
V/C Ratio(X)	0.48	0.50	0.00	0.08	0.00	1.01	2.46	0.00	0.11	0.06	0.00	0.00
Avail Cap(c_a), veh/h	83	857	772	391	0	907	236	0	574	159	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)	0.56	0.56	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.0	15.0	0.0	20.6	0.0	22.5	33.6	0.0	18.2	21.6	0.0	0.0
Incr Delay (d2), s/veh	10.7	1.2	0.0	0.4	0.0	31.9	668.6	0.0	0.1	0.1	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	2.2	10.6	0.0	1.0	0.0	54.8	89.2	0.0	1.9	0.3	0.0	0.0
LnGrp Delay(d),s/veh	55.7	16.1	0.0	21.0	0.0	54.4	702.2	0.0	18.3	21.8	0.0	0.0
LnGrp LOS	E	B		C		F	F		B	C		
Approach Vol, veh/h		467			945			642			9	
Approach Delay, s/veh		19.5			53.3			635.1			21.8	
Approach LOS		B			D			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		50.0		40.0		50.0		40.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		44.0		33.0		44.0		33.0
Max Q Clear Time (g_c+I1), s		47.5		36.0		47.0		36.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	226.5
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	42	988	116	149	308
Future Vol, veh/h	21	42	988	116	149	308
Conflicting Peds, #/hr	2	10	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	42	2	0	22	5
Mvmt Flow	24	48	1136	133	171	354

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1918	1229	0	0	1286	0
Stage 1	1219	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Critical Hdwy	6.4	6.62	-	-	4.32	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.678	-	-	2.398	-
Pot Cap-1 Maneuver	75	179	-	-	478	-
Stage 1	282	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	47	175	-	-	474	-
Mov Cap-2 Maneuver	157	-	-	-	-	-
Stage 1	278	-	-	-	-	-
Stage 2	317	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.4	0	5.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	169	474	-
HCM Lane V/C Ratio	-	-	0.428	0.361	-
HCM Control Delay (s)	-	-	41.4	16.8	-
HCM Lane LOS	-	-	E	C	-
HCM 95th %tile Q(veh)	-	-	1.9	1.6	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	133	99	0	22	177	1071	369	52	268	59
Future Volume (veh/h)	9	0	133	99	0	22	177	1071	369	52	268	59
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.99
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	1800	1792	1800	1800	1800	1800	1800	1765	1800	1800	1664	1800
Adj Flow Rate, veh/h	12	0	171	127	0	28	227	1373	473	67	344	76
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	0	0	10	10
Cap, veh/h	54	10	267	259	0	287	662	1229	1059	84	919	203
Arrive On Green	0.19	0.00	0.19	0.19	0.00	0.19	0.70	0.70	0.70	0.70	0.70	0.70
Sat Flow, veh/h	49	51	1427	1233	0	1530	981	1765	1521	254	1319	291
Grp Volume(v), veh/h	183	0	0	127	0	28	227	1373	473	67	0	420
Grp Sat Flow(s),veh/h/ln	1527	0	0	1233	0	1530	981	1765	1521	254	0	1610
Q Serve(g_s), s	1.2	0.0	0.0	2.9	0.0	1.3	10.7	60.0	11.8	0.0	0.0	9.2
Cycle Q Clear(g_c), s	9.5	0.0	0.0	12.4	0.0	1.3	19.9	60.0	11.8	60.0	0.0	9.2
Prop In Lane	0.07		0.93	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	331	0	0	259	0	287	662	1229	1059	84	0	1122
V/C Ratio(X)	0.55	0.00	0.00	0.49	0.00	0.10	0.34	1.12	0.45	0.80	0.00	0.37
Avail Cap(c_a), veh/h	398	0	0	314	0	355	662	1229	1059	84	0	1122
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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.3	0.0	0.0	34.1	0.0	29.0	9.4	13.1	5.8	43.1	0.0	5.4
Incr Delay (d2), s/veh	1.4	0.0	0.0	1.4	0.0	0.1	1.4	64.2	1.4	54.2	0.0	1.0
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	7.5	0.0	0.0	5.4	0.0	1.0	5.6	91.1	9.0	5.1	0.0	7.8
LnGrp Delay(d),s/veh	33.7	0.0	0.0	35.6	0.0	29.1	10.9	77.2	7.1	97.2	0.0	6.3
LnGrp LOS	C			D		C	B	F	A	F		A
Approach Vol, veh/h		183			155			2073			487	
Approach Delay, s/veh		33.7			34.4			54.0			18.8	
Approach LOS		C			C			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		65.0		21.1		65.0		21.1
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		59.0		19.0		59.0		19.0
Max Q Clear Time (g_c+I1), s		62.0		11.5		62.0		14.4
Green Ext Time (p_c), s		0.0		1.1		0.0		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	45.7
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	1611	6	6	493
Future Vol, veh/h	2	2	1611	6	6	493
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	2	0	0	8
Mvmt Flow	2	2	1941	7	7	594

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2553	974	0	0	1948	0
Stage 1	1945	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	26	255	-	-	304	-
Stage 1	100	-	-	-	-	-
Stage 2	547	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	25	255	-	-	304	-
Mov Cap-2 Maneuver	25	-	-	-	-	-
Stage 1	100	-	-	-	-	-
Stage 2	534	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	92.2	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	46	304	-
HCM Lane V/C Ratio	-	-	0.105	0.024	-
HCM Control Delay (s)	-	-	92.2	17.1	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	1306	0	0	544	379	774	837	344	321	0	162
Future Volume (veh/h)	376	1306	0	0	544	379	774	837	344	321	0	162
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1756	0	0	1800	1854	1764	1764	1782	1665	0	1748
Adj Flow Rate, veh/h	388	1346	0	0	561	0	798	863	355	331	0	167
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	0	0	1	2	1	1	1	7	0	6
Cap, veh/h	481	1365	0	0	746	344	1630	886	363	362	0	0
Arrive On Green	0.10	0.27	0.00	0.00	0.07	0.00	0.50	0.38	0.38	0.07	0.00	0.01
Sat Flow, veh/h	3309	3424	0	0	3510	1576	3260	2322	951	3077	331	
Grp Volume(v), veh/h	388	1346	0	0	561	0	798	622	596	331	78.5	
Grp Sat Flow(s),veh/h/ln	1655	1668	0	0	1710	1576	1630	1676	1597	1539	E	
Q Serve(g_s), s	12.6	44.2	0.0	0.0	17.7	0.0	17.8	40.1	40.5	8.0		
Cycle Q Clear(g_c), s	12.6	44.2	0.0	0.0	17.7	0.0	17.8	40.1	40.5	8.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		0.60	1.00		
Lane Grp Cap(c), veh/h	481	1365	0	0	746	344	1630	640	610	362		
V/C Ratio(X)	0.81	0.99	0.00	0.00	0.75	0.00	0.49	0.97	0.98	0.91		
Avail Cap(c_a), veh/h	481	1365	0	0	746	344	1630	640	610	362		
HCM Platoon Ratio	0.67	0.67	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.90	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.1	39.6	0.0	0.0	48.1	0.0	18.2	33.4	33.5	51.6		
Incr Delay (d2), s/veh	8.6	19.7	0.0	0.0	6.3	0.0	0.2	28.5	30.8	26.9		
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		
%ile BackOfQ(95%),veh/ln	10.2	31.6	0.0	0.0	13.7	0.0	12.7	31.5	30.8	5.4		
LnGrp Delay(d),s/veh	56.7	59.3	0.0	0.0	54.4	0.0	18.4	62.0	64.3	78.5		
LnGrp LOS	E	E			D		B	E	E	E		
Approach Vol, veh/h		1734			561			2016				
Approach Delay, s/veh		58.7			54.4			45.4				
Approach LOS		E			D			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		50.0	60.0		21.0	29.0	13.0	47.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		44.0	41.0		15.0	23.0	7.0	41.0
Max Q Clear Time (g_c+I1), s		46.7	20.3		15.1	20.2	10.5	42.6
Green Ext Time (p_c), s		0.0	3.0		0.0	2.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	53.8
HCM 2010 LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	863	0	189	1247	807	853
Future Volume (veh/h)	863	0	189	1247	807	853
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1730	0	1715	1782	1800	1785
Adj Flow Rate, veh/h	881	0	193	1272	823	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	6	2	2	7
Cap, veh/h	2263	0	293	2089	972	443
Arrive On Green	0.48	0.00	0.03	0.20	0.29	0.00
Sat Flow, veh/h	5035	0	3169	3476	3326	1517
Grp Volume(v), veh/h	881	0	193	1272	823	0
Grp Sat Flow(s),veh/h/ln	1574	0	1584	1693	1663	1517
Q Serve(g_s), s	13.1	0.0	6.6	37.6	25.6	0.0
Cycle Q Clear(g_c), s	13.1	0.0	6.6	37.6	25.6	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2263	0	293	2089	972	443
V/C Ratio(X)	0.39	0.00	0.66	0.61	0.85	0.00
Avail Cap(c_a), veh/h	2263	0	317	2089	1421	648
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.62	0.62	1.00	0.00
Uniform Delay (d), s/veh	18.3	0.0	51.6	31.7	36.6	0.0
Incr Delay (d2), s/veh	0.5	0.0	2.8	0.8	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.8	0.0	5.3	23.4	18.0	0.0
LnGrp Delay(d),s/veh	18.9	0.0	54.4	32.6	39.9	0.0
LnGrp LOS	B		D	C	D	
Approach Vol, veh/h	881			1465	823	
Approach Delay, s/veh	18.9			35.5	39.9	
Approach LOS	B			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		37.1	15.2	57.7				72.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		46.0	10.0	36.0				52.0
Max Q Clear Time (g_c+I1), s		28.1	9.1	15.6				40.1
Green Ext Time (p_c), s		3.0	0.1	14.9				9.6

Intersection Summary	
HCM 2010 Ctrl Delay	32.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	584	1595	4	2	895	494	6	2	2	0	0	0
Future Volume (veh/h)	584	1595	4	2	895	494	6	2	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.88			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1748	1800	1800	1765	1835	1800	1800	1800			
Adj Flow Rate, veh/h	608	1661	4	2	932	0	6	2	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	3	3	0	2	2	0	0	0			
Cap, veh/h	705	2843	7	18	2123	988	21	7	22			
Arrive On Green	0.43	1.00	1.00	0.01	0.63	0.00	0.02	0.02	0.02			
Sat Flow, veh/h	3293	3398	8	1714	3353	1560	1301	434	1345			
Grp Volume(v), veh/h	608	811	854	2	932	0	8	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1660	1746	1714	1676	1560	1735	0	1345			
Q Serve(g_s), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.2			
Cycle Q Clear(g_c), s	18.4	0.0	0.0	0.1	15.5	0.0	0.5	0.0	0.2			
Prop In Lane	1.00		0.00	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	705	1389	1461	18	2123	988	28	0	22			
V/C Ratio(X)	0.86	0.58	0.58	0.11	0.44	0.00	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	928	1389	1461	109	2123	988	110	0	86			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.0	0.0	0.0	53.9	10.2	0.0	53.5	0.0	53.3			
Incr Delay (d2), s/veh	0.7	0.2	0.2	2.6	0.7	0.0	5.4	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.8	0.1	0.1	0.1	11.7	0.0	0.5	0.0	0.1			
LnGrp Delay(d),s/veh	30.6	0.2	0.2	56.5	10.9	0.0	58.8	0.0	55.1			
LnGrp LOS	C	A	A	E	B		E		E			
Approach Vol, veh/h		2273			934			10				
Approach Delay, s/veh		8.3			11.0			58.1				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.2	97.0			28.5	74.7		6.8
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.6	80.0			30.0	56.0		6.0
Max Q Clear Time (g_c+I1), s	2.6	2.5			20.9	18.0		2.7
Green Ext Time (p_c), s	0.0	43.6			1.6	27.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.2
HCM 2010 LOS	A

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Future Volume (veh/h)	142	1006	54	216	1507	446	94	380	85	98	135	109
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1739	1739	1809	1713	1747	1764	1764	1746	1764	1690	1724	1791
Adj Flow Rate, veh/h	148	1048	56	225	1570	465	98	396	89	102	141	114
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	4	2	1	1	1	1	6	3	3
Cap, veh/h	171	1461	78	264	1520	685	153	501	114	213	610	459
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.24	0.24	0.24	0.05	0.34	0.34
Sat Flow, veh/h	1657	3191	170	1632	3319	1497	453	2069	469	1609	1782	1341
Grp Volume(v), veh/h	148	543	561	225	1570	465	297	0	286	102	129	126
Grp Sat Flow(s),veh/h/ln	1657	1652	1709	1632	1660	1497	1485	0	1506	1609	1638	1486
Q Serve(g_s), s	5.3	29.2	29.2	7.0	50.4	26.9	19.1	0.0	19.5	5.1	6.2	6.7
Cycle Q Clear(g_c), s	5.3	29.2	29.2	7.0	50.4	26.9	20.8	0.0	19.5	5.1	6.2	6.7
Prop In Lane	1.00		0.10	1.00		1.00	0.33		0.31	1.00		0.90
Lane Grp Cap(c), veh/h	171	756	782	264	1520	685	403	0	365	213	560	508
V/C Ratio(X)	0.87	0.72	0.72	0.85	1.03	0.68	0.74	0.00	0.78	0.48	0.23	0.25
Avail Cap(c_a), veh/h	171	756	782	264	1520	685	448	0	411	213	610	554
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	24.1	24.1	25.7	29.8	23.5	39.3	0.0	39.0	29.6	25.8	26.0
Incr Delay (d2), s/veh	34.3	5.8	5.6	22.3	32.1	5.3	5.7	0.0	8.6	1.7	0.2	0.3
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	10.1	20.7	21.3	9.1	53.6	17.8	14.1	0.0	13.9	4.2	5.1	5.1
LnGrp Delay(d),s/veh	60.6	29.8	29.7	48.0	61.9	28.8	45.0	0.0	47.6	31.2	26.0	26.3
LnGrp LOS	E	C	C	D	F	C	D		D	C	C	C
Approach Vol, veh/h		1252			2260			583			357	
Approach Delay, s/veh		33.4			53.7			46.2			27.6	
Approach LOS		C			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	55.4		42.6	12.0	55.4	11.0	31.6
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	6.0	46.0		40.0	6.0	46.0	5.0	29.0
Max Q Clear Time (g_c+I1), s	9.5	31.7		8.7	7.8	52.9	7.6	22.8
Green Ext Time (p_c), s	0.0	13.1		6.2	0.0	0.0	0.0	2.8

Intersection Summary		
HCM 2010 Ctrl Delay		44.9
HCM 2010 LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Future Volume (veh/h)	3	4	9	543	1	220	123	767	1	7	503	274
Number	3	8	18	7	4	14	5	2	12	1	6	16
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	1800	1800	1800	1800	1891	1891	1773	1844	1844	1782	1782	1853
Adj Flow Rate, veh/h	3	4	10	590	1	239	134	834	1	8	547	0
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	0	0	0	0	0	0	0	0
Cap, veh/h	413	178	444	633	3	623	288	921	1	141	641	567
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.50	0.50	0.36	0.36	0.00
Sat Flow, veh/h	1158	457	1142	1422	7	1601	1689	1841	2	661	1782	1575
Grp Volume(v), veh/h	3	0	14	590	0	240	134	0	835	8	547	0
Grp Sat Flow(s),veh/h/ln	1158	0	1599	1422	0	1608	1689	0	1844	661	1782	1575
Q Serve(g_s), s	0.2	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	1.0	25.5	0.0
Cycle Q Clear(g_c), s	9.3	0.0	0.5	35.0	0.0	9.6	4.1	0.0	37.3	25.2	25.5	0.0
Prop In Lane	1.00		0.71	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	413	0	622	633	0	625	288	0	922	141	641	567
V/C Ratio(X)	0.01	0.00	0.02	0.93	0.00	0.38	0.46	0.00	0.91	0.06	0.85	0.00
Avail Cap(c_a), veh/h	413	0	622	633	0	625	296	0	922	141	641	567
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	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.80	0.80	0.00
Uniform Delay (d), s/veh	22.9	0.0	17.0	28.6	0.0	19.8	18.8	0.0	20.6	37.6	26.6	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	20.8	0.0	0.4	1.2	0.0	14.1	0.6	11.1	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	0.1	0.0	0.4	25.2	0.0	7.7	3.6	0.0	30.2	0.4	20.0	0.0
LnGrp Delay(d),s/veh	22.9	0.0	17.0	49.4	0.0	20.1	19.9	0.0	34.7	38.2	37.7	0.0
LnGrp LOS	C		B	D		C	B		C	D	D	
Approach Vol, veh/h		17			830			969			555	
Approach Delay, s/veh		18.0			40.9			32.6			37.7	
Approach LOS		B			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		50.0		40.0	12.6	37.4		40.0
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s		44.0		34.0	7.0	31.0		34.0
Max Q Clear Time (g_c+I1), s		39.3		37.5	6.6	28.0		11.8
Green Ext Time (p_c), s		3.4		0.0	0.0	2.2		3.5

Intersection Summary	
HCM 2010 Ctrl Delay	36.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
Future Volume (veh/h)	8	766	677	59	426	1	409	7	145	32	37	50
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		0.99	1.00		0.99
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	1782	1782	1872	1836	1835	1854	1782	1664	1835	1809	1743	1809
Adj Flow Rate, veh/h	8	798	0	61	444	1	426	7	151	33	39	52
Adj No. of Lanes	1	1	1	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	0	1	1	1	14	14	1	3	3	3
Cap, veh/h	325	772	690	80	793	2	282	3	685	51	57	41
Arrive On Green	0.43	0.43	0.00	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	950	1782	1591	705	1830	4	455	7	1540	0	129	93
Grp Volume(v), veh/h	8	798	0	61	0	445	433	0	151	124	0	0
Grp Sat Flow(s),veh/h/ln	950	1782	1591	705	0	1834	463	0	1540	222	0	0
Q Serve(g_s), s	0.6	39.0	0.0	0.0	0.0	16.3	0.0	0.0	5.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.4	39.0	0.0	39.0	0.0	16.3	40.0	0.0	5.4	40.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	0.98		1.00	0.27		0.42
Lane Grp Cap(c), veh/h	325	772	690	80	0	795	285	0	685	149	0	0
V/C Ratio(X)	0.02	1.03	0.00	0.76	0.00	0.56	1.52	0.00	0.22	0.83	0.00	0.00
Avail Cap(c_a), veh/h	325	772	690	80	0	795	285	0	685	149	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)	0.09	0.09	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.0	25.5	0.0	45.0	0.0	19.1	30.6	0.0	15.4	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	19.9	0.0	49.4	0.0	2.8	250.7	0.0	0.2	30.9	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	0.3	41.5	0.0	4.7	0.0	13.8	48.4	0.0	4.2	5.7	0.0	0.0
LnGrp Delay(d),s/veh	25.0	45.4	0.0	94.4	0.0	21.9	281.3	0.0	15.6	52.5	0.0	0.0
LnGrp LOS	C	F		F		C	F		B	D		
Approach Vol, veh/h		806			506			584			124	
Approach Delay, s/veh		45.2			30.7			212.6			52.5	
Approach LOS		D			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		44.0		46.0		44.0		46.0
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0
Max Green Setting (Gmax), s		38.0		39.0		38.0		39.0
Max Q Clear Time (g_c+I1), s		41.5		42.0		41.5		42.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	90.4
HCM 2010 LOS	F

Intersection	
Int Delay, s/veh	4.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	76	85	409	17	54	988
Future Vol, veh/h	76	85	409	17	54	988
Conflicting Peds, #/hr	10	2	0	17	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	17	1	0	17	1
Mvmt Flow	89	100	481	20	64	1162

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1807	510	0	0	518	0
Stage 1	508	-	-	-	-	-
Stage 2	1299	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	~ 88	535	-	-	976	-
Stage 1	608	-	-	-	-	-
Stage 2	258	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 80	527	-	-	974	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	599	-	-	-	-	-
Stage 2	239	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41	0	0.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	280	974	-
HCM Lane V/C Ratio	-	-	0.676	0.065	-
HCM Control Delay (s)	-	-	41	9	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	4.5	0.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	42	272	0	60	24	299	101	14	1117	5
Future Volume (veh/h)	5	0	42	272	0	60	24	299	101	14	1117	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1800	1800	1800	1800	1800	1800	1800	1782	1800	1800	1782	1800
Adj Flow Rate, veh/h	5	0	45	289	0	64	26	318	107	15	1188	5
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	1	0	0	1	1
Cap, veh/h	58	20	307	396	0	340	80	1188	1018	661	1182	5
Arrive On Green	0.22	0.00	0.22	0.22	0.00	0.22	0.67	0.67	0.67	0.67	0.67	0.67
Sat Flow, veh/h	63	91	1382	1383	0	1530	477	1782	1527	977	1773	7
Grp Volume(v), veh/h	50	0	0	289	0	64	26	318	107	15	0	1193
Grp Sat Flow(s),veh/h/ln	1536	0	0	1383	0	1530	477	1782	1527	977	0	1781
Q Serve(g_s), s	0.0	0.0	0.0	15.5	0.0	3.1	0.0	6.5	2.3	0.6	0.0	60.0
Cycle Q Clear(g_c), s	2.3	0.0	0.0	17.8	0.0	3.1	60.0	6.5	2.3	7.1	0.0	60.0
Prop In Lane	0.10		0.90	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	385	0	0	396	0	340	80	1188	1018	661	0	1187
V/C Ratio(X)	0.13	0.00	0.00	0.73	0.00	0.19	0.32	0.27	0.11	0.02	0.00	1.00
Avail Cap(c_a), veh/h	385	0	0	396	0	340	80	1188	1018	661	0	1187
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	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	0.0	33.9	0.0	28.4	45.0	6.1	5.4	7.5	0.0	15.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	6.7	0.0	0.3	10.5	0.6	0.2	0.1	0.0	27.3
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	1.8	0.0	0.0	12.3	0.0	2.4	1.6	6.1	1.8	0.3	0.0	68.4
LnGrp Delay(d),s/veh	28.3	0.0	0.0	40.6	0.0	28.7	55.5	6.6	5.6	7.6	0.0	42.3
LnGrp LOS	C			D		C	E	A	A	A		F
Approach Vol, veh/h		50			353			451			1208	
Approach Delay, s/veh		28.3			38.5			9.2			41.9	
Approach LOS		C			D			A			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		65.0		25.0		65.0		25.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0
Max Green Setting (Gmax), s		59.0		19.0		59.0		19.0
Max Q Clear Time (g_c+I1), s		62.0		4.3		62.0		19.8
Green Ext Time (p_c), s		0.0		1.4		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	33.8
HCM 2010 LOS	C

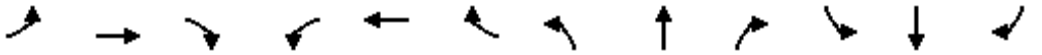
Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	4	419	2	2	1425
Future Vol, veh/h	4	4	419	2	2	1425
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	4	4	446	2	2	1516

