TRAFFIC IMPACT STUDY

for the proposed

MODWASH

Upper Allen Township, Cumberland County, PA

February 2023

Prepared for: Hutton
736 Cherry Street
Chattanooga, TN 37402

Prepared by: David E. Wooster and Associates, Inc.
19 Colonnade Way, Suite 117
PMB #269
State College, PA 16803

Project Engineer: Douglas A. Hill, P.E.

Seal 2/8/2023

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

Appendix	Description
A	Manual Turning Movement Count Data
B	PennDOT Sight Distance Form M-950S
C	Field Measurement Sketches/Photos
D	Level-of-Service Definitions
E	Capacity Calculations - Existing 2023 Conditions
F	Critical Headway and Follow-up Calculations
G	Traffic Signal Permit Plan
H	Conflict Factor Calculations
I	Capacity Calculations - Forecasted 2024 Conditions Without Development
J	Capacity Calculations - Forecasted 2029 Conditions Without Development
K	Trip Generation Calculations from Existing ModWash Facilities Study
L	Trip Distribution Calculations
M	Capacity Calculations - Forecasted 2024 Conditions Following Development
N	Capacity Calculations - Forecasted 2029 Conditions Following Development
O	Turn Lane Warrants Analysis
P	Queue Summary Printouts
Q	On-Site Queuing Calculations

TRAFFIC IMPACT STUDY
for the proposed
MODWASH

Upper Allen Township, Cumberland County, Pennsylvania
February 2023

Executive Summary

- **General Overview of the Development**

  - Development located at the intersection of Route 114 (S.R. 0114) and Kim Acres Drive in Upper Allen Township, Cumberland County, Pennsylvania
  - Development proposed to include a ModWash with 1 wash bay
  - Access to the development proposed via a full access driveway to Kim Acres Drive.

- **General Trip Generation and Distribution**

  - Trip generation determined using data collected at four existing ModWash sites
  - Trip Generation
    - AM Peak Hour: 21 In /16 Out /37 Total
    - PM Peak Hour: 44 In /43 Out /87 Total
    - SAT Peak Hour: 78 In /73 Out /151 Total
  - Trip Distribution:
    - Based on existing traffic patterns in the study area

- **List of Study Intersections**

  - Route 114 (S.R. 0114) and Kim Acres Drive/Bumble Bee Hollow Road
  - Kim Acres Drive and Aspen Drive
  - Kim Acres Drive and Proposed Site Driveway

- **Recommended Transportation Improvements to be Implemented by the Developer**

  - Construction of Site Access to Kim Acres Drive as depicted on the site plan. The existing Stop Sign (R1-1) on the Westbound Site Driveway approach should remain.

- **Auxiliary Turn Lanes Warranted and When**

  - None

TRAFFIC IMPACT STUDY
for the proposed
MODWASH

Upper Allen Township, Cumberland County, Pennsylvania
February 2023

1.0 Introduction

Hutton proposes the redevelopment of a parcel located at the intersection of Route 114 (S.R. 0114) and Kim Acres Drive in Upper Allen Township, Cumberland County, Pennsylvania (see **Figure 1** for site location). The parcel was formerly occupied by a bank. The development is proposed to consist of a ModWash with 1 wash bay. Access to the development will be via a full access driveway to Kim Acres Drive. A copy of the most recent conceptual site plan provided has been included as **Figure 2**.

The purpose of this report is to identify what impact the proposed development will have on the surrounding roadways and intersections. The study intersections were identified to be the following:

- Route 114 (S.R. 0114) and Kim Acres Drive/Bumble Bee Hollow Road
- Kim Acres Drive and Aspen Drive
- Kim Acres Drive and Proposed Site Driveway

This report will also identify any existing or forecasted safety and/or capacity deficient locations or conditions and, where applicable, recommend measures to mitigate these deficiencies.

2.0 Data Collection

The scope of this study was discussed with representatives of Upper Allen Township on January 11, 2023.

2.1 Manual Turning Movement Counts

Manual turning movement counts were performed at the following study intersections:

- Route 114 (S.R. 0114) and Kim Acres Drive/Bumble Bee Hollow Road
- Kim Acres Drive and Aspen Drive

The turning movement counts were performed in January 2023 during typical midweek conditions (Tuesday, Wednesday, or Thursday) and on a Saturday. The weekday counts were performed from 7:00 a.m. to 9:00 a.m. and from 3:00 p.m. to 6:00 p.m. in order to identify the weekday morning and evening peak street traffic hours, respectively. The Saturday counts were performed from 11:00 a.m. to 2:00 p.m. in order to identify the Saturday peak hour. Vehicular classification and pedestrian movement identifications were performed concurrent with the manual turning movement counts. The turning movement count data is included in **Appendix A**.

2.2 Corner Sight Distance Measurements

Corner sight distance measurements were performed at the location of the site access to Kim Acres Drive. The measurements were compared with the requirements as stated in PennDOT Title 67, Chapter 441, *Access to and Occupancy of Highways by Roadways and Local Roads*, and PennDOT Publication 282, *Highway Occupancy Permits Operations Manual*. The following is a summary of the corner sight distance measurements performed:

Driveway	Left/ Right	Available Sight Distance	Posted Speed Limit	Desirable Sight Distance from Chapter 441[1]	Desirable Sight Distance Satisfied?	Formula Sight Distance from Publication 282	Formula Sight Distance Satisfied?
Access to Kim Acres Drive	Left	505’	25 mph	250’	YES	145’	YES
	Right	330’	25 mph	195’	YES	143’	YES

The available corner sight distance at the site access driveway exceeds desirable and minimum corner sight distance requirements looking to the left and to the right. A copy of PennDOT Form M-950S summarizing the sight distance measurements is included in **Appendix B**.

2.3 Existing Field Conditions

General field measurements were performed at the study intersections. A photographic summary of the study intersections is included in **Appendix C**. Included in this appendix are field measurement sketches of the unsignalized intersection.

[1] Desirable Sight Distance obtained from Table 1 from Chapter 441.8(h)(1)

2.4 Crash Data Review

Crash data was obtained for the study area for the last five (5) years. The crash data and crash analysis are summarized in a separately bound appendix as required.

3.0 Existing 2023 Conditions

Existing2023 morning, evening, and Saturday peak hour volumes are summarized on **Figure 3**.

3.1 Existing Conditions Capacity Calculations

Capacity calculations were performed for the study intersections using existing 2023 traffic volumes and the methodology published by the Transportation Research Board in their *Highway Capacity Manual*, 6th Edition. This methodology determines how well an intersection, approach to an intersection, or movement at an intersection operates and assigns to it a Level-of-Service (LOS): LOS "A" being the best through LOS "F" being the worst. The Synchro 11 HCM 6th Edition module was used. Detailed definitions of LOS have been included in **Appendix D**.

Copies of the capacity calculations performed using existing traffic volumes have been included in **Appendix E**. In accordance with HCM 6th Edition methodology, a single uniform peak hour factor was used in the capacity analyses for each intersection. In addition, Pennsylvania specific values for start-up lost time, headway, and follow-up times (from PennDOT Publication 46, *Traffic Engineering Manual*) were used. A summary of the calculations performed to determine the critical headway and follow-up values at the unsignalized intersections is included in **Appendix F**.

Tables 1A and 1B in the Tables section of this report summarize the LOS for Existing 2023 Conditions. The following is a summary of the LOS results for each intersection:

Route 114 (S.R. 0114) and Kim Acres Drive/Bumble Bee Hollow Road

- The Southbound Right Turn movement operates at LOS F during the AM Peak Hour. All other movements operate at acceptable LOS D or better

Kim Acres Drive and Aspen Drive

- All movements operate at acceptable LOS A or B

3.2 Traffic Signal Permit Plan

The traffic signal timings utilized for the signalized intersection were obtained from the traffic signal permit plan for the intersection, which was obtained from PennDOT's Traffic Signal Asset Management System (TSAMS). A copy of the signal permit plan is included in **Appendix G**.

3.3 Left Turn Phasing Analysis

Analyses were performed for the signalized study intersection to identify if alternate traffic signal phasing could be considered. The analyses were performed consistent with Pennsylvania Department of Transportation Publication 149, *Traffic Signal Design Handbook* methodology, which means a conflict factor was calculated for each left turn at the intersection. The conflict factor is the product of the left turn volume and the opposing through and right turn volume, provided the opposing right turn volume is not exclusively channelized. A summary of the conflict factor calculations is included in **Appendix H**.

Other factors in addition to the Conflict Factor used in evaluating the left turn phasing of the signalized intersections were as follows:

- Are there at least two (2) left turns per signal cycle? – *This information is included in the Conflict Factor calculation in Appendix H*
- Crash History – have five correctable crashes occurred within a continuous 12-month period over the last three years? – *Crash data for the study area is summarized in a separately bound appendix as required. No changes to the existing phasing are recommended based on the crash history at the intersection.*
- Will a left turn phase reduce delay and improve overall Level-of-service? – *This factor was evaluated as part of the capacity calculations in the study and it was identified that alternative signal phasing would not improve Level-of-Service*
- Are there a high number of older drivers in the area that have difficulty estimating approach speeds and distances of oncoming vehicles? – *this criteria does not apply to the study area*
- Would a left turn phase at a signalized intersection with a left turn lane be beneficial to safety and traffic flow? – *This factor was evaluated as part of the capacity calculations in the study and it was identified that alternative signal phasing would not improve safety and traffic flow*
- Protected/*prohibited* phasing should be considered if any of the following conditions exist:
    - Dual left turn lanes – *The study intersection does not have dual left turn lanes.*
    - Three or more opposing through lanes – *The intersection does not have three or more through lanes*
    - Multi-legged intersections with more than four approaches – *The study intersection does not have more than four approaches*

- Sight distance deficiencies – *based on a field view of the study intersection, there are no apparent sight distance deficiencies for left turn movements*

4.0 Forecasted 2024 Conditions Without Development

The anticipated opening of the development is 2024. Therefore, forecasted 2024 conditions were analyzed as an opening day condition.

4.1 Background Traffic Growth Rate

Forecasted 2024 peak hour traffic volumes without the proposed development were determined by applying a background traffic growth rate of 0.59 percent per year, compounded, to the existing 2023 traffic volumes. The background traffic growth rate was obtained from the PennDOT Growth Factor Table from August 2022 to July 2023.

Forecasted 2024 peak hour traffic volumes without the proposed development are summarized on **Figure 4**.

4.2 Capacity Analyses

Capacity calculations were performed for the study intersections assuming forecasted 2024 traffic volumes without the proposed development. The results have been summarized on Tables 1A and 1B. Copies of the capacity calculations performed assuming forecasted 2024 conditions without development have been included in **Appendix I**. The following is a summary of the LOS results for each intersection:

<u>Route 114 (S.R. 0114) and Kim Acres Drive/Bumble Bee Hollow Road</u>

- The Southbound Right Turn movement is projected to operate at LOS F during the AM Peak Hour. All other movements are projected to operate at acceptable LOS D or better

<u>Kim Acres Drive and Aspen Drive</u>

- All movements are projected to operate at acceptable LOS A or B

5.0 Forecasted 2029 Conditions Without Development

Adhering to normal TIS requirements, the impact of the development was analyzed assuming a forecasted horizon condition, five (5) years beyond development completion. Because 2024 is the anticipated opening, forecasted 2029 conditions were analyzed as the horizon condition.

5.1 Traffic Volume Projections

Forecasted 2029 peak hour traffic volumes without the proposed development were determined by applying the background traffic growth rate of 0.59 percent per year, compounded, to the existing 2023 peak hour traffic volumes. Forecasted 2029 peak hour volumes for the Without Development Condition can be seen graphically on **Figure 5**.

5.2 Capacity Analyses

Capacity calculations were performed for the study intersections assuming forecasted 2029 traffic volumes without the proposed development. The results have been summarized on Tables 1A and 1B. Copies of the capacity calculations performed assuming forecasted 2029 conditions without development have been included in **Appendix J**. The following is a summary of the LOS results for each intersection:

<u>Route 114 (S.R. 0114) and Kim Acres Drive/Bumble Bee Hollow Road</u>

- The Southbound Right Turn movement is projected to operate at LOS F during the AM Peak Hour. All other movements are projected to operate at acceptable LOS D or better

<u>Kim Acres Drive and Aspen Drive</u>

- All movements are projected to operate at acceptable LOS A or B

6.0 Forecasted Trip Generation

The development is proposed to include a ModWash with 1 wash bay. The trip generation for the project was determined using data collected at four existing ModWash sites, then by calculating the trip generation rates based on the existing data. The four existing sites where the data was collected are as follows:

- 548 Carnot Road, Corapolis, PA 15108
- 4234 Buffalo Road, Erie, PA 16510

- 2945 East State Street, Hermitage PA 16148
- 1410 Washington Road, Washington, PA 15301

The data from these sites has been used on other projects requiring a Traffic Impact Study and PennDOT Highway Occupancy Permit (HOP). It should be noted that the sites above were chosen for projects located along State Routes with similar Average Daily Traffic (ADT) volumes. The four sites above are all located on state routes with ADT volumes of at least 13,600, with the average frontage road ADT of the four sites being approximately 15,600. The ADT of Route 114 (S.R. 0114) for the proposed Upper Allen site is approximately 9,200[1], which is significantly lower than the frontage road ADT's of the sites analyzed above. Therefore, it can safely be assumed that the trip generation data for the four sites above represents a very conservative estimate of the trip generation of the Upper Allen Township site.

The forecasted morning peak hour, evening peak hour, and Saturday peak hour trip generation for the proposed development is summarized on **Table 2**. A copy of the trip generation calculations performed for the four sites above is included in **Appendix K**.