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1967	224	0	0	448	0
Stage 1	447	-	-	-	-	-
Stage 2	1520	-	-	-	-	-
Critical Hdwy	6.6	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	63	786	-	-	1123	-
Stage 1	617	-	-	-	-	-
Stage 2	201	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	63	786	-	-	1123	-
Mov Cap-2 Maneuver	63	-	-	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	201	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.2	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	117	1123	-
HCM Lane V/C Ratio	-	-	0.073	0.002	-
HCM Control Delay (s)	-	-	38.2	8.2	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Future Volume (veh/h)	103	1567	0	0	589	182	277	235	218	845	0	459
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1773	0	0	1800	1872	1764	1782	1782	1764	0	1853
Adj Flow Rate, veh/h	110	1667	0	0	627	0	295	250	232	899	0	488
Adj No. of Lanes	2	2	0	0	2	1	2	2	0	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	0	0	1	1	1	0	0	1	0	0
Cap, veh/h	216	1623	0	0	1270	591	1393	277	248	858	0	0
Arrive On Green	0.07	0.48	0.00	0.00	0.74	0.00	0.43	0.16	0.16	0.22	0.00	0.01
Sat Flow, veh/h	3309	3458	0	0	3510	1591	3260	1695	1513	3260	899	
Grp Volume(v), veh/h	110	1667	0	0	627	0	295	250	232	899	88.1	
Grp Sat Flow(s),veh/h/ln	1655	1685	0	0	1710	1591	1630	1693	1515	1630	F	
Q Serve(g_s), s	3.5	53.0	0.0	0.0	8.2	0.0	6.3	15.9	16.7	24.0		
Cycle Q Clear(g_c), s	3.5	53.0	0.0	0.0	8.2	0.0	6.3	15.9	16.7	24.0		
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	216	1623	0	0	1270	591	1393	277	248	858		
V/C Ratio(X)	0.51	1.03	0.00	0.00	0.49	0.00	0.21	0.90	0.94	1.05		
Avail Cap(c_a), veh/h	391	1623	0	0	1270	591	1393	277	248	858		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.86	0.86	0.00	0.00	0.86	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	49.7	28.5	0.0	0.0	10.0	0.0	19.8	45.1	45.4	44.2		
Incr Delay (d2), s/veh	1.6	27.9	0.0	0.0	1.2	0.0	0.1	30.0	40.3	43.9		
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		
%ile BackOfQ(95%),veh/ln	3.0	55.6	0.0	0.0	6.9	0.0	5.1	14.8	14.9	9.4		
LnGrp Delay(d),s/veh	51.3	56.4	0.0	0.0	11.2	0.0	19.9	75.1	85.7	88.1		
LnGrp LOS	D	F			B		B	E	F	F		
Approach Vol, veh/h		1777			627			777				
Approach Delay, s/veh		56.1			11.2			57.3				
Approach LOS		E			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3		5	6	7	8
Phs Duration (G+Y+Rc), s		58.0	52.0		12.2	45.8	29.0	23.0
Change Period (Y+Rc), s		6.0	6.0		6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s		52.0	23.0		12.0	34.0	23.0	17.0
Max Q Clear Time (g_c+I1), s		55.5	8.8		6.0	10.7	26.5	18.7
Green Ext Time (p_c), s		0.0	0.8		0.1	17.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	56.5
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1072	0	580	782	627	516
Future Volume (veh/h)	1072	0	580	782	627	516
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1764	0	1800	1800	1818	1891
Adj Flow Rate, veh/h	1105	0	598	806	646	0
Adj No. of Lanes	3	0	2	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	0	1	1	1	1
Cap, veh/h	2036	0	707	2328	767	367
Arrive On Green	0.42	0.00	0.28	0.91	0.23	0.00
Sat Flow, veh/h	5134	0	3326	3510	3359	1607
Grp Volume(v), veh/h	1105	0	598	806	646	0
Grp Sat Flow(s),veh/h/ln	1606	0	1663	1710	1679	1607
Q Serve(g_s), s	18.9	0.0	18.6	3.6	20.2	0.0
Cycle Q Clear(g_c), s	18.9	0.0	18.6	3.6	20.2	0.0
Prop In Lane		0.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2036	0	707	2328	767	367
V/C Ratio(X)	0.54	0.00	0.85	0.35	0.84	0.00
Avail Cap(c_a), veh/h	2036	0	847	2328	916	438
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.75	0.75	1.00	0.00
Uniform Delay (d), s/veh	23.8	0.0	37.8	1.8	40.5	0.0
Incr Delay (d2), s/veh	1.0	0.0	5.3	0.3	6.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	13.4	0.0	13.4	3.0	15.2	0.0
LnGrp Delay(d),s/veh	24.8	0.0	43.0	2.1	46.7	0.0
LnGrp LOS	C		D	A	D	
Approach Vol, veh/h	1105			1404	646	
Approach Delay, s/veh	24.8			19.6	46.7	
Approach LOS	C			B	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		30.1	28.4	51.5				79.9
Change Period (Y+Rc), s		6.0	6.0	6.0				6.0
Max Green Setting (Gmax), s		29.0	27.0	36.0				69.0
Max Q Clear Time (g_c+I1), s		22.7	21.1	21.4				6.1
Green Ext Time (p_c), s		1.4	1.2	10.4				23.1

Intersection Summary	
HCM 2010 Ctrl Delay	27.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Future Volume (veh/h)	1170	1796	15	6	734	595	3	1	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.90			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1782	1731	1800	1800	1782	1853	1800	1800	1800			
Adj Flow Rate, veh/h	1219	1871	16	6	765	0	3	1	2			
Adj No. of Lanes	2	2	0	1	2	1	0	1	1			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	1	4	4	0	1	1	0	0	0			
Cap, veh/h	1227	2795	24	23	1616	752	18	6	19			
Arrive On Green	0.75	1.00	1.00	0.01	0.48	0.00	0.01	0.01	0.01			
Sat Flow, veh/h	3293	3342	29	1714	3386	1575	1301	434	1375			
Grp Volume(v), veh/h	1219	919	968	6	765	0	4	0	2			
Grp Sat Flow(s),veh/h/ln	1646	1645	1726	1714	1693	1575	1735	0	1375			
Q Serve(g_s), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	39.9	0.0	0.0	0.4	16.8	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.02	1.00		1.00	0.75		1.00			
Lane Grp Cap(c), veh/h	1227	1376	1443	23	1616	752	24	0	19			
V/C Ratio(X)	0.99	0.67	0.67	0.26	0.47	0.00	0.17	0.00	0.11			
Avail Cap(c_a), veh/h	1227	1376	1443	109	1616	752	110	0	87			
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	13.9	0.0	0.0	53.7	19.4	0.0	53.6	0.0	53.6			
Incr Delay (d2), s/veh	6.3	0.2	0.2	5.6	1.0	0.0	3.3	0.0	2.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	20.4	0.2	0.2	0.4	12.7	0.0	0.3	0.0	0.1			
LnGrp Delay(d),s/veh	20.1	0.2	0.2	59.3	20.4	0.0	56.9	0.0	56.0			
LnGrp LOS	C	A	A	E	C		E		E			
Approach Vol, veh/h		3106			771			6				
Approach Delay, s/veh		8.0			20.7			56.6				
Approach LOS		A			C			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2			5	6		8
Phs Duration (G+Y+Rc), s	6.5	97.0			46.0	57.5		6.5
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s	6.6	80.0			40.0	46.0		6.0
Max Q Clear Time (g_c+I1), s	2.9	2.5			42.4	19.3		2.7
Green Ext Time (p_c), s	0.0	47.4			0.0	22.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	10.6
HCM 2010 LOS	B

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Future Volume (veh/h)	122	1197	95	202	1128	128	83	215	144	418	456	219
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1791	1792	1809	1747	1764	1764	1764	1752	1764	1773	1779	1791
Adj Flow Rate, veh/h	126	1234	98	208	1163	132	86	222	148	431	470	226
Adj No. of Lanes	1	2	0	1	2	1	0	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	2	1	1	1	1	1	1	0	0
Cap, veh/h	207	1204	95	205	1330	593	151	348	237	332	874	417
Arrive On Green	0.06	0.38	0.38	0.08	0.40	0.40	0.26	0.26	0.26	0.08	0.39	0.39
Sat Flow, veh/h	1706	3196	253	1664	3352	1496	382	1323	902	1689	2221	1061
Grp Volume(v), veh/h	126	656	676	208	1163	132	221	0	235	431	357	339
Grp Sat Flow(s),veh/h/ln	1706	1703	1747	1664	1676	1496	1172	0	1434	1689	1690	1591
Q Serve(g_s), s	4.5	37.7	37.7	8.0	32.1	5.8	13.0	0.0	14.5	8.0	16.2	16.4
Cycle Q Clear(g_c), s	4.5	37.7	37.7	8.0	32.1	5.8	16.8	0.0	14.5	8.0	16.2	16.4
Prop In Lane	1.00		0.15	1.00		1.00	0.39		0.63	1.00		0.67
Lane Grp Cap(c), veh/h	207	641	658	205	1330	593	359	0	378	332	665	626
V/C Ratio(X)	0.61	1.02	1.03	1.01	0.87	0.22	0.61	0.00	0.62	1.30	0.54	0.54
Avail Cap(c_a), veh/h	207	641	658	205	1330	593	446	0	488	332	795	748
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.2	31.2	31.2	25.5	27.9	20.0	33.0	0.0	32.5	34.3	23.3	23.4
Incr Delay (d2), s/veh	5.1	41.6	42.1	66.5	8.2	0.9	1.7	0.0	1.7	154.0	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.3	45.1	46.4	17.0	22.8	4.6	9.6	0.0	9.8	35.3	12.2	11.7
LnGrp Delay(d),s/veh	28.3	72.8	73.3	92.2	36.1	20.8	34.7	0.0	34.1	188.3	24.0	24.1
LnGrp LOS	C	F	F	F	D	C	C		C	F	C	C
Approach Vol, veh/h		1458			1503			456			1127	
Approach Delay, s/veh		69.2			42.5			34.4			86.9	
Approach LOS		E			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	42.7		44.3	11.0	44.7	13.0	31.3
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	7.0	29.0		46.0	5.0	31.0	7.0	33.0
Max Q Clear Time (g_c+I1), s	10.5	40.2		18.7	7.0	34.6	10.5	18.8
Green Ext Time (p_c), s	0.0	0.0		8.9	0.0	0.0	0.0	6.6

Intersection Summary		
HCM 2010 Ctrl Delay	61.3	
HCM 2010 LOS	E	

Gannett Fleming

Excellence Delivered As Promised

Date: January 12, 2018

To: Steve Norcini, PE Township Engineer

From: Roger Phillips, PE

cc: Kevin W. Kochanski, RLA, CZO – Director of Community Development
Peter Nelson, Esq. – Grim, Biehn, and Thatcher
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.
Patricia Sherwin – Radnor Township Engineering Department
Ray Daly – Radnor Township Codes Official

RE: 145 King of Prussia Road – Preliminary Land Development Plan
Penn Medicine – Applicant

Date Accepted: October 2, 2017
90 Day Review: December 31, 2017, extended to January 31, 2018

Gannett Fleming, Inc. has completed a review of the Preliminary Land Development Plans. We have reviewed the plans based on the contents of ordinance No. 2016-13 amending Chapter 280 Zoning, Article XV, PLO Planned Laboratory District Sections 280-62, 280-63 and 280-64. These Plans were also reviewed for conformance with Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The applicant is proposing to demolish the three existing buildings on the site, and construct three new buildings and two parking structures for mixed uses including a mixed use medical facility, hotel and office.

The applicant has indicated that a waiver will be requested from the following requirement:

1. §255.21.A(6) – A waiver is requested for the maximum plan sheet size of 24 inches by 34 inches. The plans will be reduced for recording purposes.

Penn Medicine at Radnor
Plans Prepared By: Pennoni Associates, Inc.
Dated: 09/29/2017

Sewage Facilities Planning

1. Final plan approval will not be granted until Planning Approval is received from the PA DEP.

Zoning

1. §280-63.D(5) – A parking structure, when constructed as an accessory structure for the purposed of eliminating allowable surface parking is allowed. The applicant must indicate on the plans where any surface parking that is being eliminated would have been located.

2. §280-64.D(2) – The distance at the closet point between any two buildings or group of attached buildings, including accessory structures, shall not be less than 45 feet. A dimension must be added to the plan between the corner of the hotel and the corner of the office building. Plan measurements appears to indicate a separation distance of less than 45 feet.

3. §280-64.G – The Zoning Table must be revised to clearly indicated the zoning compliance requirements for each building and structure. The square footage of the buildings provided on the plan, do not match the square footage of the buildings located on a table subsequently provided by the applicant. This must be revised to be consistent.

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5. §280-64.G(8) – The greatest dimension in length or depth of a building (as specified in §280.64.D) may be up to 350 feet provided that: (a) the façade is constructed of brick, stone, architectural concrete, architectural metal work, or articulated glass; (b) is constructed with vertical and horizontal articulation; (c) is approved by the Township. Additional information must be provided to indicate that the proposed buildings are in compliance with this section.

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Subdivision and Land Development

1. §255.20.B(1)(n) – Existing principal buildings and their respective uses, and driveways on the adjacent peripheral strip; sewer lines, storm drains, culverts, bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site (this includes properties across streets). This must be provided or a waiver requested.

2. §255.21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be drawn as to be legible if the plan should be reduced to half size. The applicant has requested a waiver from this requirement.

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4. §255-27.C(2) – Additional right-of-way and/or cartway widths may be required by the Board of Commissioners in order to lessen traffic congestion, to secure safety from fire, panic and other dangers, to facilitate the adequate provision for transportation and other public requirements and to promote the general welfare.

5. §255-29.A(12)(b) – The width of entrance and exit drives shall be 25 feet for two way use. The two-way drive on the Northerly side of the property is 20 feet wide. This must be revised or a waiver requested.

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7. §255-29.B(1) – All parking areas shall have at least one tree 2 ½ inches minimum in caliper for every five parking spaces in single bays and one tree 2 ½ inches minimum in caliper for every 10 parking spaces in double bays. This must be clearly shown on the plans.

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10. §255-38.B. – Street trees 2 ½ inches dbh at intervals of not more than 30 feet along both sides of new streets and along one or both sides of an existing street within the proposed subdivision and land development. An equivalent number may be planted in an informal arrangement subject to the approval of the Board of Commissioners.

11. §255-41.H. – Outdoor collection stations shall be provided for garbage and trash removal when indoor collection is not provided. Collection stations shall be screened from view and landscaped. We note there is one collection station shown on the plans. The applicant must explain how garbage and trash removal will be provided for the hotel and office building.

12. §255-43.1.E(2) – Where, upon agreement with the applicant or developer, it is determined that the dedication of all or any portion of the land area required for park and recreation purposes is not feasible, the applicant or developer shall pay a fee in lieu of dedication of any such land to the Township. The fee for non-residential subdivisions or land developments shall be $3,307 per 4,000 square feet of building area. The applicant must conform to this section.

13. §255-54.B – The central water system should be designed with adequate capacity and appropriately spaced fire hydrants for fire-fighting purposes pursuant to the specification of the National Fire Protection Association. Review and approval by the Township Engineer and the Township Fire Marshall shall be required in order to ensure that adequate fire protection is provided.

Sanitary Sewer

1. The applicant has indicated that sanitary sewer service is being provided to the hotel, office building and one of the parking garages. The applicant must provide sewer service to the mixed medical facility. An explanation must be provided as to why sanitary sewer service to the parking garage is provided.

2. A profile of the proposed sanitary sewer must be provided. The sizes of all proposed sanitary sewer must be shown on the profile. All utilities crossing the sanitary sewer must be shown on the profile to ensure adequate clearance.

3. The plans indicate that the contractor will connection to the existing sewer. It is unclear from the plans if the contactor is going to connect to a portion of the existing service lateral. If that is the case, the condition of the existing lateral must be evaluated to determine if this is acceptable.

4. Sanitary sewer note #5 on sheet 2 of 26 must be revised to indicate that the typical cover of a sanitary sewer main must be 5 feet.

Storm Sewer

1. Please provide pre-development hydrographs for POI #2 for the 1-yr through 50-yr storm events.

2. §245-23(D)(2) – Water quality volume requirement can be accomplished by the permanent volume of a wet basin or the detained volume from other BMPs. Where appropriate, wet basins shall be utilized for water quality control and shall follow the guidelines of the BMP manuals referenced in Appendix G. The applicant is proposing soil amendment credit for the water quality volume required at POI #1, which does not meet Ordinance requirements. Please revise to meet the Ordinance requirement.

3. §245-27(J) - Underground stormwater management systems must be designed to store the two- through one-hundred-year storms within a pipe or other open system that will permit the inspection and maintenance of the system. The entire storm must be placed in the pipe (i.e., the stone bedding around the pipe is not to be included in the volume calculations). We note that in Section 4.3 of the stormwater management report the applicant states that the basin volume will include the storage in the rock voids. This must be revised to meet the Ordinance requirements or a waiver must be requested.

4. Table 10 on page 15 of the stormwater management report lists a tree credit for POI #1 water quality volume. Worksheet #5 for POI #1 in Appendix C and the Runoff Calculation in Appendix D list a soil amendment credit. Please revise this inconsistency.

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6. Infiltration testing results including a depth to the limiting zone must be provided. Also, please show location of test pits on the plans.

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General

1. New deeds must be prepared and recorded at the Delaware County Court house at the time of plan recording for the consolidation of the lots.

2. The Radnor Township tree protection detail must be shown on the plans.

3. Lighting details must be provided on the plans.

4. The height of all retaining walls must be indicated on the plans.

5. Detailed parking structure plans must be provided for review.

The applicant appeared before the Planning Commission on January 9, 2018. The Planning Commission recommended approval of the preliminary land development plans and waivers noting a level of service C is recommended in conjunction with other improvements as discussed with staff.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.

Roger A. Phillips, P.E.
Senior Project Manager

SAUL EWING
ARNSTEIN
& LEHR LLP

David J. Falcone
Phone: (610) 251-5752
Fax: (610) 722-3270
David.Falcone@saul.com
www.saul.com

December 19, 2017

VIA ELECTRONIC MAIL
Roger Phillips, P.E.
Gannett Fleming
PA Box 80794
Valley Forge, PA 19484

Re: Trustees of the University of Pennsylvania
145 King of Prussia Road

Dear Roger:

As you are aware, applicant, the Trustees of the University of Pennsylvania (the "UPenn"), submitted a Preliminary Land Development Application to the Township on September 29, 2017 (the "Application"). The Application is pending before Radnor Township. Pursuant to the Pennsylvania Municipalities Code, the governing body shall render a decision and communicate it to the applicant not later than ninety (90) days following the date of the regular meeting next following the date that the application is filed. UPenn hereby extends until January 31, 2018, the deadline for Radnor Township to act on the above-referenced Application.

Thank you for you continued help with this project. Please feel free to call me if you have any questions, or if you would like to discuss this issue further.

Very truly yours,

David J. Falcone

cc: Amy Kaminski, P.E.
Steve Norcini, P.E.
John Rice, Esquire
Mr. Robert Zienkowski
Mr. Kevin Mahoney
Mr. Patrick Dorris
Michael Kissinger, P.E.
Eric Swanson, AIA
Ms. Patricia Desmond

Gannett Fleming

Excellence Delivered As Promised

Date: November 28, 2017

To: Steve Norcini, PE Township Engineer

From: Roger Phillips, PE

cc: Kevin W. Kochanski, RLA, CZO – Director of Community Development
Peter Nelson, Esq. – Grim, Biehn, and Thatcher
Amy B. Kaminski, P.E. – Gilmore & Associates, Inc.
Patricia Sherwin – Radnor Township Engineering Department
Ray Daly – Radnor Township Codes Official

RE: 145 King of Prussia Road – Preliminary Land Development Plan
Penn Medicine – Applicant

Date Accepted: October 2, 2017
90 Day Review: December 31, 2017

Gannett Fleming, Inc. has completed a review of the Preliminary Land Development Plans. We have reviewed the plans based on the contents of proposed ordinance No. 2016-13 amending Chapter 280 Zoning, Article XV, PLO Planned Laboratory District Sections 280-62, 280-63 and 280-64. These Plans were also reviewed for conformance with Subdivision and Land Development, and other applicable codes of the Township of Radnor.

The applicant is proposing to demolish the three existing buildings on the site, and construct three new buildings and two parking structures for mixed uses including a mixed use medical facility, hotel and office.

The applicant has indicated that a waiver will be requested from the following requirement:

1. §255.21.A(6) – A waiver is requested for the maximum plan sheet size of 24 inches by 34 inches. The plans will be reduced for recording purposes.

Penn Medicine at Radnor
Plans Prepared By: Pennoni Associates, Inc.
Dated: 09/29/2017

Sewage Facilities Planning

1. Final plan approval will not be granted until Planning Approval is received from the PA DEP.

Zoning

1. §280-63.D(5) – A parking structure, when constructed as an accessory structure for the purposed of eliminating allowable surface parking is allowed. The applicant must indicate on the plans where any surface parking that is being eliminated would have been located.

2. §280-64.D(2) – The distance at the closet point between any two buildings or group of attached buildings, including accessory structures, shall not be less than 45 feet. A dimension must be added to the plan between the corner of the hotel and the corner of the office building. Plan measurements appears to indicate a separation distance of less than 45 feet.

3. §280-64.G – The Zoning Table must be revised to clearly indicated the zoning compliance requirements for each building and structure. The square footage of the buildings provided on the plan, do not match the square footage of the buildings located on a table subsequently provided by the applicant. This must be revised to be consistent.

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5. Detailed parking structure plans must be provided for review.

If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.

Roger A. Phillips, P.E.
Senior Project Manager

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

MEMORANDUM

Date: November 29, 2017

To: Steve Norcini, P.E.
Radnor Township Engineer

From: Amy Kaminski, P.E., PTOE
Transportation Services Manager

cc: John Rice, Esq., Grim, Biehn & Thatcher
Peter Nelson, Esq., Grim, Biehn & Thatcher
Roger Phillips, P.E., Gannett Fleming, Inc.
Damon Drummond, P.E., PTOE, Gilmore & Associates, Inc.

Reference: 145 King of Prussia Road – The University of Pennsylvania Health Systems
Preliminary Land Development Review 1
Transportation Impact Study Review 1
Radnor Township, Delaware County, PA
G&A 15-12020

Gilmore & Associates, Inc. (G&A) has completed a transportation review for the above referenced project and offers the following transportation comments for Radnor Township consideration:

I. BACKGROUND

The University of Pennsylvania Health Systems is proposing the re-development of a 26 acre parcel, located at 145 King of Prussia Road, in Radnor Township, Delaware County. The project includes a total proposed gross floor area of 475,000 sf. The proposed development will consist of a 250,000 square foot mixed medical use building with an associated 1,000 space parking garage, a 4-story 150,000 square foot general office building, a 4-story 75,000 square foot (120 room) hotel and an associated 850 space parking garage. The site is expected to generate a total of 731 AM peak hour trips, 583 PM peak hour trips, and 7,518 weekday trips without any trip reductions for internal or transit trips. The ADT along King of Prussia Road is 10,283 vehicles per day (combined).

As reminder, the Applicant withdrew the Land Development submission on October 31, 2017; and resubmitted on November 14, 2017.

II. DOCUMENTS REVIEWED

A. Preliminary Land Development Plans for Penn Medicine at Radnor, prepared for the University of Pennsylvania Health Systems, prepared by Pennoni Associates, Inc., dated September 29, 2017.

B. Traffic Impact Study for Mixed Medical Facility 145 King of Prussia Road, prepared for the University of Pennsylvania Health System, prepared by Pennoni Associates, Inc., dated September 2017.

C. Cover letter dated September 29, 2017 prepared by Pennoni Associates, Inc.

D. Waiver Request Letter for Penn Medicine at Radnor, prepared for Radnor Township, prepared by Pennoni Associates, Inc., dated September 29, 2017.

E. Subdivision and Land Development Application.

F. Application for Act 247 Review.

III. IDENTIFIED IMPROVEMENTS

A. Traffic Signal Timing Optimization at the following intersections:
   1. King of Prussia Road and Matsonford Road/Park Driveway:
   2. King of Prussia Road and Radnor-Chester Road:
   3. Lancaster Avenue and I-476 SB Off-Ramp:
   4. Lancaster Avenue and Radnor-Chester Road
   5. Lancaster Avenue and I-476 NB On-Ramp/Hillside Circle

B. King of Prussia Road and Raider Road/Site Driveway:
   1. Construct a new traffic signal.
   2. Provide left turn lanes on both approaches of King of Prussia Road.
   3. Construction of a northbound King of Prussia Road right turn lane.

C. King of Prussia Road and Southern Site Driveway:
   1. Restripe northbound King of Prussia Road to provide a shared through/right turn lane.
   2. Widen the east side of King of Prussia Road north of the Southern Site Driveway to provide two northbound receiving lanes and a taper to a single northbound lane.

D. King of Prussia Road and Lancaster Avenue (U.S. Route 30)/NB Off-Ramp:
   Restripe the northbound I-76 off-ramp at Lancaster Avenue to provide a shared through/right lane.

IV. LAND DEVELOPMENT PLAN REVIEW

A. Subdivision and Land Development Ordinance (SALDO) comments:

   1. §255-20.B(1)(n) – Existing principal buildings, and their respective uses, and driveways on the adjacent peripheral strip, sewer lines, storm drains, culverts,

bridges, utility easements, quarries, railroads and other significant man-made features within 500 feet of and within the site shall be shown on the plans.