7.0 Anticipated Trip Distribution

The forecasted trips to be generated by the development were distributed to and from the site based on existing traffic patterns entering and exiting the study area. The distribution for the three peak hours was averaged to determine an overall primary trip distribution. The anticipated trip distribution percentages are summarized on **Figure 6a**. The forecasted trips to be added to the proposed development are summarized on **Figure 6b**.

A summary of the trip distribution calculations is included in **Appendix L**.

8.0 Forecasted 2024 Conditions Following Development

8.1 Traffic Volume Development

The forecasted trips to be added by the proposed development were added to forecasted 2024 conditions without development in order to depict forecasted 2024 conditions following development. Forecasted 2024 morning, evening, and Saturday peak hour volumes following the proposed development have been summarized on **Figure 7**.

[1] PennDOT Traffic Information Repository (TIRe) – TMS Site 1632 (Route 114 east of Kim Acres Drive)

8.2 Capacity Analyses

Capacity calculations were performed for the study intersections assuming forecasted 2024 traffic volumes following the proposed development. The results have been summarized on Tables 1A through 1C. Copies of the capacity calculations performed for forecasted 2024 conditions following development are included in **Appendix M**. The following is a summary of the capacity analyses performed:

<u>Route 114 (S.R. 0114) and Kim Acres Drive/Bumble Bee Hollow Road</u>

- The Southbound Right Turn movement is projected to operate at LOS F during the AM Peak Hour in the *Without Development* condition. When the development trips are added, the delay associated with the LOS F increases. This delay increase can be mitigated via a minor signal timing adjustment in the analysis. Specifically, 1 second of green time was removed from the NB advance phase and reallocated to the SB advance phase. This timing adjustment is so minor that physical changes to the signal timings are not recommended. It is expected that this type of adjustment would be accomplished through the normal operation of the actuated traffic signal. For illustration purposes, the analysis with the minor signal timing adjustment is included in Appendix M and the resultant LOS tables.
- All other movements are projected to operate at acceptable LOS D or better. Impacts to overall intersection delays are projected to be negligible (highest projected overall intersection delay increase is 2.2 seconds per vehicle).
- No mitigation required.

<u>Kim Acres Drive and Aspen Drive</u>

- All movements are projected to operate at acceptable LOS A or B. Impacts to overall intersection delays are projected to be negligible (no increase in overall delay projected).
- No mitigation required.

<u>Kim Acres Drive and Site Drive</u>

- All movements are projected to operate at acceptable LOS A or B.
- A Stop Sign (R1-1) is recommended for the Westbound Site Driveway approach.

9.0 Forecasted 2029 Conditions Following Development

9.1 Traffic Volume Development

The forecasted trips to be added by the proposed development were added to forecasted 2029 conditions without development in order to depict forecasted 2029 conditions following development. Forecasted 2029 morning, evening, and Saturday peak hour volumes following the proposed development have been summarized on **Figure 8**.

9.2 Capacity Analyses

Capacity calculations were performed for the study intersections assuming forecasted 2029 traffic volumes following the proposed development. The results have been summarized on Tables 1A through 1C. Copies of the capacity calculations performed for forecasted 2029 conditions following development are included in **Appendix N**. The following is a summary of the capacity analyses performed:

<u>Route 114 (S.R. 0114) and Kim Acres Drive/Bumble Bee Hollow Road</u>

- The Southbound Right Turn movement is projected to operate at LOS F during the AM Peak Hour in the *Without Development* condition. When the development trips are added, the delay associated with the LOS F increases. This delay increase can be mitigated via a minor signal timing adjustment in the analysis. Specifically, 1 second of green time was removed from the NB advance phase and reallocated to the SB advance phase. This timing adjustment is so minor that physical changes to the signal timings are not recommended. It is expected that this type of adjustment would be accomplished through the normal operation of the actuated traffic signal. For illustration purposes, the analysis with the minor signal timing adjustment is included in Appendix N and the resultant LOS tables.
- All other movements are projected to operate at acceptable LOS D or better. Impacts to overall intersection delays are projected to be negligible (highest projected overall intersection delay increase is 2.1 seconds per vehicle).
- No mitigation required.

<u>Kim Acres Drive and Aspen Drive</u>

- All movements are projected to operate at acceptable LOS A or B. Impacts to overall intersection delays are projected to be negligible (no increase in overall delay projected).
- No mitigation required.

Kim Acres Drive and Site Drive

- All movements are projected to operate at acceptable LOS A or B.
- A Stop Sign (R1-1) is recommended for the Westbound Site Driveway approach.

10.0 Turn Lane Analysis

Traffic volumes at the study intersections were compared with guidelines for consideration of auxiliary turn lanes where turn lanes do not already exist. These guidelines are found in PennDOT Publication 46, *Traffic Engineering Manual*. Adhering to the methodology in Publication 46, only the mainline approaches were compared to the turn lane guidelines at the unsignalized study intersections. The worst-case horizon conditions (2029 Without and With Development) were analyzed.

There are no turn lanes warranted in the study area. A summary of the calculations performed using the methodology in Publication 46 is included in **Appendix O**.

11.0 Queuing Analyses

Queuing analyses were performed for the study intersections to identify forecasted 95th percentile vehicular queues. The analyses were performed using Synchro. The queuing results are summarized in **Tables 3A through 3C**.

The proposed development is projected to have negligible impacts on vehicular queues in the study area. The projected increase in queue from Without Development to With Development conditions is no more than one vehicle length for all movements in the study area. Vehicles are not projected to extend through adjacent study intersections. No mitigation is required based on the queuing analysis. Queue summary printouts are included in **Appendix P**.

12.0 On-Site Queuing Analysis

As required in the scope of work, an on-site queuing analysis was performed for the automated car wash operation. The proposed facility will provide room for approximately thirty-three (33) vehicles before backing out onto Kim Acres Drive (as shown on Figure 2). This includes the space(s) before the payment point (3-lane payment storage area),

between the payment point and service tunnel, and within the service tunnel itself, which may contain several vehicles simultaneously.

According to the operator, a vehicle can be serviced (i.e., make payment and proceed completely through the service tunnel) in approximately three (3) minutes. However, because there will be three (3) payment kiosks, and because more than one vehicle may be serviced at one time (i.e., a vehicle will begin its servicing process before the previous vehicle completes *its* servicing process), the facility is capable of servicing ninety (90) or more vehicles per hour. Based on this information, calculations were performed using single-channel queuing theory to determine the likelihood that more than 33 vehicles will be in the system and therefore stacked on site during peak periods of operation. These calculations are included in **Appendix Q**. The results of the calculations indicate the likelihood of there being more than 33 vehicles stacked in the facility as negligible (less than 1% chance). Therefore, it is not expected that vehicles would stack outside of the site stacking/service area.

13.0 Summary and Conclusions

The proposed ModWash located at the intersection of Route 114 (S.R. 0114) and Kim Acres Drive is projected to have negligible impact on the surrounding roadways and intersections.

The available corner sight distance at the site driveway exceeds desirable and minimum corner sight distance requirements.

The proposed development is projected to have negligible impacts on vehicular delays and queues in the study area. The study intersections were compared with turn lane warrants where turn lanes do not already exist. There are no additional turn lanes warranted within the study area.

The following mitigation is recommended to be implemented by the developer:

- Construction of Site Access to Kim Acres Drive as depicted on the site plan. The existing Stop Sign (R1-1) on the Westbound Site Driveway approach should remain.

TABLES

Table 1A

LEVEL-OF-SERVICE SUMMARY
ModWash
Upper Allen Township, Cumberland County, PA

ROUTE 114 (S.R. 0114) & KIM ACRES DRIVE/BUMBLE BEE HOLLOW ROAD

		AM Peak Hour						
Intersection		ROUTE 114 (S.R. 0114) & KIM ACRES DRIVE/BUMBLE BEE HOLLOW ROAD						
Route 114 (S.R. 0114)		East/West Roadway						
Direction	**Approach / Movement**	**Existing 2023**	**2024 Without Development**	**2024 With Development**	**2024 With Dev With Timing Adj**	**2029 Without Development**	**2029 With Development**	**2029 With Dev With Timing Adj**
Eastbound	Left Turn	B (14.4)	B (14.5)	B (14.8)	B (15.4)	B (15.1)	B (15.4)	B (16)
	Through	B (14.3)	B (14.3)	B (14.3)	B (14.9)	B (14.6)	B (14.6)	B (15.2)
	Right Turn	B (14.9)	B (14.9)	B (14.9)	B (15.5)	B (15.3)	B (15.3)	B (15.8)
	Approach	**B (14.6)**	**B (14.6)**	**B (14.7)**	**B (15.2)**	**B (15)**	**B (15.1)**	**B (15.6)**
Westbound	Left Turn	B (11.6)	B (11.6)	B (11.7)	B (12.2)	B (11.8)	B (11.9)	B (12.3)
	Through/Right Turn	C (24.3)	C (24.5)	C (25)	C (26.3)	C (25.7)	C (26.4)	C (27.8)
	Approach	**C (23.6)**	**C (23.8)**	**C (24.2)**	**C (25.5)**	**C (24.9)**	**C (25.6)**	**C (26.9)**
Kim Acres Drive/Bumble Bee Hollow Road		North/South Roadway						
Northbound	Left Turn	C (25.4)	C (25.4)	C (25.4)	C (24.7)	C (25.3)	C (25.3)	C (24.6)
	Through/Right Turn	C (25.3)	C (25.3)	C (25.7)	C (25)	C (25.1)	C (25.5)	C (24.9)
	Approach	**C (25.4)**	**C (25.3)**	**C (25.4)**	**C (24.7)**	**C (25.3)**	**C (25.3)**	**C (24.7)**
Southbound	Left Turn	C (30.5)	C (30.5)	C (30.3)	C (29.4)	C (30.5)	C (30.3)	C (29.4)
	Through	C (33.4)	C (33.4)	C (33.5)	C (32.5)	C (33.4)	C (33.5)	C (32.5)
	Right Turn	F (115.9)	F (117.4)	F (130.1)	F (99.7)	F (128.4)	F (140.2)	F (107.3)
	Approach	**F (98.3)**	**F (99.6)**	**F (107.7)**	**F (84.1)**	**F (108.5)**	**F (115.7)**	**F (90.1)**
	Overall Intersection	**C (33.9)**	**C (34.2)**	**D (36.4)**	**C (32.7)**	**D (36.2)**	**D (38.3)**	**C (34.3)**

		PM Peak Hour						
Intersection		ROUTE 114 (S.R. 0114) & KIM ACRES DRIVE/BUMBLE BEE HOLLOW ROAD						
Route 114 (S.R. 0114)		East/West Roadway						
Direction	**Approach / Movement**	**Existing 2023**	**2024 Without Development**	**2024 With Development**		**2029 Without Development**	**2029 With Development**	
Eastbound	Left Turn	A (9.4)	A (9.4)	B (10.1)		A (9.6)	B (10.2)	
	Through	B (15)	B (15.1)	B (15.9)		B (15.6)	B (16.4)	
	Right Turn	B (12.7)	B (12.8)	B (13.5)		B (13.1)	B (13.7)	
	Approach	**B (13.3)**	**B (13.4)**	**B (14)**		**B (13.8)**	**B (14.4)**	
Westbound	Left Turn	B (10.5)	B (10.6)	B (11.4)		B (10.9)	B (11.6)	
	Through/Right Turn	B (14.6)	B (14.7)	B (16.1)		B (15.1)	B (16.5)	
	Approach	**B (14.5)**	**B (14.2)**	**B (15.6)**		**B (14.6)**	**B (16)**	
Kim Acres Drive/Bumble Bee Hollow Road		North/South Roadway						
Northbound	Left Turn	C (32.7)	C (32.7)	C (31.8)		C (33.2)	C (32.3)	
	Through/Right Turn	C (32.8)	C (32.8)	C (32.8)		C (32.6)	C (32.7)	
	Approach	**C (32.7)**	**C (32.7)**	**C (32.2)**		**C (33)**	**C (32.5)**	
Southbound	Left Turn	C (32.6)	C (32.5)	C (31.2)		C (32.3)	C (31)	
	Through	D (35.9)	D (35.8)	C (35)		D (35.6)	C (34.9)	
	Right Turn	D (45.5)	D (45.6)	D (48.3)		D (46.3)	D (48.8)	
	Approach	**D (42.4)**	**D (42.4)**	**D (43.4)**		**D (42.8)**	**D (43.7)**	
	Overall Intersection	**C (20.8)**	**C (20.8)**	**C (21.8)**		**C (21.2)**	**C (22.2)**	

		SAT Peak Hour						
Intersection		ROUTE 114 (S.R. 0114) & KIM ACRES DRIVE/BUMBLE BEE HOLLOW ROAD						
Route 114 (S.R. 0114)		East/West Roadway						
Direction	**Approach / Movement**	**Existing 2023**	**2024 Without Development**	**2024 With Development**		**2029 Without Development**	**2029 With Development**	
Eastbound	Left Turn	A (10)	A (10)	B (11.4)		B (10.2)	B (11.6)	
	Through	B (14.1)	B (14.2)	B (15.4)		B (14.5)	B (15.7)	
	Right Turn	B (13.2)	B (13.3)	B (14.4)		B (13.6)	B (14.7)	
	Approach	**B (13.2)**	**B (13.2)**	**B (14.3)**		**B (13.5)**	**B (14.6)**	
Westbound	Left Turn	A (10)	B (10.1)	B (11.2)		B (10.2)	B (11.3)	
	Through/Right Turn	B (15.8)	B (15.9)	B (18.4)		B (16.2)	B (18.9)	
	Approach	**B (15.3)**	**B (15.3)**	**B (17.8)**		**B (15.7)**	**B (18.2)**	
Kim Acres Drive/Bumble Bee Hollow Road		North/South Roadway						
Northbound	Left Turn	C (24.9)	C (24.9)	C (23.9)		C (25)	C (23.9)	
	Through/Right Turn	C (26.1)	C (26.1)	C (26)		C (26)	C (25.9)	
	Approach	**C (25.2)**	**C (25.2)**	**C (24.6)**		**C (25.3)**	**C (24.5)**	
Southbound	Left Turn	C (27.6)	C (27.6)	C (25.5)		C (27.4)	C (25.4)	
	Through	C (30.2)	C (30.1)	C (28.9)		C (30)	C (28.8)	
	Right Turn	D (35.9)	D (35.9)	D (37.9)		D (35.9)	D (38.2)	
	Approach	**C (34.1)**	**C (34.1)**	**C (34.4)**		**C (34)**	**C (34.6)**	
	Overall Intersection	**B (18.3)**	**B (18.4)**	**B (19.9)**		**B (18.6)**	**C (20.1)**	

Table 1B

LEVEL-OF-SERVICE SUMMARY
ModWash
Upper Allen Township, Cumberland County, PA

KIM ACRES DRIVE & ASPEN DRIVE

		AM Peak Hour						
Intersection		KIM ACRES DRIVE & ASPEN DRIVE						
Aspen Drive		East/West Roadway						
Direction	Approach / Movement	Existing 2023	2024 Without Development	2024 With Development		2029 Without Development	2029 With Development	
Eastbound	Left/Through/Right	A (9.5)	A (9.5)	A (9.5)		A (9.6)	A (9.6)	
	Approach	A (9.5)	A (9.5)	A (9.5)		A (9.6)	A (9.6)	
Westbound	Left/Through/Right	B (11)	B (11)	B (11.1)		B (11.2)	B (11.3)	
	Approach	B (11)	B (11)	B (11.1)		B (11.2)	B (11.3)	
Kim Acres Drive		North/South Roadway						
Northbound	Left Turn	A (8.8)	A (8.8)	A (8.8)		A (8.9)	A (8.9)	
	Through/Right Turn	A (0)	A (0)	A (0)		A (0)	A (0)	
	Approach	A (3.5)	A (3.5)	A (3.5)		A (3.5)	A (3.5)	
Southbound	Left Turn	A (8.2)	A (8.2)	A (8.2)		A (8.2)	A (8.2)	
	Through/Right Turn	A (0)	A (0)	A (0)		A (0)	A (0)	
	Approach	A (0)	A (0)	A (0)		A (0)	A (0)	
	Overall Intersection	A (3.3)	A (3.3)	A (3.3)		A (3.3)	A (3.3)	

		PM Peak Hour						
Intersection		KIM ACRES DRIVE & ASPEN DRIVE						
Aspen Drive		East/West Roadway						
Direction	Approach / Movement	Existing 2023	2024 Without Development	2024 With Development		2029 Without Development	2029 With Development	
Eastbound	Left/Through/Right	A (9.3)	A (9.3)	A (9.3)		A (9.3)	A (9.4)	
	Approach	A (9.3)	A (9.3)	A (9.3)		A (9.3)	A (9.4)	
Westbound	Left/Through/Right	B (11.8)	B (11.8)	B (12)		B (12)	B (12.2)	
	Approach	B (11.8)	B (11.8)	B (12)		B (12)	B (12.2)	
Kim Acres Drive		North/South Roadway						
Northbound	Left Turn	A (8.5)	A (8.5)	A (8.5)		A (8.5)	A (8.5)	
	Through/Right Turn	A (0)	A (0)	A (0)		A (0)	A (0)	
	Approach	A (1.3)	A (1.3)	A (1.3)		A (1.3)	A (1.3)	
Southbound	Left Turn	A (8.6)	A (8.6)	A (8.6)		A (8.6)	A (8.6)	
	Through/Right Turn	A (0)	A (0)	A (0)		A (0)	A (0)	
	Approach	A (0.5)	A (0.5)	A (0.5)		A (0.5)	A (0.5)	
	Overall Intersection	A (3)	A (3)	A (3)		A (3)	A (3)	

		SAT Peak Hour						
Intersection		KIM ACRES DRIVE & ASPEN DRIVE						
Aspen Drive		East/West Roadway						
Direction	Approach / Movement	Existing 2023	2024 Without Development	2024 With Development		2029 Without Development	2029 With Development	
Eastbound	Left/Through/Right	A (8.9)	A (8.9)	A (9)		A (8.9)	A (9)	
	Approach	A (8.9)	A (8.9)	A (9)		A (8.9)	A (9)	
Westbound	Left/Through/Right	B (10.3)	B (10.3)	B (10.5)		B (10.4)	B (10.7)	
	Approach	B (10.3)	B (10.3)	B (10.5)		B (10.4)	B (10.7)	
Kim Acres Drive		North/South Roadway						
Northbound	Left Turn	A (8.4)	A (8.4)	A (8.4)		A (8.4)	A (8.4)	
	Through/Right Turn	A (0)	A (0)	A (0)		A (0)	A (0)	
	Approach	A (2)	A (2)	A (2)		A (2)	A (2)	
Southbound	Left Turn	A (8.3)	A (8.3)	A (8.3)		A (8.3)	A (8.3)	
	Through/Right Turn	A (0)	A (0)	A (0)		A (0)	A (0)	
	Approach	A (0.3)	A (0.3)	A (0.2)		A (0.3)	A (0.2)	
	Overall Intersection	A (3.4)	A (3.4)	A (3.4)		A (3.4)	A (3.4)	

Table 1C

LEVEL-OF-SERVICE SUMMARY
ModWash
Upper Allen Township, Cumberland County, PA

KIM ACRES DRIVE & SITE DRIVE

		AM Peak Hour						
Intersection		KIM ACRES DRIVE & SITE DRIVE						
Site Drive		East/West Roadway						
Direction	Approach / Movement	Existing 2023	2024 Without Development	2024 With Development		2029 Without Development	2029 With Development	
Eastbound								
	Approach							
Westbound								
	Left/Right Turn			B (10.4)			B (10.5)	
	Approach			B (10.4)			B (10.5)	
Kim Acres Drive		North/South Roadway						
Northbound								
	Through/Right Turn			A (0)			A (0)	
	Approach			A (0)			A (0)	
Southbound	Left Turn			A (8.4)			A (8.4)	
	Through			A (0)			A (0)	
	Approach			A (0.1)			A (0.1)	
	Overall Intersection			A (0.5)			A (0.5)	

		PM Peak Hour						
Intersection		KIM ACRES DRIVE & SITE DRIVE						
Site Drive		East/West Roadway						
Direction	Approach / Movement	Existing 2023	2024 Without Development	2024 With Development		2029 Without Development	2029 With Development	
Eastbound								
	Approach							
Westbound								
	Left/Right Turn			B (11.5)			B (11.7)	
	Approach			B (11.5)			B (11.7)	
Kim Acres Drive		North/South Roadway						
Northbound								
	Through/Right Turn			A (0)			A (0)	
	Approach			A (0)			A (0)	
Southbound	Left Turn			A (8.8)			A (8.8)	
	Through			A (0)			A (0)	
	Approach			A (0.3)			A (0.2)	
	Overall Intersection			A (1.1)			A (1.1)	

		SAT Peak Hour						
Intersection		KIM ACRES DRIVE & SITE DRIVE						
Site Drive		East/West Roadway						
Direction	Approach / Movement	Existing 2023	2024 Without Development	2024 With Development		2029 Without Development	2029 With Development	
Eastbound								
	Approach							
Westbound								
	Left/Right Turn			B (11)			B (11.1)	
	Approach			B (11)			B (11.1)	
Kim Acres Drive		North/South Roadway						
Northbound								
	Through/Right Turn			A (0)			A (0)	
	Approach			A (0)			A (0)	
Southbound	Left Turn			A (8.6)			A (8.7)	
	Through			A (0)			A (0)	
	Approach			A (0.5)			A (0.5)	
	Overall Intersection			A (2)			A (1.9)	

Table 2

Forecasted Trip Generation
ModWash – Upper Allen Township, Cumberland County, PA

TIME PERIOD	FORECASTED TRIP GENERATION		
	IN	OUT	TOTAL
Automated Car Wash with 1 Wash Tunnel – Local Trip Generation Data			
AM Peak Hour	21	16	37
PM Peak Hour	44	43	87
SAT Peak Hour	78	73	151

Table 3A

QUEUE SUMMARY
ModWash
Upper Allen Township, Cumberland County, PA

WOOSTER
TRAFFIC ▲ PERMITS ▲ SIGNALS

ROUTE 114 (S.R. 0114) & KIM ACRES DRIVE/BUMBLE BEE HOLLOW ROAD

Movement	Condition	Synchro 95th %ile Queue (vehicles)			Available Storage (next public intersection)
Intersection of Route 114 (S.R. 0114) & Kim Acres Drive/Bumble Bee Hollow Road					
		AM	PM	SAT	
EB Left	2023	47	66	41	185'
	2024 w/o Dev	47	66	42	
	2024 with Dev	51	74	56	
	2029 w/o Dev	48	68	43	
	2029 with Dev	52	76	57	
EB Through	2023	112	287	195	580' (US Route 15 NB Ramps)
	2024 w/o Dev	112	288	196	
	2024 with Dev	112	288	200	
	2029 w/o Dev	116	301	202	
	2029 with Dev	116	301	207	
EB Right	2023	38	41	41	200'
	2024 w/o Dev	38	41	42	
	2024 with Dev	38	41	42	
	2029 w/o Dev	39	42	42	
	2029 with Dev	39	42	43	
WB Left	2023	20	19	19	120'
	2024 w/o Dev	20	19	19	
	2024 with Dev	20	19	19	
	2029 w/o Dev	20	20	19	
	2029 with Dev	20	20	20	
WB Through/ Right Turn	2023	#422	178	207	790' (Aspen Dr)
	2024 w/o Dev	#424	179	208	
	2024 with Dev	#433	185	226	
	2029 w/o Dev	#445	185	216	
	2029 with Dev	#453	192	234	
NB Left	2023	149	#163	#132	140'
	2024 w/o Dev	150	#165	#135	
	2024 with Dev	150	#162	123	
	2029 w/o Dev	155	#177	#141	
	2029 with Dev	155	#173	126	
NB Through/ Right	2023	32	91	54	1,600' (Old Hollow Rd)
	2024 w/o Dev	32	91	54	
	2024 with Dev	35	100	63	
	2029 w/o Dev	33	94	55	
	2029 with Dev	36	104	65	
SB Left	2023	18	19	16	85'
	2024 w/o Dev	18	19	16	
	2024 with Dev	21	29	28	
	2029 w/o Dev	18	19	16	
	2029 with Dev	21	29	28	
SB Through/ Right	2023	50	58	37	405' (Aspen Dr) Without Dev; 190' (Site Dr) With Dev
	2024 w/o Dev	50	58	37	
	2024 with Dev	54	65	46	
	2029 w/o Dev	51	60	38	
	2029 with Dev	54	66	47	
SB Right	2023	61	39	8	100'
	2024 w/o Dev	61	39	8	
	2024 with Dev	62	53	27	
	2029 w/o Dev	62	43	10	
	2029 with Dev	63	55	29	

Table 3B

QUEUE SUMMARY
ModWash
Upper Allen Township, Cumberland County, PA

WOOSTER
TRAFFIC ▲ PERMITS ▲ SIGNALS

KIM ACRES DRIVE & ASPEN PLACE

Movement	Condition	Synchro 95th %ile Queue (vehicles)			Available Storage (next public intersection)
Intersection of Kim Acres Drive & Aspen Drive					
		AM	PM	SAT	
EB Left/ Through/ Right	2023	6	7	5	370' (Nittany Dr)
	2024 w/o Dev	6	7	5	
	2024 with Dev	6	7	5	
	2029 w/o Dev	6	7	5	
	2029 with Dev	6	8	5	
WB Left/ Through/ Right	2023	5	6	4	250' (Mimosa Dr)
	2024 w/o Dev	5	6	4	
	2024 with Dev	5	6	5	
	2029 w/o Dev	5	6	4	
	2029 with Dev	5	7	5	
NB Left/ Through/ Right	2023	3	2	2	405' (Route 114) Without Dev; 190' (Site Dr) With Dev
	2024 w/o Dev	3	2	2	
	2024 with Dev	3	2	2	
	2029 w/o Dev	3	2	2	
	2029 with Dev	3	2	2	
SB Left/ Through/ Right	2023	0	0	0	1,050' (Spring Run Dr)
	2024 w/o Dev	0	0	0	
	2024 with Dev	0	0	0	
	2029 w/o Dev	0	0	0	
	2029 with Dev	0	1	0	