2. §255-20.B(5)(d)[2][a] and §255-20.B(5)(d)[6][b] Coordinate with SEPTA and revise the plans to provide an ADA accessible connection from the proposed on-site sidewalk to the existing SEPTA facilities.

3. §255-21.A(6) – Final plans shall be on a sheet having a minimum size of 18 inches by 30 inches and a maximum size of 24 inches by 34 inches, and all lettering shall be so drawn as to be legible if the plan should be reduced to half size. The Applicant has requested a waiver from this requirement; we have no engineering objection to this request.

4. §255-27.B(3)(c) and §255-27.C(1) - King of Prussia Road is identified as a Major Collector and requires an 80' right-of-way (40' half-width) and a minimum 48' cartway width (24' half-width). The applicant proposes to provide a half-width right-of-way of 40' from the centerline of the roadway. The existing cartway width (36') is less than the minimum required cartway width (48' full width; 24' half-width) and the Applicant is required to widen the cartway for the full length of the site frontage along King of Prussia Road. Revise the plans to continue the two northbound lanes along the entire site frontage on King of Prussia Road beginning at the South Driveway and extending through and including the SEPTA/Northern site driveway.

5. §255-27.C(1) – Sidewalk shall be provided along the entire site frontage. The onsite trail doesn't provide an adequate walkway for pedestrians walking along the site frontage. If the Applicant considers and the Township agrees the sidewalks located along the westside of King of Prussia Road (along the Radnor Township School District frontage) as adequate; additional improvements should be provided as follows:
   a. Pedestrian crosswalks meeting the current Public Right-of-Way Accessibility Guidelines for Americans with Disabilities Act Accessibility Guidelines (PROWAG/ADAAG) requirements as indicated in PennDOT Publication 13M DM-2 Design Manual 2: Highway Design, Chapter 6; and PennDOT Publication 70M Roadway Construction Standards (RC-67) must be constructed on all approaches to the proposed traffic signal at Raider Road and at the north and south access driveways to provide adequate crossing locations.

   b. Widen the sidewalks along the westside of King of Prussia Road (Radnor Township School District frontage) to five feet (5') as required by PROWAG/ADAAG or provide 5 foot by 5 foot passing areas at a 200 foot minimum interval along the length of the roadway.

6. §255-29.A(12)(b) – The width of entrance and exit drives shall be 25 feet for two-way use. The width of the existing SEPTA/Northern site driveway is 20 feet and must be widened to comply with this section of the ordinance or a waiver must be requested.

7. §255-29.A(14) – No less than a five-foot radius of curvature shall be permitted for all curblines in parking areas. Revise the plans to label all curb radii and provide a minimum 5'curb radii along the south end of the drop-off area behind the proposed 4- story office building.

8. §255-30 – Revise the plans to delineate the proposed loading stall(s) adjacent to the proposed hotel and office building.

9. §255-30.A – Identify the area adjacent to the parking garage that is east of the loading area wall and is approximately 10'x 60'. If this area is intended for loading, it must meet the requirements for this section.

10. §255-37.A – Sidewalks and pedestrian paths shall minimize pedestrian-vehicle conflicts. As a pedestrian safety precaution, include a grass verge between the curbline and the proposed sidewalk along the King of Prussia Road site frontage to match the existing sidewalk opposite the site.

11. §255-37.E – Sidewalks and pedestrian paths shall be adequately lighted, if required by the Board of Commissioners. Revise the lighting plan to provide pedestrian lighting along all proposed sidewalks including along King of Prussia Road. Coordinate with the Township Engineer and Township Planner regarding lighting levels.

12. §255-37.H – Steps or a combination of steps and ramps shall be utilized to maintain maximum grades, where necessary. Where sidewalk grades exceed 5%, a nonslip surface texture shall be used. We recommend the Applicant provide a sidewalk connection along the north side of the central access driveway opposite to the intersection of Raider Road. We understand the ADA accessible access is provided on the south side of the driveway.

13. §255-40.F – Revise the plans to indicate the location of refuse collection stations for the proposed hotel and 4-story office building.

B. General Comments
We offer the following recommendations based on a transportation review of the land development plan submission:

1. We recommend the Applicant coordinate with the Township staff regarding the width and location of the proposed trail and consider providing a trail or sidewalk connection adjacent to the Southern Site Driveway from the trail to King of Prussia Road.

2. Provide a separate pavement marking and signage plan including all right-of-way lines, lane lengths, widths, bay taper lengths, lane line colors, lane line widths, etc.

3. Provide a 24" stop bar and an R1-1 stop sign at the northern and Southern Site Driveway egresses.

4. Install R7-302 No Parking SYMBOL/ARROW signs along the Northern/SEPTA driveway. It appears this is currently being used as overflow parking and the illegal parking creates a de facto and unacceptable single travel lane.

5. Revise the plans to provide a minimum 6' crosswalk as required in PennDOT Publication 111, TC-8600.

6. Per PennDOT Publication 111, TC-8600, we recommend the Applicant provide a 4" DY centerline along the central access and Raider Road driveways extending for a minimum of 150 feet beyond the intersection of King of Prussia Road.

7. Revise the plans to include stop bars on driveway and roadway approaches to King of Prussia Road and Raider Road/Site Driveway associated with the traffic signal.

8. Replace any references to R7-7A with the PennDOT approved R7-302 NO PARKING SYMBOL/ARROW sign. Refer to PennDOT Publication 236 for further details.

9. Replace any references to R5-3-6 with the PennDOT approved R5-101, EMERGENCY AND AUTHORIZED VEHICLES ONLY. Refer to PennDOT Publication 236 for further details.

10. Sheet 2 includes symbols to assist in identifying proposed signs; however, the symbol callouts were not utilized in the plan set. Include all proposed signs on the various sheets and also include on the requested pavement marking and signage plan.

11. We recommend the Applicant include one ingress and two egress lanes at the site access driveway opposite Raider Road on King of Prussia Road.

12. We recommend eliminating the dedicated right-turn and left-turn lanes into the Southern Site Driveway. Due to the fact that this will be a loading area only, the auxiliary lanes may not be necessary.

13. Provide curb radii (at minimum) necessary for the anticipated delivery traffic at the Southern Site Driveway. A 45 foot curb radii is recommended for truck access.

14. The fire truck turning templates should be submitted to the Fire Marshall for review.

15. We note the Applicant is only demonstrating the use of a WB-40 truck at the SEPTA/Northern site driveway. Verify that a WB-40 truck will be the largest truck anticipated for Hotel deliveries. Consider increasing the radii to accommodate larger vehicles. If the Northern driveway will only be accommodating WB-40 trucks, the appropriate truck restriction signage will be required.

16. Sheet 25 of 26 (CS9801):

a. The northbound WB-67 movement at the Southern Site Driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane. Increase the corner radii and/or widen the driveway as necessary to accommodate WB-67 trucks.
b. At the Southern Site Driveway, show the WB-67 exiting movement onto King of Prussia Road.
c. Revise the WB-67 movements to eliminate any contact with the adjacent dumpster bay walls and curblines.
d. Revise the WB-67 movement to show the truck not conflicting with the compactor.
e. The WB-67 movement shows the truck reversing into the generator area. Bollards are recommended around the generator area.
f. Show the WB-40 exiting movement onto King of Prussia Road beginning from the loading area at the SEPTA/Northern driveway.

17. Sheet 26 of 26 (CS9802):
    a. The eastbound fire truck movement at the Raider Road site driveway should be revised to eliminate any contact with the adjacent curb and curb ramp along the patient drop-off area.
    b. The northbound fire truck movement at the Raider Road site driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane.
    c. The northbound fire truck movement at the Southern Site Driveway should be revised to show the truck beginning the turn entirely within the northbound right-turn lane.
    d. Revise the fire truck movement along the Southern Site Driveway so that the truck remains completely on the roadway during the movement.

18. The Applicant will be responsible for providing the following documents prior to Final Land Development approval:
    a. Construction details related to ADA curb ramps, including spot elevations, dimensions and slopes.
    b. Traffic Signal Construction Plans, Traffic Signal Permit Plans, Traffic Signal System Plans, and a Traffic Signal design report must be provided to the Township and PennDOT for review and approval.
    c. All new or modified signal permit plans require a completed TE-160 form and associated resolution.

    d. The Applicant will need to coordinate with Radnor Township School District to eliminate parking along the south side of Raider Road near King of Prussia Road. The onstreet parking along the south side of Raider Road effectively narrows the 30' cartway width to a 22 foot width which is inadequate to store busses and automobiles. We recommend evaluating the length of parking to be eliminated based on the results of

the impending queue analysis noted under the Transportation Impact Assessment section below.

V. TRANSPORTATION IMPACT ASSESSMENT (TIA) REVIEW

A. Subdivision and Land Development Ordinance (SALDO) comments:

1. §255-20.B(5)(d)[2][a] - We recommend the applicant discuss with SEPTA the installation of a bus shelter along King of Prussia Road near the corner of the Raider Road site driveway to encourage and promote transit riders. In addition, we recommend installing a bus turn out lane to minimize traffic flow disruptions along King of Prussia Road.

2. §255-20.B(5)(d)[3] Existing traffic conditions.
    a. Traffic counts were conducted on November 18, 2015 and November 24, 2015 at some of the studied intersections. These dates were noted as early dismissal days on the Radnor School District calendar. The Applicant should provide a comparison with historical counts at these intersection indicating similar volumes or recount the intersections during a typical full day of school.
    b. Crash Data Analysis
        i. The crash data provided in the body of the report and in Appendix E should be removed from the TIA and provided under separate cover.

        ii. PennDOT Strike-Off-Letter (SOL) 470-09-4 *Transportation Impact Study Guidelines* indicates 5 years of crash data should be reviewed; the submission only provided 3 years of historical data. In addition, the crash report should include non-reportable crashes obtained from Radnor Township Police Department. The crash analysis should be revised to provide a more detailed crash data analysis as follows:
            a) Quantify the number of correctible reportable and non-reportable crash incidents in a rolling 12 month analysis period.
            b) To identify potential mitigation measures for reportable and non-reportable crashes incidents exceeding five during the rolling 12 month period.

3. §255-20.B(5)(d)[4] The TIA shall be updated to remove the 7% Transit Ridership reduction for the Trip Generation based on the following:
    a. As discussed in the *ITE Trip Generation Handbook, 3rd Edition*, Section 8.4.2, the national database of person trips by mode for the Transit Friendly Development (TFD) is limited. Therefore, the preferred method for estimating a transit mode share for external trips at a TFD would be through development of surveys at proxy sites. The TIA would need to be modified to identify any transit studies previously done for the existing site or any similar nearby sites (i.e., employee transit usage survey, origin/destination study, boarding/alighting at Paoli/Thorndale station, etc.).
    b. In accordance with the information provided in Appendix B of the ITE publication *Trip Generation Manual, 9th Edition Guide and Handbook*, this

project's Floor Area Ratio (FAR) of 0.40 does not meet the required development intensity to utilize the minimum transit reductions identified in Tables B.2 & B.3.

c. Per PennDOT Strike-off-Letter 470-09-4 *Transportation Impact Study Guidelines,* the Paoli/69th Street SEPTA bus route does not meet the minimum requirement of 3-4 buses per hour and 14-16 daily operation hours to justify a bus related trip reduction.

d. More importantly, the agreed upon trip generation methodology for the proposed mixed medical use is based on data collected at local existing sites which inherently accounts for any transit reduction in the data collection process. If there is a 7% transit reduction, the reduction was already accounted for in the lack of a vehicle entering and exiting the local site driveways that were used to develop the trip generation rates for the Mixed Medical Use.

4. §255-20.B(5)(d)[5] Provide a traffic signal warrant analysis for the intersection of the SEPTA/Northern site driveway and King of Prussia Road.

5. §255-20.B(5)(d)[6] All streets or intersections showing Level of Service below C shall be considered deficient and specific recommendations for elimination of these problems shall be listed. The analysis indicates the corridor along the site frontage of King of Prussia Road is congested with multiple LOS deficiencies. The roadway should be widened to accommodate additional through lanes where possible along King of Prussia Road. The Applicant should evaluate the feasibility of constructing a 4-lane or 5-lane roadway section along King of Prussia Road.

6. §255-20.B(5)(d)[6][b] A listing of all actions to be undertaken to increase present public transportation usage and improve service, if applicable, shall be included.

B. General TIA Comments

1. The Applicant indicates a credit was applied for site trips from a previously approved plan for a 427,110 SF General Office Building (Land Use Code 710); this credit is inappropriate and should not be applied to the No-Build conditions for this study. The applicant indicates the existing facility was previously approved and could be occupied by a tenant without additional approvals; however, in our opinion, this has no bearing on the current land development application.

2. The report should be revised to include volume development spreadsheets for each studied intersection. We were unable to verify the No-Build and Build conditions based on the figures provided.

3. The capacity analyses should be revised to include the timings for all signalized intersections and 95 percentile queues. We were unable to verify the capacity analyses due to insufficient data.

4. The Applicant should provide a 95th percentile queue analysis to determine that adequate storage lengths are available at the studied intersections.

5. Please provide a Level of Service/Delay in tabular format for the No-Build and Build scenarios as required in PennDOT Strike-off-Letter 470-09-4. Provide No-Build and Build conditions scenarios in the same table for a comparison for each peak hour on each approach by lane movement.

6. The Applicant should provide turn lane warrant analyses for all three site driveways. Appendix H only provides an analysis for the Raider Road/Site Driveway along King of Prussia Road. In addition provide an analysis for the Raider Road (eastbound) leg at the intersection of King of Prussia Road/Raider Road.

7. Provide 2025 Build turn lane warrants to determine the maximum turn lane lengths required.

8. Per the Institute of Transportation Engineers (ITE) Trip Generation Manual, 3rd Edition, revise the report to include the rates/equations regarding ITE Land Use Code 710 (General Office Building) and Land Use Code 310 (Hotel). The submission only provides the rates and distribution percentages for the Mixed Medical Use Facility.

9. Verify the speed along Matsonford Road and revise as needed.

10. Revise Figures 3 through 11 to identify the location of King of Prussia Road.

11. The pedestrian and vehicle clearance interval calculations provided in Appendix L will need to be verified and updated based on the final traffic signal permit plan.

12. The following comments pertain to discrepancies between the Manual Turning Movement counts and the Capacity Analyses provided in Appendices D, F, I & M:

    a. I-476/Southbound Off-Ramp & Lancaster Avenue: Revise the eastbound lane configuration to include a right-turn volume.

    b. I-476/Southbound Off-Ramp & Lancaster Avenue: Verify the westbound left volume during the 2020 No-Build PM conditions; it appears the volume should be revised from 584 to 571 vehicles.

    c. King of Prussia Road & Southern Site Driveway: Verify the northbound through 2020 PM Build volume; it appears the volume should be revised from 405 to 451 vehicles.

    d. King of Prussia Road & Southern Site Driveway: Verify the southbound through 2025 PM Build volume; it appears the volume should be revised from 1382 to 1319 vehicles.

    e. King of Prussia Road & Southern Site Driveway: Verify the northbound through 2025 PM Build volume; it appears the volume should be revised from 411 to 457 vehicles.

f. King of Prussia Road & Southern Site Driveway: Verify the southbound through 2025 PM Build volume; it appears the volume should be revised from 1403 to 1338 vehicles.

g. King of Prussia Road & Southern Site Driveway: Verify the northbound through 2020 AM Build volume; it appears the volume should be revised from 1544 to 1554 vehicles.

13. The following comments pertain to discrepancies between the Turning Movement counts and the existing 2016 weekday volumes included in Figure 3:

    a. Northern Driveway and King of Prussia Road: verify the southbound PM through volume; it appears the volume should be revised from 1038 to 1046.
    b. Southern Site Driveway and King of Prussia Road: Verify the southbound PM through volume; it appears the volume should be revised from 1011 to 1077.
    c. Southern Site Driveway and King of Prussia Road: Verify the northbound PM through volume; it appears the volume should be revised from 337 to 293.

14. There is an existing coordinated signal system along King of Prussia Road that includes Radnor-Chester Road and Matsonford Road. Any traffic signals proposed along the site frontage should be included in the overall coordinated system. The Applicant should also investigate coordinating the Matsonford Road/King of Prussia Road signal system with the Lancaster Avenue System.

15. We recommend the Transportation Impact Study be revised to address the above comments to the satisfaction of the Township. In order to expedite the review process for the resubmission of the above, the Applicant should submit a response letter which addresses each of the above comments including the original comment and identify any changes made unrelated to the review.

If you have any questions regarding the above, please contact this office.

ABK:DAD:las

DELAWARE COUNTY PLANNING COMMISSION

COURT HOUSE/GOVERNMENT CENTER
201 W. Front St. Media, PA 19063

Office Location: Toal Building, 2nd & Orange Sts., Media, PA 19063
Phone: (610) 891-5200 FAX: (610) 891-5203
E-mail: planning_department@co.delaware.pa.us

November 16, 2017

Mr. Robert A. Zienkowski
Radnor Township
301 Iven Avenue
Wayne, PA 19087-5297

RE: Name of Dev't: Penn Medicine at Radnor
DCPD File No.: 34-845-78-92-08-14-17
Developer: The Trustees of the University of Pennsylvania
Location: East side of King of Prussia Road, approximately 400' north of Lancaster Avenue
Recv'd in DCPD: October 17, 2017

Dear Mr. Zienkowski:

In accordance with the provisions of Section 502 of the Pennsylvania Municipalities Planning Code, the above described proposal has been sent to the Delaware County Planning Commission for review. At a meeting held on November 16, 2017, the Commission took action as shown in the recommendation of the attached review.

Please refer to the DCPD file number shown above in any future communications related to this application.

Very truly yours,

Linda F. Hill
Director

cc: The Trustees of the University of Pennsylvania
Pennoni Associates, Inc.

DELAWARE COUNTY PLANNING DEPARTMENT

DCPD

Court House/ Government Center , 201 W. Front St., Media, PA 19063
Office Location: Toal Building, 2nd & Orange Sts., Media, PA 19063
Phone: (610) 891-5200 FAX: (610) 891-5203
E-mail: planning_department@co.delaware.pa.us

Date: November 16, 2017
File No.: 34-845-78-92-08-14-17

PLAN TITLE:	Penn Medicine at Radnor
DATE OF PLAN:	September 29, 2017
OWNER OR AGENT:	The Trustees of the University of Pennsylvania
LOCATION:	East side of King of Prussia Road, approximately 400' north of Lancaster Avenue
MUNICIPALITY:	Radnor Township
TYPE OF REVIEW:	Subdivision and land development
ZONING DISTRICT:	PLO
SUBDIVISION ORDINANCE:	Local
PROPOSAL:	Subdivision: Incorporate two lots totaling 18.71 acres into one lot Land development: Develop 475,000 sq. ft. of mixed-use development
UTILITIES:	Public
RECOMMENDATIONS:	Subdivision: Approval Land development: Approval, with consideration given to staff comments
STAFF REVIEW BY:	Michael A. Leventry

F.S. 6
F.L. 5

REMARKS:

PREVIOUS ACTION

A plan for the site was last reviewed by the Delaware County Planning Commission at its meeting on October 16, 2014, as a land development. The applicant proposed to redevelop the site with four buildings totaling 550,441 sq. ft. The Commission recommended revise and resubmit.

CURRENT PROPOSAL

The applicant currently proposes to demolish the buildings that exist on the site and redevelop with a 475,000 sq. ft. mixed-use development that is to include office, medical offices, ambulatory care, and parking.

SITE CHARACTERISTICS

The site currently contains a mix of uses that primarily include office and institutional.

APPLICABLE ZONING

The proposal is located within the PLO district and is subject to applicable regulations set forth in the Township zoning code.

COMPLIANCE

The proposal appears to comply with the PLO district provisions.

SEWAGE FACILITIES

The developer should contact the Pennsylvania Department of Environmental Protection regarding the need for sewage facilities planning approval.

REMARKS (continued):

The Township should confirm receipt of any necessary Pennsylvania Department of Environmental Protection planning approval prior to final approval.

STORMWATER MANAGEMENT

The Township Engineer must verify the adequacy of all proposed stormwater management facilities.

TRANSPORTATION COMMENTS

The applicant should provide financial incentives for employees to take transit, car pool, bicycle, or walk to the site. This would reduce the number of parking spaces needed, reduce the applicant's cost to construct and maintain parking facilities, mitigate stormwater runoff, and improve employee health (consistent with a health care provider's mission). The applicant should consider providing pervious pavement to reduce stormwater runoff.

The Township should request that SEPTA (Mark Cassel 215-580-7947) place a bus stop at the proposed main entrance to the site (at the proposed sidewalk on King of Prussia Road) for the convenience of bus riders. Currently, the nearest bus stop is at the northern end of the site at the entrance drive to the High Speed Line station. The Township should also consider installing passenger shelters at the bus stops for rider security, weather protection, and advertising revenue for the Township.

The applicant should provide bicycle parking facilities so employees and visitors can bike to the site. The bicycle parking, such as inverted "U" bike docks, should secure bicycles by their frames, rather than only by their wheels.

REMARKS (continued):

The applicant proposes to construct a sidewalk to King of Prussia Road. This sidewalk should be extended to the intersection of the applicant's entrance road and Raider Road, where a traffic signal is proposed. A continental/zebra style crosswalk should be installed across King of Prussia Road at this location, as it would improve safety for bus riders at the new bus stop.

RECORDING

In accordance with Section 513(a) of the Pennsylvania Municipalities Planning Code (MPC), final plans must be recorded within ninety (90) days of municipal approval.

DELAWARE COUNTY PLANNING DEPARTMENT

COURT HOUSE/GOVERNMENT CENTER
201 W. Front St. Media, PA 19063

COUNCIL
MARIO J. CIVERA, JR.
CHAIRMAN
COLLEEN P. MORRONE
VICE CHAIRMAN
JOHN P. McBLAIN
DAVID J. WHITE
MICHAEL F. CULP

Office Location: Toal Building, 2nd & Orange Sts., Media, PA 19063
Phone: (610) 891-5200 FAX: (610) 891-5203
E-mail: planning_department@co.delaware.pa.us

LINDA F. HILL
DIRECTOR

October 26, 2017

Mr. Robert A. Zienkowski
Radnor Township
301 Iven Avenue
Wayne, PA 19087-5297

RE:	***Title:***	Penn Medicine at Radnor
	Applicant(s):	The Trustees of the University of Pennsylvania
	File Number:	34-845-78-92-08-14-17
	Meeting Date:	11/16/2017
	Municipality:	Radnor Township
	Location:	East side of King of Prussia Road, approximately 400' north of Lancaster Avenue
	Received:	10/17/2017

Dear Mr. Zienkowski,

This is to acknowledge receipt of the above referenced application for review and report. The Commission has tentatively scheduled consideration of the application for its public meeting on the date shown above at 4:00 p.m. in the Government Center Building, (Room 100), Court House Complex, Media, PA. Attendance is not required but is welcomed. If you have any questions concerning this matter, please contact Dennis De Rosa at (610) 891-5222.

NOTE: In order to avoid processing delays, the DCPD file number shown above MUST be provided in any transactions with the county regarding this or future applications related to this location.

Very truly yours,

Linda F. Hill
Director

cc: The Trustees of the University of Pennsylvania
Pennoni Associates, Inc.

LETTER OF TRANSMITTAL

PENNONI ASSOCIATES INC.
CONSULTING ENGINEERS
One South Church Street
2nd Floor
West Chester, PA 19382
Tel: 610 - 429 - 8907
Fax: 610 - 429 - 8918

TO: Radnor Township
301 Iven Avenue
Wayne, PA 19087

DATE	09/29/17	**JOB NO.**	UPHS1504
ATTENTION	Mr. Robert Zienkowski		
RE:	Penn Medicine at Radnor		

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via Hand delivered the following items:

☐ Shop Drawings ☐ Prints ☒ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change Order ☐ _____

LIST OF ITEMS TRANSMITTED

COPIES	DATE	NO:	DESCRIPTION
1	09/29/17	1	Cover Letter
1	09/29/17	1	Waiver Request Letter
1	-	2	Radnor Township Application
1	-	2	Delaware County Planning Commission Application
1	-	2	Checks for Application Fees
26	09/29/17	28	Preliminary Land Development Plans (full size)
7	09/29/17	28	Preliminary Land Development Plans (half size)
2	09/29/17	-	PCSM Report
2		-	Traffic Impact Study
2	-	8	Deed of Property
2	04/10/15	142	Commitment for Title Insurance
10	-	-	Thumb drives with all documents

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

COPY TO file

SIGNED: Christopher Poterjoy, PE

If enclosures are not as noted, kindly notify us at once.

Pennoni

One South Church Street
Second Floor
West Chester, PA 19382
T: 610-429-8907
F: 610-429-8918

www.pennoni.com

September 29, 2017

UPHS1504

Radnor Township
Attn: Mr. Robert Zienkowski
301 Iven Ave.
Wayne, PA19087

RE: PRELIMINARY LAND DEVELOPMENT APPLICATION
PENN MEDICINE AT RADNOR
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA

Dear Mr. Zienkowski:

On behalf of the Trustees of the University of Pennsylvania Health Systems, Pennoni Associates Inc. is submitting the attached plans, reports and documentation for consideration of a Preliminary Land Development approval. As you are aware, The Trustees of the University of Pennsylvania Health Systems are proposing the re-development of 145 King of Prussia Road. The development will involve the demolition of existing buildings and construction of a mixed-use facility including a mixed medical use facility, office and hotel. Two parking garages are proposed in conjunction with a surface parking lot. The site has been designed based on the draft Ordinance No. 2016-13 amending the Chapter 280, Article XV of the Radnor Township Code.

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2459 or cpoterjoy@pennoni.com.

Sincerely,

PENNONI ASSOCIATES INC.

Christopher Poterjoy, PE
Project Engineer

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems
David Falcone, Saul Ewing Arnstein & Lehr LLP

Pennoni

One South Church Street
Second Floor
West Chester, PA 19382
T: 610-429-8907
F: 610-429-8918

www.pennoni.com

September 29, 2017

UPHS1504

Radnor Township
Attn: Board of Supervisors
301 Iven Ave.
Wayne, PA19087

RE: WAIVER REQUEST LETTER
PENN MEDICINE AT RADNOR
RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA

Dear Supervisors:

On behalf of the Trustees of the University of Pennsylvania Health Systems, Pennoni Associates Inc. is respectfully requesting a waiver from the following section of the Township's Subdivision and Land Development Ordinances.

1. **Section 255-21.A(6)**

   A waiver is requested for the maximum plan sheet size if 24 inches by 34 inches. The plans will be reduced for recording purposes.

I thank you in advance for your assistance on this project. Should you have any questions or need additional information please do not hesitate to contact me at (610) 422-2459 or cpoterjoy@pennoni.com.

Sincerely,

PENNONI ASSOCIATES INC.

Christopher Poterjoy, PE
Project Engineer

Attachment

cc: Pat Dorris, The Trustees of the University of Pennsylvania Health Systems
David Falcone, Saul Ewing Arnstein & Lehr LLP

DELAWARE COUNTY PLANNING COMMISSION

APPLICATION FOR ACT 247 REVIEW

Incomplete applications will be returned and will not be considered "received" until all required information is provided.

Please type or print legibly

DEVELOPER/APPLICANT

Name The Trustees of the University of Pennsylvania; Attn: Pat Dorris E-mail _____

Address 3400 Spruce Street; Philadelphia, PA 19104 Phone _____

Name of Development Penn Medicine at Radnor

Municipality Radnor Township

ARCHITECT, ENGINEER, OR SURVEYOR

Name of Firm Pennoni Associates Inc. Phone 610-422-2459

Address One South Church St.; 2nd Floor; West Chester, PA 19382

Contact Christopher Poterjoy E-mail cpoterjoy@pennoni.com

Type of Review	Plan Status	Utilities Existing	Utilities Proposed	Environmental Characteristics
☐ Zoning Change	☐ Sketch	☑ Public Sewerage	☐ Public Sewerage	
☑ Land Development	☑ Preliminary	☐ Private Sewerage	☐ Private Sewerage	☐ Wetlands
☐ Subdivision	☐ Final	☑ Public Water	☐ Public Water	☐ Floodplain
☐ PRD	☐ Tentative	☐ Private Water	☐ Private Water	☐ Steep Slopes

Zoning District PLO

Tax Map # __ / __ / ___

Tax Folio # 36 / 02 / 01234 ___ / 00

STATEMENT OF INTENT
WRITING "SEE ATTACHED PLAN" IS NOT ACCEPTABLE.

Existing and/or Proposed Use of Site/Buildings:

The site contains 3 existing buildings which will be demolished

3 new buildings and 2 new parking structures proposed. A total of 475,000-sf of gross floor area between the 3 buildings. The site is a mixed use with uses including

a Mixed Use Medical Facility, Hotel, and Office.

Total Site Area 18.71 Acres

Size of All Existing Buildings 120,355 (footprint) Square Feet

Size of All Proposed Buildings 120,105 (footprint) Square Feet

Size of Buildings to be Demolished 120,355 (footprint) Square Feet

Patrick Dorris
Print Developer's Name

Developer's Signature

MUNICIPAL SECTION
ALL APPLICATIONS AND THEIR CONTENT ARE A MUNICIPAL RESPONSIBILITY.

Local Planning Commission Regular Meeting_____

Local Governing Body Regular Meeting_____

Municipal request for DCPD staff comments prior to DCPC meeting, to meet municipal meeting date:

Actual Date Needed _____

IMPORTANT: If previously submitted, show assigned DCPD File # _____

_____ _____
Print Name and Title of Designated Municipal Official Phone Number

_____ _____
Official's Signature Date

FOR DCPD USE ONLY

Review Fee: Check #_____ Amount $_____ Date Received_____

Applications with <u>original</u> signatures must be submitted to DCPD.

RADNOR TOWNSHIP
301 IVEN AVE
WAYNE PA 19087
P) 610 688-5600
F) 610 971-0450
WWW.RADNOR.COM

SUBDIVISION ~~ LAND DEVELOPMENT

Location of Property 145 King of Prussia Road

Zoning District PLO - Planned Laboratory - Office District Application No. _____ (Twp. Use)

Fee $5,150.00 Ward No. 2 Is property in HARB District no

Applicant: (Choose one) Owner x Equitable Owner _____

Name Trustees of the University of Pennsylvania Health Systems; Attn: Pat Dorris

Address 3400 Spruce Street; Philadelphia, PA 19104

Telephone _____ Fax _____ Cell _____

Email _____

Designer: (Choose one) Engineer x Surveyor _____

Name Pennoni Associates Inc.; Michael Kissinger

Address One South Church St.; 2nd Floor; West Chester, PA 19382

Telephone (610) 422-2459 Fax (610) 429-8918

Email mkissinger@pennoni.com

Area of property 18.71 Area of disturbance 18.71

Number of proposed buildings 5 Proposed use of property Mixed Use

Number of proposed lots 1

Plan Status: Sketch Plan ____ Preliminary x Final ____ Revised ____
Are there any requirements of Chapter 255 (SALDO) that are not in compliance with?

Are there any requirements of Chapter 255 (SALDO) not being adhered to? Explain the reason for noncompliance.

N/A

Are there any infringements of Chapter 280 (Zoning), and if so what and why?

Pending zoning amendment

Individual/Corporation/Partnership Name

I do hereby certify that I am the owner, equitable owner or authorized representative of the property which is the subject of this application.

Signature _____

Print Name Patrick Dorris

By filing this application, you are hereby granting permission to Township officials to visit the site for review purposes.

NOTE: All requirements of Chapter 255 (Subdivision of Lane) of the Code of the Township of Radnor must be complied with whether or not indicated in this application.

DT-DEED

RD BK05649-1676
2015026773 06/02/2015 03:13:55 PM:1
RCD FEE: $112.50 POL SUB TAX: $525,000.00 ST TAX: $350,000.00

DELAWARE COUNTY

36-RADNOR $525,000.00 THOMAS J. JUDGE SR. ROD

Prepared By:
Erik F. Williams, Esq.
Saul Ewing LLP
1500 Market Street, 38th Floor
Philadelphia, PA 19102

When Recorded Return To:
Record and Return To:
Land Services USA, Inc.
1835 Market Street, Suite 420
Philadelphia, PA 19103
File No: PAS715-180435LS

Folio Number: 36-02-01234-00

SPECIAL WARRANTY DEED

*Document dated May 27, 2015 yet made effective as of May 29, 2015

THIS SPECIAL WARRANTY DEED, made as of this 29th day of May, 2015, by and between **BMR-145 KING OF PRUSSIA ROAD LP**, a Delaware limited partnership, as grantor ("Grantor"), and **THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA, AS OWNER AND OPERATOR OF THE UNIVERSITY OF PENNSYLVANIA HEALTH SYSTEM,** a Pennsylvania non-profit corporation, as grantee ("Grantee") and provides as follows:

WITNESSETH

That in consideration of the sum of Thirty-Five Million Dollars ($35,000,000), in hand paid, the receipt whereof is hereby acknowledged, Grantor does grant and convey to the Grantee, in fee simple the lands and property, together with all improvements located on the property commonly known as 145 King of Prussia Road, Radnor, Pennsylvania, and situated and lying in Delaware County, Pennsylvania, and described on **Exhibit A** attached hereto (the "Property").

TOGETHER with all the buildings, improvements, rights, privileges, advantages, hereditaments and appurtenances to the same belonging or anywise appertaining, and the reversions and remainders, rents, issues and profits thereof; and all the estate, right, title, interest, property, claim and demand whatsoever of the Grantor as well at law as in equity, of, in and to the same.

TO HAVE AND TO HOLD the Property, together with all rights, privileges and advantages thereunto belonging or appertaining to the Grantee, its successors and assigns, forever.

SUBJECT to all covenants, conditions, restrictions, easements, agreements, encumbrances, rights of way and reservations of record and all matters discoverable by a current survey of the Property insofar as they affect the Property or any part thereof.

Exhibit A to Special Warranty Deed

Legal Description

PREMISES "A"

ALL THAT CERTAIN tract of land, Hereditaments and Appurtenances, SITUATE in Radnor Township, Delaware County, Commonwealth of Pennsylvania and described according to an ALTA/ACSM Land Title Survey prepared for The Rubenstein Company, L.P. by Bock & Clark's National Surveyors Network as #4200400832, dated July 14, 2004 as more fully described as follows, to wit:

BEGINNING at a point on the title line in Lancaster Avenue (being also known as Lincoln Highway (Route 30), width varies), said point being at the distance of 3501.89 feet measured Southeasterly along the title line in Lancaster Avenue from its intersection with the title line in Radnor - Chester Road, thence from said point of beginning along lands now or formerly of PA. D.O.T. the 5 following courses and distances: (1) on a line curving to the left with a radius of 161.52 feet the arc distance of 123.76 feet, the chord of said curved line extending North 4 degrees 39 minutes 05 seconds West 120.76 feet to a point of tangency, (2) North 26 degrees 36 minutes 10 seconds West 181.79 feet to a point of curve, (3) on a line curving to the right with a radius of 700.0 feet the arc distance of 198.16 feet, the chord of said curved line extending North 18 degrees 29 minutes 35 seconds West 197.50 feet to a point of tangency, (4) North 10 degrees 23 minutes West 39.35 feet to a point of curve, (5) on a line curving to the left with a radius of 200.0 feet the arc distance of 121.46 feet, the chord of said curved line extending North 27 degrees 46 minutes 50 seconds West 119.60 feet to a point of tangency: thence North 45 degrees 10 minutes 40 seconds West 83.08 feet to a point of curve; thence on a line curving to the right with a radius of 350.0 feet the arc distance of 193.24 feet; the chord of said curved line extending North 29 degrees 21 minutes 40 seconds West 190.79 feet to a point of tangency in the bed of King of Prussia Road; thence North 13 degrees 32 minutes 40 seconds West 246.94 feet to a point of curve in the centerline of King of Prussia Road (50 feet wide); thence along said line the 4 following courses and distances; (1) on a line curving to the right with a radius of 400.0 feet the arc distance of 194.18 feet, the chord of said curved line extending North 00 degrees 21 minutes 45 seconds East 192.28 feet to a point of tangency, (2) North 14 degrees 16 minutes 10 seconds East 258.06 feet to a point of curve, (3) on a line curving to the left with a radius of 400.0 feet the arc distance of 124.29 feet, the chord of said curved line extending North 5 degrees 22 minutes 05 seconds East 123.79 feet to a point of tangency, (4) North 3 degrees 32 minutes West 228.16 feet to a spike; thence leaving King of Prussia Road and extending along lands now or formerly of Radnor Racquet Club, North 84 degrees 29 minutes 30 seconds East 631.651 feet to an iron pin in line of lands now or formerly of S.E.P.T.A.; thence along said lands the 3 following courses and distances, (1) South 2 degrees 55 minutes East, 1675.84 feet to a point (2) South 87 degrees 05 minutes West 10.0 feet to a point, (3) South 2 degrees 55 minutes East 390.96 feet to a point in the title line in Lancaster Avenue aforesaid; and thence along the title line in Lancaster Avenue

North 69 degrees 58 minutes West 382.45 feet to the place of beginning.

PREMISES "B"

ALL THAT CERTAIN tract of land, Hereditaments and Appurtenances, SITUATE in Radnor Township, Delaware County, Commonwealth of Pennsylvania, and described according to an ALTA/ACSM Land Title Survey Plan prepared for The Rubenstein Company, L.P., by Yerkes Associates Inc., Consulting Engineers and Surveyors dated 11/8/2000, as follows, to wit BEGINNING at an iron pin at an interior corner of lands now or formerly of PA D.O.T. said point being located the 5 following courses and distances along said lands of PA D.O.T. from a point on the title line in Lancaster Avenue (the point of beginning of Premises "A": (1) on a line curving to the left with a radius of 161.52 feet the arc distance of 123.76 feet the chord of said curved line extending North 4 degrees 39 minutes 05 seconds West 120.786 feet to a point, (2) thence North 26 degrees 36 minutes 10 seconds West 181.79 feet to a point, (3) thence on a line curving to the right with a radius of 700.0 feet the arc distance of 198.16 feet the chord of said curved line extending North 18 degrees 29 minutes 35 seconds West 197.50 feet to a point, (4) thence North 10 degrees 23 minutes West 39.35 feet to a point, and (5) thence on a line curving to the left with a radius of 200.0 feet the arc distance of 84.83 feet the chord of said curved line extending North 22 degrees 32 minutes 03 seconds West 84.20 feet to the point and place of beginning, thence from said point and place of beginning, along lands of said PA D.O.T. North 70 degrees 32 minutes 40 seconds West 226.29 feet to a spike in the middle line of King of Prussia Road (50 feet wide); thence along the middle line of said King of Prussia Road on a line curving to the left with a radius of 395.18 feet the arc distance of 252.62 feet the chord of said curved line extending North 4 degrees 46 minute 11 seconds East 248.34 feet to a point on the Southwesterly line of Premises "A"; thence along said line South 13 degrees 32 minutes 40 seconds East 72.0 feet to a point, thence along the same, on a line curving to the left with a radius of 350.0 feet the arc distance of 193.24 feet the chord of said curved line extending South 29 degrees 21 minutes 40 seconds East 190.79 feet to a point, thence along the same South 45 degrees 10 minutes 40 seconds East 83.08 feet to a point; thence along the same, on a line curving to the right with a radius of 200.0 feet the arc distance of 36.63 feet the chord of said curved line extending South 39 degrees 55 minutes 52 seconds East 36.58 feet to the first mentioned point and place of beginning.

PARCEL "C" (Easement Parcel)

TOGETHER with all the rights and benefits set forth in those certain Agreements each dated January 20, 1956 and recorded in the Delaware County Recorder of Deeds Office in Deed Book 2137 page 548 and in Deed Book 2137 page 551 as modified by that certain Agreement dated December 10, 1965 and recorded in the Delaware County Recorder of Deeds Office in Deed Book 2227 page 592.

PARCEL "D" (Easement Parcel)

ALSO TOGETHER WITH all the rights and benefits conferred in the certain Indenture dated June 24, 1946 and recorded in the Delaware County Recorder of Deeds Office in Deed Book 1278 page 499.

PARCEL "E" (Easement Parcel)

ALSO TOGETHER WITH all the rights and benefits conferred in that certain Indenture dated April 7, 1953 and recorded in the Delaware County Recorder of Deeds Office in Deed Book 1573 page 567.

PARCEL #36-02-01234-00

BEING the same premises which Wyeth-Ayerst Pharmaceuticals, Inc., a New York Corporation, by Indenture bearing date the 6th day of April A.D. 2001 and recorded in the Office of the Recorder of Deeds in and for the County of Delaware, aforesaid, in Volume 2155 page 378 &c., granted and conveyed unto Radnor Properties-145 KOP, L.P., a Delaware Limited Partnership, in fee.

AND Grantor covenants that Grantor will warrant specially the Property hereby conveyed and will only forever warrant and defend the Property, and any part thereof, unto the Grantee, its heirs, personal representatives and assigns, against the lawful claims and demands of the Grantor and all those persons claiming by, through or under Grantor, but not otherwise.

[Signature Page Follows]

IN WITNESS WHEREOF, Grantor has caused this Special Warranty Deed to be properly executed and sealed the day and year first above written.

GRANTOR:

BMR-145 KING OF PRUSSIA ROAD LP,
a Delaware limited partnership

By: BMR-145 King of Prussia Road GP LLC,
a Delaware limited liability company,
its general partner

By: _____ (SEAL)
Name: Kevin M. Simonsen
Title: Sr. VP, Real Estate Legal

SIGNED AND DELIVERED in the presence of

_____ (SEAL)
Name: _____
Title: _____

[Notary block follows]

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of San Diego)

On May 27, 2015 before me, Fern M. Kissel, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Kevin M. Simonsen
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(s) on the instrument the person(~~s~~), or the entity upon behalf of which the person(~~s~~) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

FERN M. KISSEL
Commission # 2090811
Notary Public - California
San Diego County
My Comm. Expires Nov 21, 2018

Signature Fern M. Kissel
Signature of Notary Public

Place Notary Seal Above

OPTIONAL

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: _____ Document Date: _____
Number of Pages: _____ Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer — Title(s): _____	☐ Corporate Officer — Title(s): _____
☐ Partner — ☐ Limited ☐ General	☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer Is Representing: _____	Signer Is Representing: _____

I HEREBY CERTIFY that the precise address of the within Grantee is:

3451 Walnut Street
The Franklin Building, Suite 737
Philadelphia, PA 19104

By: _____ (SEAL)
Name: Ralph W. Muller
Title: Chief Executive Officer
(On behalf of Grantee)

ORDINANCE NO. _____

AN ORDINANCE OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AMENDING CHAPTER 235, SEWERS, BY CREATING A NEW ARTICLE VI, "ADOPTION OF PWD WASTEWATER CONTROL REGULATIONS BY REFERENCE" WHICH FORMALLY ADOPTS THE PHILADELPHIA WATER DEPARTMENT SEWER AND WASTEWATER CONTROL REGULATIONS AS AMENDED JANUARY 1, 2013 FOR THAT PORTION OF THE SANITARY SEWER SYSTEM OF RADNOR TOWNSHIP WHICH FLOWS INTO LOWER MERION TOWNSHIP

WHEREAS, the City of Philadelphia requires that all contributing municipalities adopt by reference its Wastewater Control Regulations; and

WHEREAS, a portion of the Radnor Township wastewater flow enters the Lower Merion Township wastewater system and ultimately discharges to the City of Philadelphia wastewater facilities; and

WHEREAS, Lower Merion Township has requested that Radnor Township adopt and incorporate the Philadelphia Water Department Wastewater Control Regulations as adopted on January 1, 2013.

WHEREAS, Radnor Township wishes to adopt and incorporate the Philadelphia Water Department Wastewater Control Regulations into Chapter 235 of its Code of Ordinances.

NOW, THEREFORE, be it hereby ***ENACTED*** and ***ORDAINED*** by the Radnor Township Board of Commissioners as follows:

SECTION 1. Chapter 235, Article VI, Adoption of PWD Wastewater Control Regulations by Reference, is hereby added to read as follows:

ARTICLE VI: Adoption of PWD Wastewater Control Regulations by Reference

§235-29. Adoption and Incorporation.

Radnor Township hereby adopts and incorporates by reference the City of Philadelphia Water Department ("PWD") Wastewater Control Regulations, effective January 1, 2013 which shall apply to all Radnor Township wastewater flowing into the Lower Merion Township Wastewater System. A copy of the January 1, 2013 PWD Wastewater Control Regulations is attached hereto and incorporated herein as ***Exhibit "A"***.

§235-30. Additional Requirements.

The Township's adoption of the PWD Wastewater Control Regulations shall be implemented and enforced in accordance with the following additional requirements:

A. The PWD and/or Township may enforce the PWD Wastewater Control Regulations, including inspections and penalties, and shall provide notice of such enforcement.

B. All notifications and reports required by a user subject to the PWD Wastewater Control Regulations shall be provided to both the PWD and the Township.

C. Any industrial user responsible for any accidental discharge of wastewater must immediately notify both the PWD and the Township of said discharge.

D. The knowing transmittal of false information by an industrial user to either the PWD or the Township is prohibited and constitutes a wastewater control regulation violation.

E. The PWD or the Township may require an industrial user to install monitoring and pretreatment facilities, and these shall be provided and operated at the user's own expense.

F. Any authorized officer or employee of the PWD may, upon twenty-four (24) hours' notice to the Township, enter and inspect, sample or test at any reasonable time any part of the Township's wastewater collection system, and, as permitted by law, enter onto private property to inspect, sample or test waste discharges of industrial users; the Township may also choose to inspect, sample and test waste discharges of the industrial users subject to the PWD Wastewater Control Regulations.

G. Where a discharge to the wastewater collection system appears to present an imminent danger to the health and welfare of persons, or presents or may present an imminent danger to the environment, or threatens to interfere with the operation of the PWD's wastewater treatments system, the PWD or the Township may immediately initiate steps to identify the source of the discharge, and to prevent said discharge.

H. In addition, to those penalties for violations specified in the PWD Wasterwater Control Regulations, effective January 1, 2013, any user who is found to have violated, continues to violate or fails to comply with any provisions of the regulations and permits issued hereunder shall be liable to the Township for a civil penalty not to exceed $1,000 plus attorneys fees and costs of prosecution for each and every violation or, in default of payment of such fine and costs, to undergo imprisonment for not more than ninety (90) days for each violation. Each day a violation continues shall constitute a separate offense.

SECTION 2. Repealer. All ordinances or parts of ordinances which are inconsistent herewith are hereby repealed.

SECTION 3. Severability. If any section, paragraph, subsection, clause or provision of this Ordinance shall be declared invalid or unconstitutional by a court of competent jurisdiction, such decision shall not affect the validity of this Ordinance as a whole or any part thereof other than that portion specifically declared invalid.

SECTION 4. Effective Date. This Ordinance shall become effective in accordance with the Radnor Township Home Rule Charter.

ENACTED and ***ORDAINED*** this ___ day of January, 2018.

RADNOR TOWNSHIP

By: _____
Name:
Title:

Attest: _____
Robert A. Zienkowski, Secretary

Radnor Township

PROPOSED LEGISLATION

DATE: January 16, 2018

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer SFN

CC: Robert A. Zienkowski, Township Manager
William M. White, Assistant Township Manager & Finance Director
John Rice, Solicitor

LEGISLATION: **Ordinance #2018–01 – *(Introduction)*** – An Ordinance of Radnor Township, Delaware County, Pennsylvania, Amending Chapter 235, Sewers, by Creating a New Article VI, "Adoption of PWD Wastewater Control Regulations by Reference", Which Formally Adopts the Philadelphia Water Department Sewer and Wastewater Control Regulations as Amended January 1, 2013, for that Portion of the Sanitary Sewer System of Radnor Township Which Flows into Lower Merion Township

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LEGISLATIVE HISTORY: This item has not been before the Board of Commissioners previously.