Table 3C

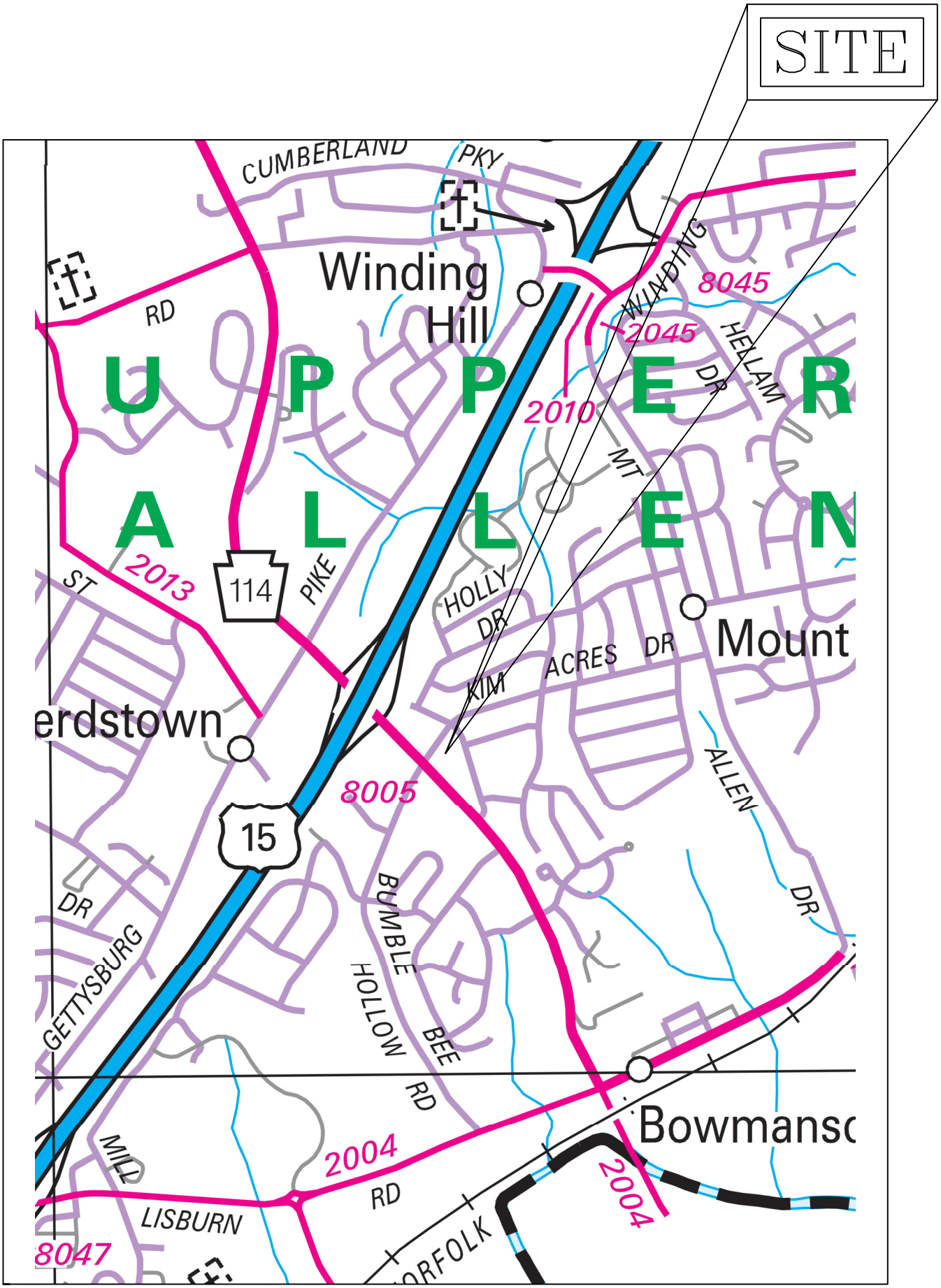
QUEUE SUMMARY
ModWash
Upper Allen Township, Cumberland County, PA

KIM ACRES DRIVE & SITE DRIVE

Movement	Condition	Synchro 95th %ile Queue (vehicles)			Available Storage (next public intersection)
Intersection of Kim Acres Drive & Site Drive					
		AM	PM	SAT	
WB Left/ Through/ Right	2023	DNE	DNE	DNE	100'
	2024 w/o Dev	DNE	DNE	DNE	
	2024 with Dev	2	7	11	
	2029 w/o Dev	DNE	DNE	DNE	
	2029 with Dev	2	7	11	
NB Left/ Through/ Right	2023	DNE	DNE	DNE	190' (Route 114)
	2024 w/o Dev	DNE	DNE	DNE	
	2024 with Dev	0	0	0	
	2029 w/o Dev	DNE	DNE	DNE	
	2029 with Dev	0	0	0	
SB Left/ Through/ Right	2023	DNE	DNE	DNE	190' (Aspen Dr)
	2024 w/o Dev	DNE	DNE	DNE	
	2024 with Dev	0	0	1	
	2029 w/o Dev	DNE	DNE	DNE	
	2029 with Dev	0	0	1	

DNE = Does not exist prior to development

FIGURES



MODWASH – Upper Allen Township
Site Location

FIGURE 1

DAVID E. WOOSTER & ASSOC., INC.

SITE NOTE:

1. THE CONTRACTOR SHALL INSTALL ALL PAVEMENT MARKINGS AS SHOWN ON THE PLANS.
2. NO WETLANDS EXIST WITHIN THE PROJECT BOUNDARY.
3. MINE OPENINGS ARE NOT ANTICIPATED. IF MINE SPOILS ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL EITHER REWORK THE MATERIAL PER GEOTECHNICAL ENGINEERS RECOMMENDATIONS OR REMOVE THE MATERIAL TO A PERMITTED AREA.
4. NO SIGNIFICANT CULTURAL OR SENSITIVE ENVIRONEMENTAL FEATURES EXIST WITHIN THE PROJECT BOUNDARY. NO FURTHER ENVIRONMENTAL STUDIES WILL BE NECESSARY.
5. NO WATER RESOURCES EXIST WITHIN THE PROJECT BOUNDARY.

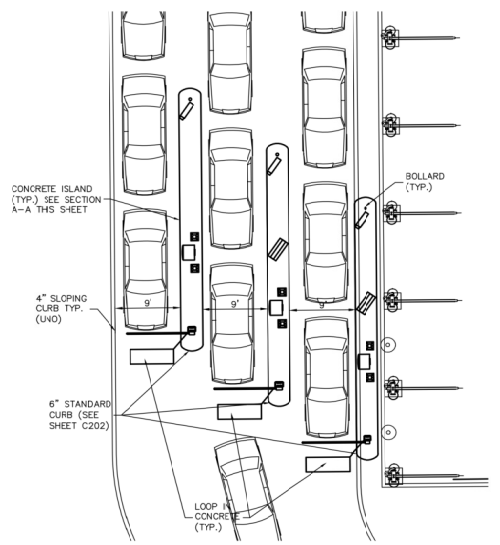
ZONING INFORMATION

LOCATION: 127 KIM ACRES DRIVE, MECHANICSBURG, PA		
ZONE: C-2 HIGHWAY COMMERCIAL		
USE: CAR WASH		
ITEM	REQUIREMENTS	PROPOSED
MINIMUM LOT AREA	N/A	---
MINIMUM LOT WIDTH	N/A	---
MINIMUM FRONT SETBACK	50 FEET	50 FEET
MINIMUM SIDE SETBACK	25 FEET	25 FEET
MINIMUM REAR SETBACK	25 FEET	25 FEET
MINIMUM DRIVE AISLE SETBACK	10 FEET	10 FEET
MAXIMUM BUILDING HEIGHT	35 FEET	<35 FEET
MAXIMUM BUILDING COVERAGE	50 PERCENT	<50 PERCENT
MAXIMUM SITE COVERAGE	70 PERCENT	<70 PERCENT
LOT ACREAGE	---	1.20

PARKING INFORMATION

REQUIREMENT DESCRIPTION:
VEHICLE WASHING USE SHALL PROVIDE 3 PARKING SPACES FOR EACH WASH BAY.

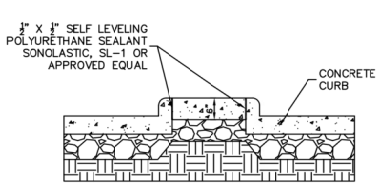
ITEM	REQUIREMENTS	PROPOSED
PARKING SPACES:	3/BAY=3	24



PAY STATION DETAIL

SCALE: 1" = 10'

1. SEE ARCHITECTURAL PLANS FOR ELECTRICAL LAYOUT, EQUIPMENT, AND CANOPY DETAILS.



SECTION A–A
CONCRETE ISLAND DETAIL

N.T.S.

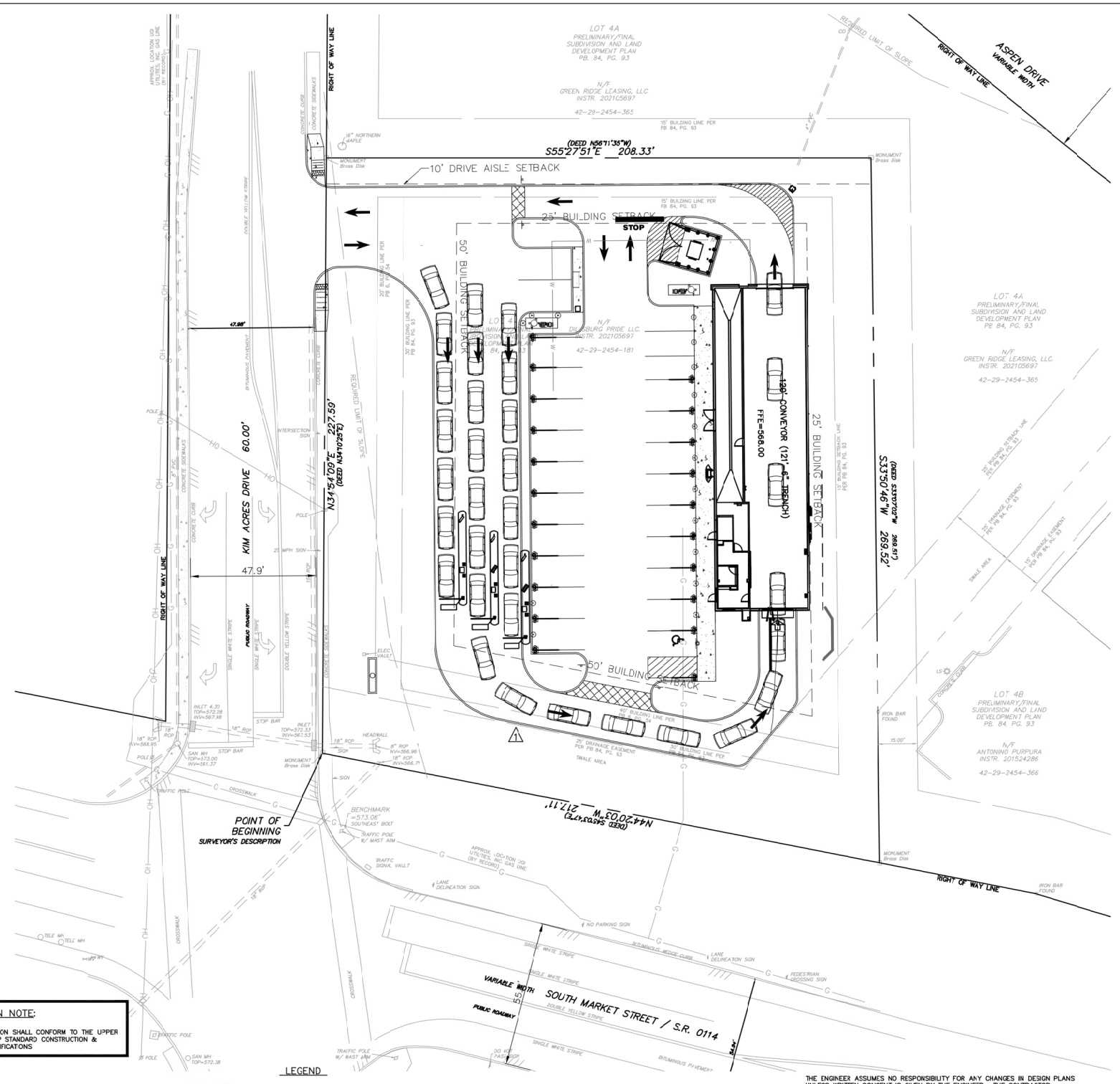
CONSTRUCTION NOTE:

1. ALL CONSTRUCTION SHALL CONFORM TO THE UPPER ALLEN TOWNSHIP STANDARD CONSTRUCTION & MATERIALS SPECIFICATONS

CALL BEFORE YOU DIG
IN PENNSYLVANIA
1-800-242-1776
DESIGN SN: 20211762062

THE GENERAL CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES INVOLVED IN THE SITE NO MORE TEN DAYS AND NO LESS THAN THREE DAYS IN ADVANCE OF EXCAVATION (PA ACT 287 OF 1974 AMENDED BY ACT 50 OF 2018). PA STATE LAW REQUIRES 3 WORKING DAYS NOTICE

Know what's below
Call before you dig



LEGEND

SAN – SANITARY	—G— – GAS LINE
ST – STORM	—W— – WATER LINE
MH – MANHOLE	—T— – SUBSURFACE TELEPHONE LINE
TOP – TOP OF CASTING	—E— – SUBSURFACE ELECTRIC LINE
INV – INVERT / FLOW LINE	—OH— – OVERHEAD WIRES
WV – WATER VALVE	– – 308 – – – EXISTING CONTOURS
GV – GAS VALVE	– EXISTING INLET
GM – GAS METER	– EXISTING MANHOLE
EM – ELECTRIC METER	= = = = = = – EXISTING SEWER
S.R. – STATE ROUTE	—X—X— – FENCE
TELE – TELEPHONE	
RCP – REINFORCED CONCRETE PIPE	
CPP – CORRUGATED PLASTIC PIPE	

GRAPHIC SCALE
0' 10' 20' 40'
SCALE: 1" = 20

THE ENGINEER ASSUMES NO RESPONSIBILITY FOR ANY CHANGES IN DESIGN PLANS UNLESS WRITTEN CONSENT IS GIVEN BY THE ENGINEER. THE CONTRACTOR AND/OR THE OWNER WILL BE HELD RESPONSIBLE FOR ANY FIELD MODIFICATIONS MADE WITHOUT THE WRITTEN CONSENT OF THE ENGINEER AND NECESSARY APPROVALS BY PERMITTING AGENCIES.