PURPOSE AND EXPLANATION: Portions of Radnor Township's sanitary sewer flows are conveyed to the Philadelphia Treatment Plant via Lower Merion Township. The Philadelphia Water Department (PWD) required Lower Merion Township to adopt the Philadelphia Water Department Sewer & Wastewater Control Regulations (please see attached Exhibit A). Any entity that conveys sewer flows to the PWD, through Lower Merion Township, is also required to adopt the regulations. This is standard practice for all wastewater treatment plants. The Regulations cover many items (again standard fare) including, but not limited to: pollution limits (also known as local limits), cross connections, penalties, prohibitions, etc. The properties in Radnor Township whose flows are conveyed to the PWD through Lower Merion Township are noted in the table below:

Radnor Township Sanitary Sewer Flows to Lower Merion Township		
Area	Street	Street Address
South of Lancaster Avenue	Braxton	2,4,6,8
Lancaster Avenue	Lancaster Avenue	985,987,989,995
North of Lancaster Avenue	North Black Friar Road	102,110
South of Lancaster Avenue	Black Friar Road	100,106,108,112,114
Villanova University	West, North, and Main Campus	County Line Road, North Ithan Avenue, Lancaster Avenue

The Township Solicitor has prepared Ordinance #2018 – 01 (please see attached) for introduction to the Board of Commissioners and residents. If so moved, the Ordinance will be before the Commissioners for adoption at the February 12, 2018 regularly scheduled meeting, and will be in affect thirty days from that point.

IMPLEMENTATION SCHEDULE: If so moved, the Ordinance will be before the Commissioners for adoption at the February 12, 2018 regularly scheduled meeting, and will be in affect thirty days from that point.

FISCAL IMPACT: There is no fiscal impact associated with the adoption of Ordinance #2018-01.

RECOMMENDED ACTION: I respectfully request that the Board of Commissioners adopt Ordinance #2018–01 – (Introduction) – An Ordinance of Radnor Township, Delaware County, Pennsylvania, Amending Chapter 235, Sewers, by Creating a New Article VI, "Adoption of PWD Wastewater Control Regulations by Reference", Which Formally Adopts the Philadelphia Water Department Sewer and Wastewater Control Regulations as Amended January 1, 2013, for that Portion of the Sanitary Sewer System of Radnor Township Which Flows into Lower Merion Township

MOVEMENT OF LEGISLATION: It is being requested the Board of Commissioners adopt this legislation.

Enclosures: Exhibit A
Ordinance #2018-01

PHILADELPHIA
WATER
DEPARTMENT

PHILADELPHIA WATER DEPARTMENT SEWER & WASTEWATER CONTROL REGULATIONS

Effective January 1, 2013

Also available at
http://www.phila.gov/water/PDF/PWDregCH5.pdf

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CHAPTER 5
SEWER & WASTEWATER CONTROL

500.0 CROSS CONNECTED SEWER LATERALS

500.1 Definitions

(a) City shall mean the City of Philadelphia acting through its Water Department (Department) or other City departments.

(b) Cross Connection shall mean a connection of sewer lateral(s) to the sewer main(s) such that a Dye Test, as herein defined, has demonstrated that flow in the sanitary sewer lateral discharges only to the City's municipal separate storm sewer system.

(c) Dye Test shall mean a test utilizing water-soluble dyes conducted by the City for the purpose of investigating the discharge of sewage into the municipal separate storm sewer system.

(d) Internal Cross shall mean the connection of particular plumbing fixture(s) within the property such that a Dye Test, as herein defined, has demonstrated that the flow from these particular plumbing fixture(s) within the property discharges to the municipal separate storm sewer system while flow from the other plumbing fixture(s) within the property discharges to the sanitary sewer.

500.2 General Policy

Cross Connections and Internal Crosses result in the discharge of untreated sewage into rivers and streams. Cross Connections and Internal Crosses are public nuisances and are prohibited by the Philadelphia Code, the Pennsylvania Clean Streams Law and the federal Clean Water Act. The investigation of Cross Connections and Internal Crosses is necessary for the health and safety of the public. The hindrance of Cross Connection investigations or Internal Cross investigations is prohibited. Cross Connections or Internal Crosses that are identified must be promptly abated.

500.3 Investigation of Cross Connections

As a condition of water and sewer service, the City shall be permitted access to all properties for the purpose of conducting Dye Tests and other investigations to identify Cross Connections.

500.4 Abatement of Cross Connections

(a) When a Cross Connection has been identified by a Dye Test, the Department shall notify the property owner, and the Department shall arrange for and bear the cost of the abatement of the Cross Connection.

(b) The property owner and any other occupant shall cooperate with the Department to abate the Cross Connection.

(1) The property owner and any other occupant shall provide the City, its agents or contractors with access to the property for testing, developing work orders, plumbing repair, inspections and other necessary or desirable work.

(2) Failure to comply with this Section may result in the suspension of water service and/or imposition of other penalties established by law.

500.5 Investigation of Internal Crosses

As a condition of water and sewer service, the City shall be permitted access to all properties for the purpose of conducting Dye

Tests and other investigations to identify Internal Crosses.

500.6 Abatement of Internal Crosses

(a) Except as provided in Section 500.6(e) of these Regulations, when an Internal Cross has been identified at a property, the property owner shall arrange and bear the cost of the abatement of the Internal Cross.

(b) Internal Crosses shall be abated within thirty (30) days from the date of notification by the City, or such shorter period as determined necessary by the City to protect public health and safety or the environment. The City's notification shall state the time period granted for abatement. Failure to promptly abate the Internal Cross may result in the suspension of water service and/or the imposition of other penalties established by law.

(c) The property owner and any other occupant shall provide the City, its agents or contractors with access to the property for testing, developing work orders, plumbing repair, inspections and other necessary or desirable work.

(d) Failure to comply with this Regulation may result in the suspension of water service and/or imposition of other penalties established by law.

(e) Subject to the availability of funds, the owner of a property where an Internal Cross has been identified may be eligible for the Water Department assistance program if that property owner can satisfy the conditions set forth in Sections 200.2(a)(c)(e) and (f), Section 200.3, and Section 200.4 of these Regulations.

501.0 WASTEWATER CONTROL

Whereas, the Philadelphia Home Rule Charter, Section 5-800 et seq. mandates that the Philadelphia Water Department operate the City of Philadelphia ("City") water supply and wastewater system; and

Whereas, the Philadelphia Water Department must ensure sound and safe operation of the City wastewater treatment plants and sewer system ("Wastewater System"); and

Whereas, the Federal Clean Water Act requires that the City prevent the introduction of pollutants into the City Wastewater System which will interfere with the operation of the Wastewater System or contaminate the resulting sludge; and

Whereas, an objective of the Federal Clean Water Act requires that the City prevent the introduction of pollutants into the City Wastewater System which will pass through the Wastewater System, inadequately treated, into receiving waters or atmosphere or otherwise be incompatible with the Wastewater System; and

Whereas, an objective of the Federal Clean Water Act is to improve the opportunity to recycle and reclaim wastewater and sludge from the Wastewater System.

Now therefore, the City of Philadelphia Water Department promulgates these Wastewater Control Regulations ("Regulations").

501.1 Purpose and Policy

The purposes of these Regulations are:

(a) To set forth uniform requirements for direct and indirect contributors to the City

Wastewater System owned and operated by the City of Philadelphia and to enable the City to comply with all applicable state and federal laws required by the Clean Water Act, the General Pretreatment Regulations (40 CFR Part 403) and the National Categorical Pretreatment Standards (40 CFR Chapter I, Subchapter N).

(b) To prevent the introduction of pollutants into the City Wastewater System which will:

(1) interfere with the operation of the Wastewater System;

(2) contaminate the resulting sludge;

(3) cause the Wastewater System to violate its National Pollutant Discharge Elimination System ("NPDES") discharge permit;

(4) pass through the Wastewater System, inadequately treated, into receiving waters or the atmosphere; or

(5) be otherwise incompatible with the Wastewater System.

(c) To improve the opportunity to recycle and reclaim wastewaters and sludges from the Wastewater System. These Regulations provide for the regulation of direct and indirect contributors to the City Wastewater System through the issuance of permits to certain non-domestic users and Industrial Users and through enforcement of general requirements for other Users: the Regulations authorize monitoring and enforcement activities and require User reporting and compliance schedule submissions.

501.2 Definitions

Unless the context specifically indicates otherwise, the following terms and phrases, as used in these Regulations, shall have the following meanings:

(a) Act or "the Act" or Clean Water Act: Federal Water Pollution Control Act, as amended by the Federal Water Pollution Control Act Amendments of 1972, the Clean Water Act of 1977 and the Water Quality Act of 1987, and any subsequent amendments thereto.

(b) Approval Authority: The Director in an NPDES state with an approved State Pretreatment Program and the Administrator of the EPA in a non-NPDES state or NPDES state without an Approved State Pretreatment Program.

(c) Authorized Representative of Industrial User:

(1) In the case of a corporation, a president, secretary, treasurer or vice president of the corporation who is in charge of a principal business function;

(2) In the case of a partnership or proprietorship, a general partner or proprietor; and

(3) A duly authorized representative of the individual designated above if:

(A) such representative is responsible for the overall operation of the facilities from which the indirect discharge into the Publicly Owned Treatment Works ("POTW") originates;

(B) the authorization is in writing; and

(C) the written authorization is submitted to the City.

(d) Best Management Practices or BMPs: Management practices that are implemented to comply with any Pretreatment Standard or Requirement. Such activities include, but are not limited to, schedules of activities, prohibitions of practices, and maintenance procedures.

(e) Biochemical Oxygen Demand or BOD_5: The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure for five (5) days at 20 degrees Celsius expressed in terms of concentration (milligrams per liter (mg/l).

(f) Building Sewer: A private sewer conveying wastewater from the premises of a User to the City Wastewater System.

(g) Bypass: The intentional diversion of wastestreams from any portion of an Industrial User's pretreatment facility.

(h) Categorical Standards: National Categorical Pretreatment Standards.

(i) City: The City of Philadelphia, including, but not limited to, the Philadelphia Water Department.

(j) Collector System: All piping leading to a treatment plant, including those pipes connected to a combined sewer overflow that lead directly to a receiving stream.

(k) Commissioner: The Water Commissioner of the City of Philadelphia or his designee.

(l) Commonwealth: The Commonwealth of Pennsylvania.

(m) Composite Sample: A series of samples based on time (time-proportioned) or flow (flow-proportioned), taken over a given period of time and combined in a single reservoir to determine pollutant level(s).

(n) Cooling Water: The water discharged from any use such as air conditioning, cooling or refrigeration, or to which the only pollutant added is heat and which does not contain a level of contaminants detectably higher than that of the source of the water.

(o) Daily Maximum: The maximum allowable discharge of a pollutant during a calendar day or other twenty-four (24) hour period as allowed by the POTW. Where maximum limitations are expressed in units of mass, the daily discharge is the total mass discharged over the course of a day. Where daily maximum limitations are expressed in terms of concentration, the daily discharge is the arithmetic average of all measurements taken that day.

(p) Direct Discharge: The discharge of treated or untreated wastewater directly to the waters of the Commonwealth which may occur through the City's stormwater conduits or combined sewer outfall structures.

(q) Effluent Data: For any user discharging wastewater to the City's sewer system, effluent data shall mean:

(1) Information necessary to determine the identity, amount, frequency, concentration, temperature, or other characteristics (to the extent related to water quality) of any pollutant which has been discharged by the source (or of any pollutant resulting from any discharge from the source), or any combination of the foregoing;

(2) Information necessary to determine the identity, amount, frequency, concentration, temperature, or other characteristics (to the extent related to water quality) of the pollutants which, under an applicable standard or limitation, the source was authorized to discharge (including, to the extent necessary for such purpose, a description of the manner or rate of operation of the source); and

(3) A general description of the location and/or nature of the source to the extent necessary to identify the source and to distinguish it from other sources (including, to the extent necessary for such purposes, a description of the device, installation, or operation constituting the source).

(r) Environmental Protection Agency or EPA: The United States Environmental Protection Agency, or where appropriate the term may also be used as a designation for the Administrator or other duly authorized official of said agency.

(s) Grab Sample: A sample which is taken from a wastestream on a one-time basis, in fifteen (15) minutes or less, and with no regard to the volume of flow of the wastestream.

(t) Holding Tank Waste: Any waste from holding tanks such as vessels, chemical toilets, campers, trailers, septic tanks, and vacuum-pump tank trucks.

(u) Indirect Discharge: The discharge or the introduction of pollutants, including Holding Tank Waste, into the POTW.

(v) Industrial User or User: Any person that introduces or has the potential to introduce an Indirect Discharge regulated under the Act, State or local law, to the POTW.

(w) Interference: A discharge which, alone or in conjunction with a discharge or discharges from other sources:

(1) inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

(2) is a cause of a violation of any requirement of the City's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

(3) In addition, Interference shall mean any of the following:

(A) the introduction of pollutants into the POTW which alone or in conjunction with other discharges, inhibits or disrupts the process, operations or maintenance of the POTW, or causes an evacuation of any POTW personnel, whether or not it causes or contributes to a violation of the City's NPDES Permit; or

(B) the introduction of pollutants, either alone or in conjunction with other discharges, which when reaching the Treatment Plant, inhibits, disrupts or limits the Solid Waste Byproducts disposal options

available to the POTW, whether or not it causes or contributes to a violation of Section 405 of the Act, the Solid Waste Disposal Act or any other law or regulation regulating Solid Waste Byproducts; or

(C) the introduction of pollutants into the City's Collector System, which alone or in conjunction with other discharges, inhibits, disrupts or adversely affects the operations or maintenance of the Collector System.

(x) Monthly Average: The arithmetic mean of the daily values for effluent samples collected over a calendar month.

(y) National Categorical Pretreatment Standards: Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with Sections 307(b) and (c) of the Act (33 USC 1317) which applies to a specific category of Industrial Users and Pretreatment Standards as published in 40 CFR Chapter I, Sub Chapter N.

(z) National Pollutant Discharge Elimination System or NPDES Permit: A permit issued pursuant to Section 402 of the Act (33 USC 1342).

(aa) National Prohibitive Discharge Standard or Prohibitive Discharge Standard: Any regulation developed under the authority of Section 307(b) of the Act and 40 CFR Part 403.5.

(bb) New Source:

(1) Any building, structure, facility or installation from which there is or may be a discharge of pollutants, the construction of which commenced after the publication of proposed Pretreatment Standards under section 307(c) of the Act which will be applicable to such source if such Standards are thereafter promulgated in accordance with that section, provided that:

(A) the building, structure, facility or installation is constructed at a site at which no other source is located; or

(B) the building, structure, facility or installation totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or

(C) the production or wastewater generating processes of the building, structure, facility or installation are substantially independent of an existing source at the same site.

(2) Construction on a site at which an existing source is located results in a modification rather than a New Source if the construction does not create a new building, structure, facility or installation meeting the criteria of Section 501.2(bb)(1)(B) or Section 501.2(bb)(1)(C), but otherwise alters, replaces, or adds to existing process or production equipment.

(3) Construction of a new source as defined in Section 501.2(bb)(1) and Section 501(bb)(2) has commenced if the owner or operator has either:

(A) begun or caused to begin as part of a continuous onsite construction program:

(i) any placement, assembly, or installation of facilities or equipment; or

(ii) significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or facilities which is necessary for the

placement, assembly, or installation of new source facilities or equipment.

(B) or entered into a binding contractual obligation for the purchase of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies do not constitute a contractual obligation under this paragraph.

(cc) Non-Domestic Users: Commercial, industrial or municipal users who discharge to the POTW.

(dd) Pass Through: A discharge which exits the POTW to the receiving stream or its atmosphere in quantities or concentrations which alone or in conjunction with other discharges is a cause of a violation of any requirement of the City's NPDES permit or a violation of any air emission standard set by the Clean Air Act, State or local rules and regulations governing emissions to the air (including an increase in the magnitude or duration of a violation).

(ee) Person: Any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine, the singular shall include the plural where indicated by the context.

(ff) pH: The negative logarithm (base 10) of the concentration of hydrogen ions expressed in moles per liter of solution.

(gg) Pollution: The man-made or man-induced alteration of the chemical, physical, biological, and/or radiological integrity of water.

(hh) Pollutant: Any dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, and agricultural waste or any other contaminant discharged into water.

(ii) Pretreatment or Treatment: The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater to a less harmful state prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. The reduction, elimination or alteration can be obtained by physical, chemical or biological processes, process changes, or other means, except as prohibited by Section 501.3(b)(20)(G).

(jj) Process Wastewater: Any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

(kk) Pretreatment Standards or Requirements: Any substantive or procedural requirement related to pretreatment, including, but not limited to, those requirements found in the Clean Water Act, the General Pretreatment Regulations (40 CFR Part 403), the National Categorical Pretreatment Standards, the Resource Conservation and Recovery Act (42 USC 6901 et seq.), the Solid Waste Management Act (35 P.S. 6018.101 et seq.) as they relate to the proper disposal of pretreatment sludges, these Regulations and any order issued under these Regulations, the

Industrial User's Wastewater Discharge Permit and any other federal, state or local law or regulation which regulates discharges to the POTW.

(ll) Publicly Owned Treatment Works or POTW: A treatment works as defined by Section 212 of the Act (33 USC 1292) which is owned by the City including any devices and systems used in the storage, treatment, recycling or reclamation of municipal sewage and industrial waste. This definition includes any sewers that convey wastewater to the POTW Treatment Plant, but does not include pipes, sewers or other conveyances not connected to a facility providing treatment. For the purposes of this regulation, "POTW" shall also include any sewers that convey wastewater to the POTW from persons outside the City who are, by contract or agreement with the City, users of the City's POTW.

(mm) POTW Treatment Plant or Treatment Plant: That portion of the POTW designed to provide treatment to wastewater.

(nn) Shall is mandatory; May is permissive.

(oo) Significant Industrial User: The term Significant Industrial User shall mean the following:

(1) any Industrial User subject to any National Categorical Pretreatment Standard; or

(2) any Industrial User that discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, non-contact cooling and boiler blowdown wastewater) or contributes a process wastestream which makes up five percent (5%) or more of the average dry weather hydraulic or organic capacity of the POTW Treatment Plant; or

(3) any Industrial User that is found by the City, DEP or EPA to have a reasonable potential, either alone or in conjunction with other discharges, to adversely affect the POTW, the Collector System, the Solid Waste Byproducts of the POTW, or air emissions from the POTW.

(pp) Solid Waste Byproducts: Materials related to POTW operations which include, but are not limited to, grit, scum, screenings, incinerator ash, sludge and dredge spoils.

(qq) Spill or Slug Discharge: Any discharge of a non-routine, episodic nature, including, but not limited to, an accidental spill or non-customary batch discharge, or any discharge at a flow rate or concentration which could cause a violation of the prohibited discharge standards found in Section 501.3, Section 501.4 and Section 501.5 of these Regulations.

(rr) State: The Commonwealth of Pennsylvania.

(ss) Standard Industrial Classification (SIC): A classification pursuant to the Standard Industrial Classification Manual issued by the Executive Office of the President, Office of Management and Budget, 1972, as amended.

(tt) Stormwater: Any flow occurring during or following any form of natural precipitation and resulting therefrom.

(uu) Suspended Solids: The total suspended matter that floats on the surface of, or is suspended in water, wastewater or other liquids, and which is removable by laboratory filtering, expressed in terms of concentration (milligrams per liter (mg/l)).

(vv) Toxic Pollutant: Any pollutant or combination of pollutants listed as toxic pursuant to Pennsylvania Statutes and Rules, Section 307(a) of the Act or other Federal statutes.

(ww) Wastewater: The liquid and water-borne wastes from dwellings, commercial buildings, industrial facilities, utility structures, institutions and construction sites, together with any groundwater, surface water and stromwater that may be present, whether treated or untreated.

(xx) Waters of the Commonwealth: All streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the Commonwealth or any portion thereof.

(yy) Wastewater Discharge Permit or Permit: As set forth in Section 502.1 of these Regulations.

(zz) Abbreviations --The following abbreviations shall have the designated meanings:

(1) BOD_5: Five-day Biochemical Oxygen Demand

(2) BMP: Best Management Practice.

(3) CERCLA: Comprehensive Environmental Response, Compensation and Liability Act. (42 USC 9601 et seq., as amended)

(4) CFR: Code of Federal Regulations

(5) DEP: Pennsylvania Department of Environmental Protection

(6) EPA: United States Environmental Protection Agency

(7) l: Liter

(8) mg: Milligrams

(9) mg/l: Milligrams per liter

(10) NAICS: North American Industry Classification System

(11) NPDES: National Pollutant Discharge Elimination System

(12) POTW: Publicly Owned Treatment Works

(13) RCRA: Resource Conservation and Recovery Act

(14) SIC: Standard Industrial Classification

(15)SIU: Significant Industrial User

(16) SWDA: Solid Waste Disposal Act, 42 USC 6901 et seq.

(17) TSS: Total Suspended Solids

(18) USC: United States Code

501.3 General Discharge Prohibitions

(a) No User shall contribute or cause to be contributed, directly or indirectly, to the POTW any pollutant or wastewater which will pass through or interfere with the operation or performance of the POTW. These general prohibitions apply to all Users of the POTW whether or not the User is

subject to Federal Categorical Pretreatment Standards or any other Federal, State, or local Pretreatment Standards or Requirements.

(b) No User shall contribute the following substances to any POTW:

(1) any liquids, solids or gases which by reason of their nature or quantity are, or may be, sufficient either alone or by interaction with other substances to cause fire or explosion or be injurious in any other way to the POTW or to the operation of the POTW. At no time shall the atmosphere in a private sewer leading to a POTW structure exceed 25% Lower Explosive Limit (LEL) unless the User can demonstrate that such a discharge does not create at the point of discharge into the POTW or at any other point in the POTW a reading over 10% LEL as measured by an explosimeter. Prohibited materials include, but are not limited to, any substances which can create a fire or explosion hazard to the POTW;

(2) solid or viscous substances which may cause obstruction to the flow in a sewer or other interference with the operation of the wastewater treatment facilities such as, but not limited to, grease, garbage with particles greater than one-half inch (1/2") in any dimension, animal guts or tissues, paunch, manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastics, tar, asphalt residues, residues from refining or processing of fuel or lubricating oil, mud, or glass grinding or polishing wastes or any material which can be disposed of as trash;

(3) any wastewater having a pH less than 5.5 or higher than 12.0 as measured by a grab sample or wastewater having any other corrosive property capable of causing damage or hazard to structures, equipment, and/or personnel of the POTW;

(A) No Industrial User measuring pH continuously at the point of discharge shall discharge wastes having a pH lower than 5.5 or higher than 12.0 at any time except for a period not to exceed a total of five (5) minutes in any one (1) hour period. In the event that a discharge of a pH lower than 5.5, or higher than 12.0 for a period exceeding five (5) minutes occurs, the Industrial User must demonstrate that the pH will not exceed the range of 5.5 to 10.0 at a down stream point designated by the City. In no case may the Industrial User's discharge contain a pH less than 5.0 at the point of discharge into the POTW.

(B) In the event that the influent wastewater flow arriving at a Treatment Plant is outside the pH range of 6.5 to 8.5, the City may limit the Industrial Users to that Treatment Plant to a pH range of 6.0 to 9.0, upon oral or written notice, for as long as the City deems necessary.

(4) any wastewater containing pollutants which may, either singly or by interaction with other pollutants:

(A) injure, adversely affect or interfere with any wastewater treatment process; or

(B) constitute a hazard to humans or other biota, or may create an adverse effect in the receiving waters of the POTW, as determined through biomonitoring conducted on the POTW's effluent or through in-stream monitoring; or

(C) violate any provision of the Federal Clean Air Act (42 USC 7401 et

seq.) as amended, or local air quality regulations;

(%) any noxious or malodorous liquids, gases, or solids which either singly or by interaction with other wastes are sufficient to create a public nuisance or hazard to life or may result in toxic gases, vapor or fumes or are sufficient to prevent entry into the POTW for maintenance and repair without respiratory protection or other personal safety equipment;

(6) any substance which may cause the POTW's effluent or any other product of the POTW such as residues, sludge, or scum, to be unsuitable for reclamation and reuse or to interfere with the reclamation process. In no case shall a substance discharged to the POTW cause the City to be in non-compliance with sludge use or disposal criteria, guidelines or regulations developed under Section 405 of the Act, nor any criteria, guidelines, or regulations affecting sludge use or disposal developed pursuant to the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, or State criteria applicable to the sludge management methods being used by City;

(7) any substance which will cause the City to violate its NPDES and/or State Disposal System Permit or the receiving water quality standards;

(8) any wastewater with objectionable color not removed in the treatment process, including, but not limited to, dye wastes and vegetable tanning solutions;

(9) any wastewater having a temperature which will inhibit biological activity in the POTW Treatment Plant resulting in Interference, but in no case wastewater with a temperature at the introduction into the POTW which exceeds 60°C (140°F) or which shall cause the wastewater entering the POTW Treatment Plant to exceed 40°C (104°F);

(10) any pollutants, including oxygen demanding pollutants and suspended solids released at a flow rate and/or pollutant concentration which a User knows or has reason to know will cause Interference or Pass Through to the POTW. In no case shall a slug load have a flow rate or contain concentrations or quantities of pollutants that exceed for any time period longer than fifteen (15) minutes more than five (5) times the average twenty-four (24) hour permitted concentration, quantities, or flow during normal operation;

(11) any wastewater containing any radioactive wastes or isotopes of such half life or concentrations as may exceed limits established by the City in compliance with applicable State or Federal regulations;

(12) any wastewater which causes a hazard to human life or creates a public nuisance;

(13) any wastewater containing motor oils or lubricants removed from vehicles or other machinery;

(14) any wastewater containing substances which may solidify or become viscous at temperatures between 0° C (32° F) and 65 °C (149°F);

(15) any wastewater containing in excess of 100 mg/l of fats, oils and greases of mineral, petroleum or unknown origin at any time as shown by grab sample;

(A) Wastewaters discharged to the POTW shall contain no floatable or non-mulsified fats, oils and greases of animal or vegetable origin. Specific numerical limits

for these pollutants may be placed in an Industrial User's Wastewater Discharge Permit if found by the City to be necessary. Wastewater shall in no case contain concentrations of these pollutants high enough to cause Interference or Pass Through. The limits for both fats, oils and greases of mineral, petroleum or unknown origin and of animal or vegetable origin may be reduced by the City without amending these Regulations where the existing limits cause adverse impacts to the Collector System and/or POTW.

(16) any sludges from septage or holding tanks without prior written approval of the City;

(17) any wastewater which because of its chemical nature or composition causes the sewer atmosphere to contain airborne chemical concentrations in excess of concentrations established by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR Part 1910, regardless of duration of exposure experienced by any individual, whether a City or contractor's employee, unless written authorization is granted by the Commissioner;

(18) wastewater which may create a fire or explosive hazard in the POTW, including, but not limited to, wastewater with a closed-cup flashpoint of less than 60°C (140 °F) using the test methods specified in 40 CFR 261.21; or

(19) any wastewater which, alone or in conjunction with any other discharges, causes foam anywhere in the Treatment Plant or its effluent.

(20) In addition, the following activities are prohibited:

(A) No person shall discharge wastewater, pollutants, chemicals or any other substance or contaminant into street inlets or through sewer manholes without the prior written approval of the City.

(B) No person who generates wastewater at one property shall discharge it at another property without prior written approval from the City.

(C) No person shall discharge wastewater in quantities or at rates of flow which may have an adverse or harmful effect on or overload the City's sewer system or Treatment Plants or cause excessive or additional treatment costs or render inaccurate or interfere with the function of sewer metering devices.

(D) No person shall discharge a wastewater flow contributing greater than 2,500 pounds per day of five (5) day biochemical oxygen demand, or contributing greater than 1,750 pounds per day of suspended solids or having a volume in excess of three (3) million gallons per day without prior written approval of the City.

(E) No person shall store or handle any material, including hazardous substances defined by CERCLA, in any area draining to the City Wastewater System, because discharge or leakage from such storage or handling may create an explosion hazard in the sewer system or Treatment Plants or may constitute a hazard to human beings or animals or the receiving stream, or may in some other way have a deleterious effect upon the Treatment Plants. Such storage or handling shall be subject to review by the City, and shall require a spill control plan with reasonable safeguards to prevent discharge or leakage of such materials into the sewers.

(F) Industrial Users processing regulated wastestreams through their pretreatment facilities shall not bypass such pretreatment facilities unless they notify the City in writing and obtain prior written approval from the City.

(G) No person shall increase the use of potable water, groundwater, rainwater, river water or process water or in anyway attempt to dilute an effluent as a partial or complete substitute for adequate treatment to achieve compliance with any Pretreatment Standards or Requirements.

501.4 General Pretreatment Regulations and National Categorical Pretreatment Standards:

All users shall comply with all provisions contained in the General Pretreatment Regulations (40 CFR Part 403) as amended, and if applicable, National Categorical Pretreatment Standards (40 CFR Chapter I. Subchapter N) as amended. Any limitations imposed under the General Pretreatment Regulations or the National Categorical Pretreatment Standards which are more stringent than the limitations in these Regulations shall supersede the limitations imposed under these Regulations.

(a) Modification of Federal Categorical Pretreatment Standards: Where the City's Wastewater System achieves consistent removal of pollutants limited by Federal Pretreatment Standards, the City may apply to the Approval Authority for modification of specific limits in the Federal Pretreatment Standards of an Industrial User or a whole category.

501.5 Specific Pollutant Limitations

(a) No person shall discharge the following substances in excess of the concentrations, in milligrams per liter, (mg/l), as expressed below:

Substance	Daily Maximum	Monthly Average
arsenic	0.15	0.10
cadmium	0.2	0.1
chromium (total)	7.0	4.0
copper	4.5	2.7
cyanide (total)	10.0	
lead	0.69	0.43
mercury	0.01	0.005
nickel	4.1	2.6
selenium	0.2	0.1
silver	0.43	0.24
zinc	4.2	2.6

(b) No person shall discharge any of the substances listed below to the POTW without obtaining prior written approval of the City.

Acrylonitrile
Aldrin
Alpha BHC
Aluminum
Benzene
Benzo (a) pyrene
Benzotrichloride
Beryllium
Bis(2-ethylhexyl)phthalate (DEHP)
Bromobenzene
Bromodichloromethane
Bromoform
Carbon tetrachloride

Chlordane
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
2-Chlorophenol
Cumene (Isopropylbenzene)
DDT/DDE/DDD
Dibutylphthalate
Dichlorobromomethane
bis (2-chloroethyl) ether
Dieldrin
Dioxins
Dimethyl Sulfoxide (DMSO)
Dimethylnitrosamine
Ethylbenzene
Heptachlor
Hexachlorobutadiene
Hexachlorobenzene
Iron
Lindane
Dichlorobenzene
Methyl chloride (Chloromethane)
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
Molybdenum
Xylenes
o-Chlorotoluene
o-Dichlorobenzene
p-Dichlorobenzene
p-Chlorotoluene
Phenanthrene
Phenols
Pyrene
Styrene
Tetrachloroethylene (Perchloroethylene)
Titanium
Toluene
Toxaphene (chlorinated camphene)
Trichloroethylene
Vinyl chloride
Tetrachloroethane
1,1,2-Trichloroethane
Dichloroethane
1,1-Dichloroethlyene
1,1-Dichloropropene
trans-1,2-Dichloroethylene
1,2,3-Trichloropropane
cis-1,2-Dichloroethylene
1,2-Dibromo-3-Chloropropane
1,2-Dichloropropane
1,3-Dichloropropane
1,3-Dichloropropene
2,2-Dichloropropane
2,4-Dinitrophenol
2,4-Dinitrotoluene
3,3-Dichlorobenzidiene
Volatile Organic Sulfides

(c) The City reserves the right to modify this list of materials prohibited from entering the POTW.

(d) Polychlorinated Biphenyls (PCBs): The PCB content of waste shall be non-detectable by EPA method 608.

501.6 State Requirements

State requirements and limitations on discharges shall apply in any case where they are more stringent than Federal requirements and limitations or those in these Regulations.

501.7 Accidental Discharges

(a) Spill and Slug Discharge Prevention Plan: Each Significant Industrial User shall provide protection from accidental discharge of prohibited materials or other substances which may interfere with the POTW by developing a Spill and Slug Discharge Prevention Plan. Facilities to prevent accidental discharge of prohibited materials shall be provided and maintained at the owner or User's own cost and expense. Detailed plans showing facilities and operating procedures to provide this protection shall be submitted to the City for review, and shall be approved by the City before construction of the facility. The Spill

and Slug Discharge Plan shall contain, at a minimum, the following:

(1) description of discharge practices, including routine and non-routine batch discharges;

(2) description of stored chemicals;

(3) procedures for promptly notifying the City of spills or slug discharges, with procedures for follow-up written notification within five (5) working days;

(4) any necessary procedures to prevent accidental spills and slug discharges, including inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff and worker training;

(5) any necessary measures for building containment structures or equipment;

(6) any necessary measures to assure the integrity of storage;

(7) any necessary measures for controlling toxic organic pollutants (including solvents);

(8) any necessary procedures and equipment for emergency response; and

(9) any necessary follow-up practices to limit the damage suffered by the POTW or the environment.

(b) All existing Users shall complete such a plan within three (3) months of notice to do so by the City. No User who commences a new discharge to the POTW after the effective date of these Regulations shall be permitted to introduce pollutants into the Wastewater System until accidental discharge procedures have been approved by the City. Review and approval of such plans and operating procedures shall not relieve the Industrial User from the responsibility to modify the User's facility as necessary to meet the requirements of these Regulations.

(c) Notification: In the case of an accidental discharge, it is the responsibility of the User to immediately notify the City of the incident by telephone. The notification shall include date, time and location of discharge, type of waste including concentration and volume, duration of discharge, and any corrective actions taken by the User.

(d) Written Notice: Within five (5) business days, unless a different period is prescribed by the City, following an accidental discharge, the User shall submit to the City a detailed written report describing the cause of the discharge and the measures that will be taken by the User to prevent similar future occurrences. Such notification shall not relieve the User of any expense, loss, damage, or other liability which may be incurred as a result of damage to the POTW, fish kills, or any other damage to person or property; nor shall such notification relieve the User of any fines, civil penalties, or other liability which may be imposed by these Regulations or other applicable law.

(e) Notice to Employees: A notice shall be permanently posted on the User's bulletin board(s) or other prominent places advising employees whom to call in the event of a dangerous discharge. Employers shall advise all employees who may cause or be injured by such a discharge of the emergency notification procedure.

501.8 Fees

(a) Purpose: It is the purpose of this Section to provide for the recovery of costs from the Users of the City's Wastewater System for the implementation of the program established herein.

(b) Charges and Fees

(1) All Industrial Users applying for or issued a permit after the promulgation of these Regulations shall pay a fee of One Thousand Dollars ($1,000.00) per permit application.

(2) The City may adopt charges and fees which may include:

(A) fees for reimbursement of costs of setting up and operating the City's Pretreatment Program;

(B) fees for monitoring, inspections and surveillance procedures;

(C) fees for reviewing accidental discharge procedures and construction; and

(D) other fees as the City may deem necessary to carry out the requirements contained herein.

(3) These fees relate solely to the matters covered by these Regulations are separate from all other fees chargeable by the City. The City reserves the right to change the fees set forth herein.

501.9 Civil Penalty Assessment Policy

(a) Purpose: The purpose of this section is to enact a civil penalty assessment policy pursuant to the Publicly Owned Treatment Works Penalty Law, Act No.1992-9.

(b) Scope: The POTW Penalty Law allows the City, as the owner and operator of publicly owned treatment works with an approved pretreatment program, to assess civil penalties of up to Twenty-Five Thousand Dollars ($25,000) per violation of any Pretreatment Standards or Requirements per day. Each term, condition or parameter violated shall constitute a separate and distinct offense. Each day on which a violation occurs or continues to occur shall constitute a separate and distinct offense. In developing this Civil Penalty Assessment Policy, the City considered the following factors:

(1) the damage to air, water, land or other natural resources of this City and Commonwealth and their uses;

(2) cost of restoration and abatement;

(3) savings resulting to the person in consequence of the violation;

(4) history of past violations;

(5) deterrence of future violations;

(6) harm and/or potential harm to the POTW and/or its employees;

(7) whether the violation resulted or could have resulted in the City violating its NPDES Permit; and

(8) whether the violation resulted or could have resulted in the City violating any law or regulation affecting its sludge disposal options.

(c) Mandatory Civil Penalties: Civil Penalties shall be assessed against any Industrial User in significant noncompliance ("SNC") with any Pretreatment Standards or Requirements. The amount of the civil

penalty shall be calculated in accordance with Sections 501.9(f), (g), and (h) of these Regulations. An Industrial User is in significant noncompliance if it meets one or more of the following criteria.

(1) If 33% or more of all samples taken for any single parameter during a six month period demonstrate exceedances of any numeric Pretreatment Standard or Requirement, including the daily maximum effluent limitation, the monthly average limitation, and any instantaneous limits, as defined by any regulation containing pollutant discharge limits promulgated by the EPA in accordance with section 307(b) and (c) of the Act, which applies to Industrial Users. This term includes prohibitive discharge limits established pursuant to Section 501.5.

(2) Monitoring for any parameter less than 100% of the total sampling events required by the Permit.

(3) Discharging without the required Permit under these Regulations.

(4) Violation of any Pretreatment Standard or Requirement that the City determines has caused, either alone or in combination with any other discharges, interference or pass through (including endangering the health of POTW personnel or the general public).

(5) Any discharge of a pollutant that has caused imminent endangerment to human health, welfare or the environment or has resulted in the City's exercise of its emergency authority.

(6) Violation by forty-five (45) days or more of the scheduled date of compliance with milestones for starting construction, completing construction, attaining final compliance or any other milestone event described in any compliance schedule.

(7) Failure to provide any required reports such as Baseline Monitoring Reports, 90 Day Compliance Reports, Periodic Compliance Reports, Spill or Slug Discharge Reports, Responses to Notices of Violation or Notices of Significant Non Compliance, Compliance Schedule Reports, Pretreatment Facilities Report or any other Report required by law or Permit within thirty (30) days after the report's due date.

(8) Failure to report noncompliance accurately.

(9) Violation of any Best Management Practice requirements or any other violation or group of violations that:

(A) adversely affects the operation or implementation of the local pretreatment program; or

(B) either alone or in conjunction with any other discharge causes harm to the POTW.

(d) Discretionary Civil Penalties: Civil Penalties are discretionary where an Industrial User's violation(s) of the Pretreatment Standards or Requirements do not constitute significant noncompliance as defined in Section 501.9(c) of these Regulations. In exercising its discretion as to whether to assess civil penalties for these violations, the City shall consider the following factors:

(1) Compliance History
The City shall examine the Industrial User's compliance history for the specific term or condition now being violated as well as the Industrial User's compliance history with all

other Pretreatment Standards or Requirements.

(2) Reasons for noncompliance.

(3) Magnitude of violation.

(4) Good faith compliance efforts. Good faith compliance efforts consist of the following actions:

(A) whether the Industrial User properly notified the City of the violation;

(B) whether the Industrial User responded to the Notice of Violation within fifteen (15) days as required in the Notice;

(C) the corrective actions the Industrial User has taken or will take to ensure a return to compliance; and

(D) the timeliness of these corrective actions.

(e) Where it is determined that a civil penalty should be levied under this Section, the amount of the civil penalty shall be calculated in accordance with Sections 501.9(f), (g), and (h).

(f) Civil Penalty

The calculation of the civil penalty which shall be assessed shall be in conformity with this Section and Sections 501.9(g) and 501.9(h) of these Regulations.

In this Section, violations of Pretreatment Standards or Requirements are contained in Column I of the Civil Penalty Grid. (See note 1, immediately after the Grid, for further explanation.) Once the specific type of violation has been identified in the Civil Penalty Grid, the appropriate range of civil penalties for the violation is selected from either: Column II, III or IV. (See notes 2, 3 and 4, for further explanation on the selection of civil penalty ranges.) Once the range of fines is selected, the precise civil penalty within that range is determined by considering the factors enumerated in Column V. (See note 5 for further explanation in applying the selection factors.) Finally, there are two exceptions to the general rules in using this Civil Penalty Grid. (See note 6 for further explanation.)

CIVIL PENALTY GRID

Column I	Column II	Column III	Column IV	Column V
Violations [1]	Non-SNC or First SNC Notification[2]	Second Consecutive SNC Notification [3]	Third Consecutive SNC Notification or Causes or Contributes to Pass Through or Interference[4]	Selection Factors[5]
1. Daily, Hourly or Instantaneous Effluent Limits or Best Management Practices	$300 – $5,000	$5,000 – 15,000	$15,000 - $25,000	B, A, C, D
2. Monthly Average Effluent Limits	$300 - $9,000	$3,000 - $12,000	$12,000 - $25,000	B, A, C, D
3. Self-Monitoring (sampling)	$300 – $5,000	$5,000 - $15,000	$15,000 - $25,000	B, D, C.
4. Reporting	$300 - $1,000	$1,000 - $5,000	$5,000 – $25,000	B, D, C
5. Incomplete Reporting	$300 – $5,000	Not Applicable (N/A)	N/A	B, E, D
6. Intentional Falsification of Reports or Data or knowingly rendering any monitoring device or method inaccurate	$25,000	N/A	N/A	N/A
7. Spills or Slug Discharges	$300 - $10,000	N/A	$15,000 - $25,000	B, A,C, D
8. Unauthorized Discharge	$300 - $10,000	N/A	$10,000 - $25,000	A, D
9. Compliance Schedule Completion Dates	$300 - $5,000	$5,000 - $15,000	$15,000 – $25,000	F, D
10. Dilution to Meet Effluent Limits	$300 - $25,000	N/A	N/A	B, D
11. Inadequate Record Keeping[6]	$300 - $5,000	$5,000 - $15,000	$15,000 - $25,000	B, D, E
12. Failure to Admit Authorized Personnel[6]	$300 – $10,000	$10,000 - $25,000	N/A	D, B
13. Failure to notify of any Substantial Change in Volume of Pollutants in Discharge (See 40 CFR 403.21(j))	$300 - $10,000	N/A	$10,000 - $25,000	B, A, C, D
14. Failure to Mitigate Noncompliance	$300 - $10,000	N/A	$10,000 - $25,000	A, B, C, D
15. Improper Disposal of Pretreatment sludges and spent chemicals	$300 - $10,000	N/A	$10,000 - $25,000	B, D
16. Unauthorized Bypass	$300 - $10,000	N/A	$10,000 - $25,000	C, A

Explanatory Notes to Civil Penalty Grid:

Note Number 1

Column I contains a list of sixteen categories of Pretreatment Standard or Requirement violations. These sixteen categories of violation should be all inclusive, covering all possible types of Pretreatment Standards or Requirement violations. If, however, a violation occurs which does not fall within one of the categories, then the civil penalty for that violation shall be assessed in accordance with the method used for assessing civil penalties for violation of daily or hourly effluent limits.

The sixteen categories of Pretreatment Standards or Requirements violations found in Column I are explained in greater detail immediately below:

1. Daily, Hourly or Instantaneous Effluent Limits or Best Management Practices: This category addresses violations of the effluent discharge limits for daily, hourly or instantaneous discharges or best management practices.

2. Monthly Average Effluent Limits: This category addresses violations of the monthly average effluent limits.

3. Self-Monitoring (sampling): Permitted Industrial Users must sample their effluent in accordance with the terms and conditions of their Wastewater Discharge Permits. Violations of these self-monitoring requirements are addressed in this category. Examples of these violations include, but are not limited to, the following:

a) failure to sample for any required parameters;

b) failure to follow proper sampling protocols;

c) failure to sample at the appropriate point; and

d) failure to sample as frequently as required in the Wastewater Discharge Permit.

4. Reporting: The Industrial User is subject to numerous reporting and notification requirements. Failure to provide any of these reports and notifications, or providing these reports and notifications in an untimely fashion, is addressed in this category. These reports and notifications include, but are not limited to, the following:

a) Baseline Monitoring Reports;

b) 90 Day Compliance Reports (40 CFR 403.12(d));

c) Periodic Compliance Reports;

d) Spill Plans;

e) Responses to Notices of Violations or Notices of Significant Non Compliance;

f) Surcharge Reports;

g) Reports required pursuant to any Compliance Schedule, Administrative Order or Consent Decree;

h) Notification of spill or slug discharge; Follow-up written report within five (5) days of spill or slug event;

i) Reporting sampling noncompliance within twenty-four (24) hours of becoming aware of violation; Reporting first sample result showing a return to compliance;

j) Application for Wastewater Discharge Permit or late application;

k) Hazardous Waste Notification pursuant to 40 CFR 403.12(p); and

l) Pretreatment Facilities Reports.

5. Incomplete Reporting:
In this category, reports and notifications are timely submitted but contain errors or omissions.

6. Intentional Falsification of Reports or Data or Knowingly Rendering Any Monitoring Device or Method Inaccurate: In this category, where the Industrial User has intentionally falsified reports or data, the maximum penalty of $25,000 per falsification will be assessed. Similarly, where the Industrial User knowingly renders any monitoring device or method inaccurate, this category requires that the maximum penalty be assessed.

7. Spills or Slug Discharges: A spill or slug discharge is any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or non-customary batch discharge. Violations as the result of spills or slug discharges are addressed in this category.

8. Unauthorized Discharge:
This category includes three types of violations. First, where an Industrial User is required to have a Permit discharges pollutants without a Wastewater Discharge Permit. Second, where an already permitted Industrial User is discharging pollutants from a regulated process which has not been specifically approved by the City and controlled by the User's Wastewater Discharge Permit. (Please note that each pollutant discharged without a permit constitutes a separate and distinct offense.) Third, any discharge violating Section 501.3, Section 501.4 or Section 501.5 of these Regulations.

9. Compliance Schedule Completion Dates: In Administrative Orders and Consent Decrees there will often appear compliance schedules for returning the Industrial User to compliance. This category addresses violations of the compliance schedule completion dates. (Please note that where the Administrative Orders or Consent Decrees contain stipulated penalties for violation of the compliance schedule dates, the stipulated penalties contained therein shall constitute the exclusive civil penalties available for these violations. Therefore, in these cases, the Civil Penalty Grid will not be used.)

10. Dilution to Meet Effluent Limits: This category addresses the situation where the Industrial User is using dilution to achieve compliance with any effluent limit.

11. Inadequate Record Keeping: This category includes any violations of the Pretreatment Standards or Requirements involving record keeping and storage.

12. Failure to Admit Authorized Personnel: This category involves an Industrial User's refusal to allow a City representative ready access to a facility for purposes of inspection, sampling, records examination and/or copying or for the performance of any other duty.

13. Failure to Notify of Any Substantial Change in the Volume or Character of Pollutants in Discharge: (See 40 CFR 403.12(j)). This category involves any violations resulting from the Industrial User's failure to comply with the advance notification of changed discharge requirements contained in 40 CFR 403.12(j).

14. Failure to Mitigate Non Compliance: An Industrial User has an obligation to mitigate its noncompliance. Violation of this obligation is addressed in this category.

15. Improper Disposal of Pretreatment Sludge and Spent Chemicals: Industrial

Users must dispose of hazardous sludge and spent chemicals in accordance with all applicable laws including, but not limited to, the Clean Water Act and the Resource Conservation and Recovery Act.

16. Unauthorized Bypass:
Industrial Users processing regulated wastestream through their pretreatment facilities are prohibited from bypassing such pretreatment facilities unless they notify the City in advance of any bypass and obtain the City's prior written approval authorizing such bypass.

Notes 2, 3, and 4

After the category of violation has been identified, there are several ranges of civil penalties which can be assessed for the violation. Notes 2, 3 and 4 define the appropriate range to be selected.

(a) Note 2 - COLUMN II

NON-SNC or FIRST SNC NOTIFICATION
If the violation does not rise to the level of Significant Noncompliance (SNC) as defined in Section 501.9(c) of these Regulations, the appropriate fining range is therefore contained in Column II. If the violation does constitute SNC as defined in Section 501.9(c) or this is the first time that the Industrial User has been notified that it is in SNC for that specific standard or requirement, then the appropriate fining range is again contained in Column II.