THE LOCATION OF EXISTING UTILITIES WERE TAKEN FROM RECORDS AND MARKING PROVIDED BY OTHERS AND OBSERVED EVIDENCE. THE LOCATIONS SHOWN MAY BE APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS, SIZES AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL EXERCISE CARE TO AVOID DAMAGE TO ALL EXISTING UTILITIES

REVISION BY: MKF	DATE: 02/09/22	DESCRIPTION: REVISED PER TOWNSHIP COMMENTS/OWNER
REVISION BY: GJV	DATE: 03/15/22	DESCRIPTION: RVSD PER TOWNSHIP COMMENTS
REVISION BY: EMC	DATE: 4/8/22	DESCRIPTION: RVSD PER TOWNSHIP COMMENTS
REVISION BY: NJM	DATE: 05/02/22	DESCRIPTION: REVISED PER CLIENT COMMENTS
REVISION BY: GJV	DATE: 09/12/22	DESCRIPTION: ADDED UPDATED PAY KIOSKS
REVISION BY: —	DATE: —	DESCRIPTION: —
REVISION BY: —	DATE: —	DESCRIPTION: —

DESIGNED BY: EMC
REVIEWED BY: EMC
DRAWN BY: GJV
DATE: NOV 2021
PROJ. NO.: 1856.66

SCALE:
1" = 20'

Morris Knowles
(A Hammontree Company)
Consulting Engineers and Land Surveyors
Dallastown, PA 17313
Telephone: (717) 244-4822
Fax: (717) 428-8940
info@morrisknowles.com www.morrisknowles.com

SITE PLAN
MODWASH - UPPER ALLEN TOWNSHIP, PA
prepared for
HUTTON MECHANICSBURG PA ST, LLC
UPPER ALLEN TOWNSHIP, CUMBERLAND COUNTY, PA

SHEET NO.
C200

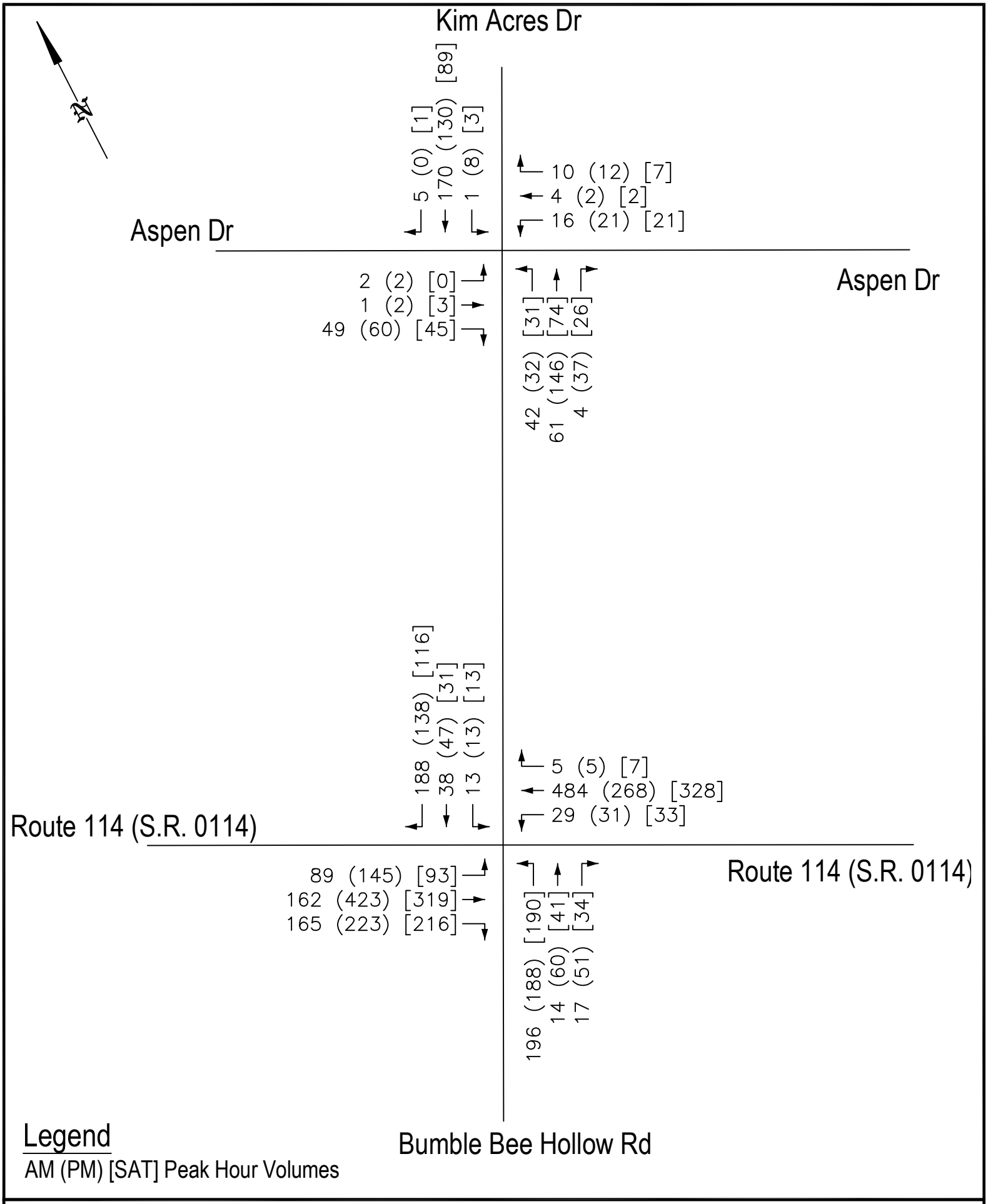
DWG. PATH: H:\Clients\1856 Hutton Development\1856.66 - 127 Kim Acres, Upper Allen Twp, PA\1856.66 - 127 Kim Acres, Upper Allen Twp, PA - 1.dwg
LAST SAVED: Nov 09, 2023 - 2:32pm gjoerner

NOTE:
NOT TO SCALE

PROPOSED MODWASH DEVELOPMENT – Upper Allen Township
Preliminary Site Plan

FIGURE 2

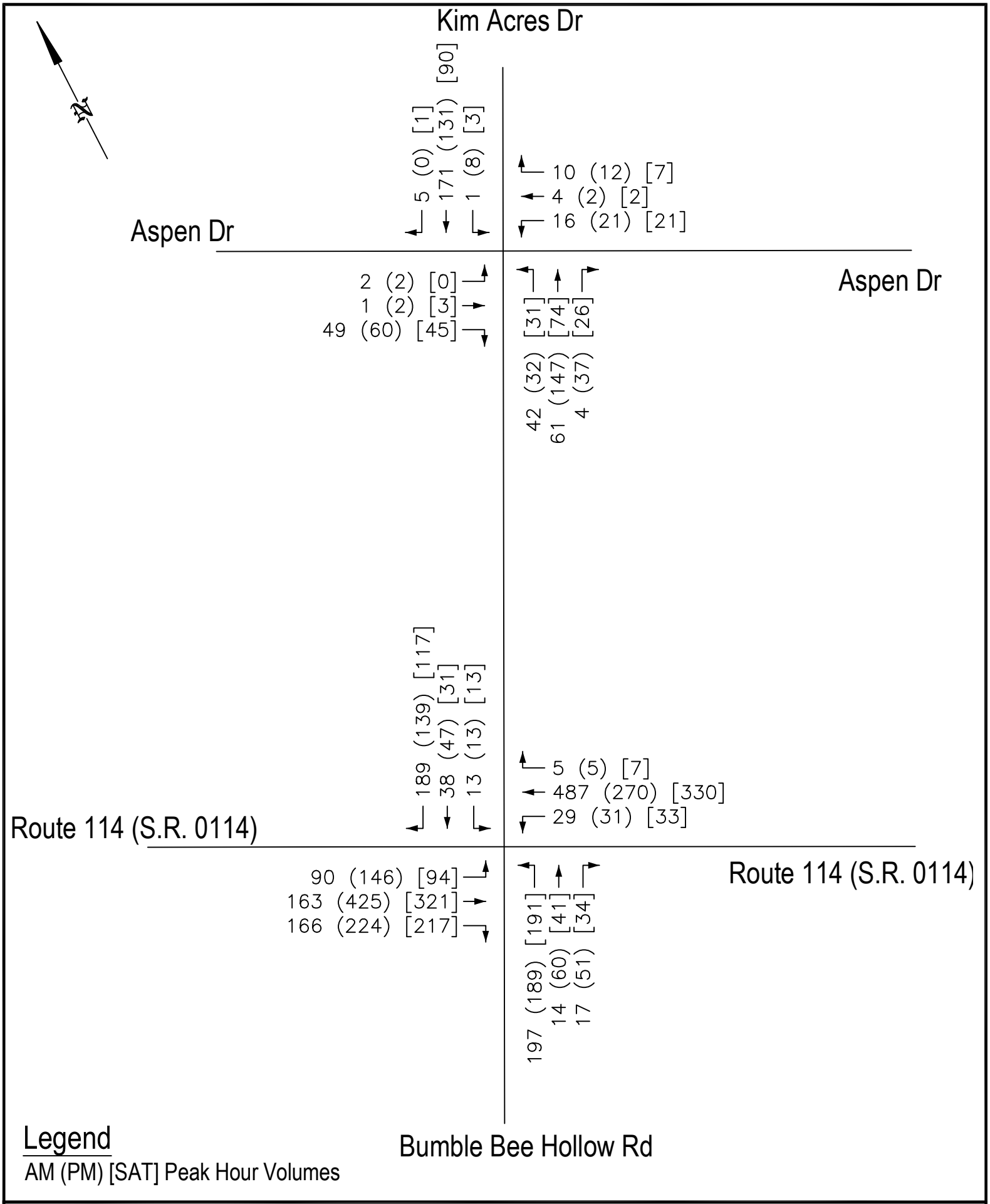
DAVID E. WOOSTER & ASSOC., INC.



PROPOSED MODWASH – Upper Allen Township
Existing 2023 Condition
Peak Hour Traffic Volumes

DAVID E. WOOSTER & ASSOC., INC.

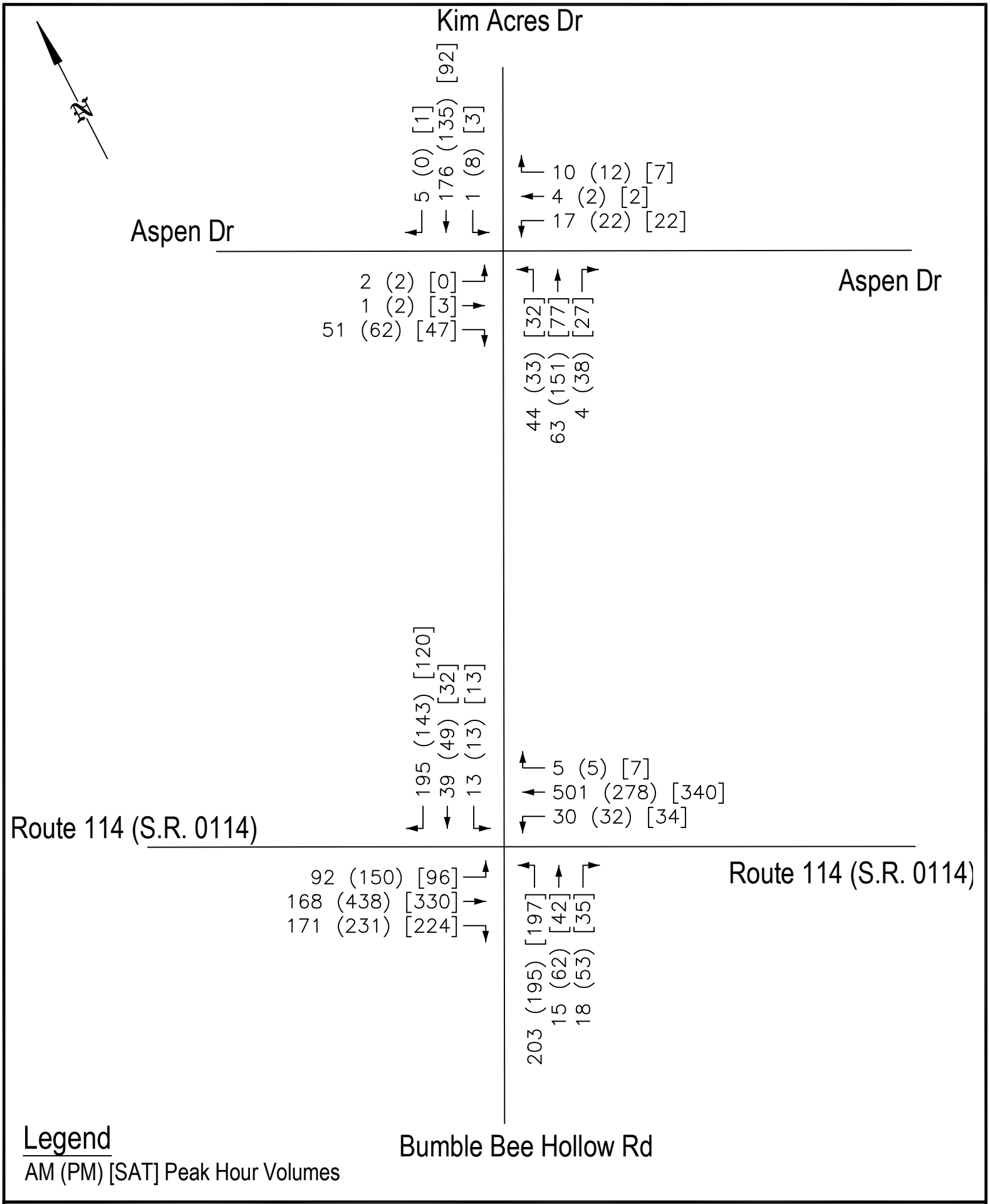
FIGURE 3
4074011323_Figs



PROPOSED MODWASH – Upper Allen Township
Opening Year 2024 Without Development Condition
Peak Hour Traffic Volumes

DAVID E. WOOSTER & ASSOC., INC.