(b) Note 3 - COLUMN III

SECOND CONSECUTIVE SNC NOTIFICATION: This range of civil penalties applies where the Industrial User has received a second Notice of Significant Noncompliance for the same standard or requirement in two (2) consecutive six (6)-month periods.

Where a Notice of SNC is issued for any standard or requirement, and there was no Notice of SNC issued for the standard or requirement in the previous six-month period, the appropriate range reverts to Column II.

If as the result of the issuance of the first SNC Notice, the Industrial User has been issued an Administrative Consent Order or is subject to a Consent Decree, and stipulated penalties are contained therein, then the stipulated penalties shall be the exclusive method for assessing future civil penalties for as long as the stipulated penalty provision remains in effect.

(c) Note 4 - COLUMN IV

THIRD CONSECUTIVE SNC NOTIFICATION OR CAUSES OR CONTRIBUTES TO PASS THROUGH OR INTERFERENCE: This range of civil penalties applies in two situations. First, where the Industrial User has received a third consecutive notice of SNC for the same standard or requirement. Second, where the violation has caused or contributed to interference or pass through, as defined in Sections 501.2 (w) and (dd) of these Regulations. Again, where an Administrative Consent Order or Consent Decree provides for stipulated penalties, the stipulated penalties shall be the exclusive method for assessing future civil penalties for as long as the stipulated penalty provision remains in effect.

NOTE 5 -

Once the type of violation has been identified in Column I, and the appropriate range of civil penalties selected from Columns II, III and IV, the precise civil penalty within the appropriate range must be selected. Selection of the precise civil penalty will be based on those Selection Factors appropriate for each type of violation

which are found in Column V. The six selection factors are lettered A through F as follows:

A. SEVERITY OF VIOLATION

B. SPECIFIC COMPLIANCE HISTORY

C. GENERAL COMPLIANCE HISTORY

D. REASONS FOR VIOLATION

E. COMPLETENESS

F. CONSENT DECREE OR ADMINISTRATIVE ORDER

Most violations found in Column I contain numerous selection factors which must be considered in selecting the precise civil penalty. The selection factors appropriate for each violation are listed in their order of importance and weight which should be given each factor. The first factor listed should be given the greatest weight; the second factor the second greatest weight, etc. Although the relative weight given each factor is determined by its order of listing, the absolute weight has not been provided. This is because violations, and the circumstances surrounding and causing them, are too different and complex to be resolved in a mathematical formula. This can only be determined on a case by case basis.

Selection Factors A through F are explained in greater detail immediately below:

A. Severity of Violation:
This factor considers the degree of severity of effluent violations in three different ways. First, the frequency of violation should be considered, Next, the level of exceedance should be considered. Finally, the violations should be considered from total mass perspective.

B. Specific Compliance History: This factor considers whether and how often in the past the Industrial User has violated the parameter for which it is now being fined.

C. General Compliance History: This factor considers the Industrial User's present and past overall compliance with all Pretreatment Standards or Requirements.

D. Reasons for Violation: (self-explanatory)

E. Completeness: For the violation categories Incomplete Reporting and Inadequate Record Keeping, the level and/or degree of omissions and errors shall be considered.

F. Consent Decree or Administrative Order:
For the violation category Compliance Schedule Completion Dates, the Industrial User's past and present history of compliance with the Decree or Administrative Order should be examined.

Finally, although addressed separately in Sections 501.9(g) and (h) of these Regulations, for all categories of violations, the economic benefit of noncompliance and any damages, costs and fines must be recovered in selecting the precise civil penalty within the appropriate range.

NOTE 6

For most violations, the appropriate range of penalties is selected by the criteria discussed in notes 2, 3 and 4. However, for the categories of Inadequate Record Keeping and Failure to Admit Authorized Personnel, the appropriate ranges are selected differently.

For these categories, the civil penalty range moves from Column II to III if that Industrial User has ever in the past been cited for a violation in that category. The violations do not need to rise to the level of SNC nor do they need to occur in consecutive six (6) month periods.

Similarly, the civil penalty range moves to Column IV for these two categories of violations if the Industrial User has been cited twice or more, at any time in the past, for the same category of violation.

(g) Economic Benefit of Noncompliance

(1) In all cases, the civil penalty assessed shall exceed the economic benefit of noncompliance gained by the Industrial User as a result of not complying with the Pretreatment Standards or Requirements. The economic benefit of noncompliance is that amount of both capital and operating funds saved by the Industrial User by either failing or delaying to install and/or operate the necessary pretreatment to achieve compliance with all Pretreatment Standards or Requirements. The City may use the Guidance Manual for POTWs to Calculate the Economic Benefit of Noncompliance, U.S. Environmental Protection Agency, September 5, 1990, or any subsequent revision, to assist it in calculating the economic benefit of noncompliance.

(2) If a situation arises where the amount assessed under the Civil Penalty Grid in Section 501.9(f) of these Regulations fails to exceed the economic benefit of noncompliance, then the Civil Penalty Grid shall not be used to determine the civil penalty. Rather, the City shall set the civil penalty by first calculating the economic benefit of noncompliance. Next, the amount calculated to be the economic benefit of noncompliance shall be increased by anywhere from 10% to 100%. This increased amount shall constitute the civil penalty. (Simply assessing the economic benefit of noncompliance fails to penalize the Industrial User).

In determining the appropriate increase factor (anywhere from 10% to 100%) the City shall consider the severity of the violations, the reason for the violation and how quickly the Industrial User abates the violation.

(h) Recovery of Damages, Costs and Fines

(1) In all cases, the civil penalty shall, at a minimum, be set so that it fully compensates the City for any damage or injury to the POTW, its employees, the POTW's sludge or the environment. Any and all costs incurred by the City to correct or compensate for the damage or injury shall also be fully recovered in the civil penalty. Costs shall include, but not be limited to, attorney's fees, court costs, court reporter fees and other expenses associated with enforcement activities, as well as all sampling and monitoring expenses related to discovering, enforcing and maintaining the Industrial User's compliance. Where violation of the Pretreatment Standards or Requirements causes, either alone or in conjunction with a discharge or discharges from other sources, the City to violate any local, state or federal law or regulation, and the City is fined for this violation, the civil penalty assessed shall fully reimburse the City for the fine paid.

(2) If a situation arises where the amount assessed under the Civil Penalty Grid fails to fully compensate the City for all damages, costs and fines, then the Civil Penalty Grid shall not be used to determine the civil penalty. Rather, the City shall set the civil penalty by first calculating all damages, costs and fines to the City resulting from the violation. Next, this amount shall be increased by anywhere from 10% to 100%. This increased amount shall constitute the civil penalty.

(3) In determining the appropriate increase factor (anywhere from 10% to 100%) the City shall consider the extent and nature of the damage, its impact on the POTW, the reasons for the violation and how quickly the Industrial User corrects the damage.

(i) Civil Penalty Appeal

The Industrial User charged with the penalty shall have thirty (30) days to pay the proposed penalty in full, or, if the Industrial User wishes to contest either the amount of the penalty or the fact of the violation, the Industrial User must file an appeal, pursuant to the Philadelphia Home Rule Charter. Failure to appeal within this period shall result in a waiver of all legal rights to contest the violation or the amount of the penalty.

502.0 WASTEWATER DISCHARGE PERMITS

502.1 Wastewater Discharge Permits Types

(a) General Permits: Any Significant Industrial User proposing to connect to or contribute to the POTW shall obtain a Wastewater Discharge Permit before connecting to or contributing to the POTW. All existing Significant Industrial Users connected to or contributing to the POTW shall obtain a Wastewater Discharge Permit within 365 days after the effective date of these Regulations.

(b) No Discharge Permits: Any Significant Industrial User with no wastewater discharge from its regulated process(es) shall obtain a No Discharge Permit, as long as its facility is connected to or contributes to the POTW and has the potential to discharge wastewater from its regulated process(es).

(c) Trucked or Hauled Wastewater Permit: Any person trucking or hauling wastewater to the POTW must first obtain a septage discharge permit. The following prohibitions apply to all trucked or hauled wastewater:

(1) All wastes are to be discharged only at the designated location contained in the User's septage discharge permit.

(2) All loads are to be sampled and approved prior to discharge.

(3) Only sanitary septic wastes are to be discharged unless prior written approval is given.

(4) Sludges or grease trap wastes shall not be discharged.

(d) Groundwater Discharge Permit: Any non-domestic User discharging pumped-out groundwater to the City's sewer system must first obtain a Groundwater Discharge Permit.

(e) Manhole Pump-out Permit: Any non-domestic User discharging wastewater from underground structures to the City's sewer system must first obtain a manhole pump-out permit.

502.2 Wastewater Discharge Permit Administration

(a) Permit Application: Users required to obtain a Wastewater Discharge Permit shall complete and file with the City a Baseline Monitoring Report or other

report as may be required by the City. Existing Users shall apply for a Wastewater Discharge Permit within 30 days after the effective date of these Regulations, unless the City has previously issued such a permit which has not expired. New Users shall apply at least 90 days prior to connecting to or contributing to the POTW. The Baseline Monitoring Report shall contain the information required by Section 502.4(a).

(1) The City will evaluate the data furnished by the User and may require additional information. After evaluation and acceptance of the data furnished, the City may issue a Wastewater Discharge Permit subject to terms and conditions provided herein.

(b) Promulgation of Additional National Categorical Pretreatment Standards: When additional and/or new National Categorical Pretreatment Standards are promulgated, any User subject to such additional or new Standards shall apply for a Wastewater Discharge Permit within 180 days of the promulgation of such Standard. In addition, any User with an existing Wastewater Discharge Permit shall submit to the City within 180 days of the promulgation of an applicable National Categorical Pretreatment Standard the information required by Sections 502.4(a)(7) and (8) of these Regulations.

(c) Permit Modifications: The City may modify any existing permit for any of the following reasons:

(1) to incorporate any new or revised federal, state or local Pretreatment Standards or Requirements;

(2) material or substantial alterations or additions to Industrial User's operation which were not covered in the effective permit;

(3) a change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge;

(4) information indicating that the permitted discharge could in any manner adversely affect the POTW, personnel or receiving waters;

(5) violation of any terms or conditions of the Permit;

(6) obtaining the Permit by misrepresentation or failure to disclose fully all relevant facts; or

(7) upon request of the Industrial User, provided such request does not create a violation of any existing applicable requirements, standards, laws or rules and regulations.

(d) Permit Conditions: Wastewater Discharge Permits shall be expressly subject to all provisions of these Regulations and all other applicable regulations, User charges and fees established by the City. Permits may contain the following:

(1) concentration and/or mass limits on the average and maximum wastewater constituents and characteristics;

(2) limits on average and maximum rate and time of discharge or requirements for flow regulation and equalization;

(3) requirements for installation and maintenance of inspection and sampling facilities;

(4) specifications for monitoring programs which may include sampling locations, frequency of sampling, number, types and standards for tests and reporting schedule;

(5) compliance schedules. The City may, at its discretion, issue interim effluent limits as part of a compliance schedule;

(6) requirements for submission of technical reports or discharge reports (see Section 502.4 of these Regulations);

(7) requirements for maintaining and retaining records relating to wastewater discharge as specified by the City, and affording City access thereto;

(8) requirements for implementation of and compliance with a spill prevention and slug control plan;

(9) requirements for implementation of and compliance with Best Management Practices;

(10) requirements for notification of the City of any facility changes that affect the potential for a slug discharge or any new introduction of wastewater constituents or any substantial change in the volume or character of the wastewater constituents being introduced into the Wastewater System;

(11) requirements for notification of a spill or slug discharge; and

(12) other conditions as deemed appropriate by the City to ensure compliance with these Regulations.

(e) Public Notice of Permit Issuance

(1) Public notice of every proposed General Wastewater Discharge Permit and No Discharge Wastewater Discharge Permit shall be published by the City in a newspaper of daily circulation within the geographical area of the discharge. The notice shall include at least the following:

(A) name and address of each permittee;

(B) each permittee's activity or operation which results in the discharge described in the Wastewater Discharge Permit;

(C) address and phone number of premises where a copy of the proposed permit may be requested; and

(D) notice of the 30-day comment period required by Section 502.2(e)(2)of these Regulations.

(2) There shall be a thirty (30)-day period following publication of notice during which written comments may be submitted by the permittee or interested persons located within the City's wastewater processing service area. The Commissioner will make his final determination on a proposed permit following the comment period. The period for comment may be extended at the discretion of the Commissioner for up to 30 additional days.

(3) The Commissioner shall issue the permit as soon as is practicable and this shall be a final decision.

(f) Permit Duration

(1) Permits shall be issued for a specified time period, not to exceed five (5) years. The Permit may be issued for a period less than a year or may be stated to expire on a specific date. The User shall apply for Permit re-issuance a minimum of 180 days prior to the expiration of the User's existing Permit. Where the User has made a timely and complete Permit renewal application, the existing Permit shall continue in effect until a new Permit is issued by the City. The User shall be informed of any proposed changes in the Permit at least thirty (30) days prior to the effective date of change. Any changes or new conditions in the Permit shall include a reasonable time schedule for compliance.

(2) If a User wishes to contest any provisions of the Permit, the User may file an appeal pursuant to the Philadelphia Home Rule Charter. The appeal shall specifically state all terms and/or conditions of the Permit which are being challenged and shall state all reasons why the User believes the terms and/or conditions are inappropriate. The appeal shall be taken within thirty (30) days of the User's receipt of the Permit. Failure to appeal within this time period shall result in a waiver of all legal rights to challenge the terms and/or conditions of the Permit. Where the Permit has been appealed, the appeal shall only stay the contested terms and/or conditions of the Permit and not the entire Permit. The remainder of the Permit remains in full force and effect.

(g) Wastewater Discharge Permit Transfer: Wastewater Discharge Permits may be transferred to a new owner or operator only if the permittee gives at least thirty (30) days advance written notice to the City and the City approves the Wastewater Discharge Permit transfer in writing. The notice to the City must include a written certification by the new owner or operator which:

(1) states that the new owner and/or operator has no immediate intent to change the facility's operation or processes;

(2) identifies the specific date on which the transfer is to occur;

(3) acknowledges full responsibility for complying with the existing Wastewater Discharge Permit; and

(4) acknowledges full responsibility for correcting all pre-existing violations, including, but not limited to, implementing corrective action plans and paying fines.

(h) Effective Date

The Permit becomes effective when signed by the Commissioner or as specified in the Permit.

502.3 Sampling and Analysis Requirements

(a) Sampling Requirements

(1) Samples should be taken immediately downstream from pretreatment facilities if such exist or immediately downstream from the

regulated process if no pretreatment exists.

(2) Samples and measurements taken for purposes of the monitoring requirements shall be representative of the normal discharges occurring during the reporting period.

(3) Grab samples must be used for pH, cyanide, total phenols, oil and grease, sulfide, and volatile organic compounds.

(A) For sampling required in support of baseline monitoring and 90-day compliance reports required in Section 502.4(a) and (b), a minimum of four (4) grab samples must be used for pH, cyanide, total phenols, oil and grease, sulphide and volatile organic compounds for facilities for which historical sampling data do not exist; for facilities for which historical sampling data are available, the City may authorize a lower minimum.

(B) For the reports required by Section 502.4(c), the City shall require the number of grab samples necessary to assess and assure compliance by Industrial Users with applicable Pretreatment Standards and Requirements.

(4) For any pollutants not identified in Section 502.3(a)(3), 24-hour composite samples must be obtained through flow proportional composite sampling techniques, unless time-proportional composite sampling or grab sampling is authorized by the City.

(5) Sampling shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto including but not limited to sample preservation, sampling vessels and equipment.

(b) Sample Analysis Requirements

(1) Analysis shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto including but not limited to analytical methods and sample holding time.

502.4 Reporting Requirements

(a) Baseline Monitoring Reports

Any User receiving a Baseline Monitoring Report form shall complete the form by providing all information requested therein and shall return the completed form to the POTW within thirty (30) days upon its receipt. In support of the application, the User shall submit, in units and terms appropriate for evaluation, the following information:

(1) Name, mailing address, and facility address;

(2) NAICS number according to the North American Industry Classification System, Office of Management and Budget, 1997, as amended;

(3) Wastewater constituents and characteristics including but not limited to those mentioned in Section 501.5(a) of these Regulations as determined by a reliable analytical laboratory; sampling and analysis shall be performed in accordance with procedures established by the EPA pursuant to Section 304(g) of the Act and contained in 40 CFR Part

136, as amended; User shall follow the requirements of Section 502.3 of these Regulations for Sampling and Analysis Requirements;

(4) Time and duration of contribution;

(5) Average daily, maximum daily and thirty (30) minute peak wastewater flow rates, including daily, monthly and seasonal variations, if any;

(6) Description of activities, facilities and plant processes on the premises including all materials, which are or could be discharged;

(7) The nature and concentration of any pollutants in the discharge which are limited by any City, State, or Federal Pretreatment Standards, as well as any information demonstrating compliance with any applicable Best Management Practices, and a statement regarding whether or not the Pretreatment Standards or Requirements are being met on a consistent basis, and if not, whether additional operation and maintenance (O&M) and/or additional pretreatment is required for the User to meet applicable Pretreatment Standards or Requirements;

(8) Where additional pretreatment and/or O&M will be required to meet the Pretreatment Standards, the shortest schedule by which the User will provide such additional pretreatment. The completion date in this schedule shall not be later than the compliance date established for the applicable Pretreatment Standard. The following conditions shall apply to this schedule:

(A) The schedule shall contain increments of progress in the form of dates for the commencement and completion of major events leading to the construction and operation of additional pretreatment required for the User to meet the applicable Pretreatment Standards (e.g., completing preliminary plans, completing final plans, executing contract for major components, commencing construction, completing construction, etc.).

(B) No increment referred to in paragraph (A) above shall exceed nine (9) months.

(C) Not later than fourteen (14) days following each date in the schedule and the final date for compliance, the User shall submit a progress report to the City indicating, at a minimum, whether or not it complied with the increment of progress to be met on such date and, if not, the date on which it expects to comply with this increment of progress, the reason for delay, and the steps being taken by the User to return the construction to the schedule established. Such progress reports shall be submitted to the City at least every nine (9) months.

(9) Each product produced by type, amount, process or processes and rate of production;

(10) Type and amount of raw materials processed (average and maximum per day);

(11) Number and type of employees, hours of operation of plant and proposed or actual hours of operation of pretreatment system;

(12) Any other information as may be deemed by the City to be necessary to evaluate the permit application;

(13) a list of any environmental control permits held by or for the facility; and

(14) a certification statement, signed and dated by an Authorized Representative of the Industrial User, as required by 40 CFR 403.6(a)(2)(ii) and Section 502.4(k) of these Regulations.

(b) Report on Compliance with National Categorical Pretreatment Standards Deadline (90 Day Compliance Report).

(1) Within ninety (90) days following the date for final compliance with applicable National Categorical Pretreatment Standards or in the case of a New Source, following commencement of the introduction of wastewater into the POTW, any Industrial User subject to Pretreatment Standards or Requirements shall submit to the City a report containing the information described in Section 502.4(a)(3) through (7).

(2) For Industrial Users subject to equivalent mass or concentration limits established by the City in accordance with the procedures in 40 CFR 403.6(c), this report shall contain a reasonable measure of the User's long term production rate. For all other Industrial Users subject to National Categorical Pretreatment Standards expressed in terms of allowable pollutant discharge per unit of production (or other measure of operation), this report shall include the User's actual production during the appropriate sampling period.

(c) Periodic Compliance Reports

(1) The reporting periods shall run from January 1 to June 30 and from July 1 to December 31. Every SIU shall submit to the City during the months of July and January, unless required in different months or more frequently by the City, a Periodic Compliance Report for the preceding reporting period. The Periodic Compliance Report shall contain, at minimum, the following:

(A) The results of the monitoring program conducted by Industrial User, including all sample results, sampling frequency and sample type (grab or composite), and any information demonstrating compliance with any applicable best management practices.

(i) All analyses shall be performed in accordance with procedures established by the EPA pursuant to Section 304(g) of the Act and contained in 40 CFR Part 136, as amended; or other test procedures approved by the EPA for use under the Clean Water Act. User shall follow sampling and analysis requirements in Section 502.3 of these Regulations.

(B) Wastewater flow data for the reporting period, specifically daily averages and maximums in gallons per day.

(C) For Industrial Users subject to equivalent mass or concentration limits established by the City in accordance with the procedures in 40 CFR 403.6(c), this report shall contain a reasonable measure of the User's long term production rate. For all other

Industrial Users subject to National Categorical Pretreatment Standards expressed in terms of allowable pollutant discharge per unit of production (or other measure of operation), this report shall include the User's actual production during the appropriate sampling period.

(D) A statement as to whether or not Industrial User has achieved compliance with all Pretreatment Standards or Requirements, including Best Management Practices.

(E) If the Industrial User has not achieved compliance with all Pretreatment Standards or Requirements and Best Management Practices, a proposed schedule indicating what additional pretreatment and/or operations and maintenance will be required to achieve compliance in the shortest time.

(F) a certification statement, signed and dated by an Authorized Representative of the Industrial User, as required by 40 CFR 403.6(a)(2)(ii) and Section 502.4(k) of these Regulations.

(d) Notification of Changed Discharge

All Industrial Users shall promptly notify the City in advance of any facility changes that affect the potential for a slug discharge or any other substantial change in the volume or character of pollutants in their discharge, including the listed or characteristic hazardous wastes for which the Industrial User has submitted initial notification under Section 502.4(e) of these Regulations.

(e) Hazardous Waste Notification Requirement

(1) The Industrial User shall notify the City, the EPA Regional Waste Management Division Director, and State hazardous waste authorities in writing of any discharge to the City of a substance, which, if otherwise disposed of, would be a hazardous waste under 40 CFR Part 261 (RCRA). Such notification must include the name of the hazardous waste as set forth in 40 CFR Part 261, the EPA hazardous waste number, and the type of discharge (continuous, batch, or other). If the Industrial User discharges more than one-hundred (100) kilograms of such waste per calendar month to the City, the notification shall also contain the following information to the extent such information is known and readily available to the Industrial User: An identification of the hazardous constituents contained in the wastes, an estimation of the mass and concentration of such constituents in the wastestream discharged during the calendar month, and an estimation of the mass of constituents in the wastestream expected to be discharged during the following twelve (12) months. Any notification under this paragraph need be submitted only once for each hazardous waste discharged. The notification requirement in this Section does not apply to pollutants already reported under the self-monitoring requirements.

(2) The Industrial User is exempt from the requirements of paragraph (1) of this section during a calendar month in which it discharges no more than fifteen (15) kilograms of hazardous wastes, if allowed under its Permit, unless the wastes are RCRA acute hazardous wastes, which require a one-time notification. Subsequent months during which the Industrial User discharges more than such quantities of

any hazardous waste, where allowed by its Permit, do not require additional notification.

(3) In the case of any new regulations under Section 3001 of RCRA identifying additional characteristics of hazardous waste or listing any additional substance as a hazardous waste, the Industrial User must notify the City, the EPA Regional Waste Management Division Director, and State hazardous waste authorities of the discharge of such substance within ninety (90) days of the effective date of such regulations.

(4) In the case of any notification made under this Section, the Industrial User shall certify that it has a program in place to reduce the volume and toxicity of hazardous wastes generated to the degree it has determined to be economically practical.

(f) Closure Statement

If Industrial User requests modification or termination of Industrial User's Wastewater Discharge Permit due to ceasing all or part of the process(es) regulated by the Permit, Industrial User shall submit to the City, in writing, thirty (30) days prior to closing, a Closure Statement which shall contain, at a minimum, the following:

(1) company name and address (at which regulated process(es) are or were located);

(2) name and telephone number of company contact person;

(3) closure date(s) of regulated process(es);

(4) list of other process(es) that will continue to operate at same location;

(5) indication of whether a water shut-off request has been filed if entire facility has or will shut down;

(6) ultimate plans for disposal of building(s), equipment and materials;

(7) schedule for (6) above;

(8) receipts and manifests for disposal of hazardous wastes and materials, etc.; and

(9) a certification statement, signed and dated by an Authorized Representative of the Industrial User, as required by 40 CFR 403.6(a)(2)(ii) and Section 502.4(k) of these Regulations.