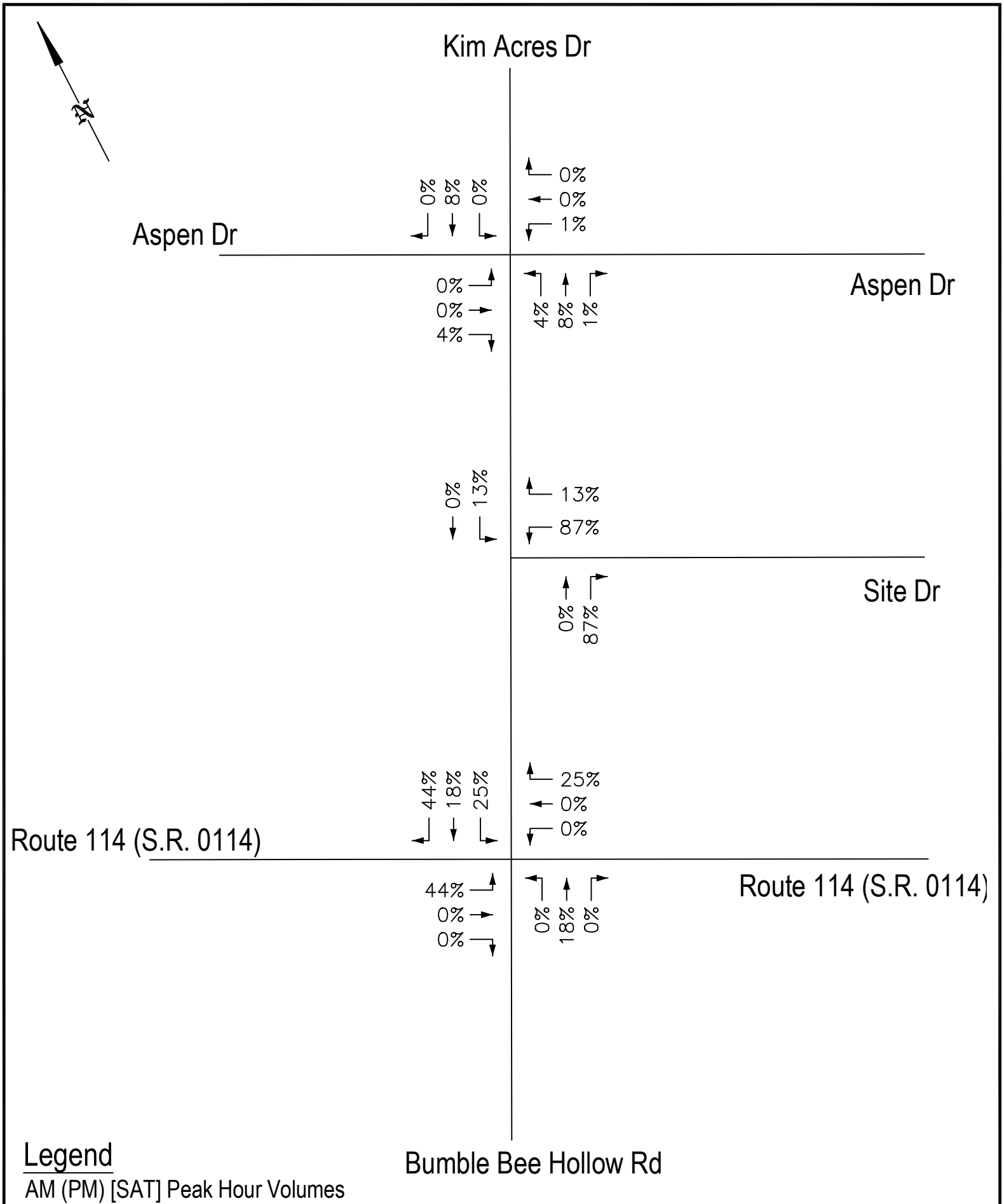
FIGURE 4
4074011323_Figs



PROPOSED MODWASH – Upper Allen Township
Design Year 2029 Without Development Condition
Peak Hour Traffic Volumes

DAVID E. WOOSTER & ASSOC., INC.

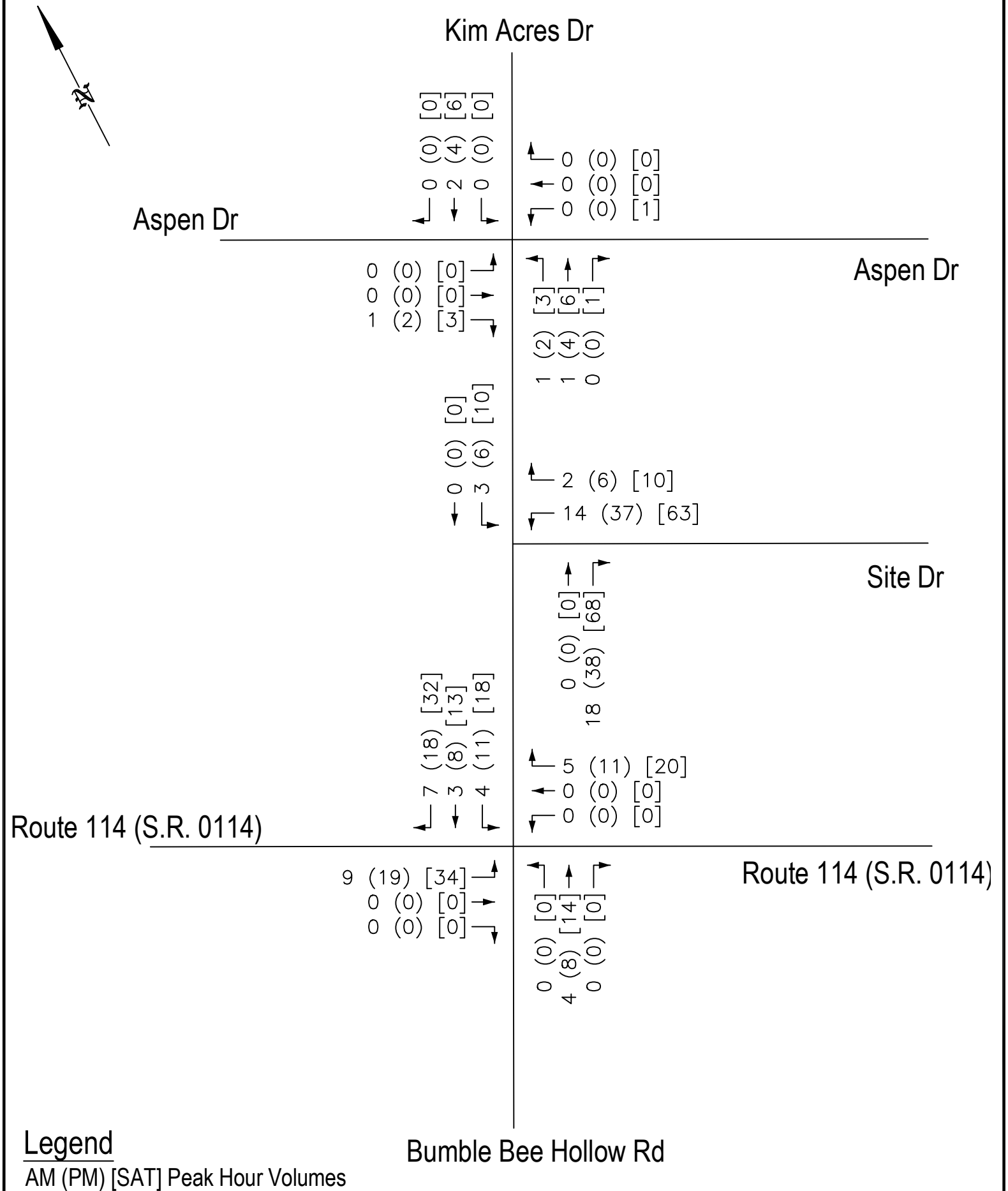
FIGURE 5
4074011323_Figs



PROPOSED MODWASH – Upper Allen Township
Anticipated Trip Distribution
Peak Hour Traffic Volumes

DAVID E. WOOSTER & ASSOC., INC.

FIGURE 6a
4074011323_Figs



Legend

AM (PM) [SAT] Peak Hour Volumes

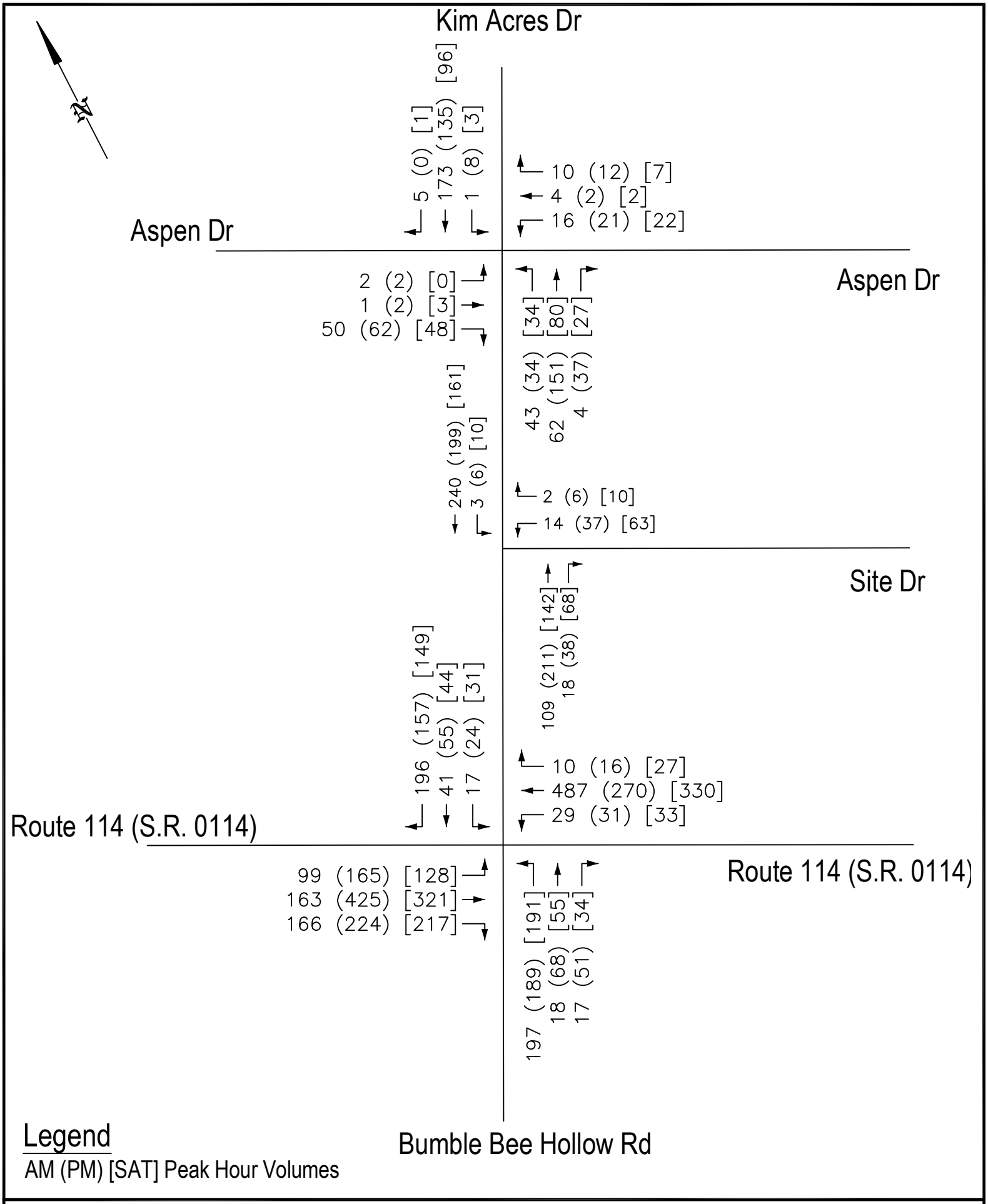
PROPOSED MODWASH – Upper Allen Township

Forecasted Trip Additions

FIGURE 6b

4074011323_Figs

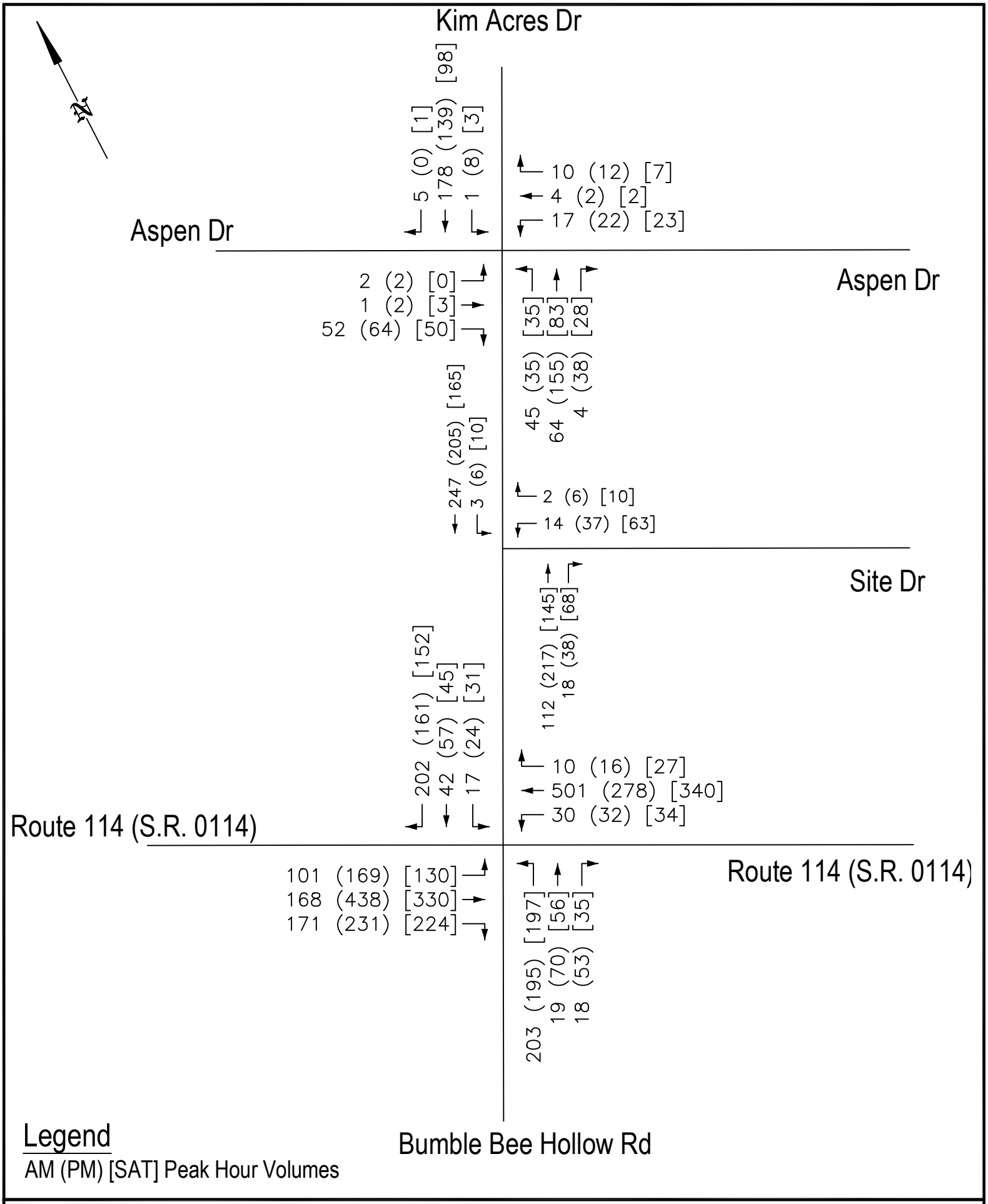
DAVID E. WOOSTER & ASSOC., INC.



PROPOSED MODWASH – Upper Allen Township
Opening Year 2024 With Development Condition
Peak Hour Traffic Volumes

DAVID E. WOOSTER & ASSOC., INC.

FIGURE 7
4074011323_Figs



PROPOSED MODWASH – Upper Allen Township
Design Year 2029 With Development Condition
Peak Hour Traffic Volumes

DAVID E. WOOSTER & ASSOC., INC.

FIGURE 8
4074011323_Figs

APPENDIX A

Manual Turning Movement Count Data

TRI-STATE TRAFFIC DATA

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Thursday, January 19, 2023
Location: 40.176298, -76.984881

Count Name: Rt. 114 & Kim Acres Dr
Site Code:
Start Date: 01/19/2023
Page No: 1

Turning Movement Data

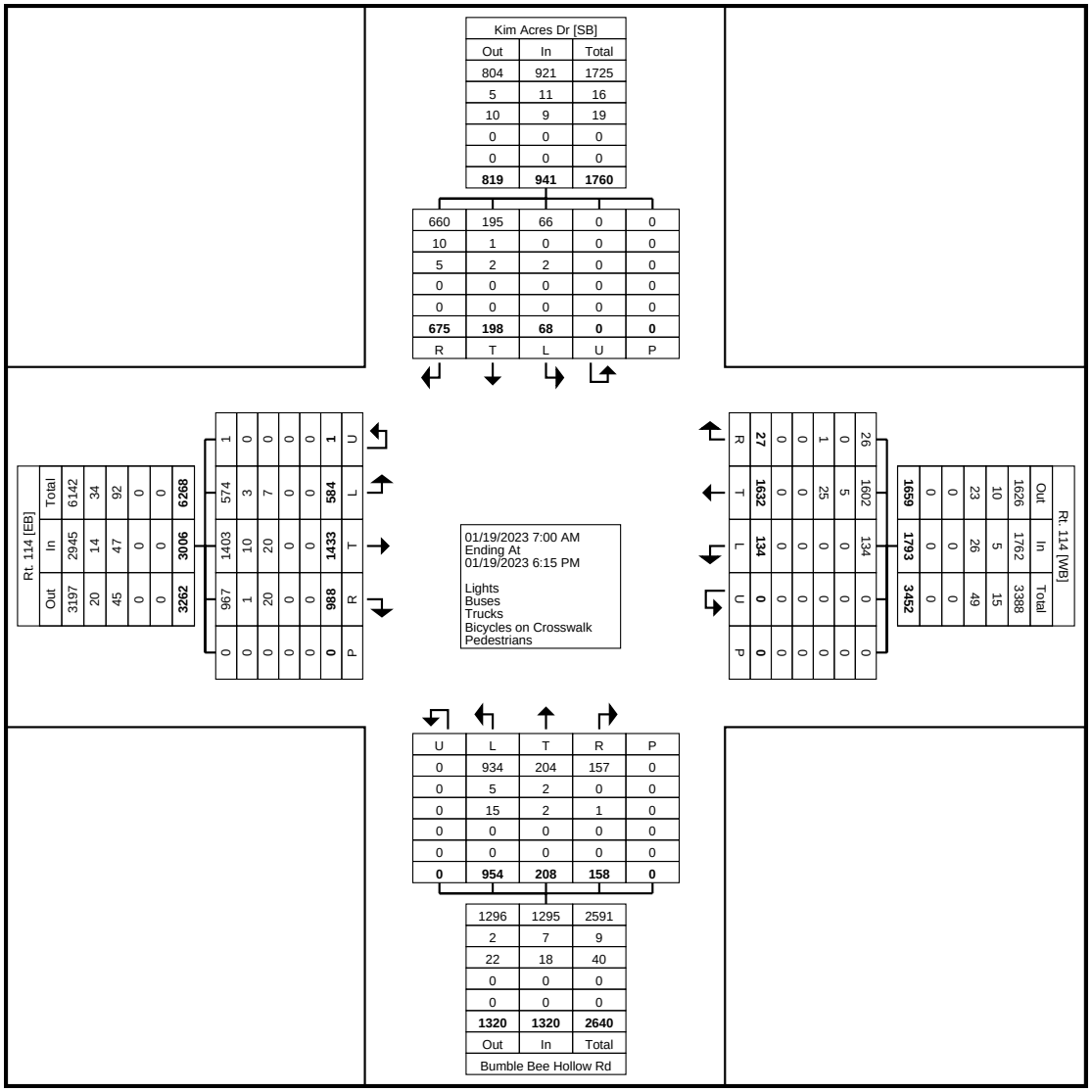
Start Time	Rt. 114 Eastbound							Rt. 114 Westbound							Bumble Bee Hollow Rd Northbound							Kim Acres Dr Southbound							Int. Total
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	
7:00 AM	6	31	20	2	0	0	59	11	109	1	1	0	0	122	33	2	0	2	0	0	37	2	2	8	30	0	0	42	260
7:15 AM	24	30	19	7	0	0	80	1	124	1	2	0	0	128	55	2	2	0	0	0	59	4	9	13	29	0	0	55	322
7:30 AM	21	39	22	12	0	0	94	12	142	2	0	0	0	156	46	1	4	3	0	0	54	6	12	16	25	0	0	59	363
7:45 AM	22	55	51	8	0	0	136	9	120	0	0	0	0	129	48	7	1	2	0	0	58	1	12	16	35	0	0	64	387
Hourly Total	73	155	112	29	0	0	369	33	495	4	3	0	0	535	182	12	7	7	0	0	208	13	35	53	119	0	0	220	1332
8:00 AM	22	38	36	10	0	0	106	7	98	0	0	0	0	105	47	4	1	4	0	0	56	2	5	19	35	0	0	61	328
8:15 AM	27	39	39	7	0	0	112	4	104	0	0	0	0	108	49	10	2	4	0	0	65	2	6	6	22	0	0	36	321
8:30 AM	19	36	30	5	0	0	90	3	97	2	0	0	0	102	61	14	3	3	0	0	81	2	9	0	12	0	0	23	296
8:45 AM	34	37	34	13	0	0	118	6	99	1	1	0	0	107	69	7	3	0	0	0	79	3	8	14	29	0	0	54	358
Hourly Total	102	150	139	35	0	0	426	20	398	3	1	0	0	422	226	35	9	11	0	0	281	9	28	39	98	0	0	174	1303
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	25	84	29	19	0	0	157	10	39	1	0	0	0	50	52	12	6	2	0	0	72	5	9	8	23	0	0	45	324
3:15 PM	33	89	33	20	0	0	175	7	64	3	0	0	0	74	35	14	7	0	0	0	56	4	11	7	16	0	0	38	343
3:30 PM	43	103	43	31	0	0	220	6	59	0	0	0	0	65	35	11	3	6	0	0	55	6	9	5	23	0	0	43	383
3:45 PM	37	102	31	13	0	0	183	8	59	1	0	0	0	68	53	12	5	7	0	0	77	3	16	7	18	0	0	44	372
Hourly Total	138	378	136	83	0	0	735	31	221	5	0	0	0	257	175	49	21	15	0	0	260	18	45	27	80	0	0	170	1422
4:00 PM	32	94	30	28	0	0	184	8	54	1	0	0	0	63	51	14	6	1	0	0	72	4	9	20	14	0	0	47	366
4:15 PM	36	101	32	21	1	0	191	11	63	3	0	0	0	77	44	11	13	3	0	0	71	4	10	9	17	0	0	40	379
4:30 PM	28	116	40	25	0	0	209	5	78	1	0	0	0	84	41	14	14	3	0	0	72	6	10	10	22	0	0	48	413
4:45 PM	36	115	31	29	0	0	211	8	67	0	1	0	0	76	46	18	11	4	0	0	79	2	13	19	28	0	0	62	428
Hourly Total	132	426	133	103	1	0	795	32	262	5	1	0	0	300	182	57	44	11	0	0	294	16	42	58	81	0	0	197	1586
5:00 PM	45	91	25	20	0	0	181	7	60	0	0	0	0	67	57	17	0	3	0	0	77	1	14	5	28	0	0	48	373
5:15 PM	39	79	33	19	0	0	170	4	69	1	0	0	0	74	51	13	9	6	0	0	79	3	14	12	26	0	0	55	378
5:30 PM	30	82	47	22	0	0	181	4	64	1	0	0	0	69	44	10	6	1	0	0	61	7	9	12	12	0	0	40	351
5:45 PM	25	72	32	20	0	0	149	3	63	3	0	0	0	69	37	15	5	3	0	0	60	1	11	12	13	0	0	37	315
Hourly Total	139	324	137	81	0	0	681	18	256	5	0	0	0	279	189	55	20	13	0	0	277	12	48	41	79	0	0	180	1417
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	584	1433	657	331	1	0	3006	134	1632	22	5	0	0	1793	954	208	101	57	0	0	1320	68	198	218	457	0	0	941	7060
Approach %	19.4	47.7	21.9	11.0	0.0	-	-	7.5	91.0	1.2	0.3	0.0	-	-	72.3	15.8	7.7	4.3	0.0	-	-	7.2	21.0	23.2	48.6	0.0	-	-	-
Total %	8.3	20.3	9.3	4.7	0.0	-	42.6	1.9	23.1	0.3	0.1	0.0	-	25.4	13.5	2.9	1.4	0.8	0.0	-	18.7	1.0	2.8	3.1	6.5	0.0	-	13.3	-
Lights	574	1403	640	327	1	-	2945	134	1602	21	5	0	-	1762	934	204	100	57	0	-	1295	66	195	210	450	0	-	921	6923
% Lights	98.3	97.9	97.4	98.8	100.0	-	98.0	100.0	98.2	95.5	100.0	-	-	98.3	97.9	98.1	99.0	100.0	-	-	98.1	97.1	98.5	96.3	98.5	-	-	97.9	98.1
Buses	3	10	1	0	0	-	14	0	5	0	0	0	-	5	5	2	0	0	0	-	7	0	1	4	6	0	-	11	37
% Buses	0.5	0.7	0.2	0.0	0.0	-	0.5	0.0	0.3	0.0	0.0	-	-	0.3	0.5	1.0	0.0	0.0	-	-	0.5	0.0	0.5	1.8	1.3	-	-	1.2	0.5
Trucks	7	20	16	4	0	-	47	0	25	1	0	0	-	26	15	2	1	0	0	-	18	2	2	4	1	0	-	9	100
% Trucks	1.2	1.4	2.4	1.2	0.0	-	1.6	0.0	1.5	4.5	0.0	-	-	1.5	1.6	1.0	1.0	0.0	-	-	1.4	2.9	1.0	1.8	0.2	-	-	1.0	1.4
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Thursday, January 19, 2023
Location: 40.176298, -76.984881