(g) Notice of Potential Problems

Industrial User shall notify the City immediately of all discharges which could cause problems to the POTW, including spills or slug discharges.

(h) Notice of Indication of Violation

If sampling performed by Industrial User indicates a violation, User shall notify the City within twenty-four (24) hours of becoming aware of the violation, and submit to the City within five (5) business days, unless otherwise specified, a detailed written report describing the discharge and the measures taken to prevent similar future occurrences. User shall also repeat the sampling and analysis and submit the results of the repeat analysis to the City within thirty (30) days of becoming aware of the violation.

(j) Responses to Notices of Violations and Notices of Significant Non Compliance

All Users shall respond in writing to Notices of Violations and Notices of Significant Non-Compliance ("Notice") within fifteen (15) days of their receipt of these Notices or as otherwise required in the Notices. The written response must state the reasons for the violation(s), all actions that have or will be taken to return to compliance, and when full compliance will be achieved.

(k) Certification Requirement

All reports, including, but not limited to, Baseline Monitoring Reports, reports on compliance with categorical pretreatment standards and periodic compliance reports shall include the following certification statement, signed and dated by an authorized representative of the Industrial User: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

(l) Signatory Requirements

All reports, including but not limited to, baseline monitoring reports and periodic compliance reports shall be signed by an Authorized Representative of the User.

502.5 Monitoring Facilities

(a) The City shall require monitoring facilities, to be provided and operated at the User's own expense, that allow for inspection, sampling, and flow measurement of the Building Sewer and/or internal drainage systems. The monitoring facility should normally be situated on the User's premises, but the City may, when such a location would be impractical or cause undue hardship on the User, allow the facility to be constructed in the public street or sidewalk area and located so that it will not be obstructed by landscaping or parked vehicles.

(b) There shall be ample room in or near such sampling manhole or facility to allow accurate sampling and preparation of samples for analysis. The facility, sampling and measuring equipment shall be maintained at all times in a safe and proper operating condition at the expense of the User.

(c) Whether constructed on public or private property, the sampling and monitoring facilities shall be provided in accordance with the City's requirements and all applicable local construction standards and specifications. Construction shall be completed within ninety (90) days following written notification by the City.

502.6 Inspection and Sampling

(a) The City may inspect User's facilities to determine compliance with Pretreatment Standards or Requirements. Persons or occupants of premises connected to the City Wastewater System shall allow the City or their representative ready access at all reasonable times to all parts of the premises for the purposes of inspection, sampling, records examination, copying of records or for the performance of any of their duties.

(b) The City shall have the right to set up on the User's property such devices as are necessary to conduct sampling, inspection, compliance monitoring and/or metering operations.

(c) Where a User has security measures in force which would require proper identification and clearance before entry into their premises, the User shall make necessary arrangements with their security guards so that upon presentation of suitable identification, personnel from the City shall be permitted to enter, without delay, for the purposes of performing their specific responsibilities.

502.7 Pretreatment

Users shall provide necessary wastewater treatment as required to comply with these Regulations and shall achieve compliance with all Pretreatment Standards or Requirements. Any facilities required to pre-treat wastewater to a level acceptable to the City shall be provided, operated and maintained at the User's expense. A Pretreatment Facilities Report containing detailed plans showing the pretreatment facilities and detailed operating procedures shall be submitted to the City for review, and shall be acceptable to the City before construction or operation of the facility. Any User currently operating that has not submitted a Pretreatment Facilities Report shall submit this report to the City within fifteen (15) days of the City's request for this Report. The review of such plans and operating procedures will in no way relieve the User from its responsibility of providing an effluent limit which complies with all Pretreatment Standards or Requirements. User shall report in writing to the City any changes in its pretreatment facilities, method of operation or nature or characteristics of the wastewater prior to implementing such changes.

502.8 Record Keeping Requirements

(a) All Users shall retain all records relating to compliance with Pretreatment Standards or Requirements including documentation associated with Best Management Practices for a period of at least three (3) years, and shall contain all of the following requirements:

(1) the date, exact place, method, and time of sampling and the names of the person or persons taking the samples;

(2) the dates analyses were performed;

(3) who performed the analyses;

(4) the analytical techniques/methods used; and

(5) the results of such analyses.

(b) The period of retention shall be automatically extended during the course

of any unresolved dispute between the User and the City, or when the City so requests. Upon request, these records shall immediately be made available to the City for inspection and copying.

502.9 Duty to Mitigate

Industrial User shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with any Pretreatment Standards or Requirements, including such accelerated or additional monitoring as is necessary to determine the nature and impact of the non-complying discharge.

502.10 Confidential Information

(a) Information and data on a User obtained from reports, questionnaires, permit applications, permits and monitoring programs and from inspections shall be available to the public or other governmental agency without restriction unless the User specifically requests and is able to demonstrate to the satisfaction of the City that the release of such information would divulge information, processes or methods of production entitled to protection as trade secrets of the User.

(b) When requested by the person furnishing a report, the portions of a report which might disclose trade secrets or secret processes shall not be made available for inspection by the public but shall be made available upon written request by governmental agencies for uses related to these Regulations, the City's NPDES Permit, State Disposal System permit and/or the Pretreatment Program, and for use by State and Federal government or any state or federal agency in judicial review or enforcement proceedings involving the person furnishing the report. Effluent data, as defined in Section 501.2(q), will not be recognized as confidential information.

502.11 Public Notification

The City shall publish, at least semi-annually in the daily newspaper with the largest circulation a list of the Users which were in Significant Noncompliance, as defined in Section 501.9(c) of these Regulations, during the previous six (6) months. The notification may also summarize any enforcement actions taken against the User(s) during the same six (6) months.

502.12 Enforcement

(a) Emergency Suspensions

(1) Notwithstanding any other provisions of these Regulations, the City may suspend the wastewater treatment service and/or a Wastewater Discharge Permit when such suspension is necessary in the opinion of the City, in order to stop an actual or threatened discharge which:

(A) presents or may present an imminent or substantial endangerment to the health or welfare of persons; or

(B) presents or may present an imminent or substantial endangerment to the environment; or

(C) may cause or actually causes Interference to the POTW; or

(D) may cause or actually causes the City to violate any condition of its NPDES Permit.

(2) Any person notified of a suspension of wastewater treatment service and/or the Wastewater Discharge Permit shall immediately stop or eliminate all contributions.

(3) Should the person fail to immediately comply voluntarily with the suspension order, the City shall take such steps as deemed necessary, including but not limited to termination of water service, and/or immediate severance of the sewer connection.

(4) City shall revoke its emergency suspension order and restore wastewater and/or water service once the following information has been provided to and accepted by the City:

(A) a detailed written report describing the cause(s) of the harmful contribution and indicating what measures have been taken to prevent any future occurrence of same, and

(B) proof of the elimination of the harmful discharge.

(5) Revocation of an emergency suspension order and restoration of wastewater and/or water service shall not preclude the City from taking any other enforcement action as permitted under Sections 502.12(b)-(j), inclusive, and Section 501.9 of these Regulations.

(b) Revocation of Permit: Any User who violates these Regulations, the Wastewater Discharge Permit, or any applicable Federal, State or local law, is subject to having his Wastewater Discharge Permit revoked in accordance with the procedures of Section 502.12(c) of these Regulations. Revocation of a User's Permit requires the User to immediately cease all wastewater discharges.

(c) Procedure for Revocation of Permit

(1) Whenever the City finds that any User has violated or is violating any Pretreatment Standards or Requirements, the City may serve personally or by regular or certified mail upon such person a notice of revocation stating the nature of the violation(s). Notice by regular mail alone shall be deemed sufficient notice.

(2) Within fifteen (15) days of the date of the notice of revocation, the User shall respond in writing. The response must state why the violation occurred, the steps taken to prevent its recurrence, and whether the violation has been corrected. If the response indicates that the violation has not been corrected, the response shall contain a plan for the immediate correction of the violation.

(3) The Commissioner shall consider the User's response, if any, before rendering his final determination order. The Commissioner's final determination order may direct that:

(A) the User's Permit be immediately revoked; or

(B) the User's Permit be revoked on a specified future date unless adequate treatment facilities, devices or other related appurtenances shall have been installed and existing treatment facilities, devices or other related appurtenances are properly operated; or

(C) the User's Permit shall continue in effect.

(4) Further orders and directives as are necessary and appropriate may be issued.

(d) Enforcement of Permit Revocation: If the User fails to immediately cease all wastewater discharges upon the revocation of his Wastewater Discharge Permit, the Commissioner may order any of the following actions to be taken:

(1) immediate termination of the User's water service;

(2) immediate severance of the User's sewer connection; and

(3) any other action designed to immediately terminate the User's wastewater discharge.

(4) All costs related to terminating or reinstating after termination the User's water and/or sewer service shall be borne by the User.

(e) Reissuance of Permit after Revocation

(1) Where a User has failed to respond to a notice of revocation in accordance with Section 501.9(c) of these Regulations and/or has failed to comply with the Commissioner's final determination order, the City may decline to reissue a permit.

(2) No permit shall be reissued until the User has submitted and completed a corrective action plan, which will ensure compliance with all Pretreatment Standards or Requirements.

(3) Prior to reissuance of a Permit the City may require the User to:

(A) file with the City a performance bond payable to the City, in a sum not to exceed a value determined by the City to be necessary to achieve consistent compliance; or

(B) submit proof that it has obtained liability insurance acceptable to the City, sufficient to restore or repair the POTW for damages that may be caused by the User's discharge.

(f) Procedure for Terminating Discharge against Non-Permitted Users

(1) Whenever the City finds that any User has violated or is violating any Pretreatment Standards or Requirements, the City may serve personally or by regular or certified mail upon such User a notice of the City's intent to terminate the User's discharge, along with a description of the User's violation(s). Notice by regular mail shall be deemed sufficient notice.

(2) Within fifteen (15) days from the date of the notice of the City's intent to terminate, the User shall respond in writing. The User's response shall include a plan for the satisfactory correction of the violation(s).

(3) The Commissioner shall consider the User's response, if any, before rendering his final determination order. The Commissioner's final determination order may direct that:

(A) the User immediately cease all wastewater contributions; or

(B) the User be prohibited from contributing wastewater into the POTW unless adequate treatment facilities are installed and operating; or

(C) the User may continue his wastewater contribution.

(4) Further orders and directives as are necessary and appropriate may be issued.

(5) If a User fails to immediately comply with the Commissioner's final determination order, the Commissioner may enforce his order by taking any or all of the actions stated in Section 502.12(d) of these Regulations. In addition, the Commissioner may use any other administrative, legal, or equitable relief available.

(6) After termination, the User may apply to the Commissioner to once again contribute wastewater into the City's system. The Commissioner may accept, deny, or condition his acceptance of the application pursuant to Section 502.12(e) of these Regulations.

(g) Administrative Orders

(1) Whenever a User has violated or continues to violate any Pretreatment Standards or Requirements, the Commissioner may issue an Administrative Order requiring the User to correct the violations and to return to compliance. The Order may require that the User take any or all of the following actions:

(A) install new or additional pretreatment facilities to ensure compliance with all Pretreatment Standards or Requirements;

(B) make operational changes to ensure compliance with all Pretreatment Standards or Requirements;

(C) meet interim and/or final deadlines by which actions and/or compliance must be achieved;

(D) conduct additional self-monitoring and additional reporting;

(E) require remediation of any damage done to the POTW or the environment;

(F) establish interim effluent limits;

(G) require the User's Wastewater Discharge Permit to be amended in accordance with these Regulations;

(H) require the User to submit information and reports;

(I) pay fines in accordance with Section 501.9 of these Regulations; or

(J) take any other action, which the Commissioner deems necessary to ensure both present and future compliance with all Pretreatment Standards or Requirements.

(2) If the User fails to comply with the Administrative Order, the User's wastewater and/or water service may be terminated. The issuance of an Administrative Order shall not be a bar against, or a prerequisite for, taking any other action against the User. If the User wishes to contest the Administrative Order, he shall file its appeal pursuant to

the Philadelphia Home Rule Charter within 30 days. Failure to appeal within this time period shall result in a waiver of all legal rights to contest the violation or any provisions contained in the Order.

(h) Administrative Consent Orders

The Commissioner may enter into Administrative Consent Orders establishing an agreement with any User. An Administrative Consent Order may contain any or all of the provisions contained in Section 502.12(g) of these Regulations. Administrative Consent Orders shall have the same force and effect as Administrative Orders.

(i) Legal Action

If any person violates any Pretreatment Standards or Requirements, the City Solicitor may commence an action for appropriate legal and/or equitable relief in the appropriate court.

(j) Injunctive Relief

If an Industrial User violates any Pretreatment Standards or Requirements, the City may petition the Court for an injunctive relief, which restrains or compels the activities on the part of the Industrial User.

503.0 MISCELLANEOUS

503.1 City's Right of Revision

The City reserves the right to establish by regulation more stringent limitations or requirements on discharges to the City's Wastewater System if deemed necessary to comply with the objectives presented in Section 501.1 of these Regulations.

503.2 Severability

If any provision, paragraph, word, section, or article of these Regulations is invalidated by any court of competent jurisdiction, the remaining provisions, paragraphs, words, sections and articles shall not be affected and shall continue in full force and effect.

503.3 Conflict

All other regulations and parts of other regulations inconsistent or conflicting with any part of these Regulations are hereby repealed to the extent of such inconsistency or conflict.

503.4 Effect of Regulations

These Regulations shall apply to the City and to persons outside the City who are, by contract or agreement with the City, users of the POTW.

RESOLUTION NO. 2018-16

A RESOLUTION OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AUTHORIZING PAYMENT OF CHANGE ORDERS TO THE GENERAL PRIME CONTRACTOR, DOLAN CONSTRUCTION, INCORPROATED, FOR THE MEMORIAL LIBRARY OF RADNOR RENOVATION AND EXPANSION PROJECT

WHEREAS, during construction, it was determined that change orders are required for work that was unforeseen and work requested by the owner

WHEREAS, Change Order cost proposals have been submitted by Dolan Construction, the General Prime Contractor

WHEREAS, the Change Order cost proposals have been reviewed by the architect of record and the owner's representative

NOW, THEREFORE, be it ***RESOLVED*** by the Board of Commissioners of Radnor Township does hereby authorize and approve the following change orders, as outlined on the attached AIA documents, as follows:

Dolan Construction, General Prime, Change Orders Change Orders 11,12R1,1315R1,16,17,18,19,20,21,24, and 29 in the amount of $48,105.38

SO RESOLVED this 22nd day of January, A.D., 2018

RADNOR TOWNSHIP

By: _____
Name: Lisa Borowski
Title: President

ATTEST: _____
Robert A. Zienkowski
Manager/Secretary

DRAFT

AIA® Document G701™ – 2001

Change Order

PROJECT *(Name and address)*:
Radnor Library Expansion and Renovation
114 West Wayne Avenue
Wayne, PA 19087

CHANGE ORDER NUMBER: 007
DATE: 1/17/2018

OWNER: ☒
ARCHITECT: ☒
CONTRACTOR: ☒
FIELD: ☐
OTHER: ☐

TO CONTRACTOR *(Name and address)*:
Dolan Construction Inc.
401 South 13th Street
Reading, PA 19602

ARCHITECT'S PROJECT NUMBER:
CONTRACT DATE:
CONTRACT FOR: General Construction

THE CONTRACT IS CHANGED AS FOLLOWS:
(Include, where applicable, any undisputed amount attributable to previously executed Construction Change Directives)

1) COR: G-015R1 ($5,900.76) Drylock at Lower Level exterior walls
2) COR: G-016 ($4,519.48) Attic Ventilation
3) COR: G-017 ($738.72) Ramp Modification
4) COR: G-021 ($3,695.75) Exterior framing @ overhang Soffit
5) COR: G-024 ($436.96) Soffit for rain leader
6) COR: G-029 ($8,737.49) EFIS finish on exterior patio beams

The original Contract Sum was	$	3,612,400.00
The net change by previously authorized Change Orders	$	100,318.98
The Contract Sum prior to this Change Order was	$	3,712,718.98
The Contract Sum will be increased by this Change Order in the amount of	$	24,029.16
The new Contract Sum including this Change Order will be	$	3,736,748.14

The Contract Time will be unchanged by Zero (0) days.
The date of Substantial Completion as of the date of this Change Order therefore is December 20, 2017

NOTE: This Change Order does not include changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive-

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

Kimmel Bogrette Architecture + Site, INc.	Dolan Construction Inc.	Radnor Township
ARCHITECT *(Firm name)*	**CONTRACTOR** *(Firm name)*	**OWNER** *(Firm name)*
482 Norristown Road Suite 200 Blue Bell, PA 19422	401 South 13th Street Reading, PA 19602	301 Iven Avenue Wayne, PA 19087-5297
ADDRESS	**ADDRESS**	**ADDRESS**
BY *(Signature)*	**BY** *(Signature)*	**BY** *(Signature)*
Sherri Kimmel	Michael Vottero	Steve Norcini
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	**DATE**	**DATE**

DRAFT

AIA® Document G701™ – 2001

Change Order

PROJECT *(Name and address)*:
Radnor Library Expansion and Renovation
114 West Wayne Avenue
Wayne, PA 19087

CHANGE ORDER NUMBER: 006
DATE: 1/17/2018

OWNER: ☒
ARCHITECT: ☒
CONTRACTOR: ☒
FIELD: ☐
OTHER: ☐

TO CONTRACTOR *(Name and address)*:
Dolan Construction Inc.
401 South 13th Street
Reading, PA 19602

ARCHITECT'S PROJECT NUMBER:
CONTRACT DATE:
CONTRACT FOR: General Construction

THE CONTRACT IS CHANGED AS FOLLOWS:
(Include, where applicable, any undisputed amount attributable to previously executed Construction Change Directives)

1) COR: G-011 ($7,917.99) Quiet Room and TeenCenter GWB walls
2) COR: G-012R1 ($5,429.74) Friends Area ceiling and wall paint
3) COR: G-013 (-$4,027.00) Delete Lockers
4) COR: G-018 (-$1732.16) Delete Interior Code Signage
5) COR: G-019 ($12,799.66) Sprinkler Soffits
6) COR: G-020 ($3,687.99) Carpet Upgrade

The original Contract Sum was	$	3,612,400.00
The net change by previously authorized Change Orders	$	76,242.76
The Contract Sum prior to this Change Order was	$	3,688,642.76
The Contract Sum will be increased by this Change Order in the amount of	$	24,076.22
The new Contract Sum including this Change Order will be	$	3,712,718.98

The Contract Time will be unchanged by Zero (0) days.
The date of Substantial Completion as of the date of this Change Order therefore is December 20, 2017

NOTE: This Change Order does not include changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change ~~Directive~~Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

Kimmel Bogrette Architecture + Site, INc.	Dolan Construction Inc.	Radnor Township
ARCHITECT *(Firm name)*	**CONTRACTOR** *(Firm name)*	**OWNER** *(Firm name)*
482 Norristown Road Suite 200 Blue Bell, PA 19422	401 South 13th Street Reading, PA 19602	301 Iven Avenue Wayne, PA 19087-5297
ADDRESS	**ADDRESS**	**ADDRESS**
BY *(Signature)*	**BY** *(Signature)*	**BY** *(Signature)*
Sherri Kimmel	Michael Vottero	Steve Norcini
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	**DATE**	**DATE**

Radnor Township

PROPOSED LEGISLATION

DATE: January 17, 2018

TO: Radnor Township Board of Commissioners

FROM: Stephen F. Norcini, P.E., Township Engineer

CC: Robert A. Zienkowski, Township Manager
William M. White, Assistant Township Manager/Finance Director
Helen McGrane, President, Board of Directors, Memorial Library of Radnor
Anny Laepple, Director, Memorial Library of Radnor
Rick Capone, QCI

LEGISLATION: **Resolution #2018-16:** Authorizing Payment of Change Orders to the General Prime Contractor for the Memorial Library of Radnor Renovation and Expansion Project

LEGISLATIVE HISTORY: The Board of Commissioners authorized the payment of $131,386.30 in change orders for this project by virtue of Resolution #2017-116 in October of 2017.

PURPOSE AND EXPLANATION: During construction, change orders are required for work that was not included in the original contract. In the case of the Library Renovation and Expansion project, change orders are required for work that was unforeseen and work requested by the owner. Please note that two of the change orders are credits.

The purpose of the legislation is to have the Board of Commissioners authorize the work under the change orders to be completed, at the Not To Exceed costs noted. There are other possible change orders pending, which may be brought before the Board at a future meeting.

Memorial Library Of Radnor General Prime Change Orders		
Change Order #	Description	NTE Cost
11	Teen Room, Quiet Room walls	$7,917.99
012R1	Revised finishes to Friends Area	$5,429.74
13	Credit for deleting supplying and installing lockers	-$4,027.00
015R1	Drylock masonry, lower level walls	$5,900.76
16	Ventilation of attic ceiling	$4,519.48
17	Ramp to front terrace	$738.72
18	Delete interior signage	-$1,732.16
19	Interior wall soffit, stud framed ceiling	$12,799.66
20	Flooring changes	$3,687.99
21	Repair and reframe portions of overhang	$3,695.75
24	Relocate rain leader	$436.96
29	Refinish ext. beam w/denseglass, stucco	$8,737.49
TOTAL OF LISTED CHANGE ORDERS		**$48,105.38**

IMPLEMENTATION SCHEDULE: Pending Board of Commissioners approval, additions to the original contract amounts will be made, noting the change order numbers, and the Resolution number that noting the Board of Commissioners authorization to proceed with the work under the change orders. The contractors will be notified, and work will begin as soon as possible.

FISCAL IMPACT: The cost of the change orders will be paid form the contingency fund of the Library construction project. The accompanying resolution will allow us to authorize the change orders, as well as payment upon completion of the work.

Recommendation: Staff respectfully recommends that the Board of Commissioners authorizes and approves Change Orders for Dolan Construction as noted on the attached AIA Documents, Change Orders 11,12R1,1315R1,16,17,18,19,20,21,24, and 29 in the amount of $48,105.38

ORDINANCE NO. 2018-03

AN ORDINANCE OF RADNOR TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, AMENDING THE CODE OF THE TOWNSHIP OF RADNOR, CHAPTER 270, VEHICLES AND TRAFFIC, SECTION 270-30, TIME LIMIT PARKING.

The Board of Commissioners of the Township of Radnor does hereby ENACT and ORDAIN the following amendments to Chapter 270-30 as follows:

Section 1. Section 270-30, Parking Requirements of the Code of the Township of Radnor to enact the following parking requirements:

Name of Street	Side	Hours	Location
900 Block Glenbrook Avenue	South	6:00 PM - 6:00 AM Permit Parking Only	From Beatrice Drive in a westerly direction to Charles Drive

Section 2. Permit Parking Only.

Section 3. Severability. If any section, paragraph, subsection, clause or provision of this Ordinance shall be declared invalid or unconstitutional by a court of competent jurisdiction, such decision shall not affect the validity of this Ordinance as a whole or any part thereof other than that portion specifically declared invalid.

Section 4. Effective Date. This Ordinance shall become effective in accordance with the Home Rule Charter of Radnor Township.

ENACTED and *ORDAINED* this 26 day of February 2018.

RADNOR TOWNSHIP

By: _____
Name: Lisa Borowski
Title: President

Attest: _____
Robert A. Zienkowski, Secretary

[ ] Delete

____ Add

Radnor Township

PROPOSED LEGISLATION

DATE: 1/22/2018

TO: Robert A. Zienkowski, Township Manager

FROM: William A. Colarulo, Police Superintendent

LEGISLATION: Ordinance 2018-03 is establishing Residential Permit Parking 6:00 PM - 6:00 AM on the south side of Glenbrook Avenue from Beatrice Avenue to Charles Drive. This recommendation is to make the above restrictions permanent.

LEGISLATIVE HISTORY: None.

PURPOSE AND EXPLANATION: These changes are necessary to protect the neighborhood and ensure residents will be able to find parking on their street. This will limit on street parking to participating residents living in the 900 Block of Glenbrook Avenue.

FISCAL IMPACT: None.

RECOMMENDED ACTION: The Police Department respectfully requests the Board to adopt the amendment at the regular Board of Commissioners Meeting on February 26, 2018.