Count Name: Rt. 114 & Kim Acres Dr
Site Code:
Start Date: 01/19/2023
Page No: 2



Turning Movement Data Plot

TRI-STATE TRAFFIC DATA
www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Thursday, January 19, 2023
Location: 40.176298, -76.984881

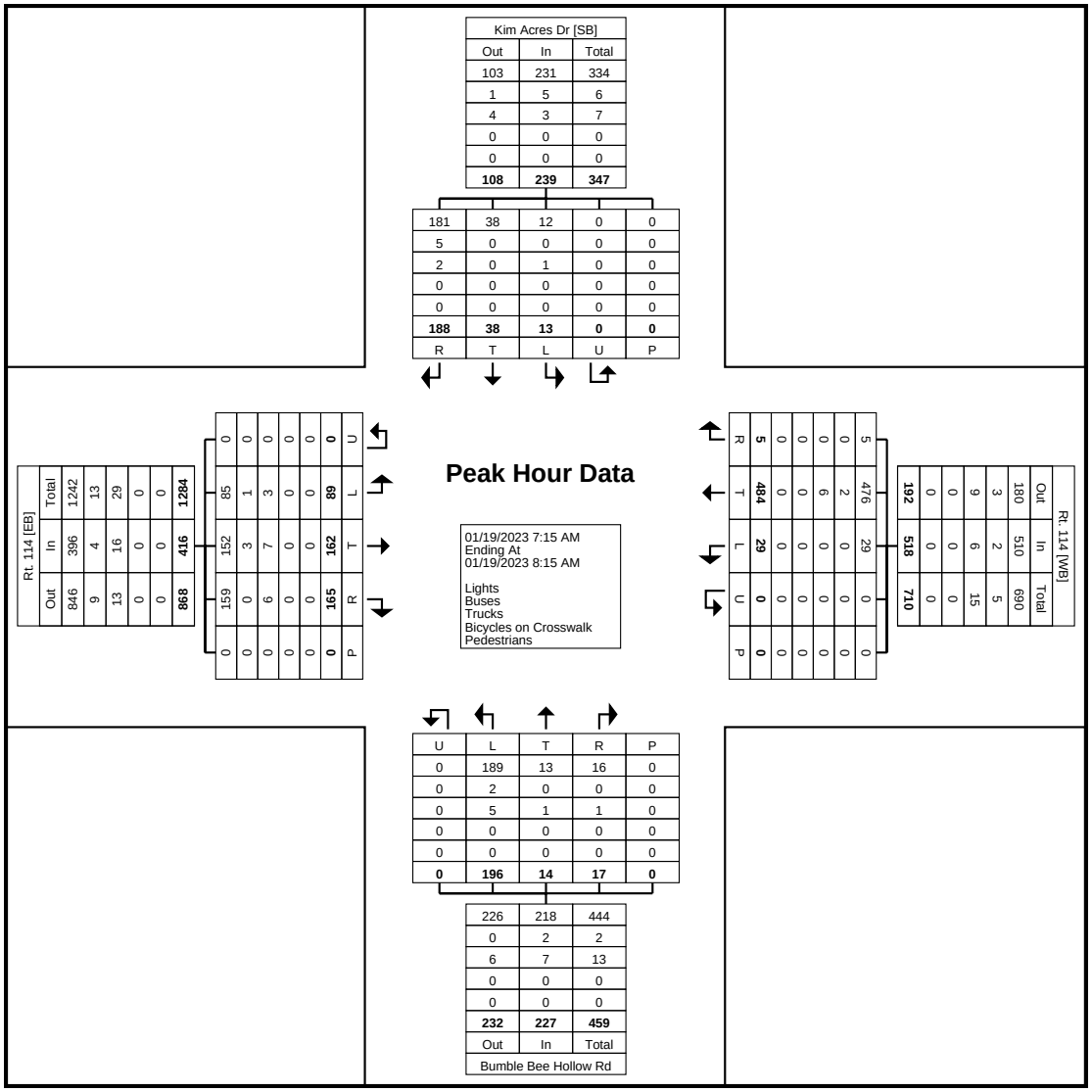
Count Name: Rt. 114 & Kim Acres Dr
Site Code:
Start Date: 01/19/2023

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Rt. 114 Eastbound							Rt. 114 Westbound							Bumble Bee Hollow Rd Northbound							Kim Acres Dr Southbound							
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
7:15 AM	24	30	19	7	0	0	80	1	124	1	2	0	0	128	55	2	2	0	0	0	59	4	9	13	29	0	0	55	322
7:30 AM	21	39	22	12	0	0	94	12	142	2	0	0	0	156	46	1	4	3	0	0	54	6	12	16	25	0	0	59	363
7:45 AM	22	55	51	8	0	0	136	9	120	0	0	0	0	129	48	7	1	2	0	0	58	1	12	16	35	0	0	64	387
8:00 AM	22	38	36	10	0	0	106	7	98	0	0	0	0	105	47	4	1	4	0	0	56	2	5	19	35	0	0	61	328
Total	89	162	128	37	0	0	416	29	484	3	2	0	0	518	196	14	8	9	0	0	227	13	38	64	124	0	0	239	1400
Approach %	21.4	38.9	30.8	8.9	0.0	-	-	5.6	93.4	0.6	0.4	0.0	-	-	86.3	6.2	3.5	4.0	0.0	-	-	5.4	15.9	26.8	51.9	0.0	-	-	-
Total %	6.4	11.6	9.1	2.6	0.0	-	29.7	2.1	34.6	0.2	0.1	0.0	-	37.0	14.0	1.0	0.6	0.6	0.0	-	16.2	0.9	2.7	4.6	8.9	0.0	-	17.1	-
PHF	0.927	0.736	0.627	0.771	0.000	-	0.765	0.604	0.852	0.375	0.250	0.000	-	0.830	0.891	0.500	0.500	0.563	0.000	-	0.962	0.542	0.792	0.842	0.886	0.000	-	0.934	0.904
Lights	85	152	122	37	0	-	396	29	476	3	2	0	-	510	189	13	7	9	0	-	218	12	38	60	121	0	-	231	1355
% Lights	95.5	93.8	95.3	100.0	-	-	95.2	100.0	98.3	100.0	100.0	-	-	98.5	96.4	92.9	87.5	100.0	-	-	96.0	92.3	100.0	93.8	97.6	-	-	96.7	96.8
Buses	1	3	0	0	0	-	4	0	2	0	0	0	-	2	2	0	0	0	0	-	2	0	0	2	3	0	-	5	13
% Buses	1.1	1.9	0.0	0.0	-	-	1.0	0.0	0.4	0.0	0.0	-	-	0.4	1.0	0.0	0.0	0.0	-	-	0.9	0.0	0.0	3.1	2.4	-	-	2.1	0.9
Trucks	3	7	6	0	0	-	16	0	6	0	0	0	-	6	5	1	1	0	0	-	7	1	0	2	0	0	-	3	32
% Trucks	3.4	4.3	4.7	0.0	-	-	3.8	0.0	1.2	0.0	0.0	-	-	1.2	2.6	7.1	12.5	0.0	-	-	3.1	7.7	0.0	3.1	0.0	-	-	1.3	2.3
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Thursday, January 19, 2023
Location: 40.176298, -76.984881

Count Name: Rt. 114 & Kim Acres Dr
Site Code:
Start Date: 01/19/2023



Kim Acres Dr [SB]

Out	In	Total
103	231	334
1	5	6
4	3	7
0	0	0
0	0	0
108	**239**	**347**

R	T	L	U	P
181	38	12	0	0
5	0	0	0	0
2	0	1	0	0
0	0	0	0	0
0	0	0	0	0
188	**38**	**13**	**0**	**0**

Rt. 114 [EB]

Out	In	Total
846	396	1242
9	4	13
13	16	29
0	0	0
0	0	0
868	**416**	**1284**

U	L	T	R	P
0	85	152	159	0
0	1	3	0	0
0	3	7	6	0
0	0	0	0	0
0	0	0	0	0
0	**89**	**162**	**165**	**0**

Peak Hour Data

01/19/2023 7:15 AM
Ending At
01/19/2023 8:15 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Rt. 114 [WB]

Out	In	Total
180	510	690
3	2	5
9	6	15
0	0	0
0	0	0
192	**518**	**710**

R	T	L	U	P
5	476	29	0	0
0	2	0	0	0
0	6	0	0	0
0	0	0	0	0
0	0	0	0	0
5	**484**	**29**	**0**	**0**

U	L	T	R	P
0	189	13	16	0
0	2	0	0	0
0	5	1	1	0
0	0	0	0	0
0	0	0	0	0
0	**196**	**14**	**17**	**0**

Out	In	Total
226	218	444
0	2	2
6	7	13
0	0	0
0	0	0
232	**227**	**459**

Bumble Bee Hollow Rd

Turning Movement Peak Hour Data Plot (7:15 AM)

TRI-STATE TRAFFIC DATA
www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Thursday, January 19, 2023
Location: 40.176298, -76.984881

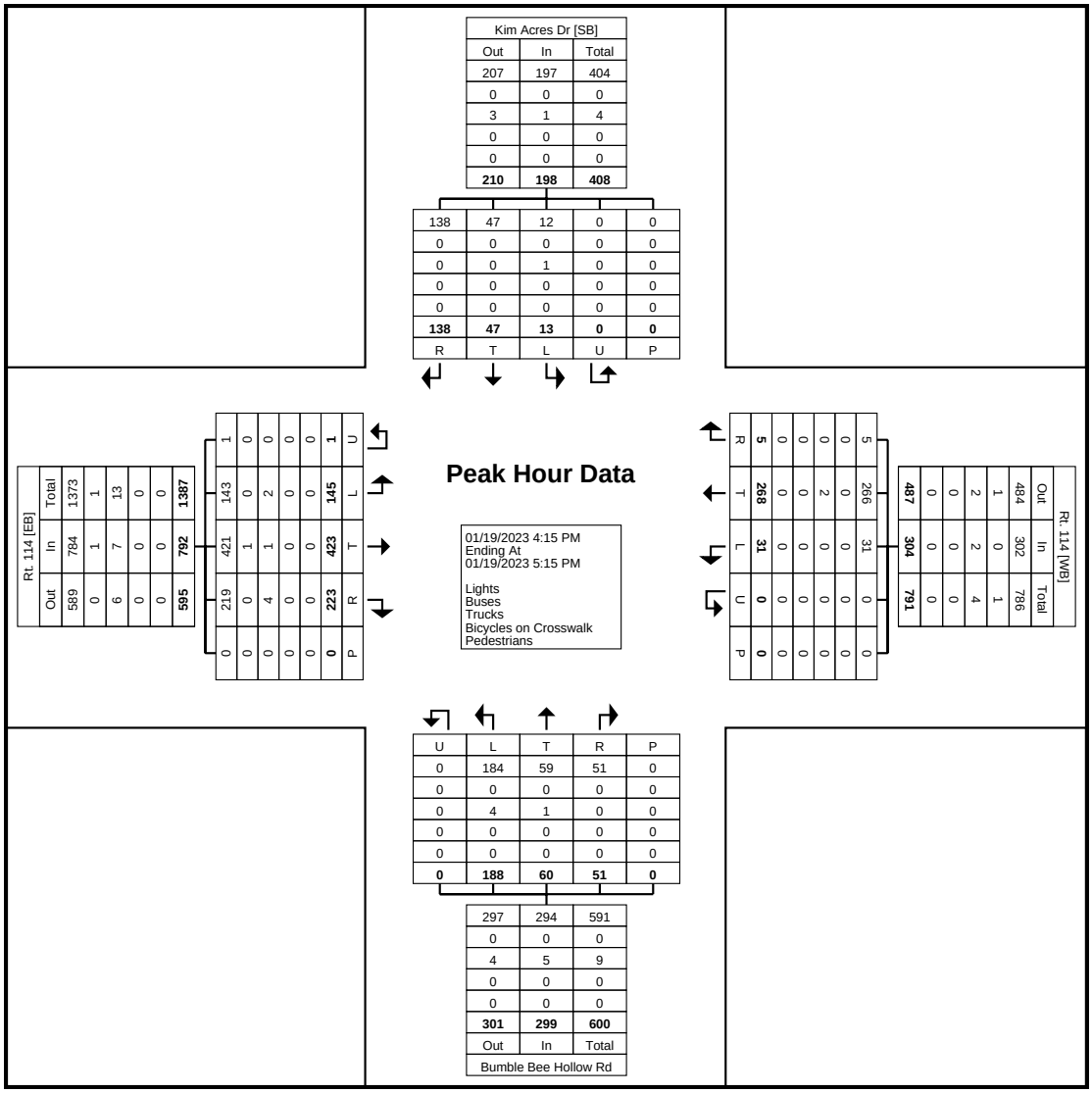
Count Name: Rt. 114 & Kim Acres Dr
Site Code:
Start Date: 01/19/2023

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Rt. 114 Eastbound							Rt. 114 Westbound							Bumble Bee Hollow Rd Northbound							Kim Acres Dr Southbound							
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
4:15 PM	36	101	32	21	1	0	191	11	63	3	0	0	0	77	44	11	13	3	0	0	71	4	10	9	17	0	0	40	379
4:30 PM	28	116	40	25	0	0	209	5	78	1	0	0	0	84	41	14	14	3	0	0	72	6	10	10	22	0	0	48	413
4:45 PM	36	115	31	29	0	0	211	8	67	0	1	0	0	76	46	18	11	4	0	0	79	2	13	19	28	0	0	62	428
5:00 PM	45	91	25	20	0	0	181	7	60	0	0	0	0	67	57	17	0	3	0	0	77	1	14	5	28	0	0	48	373
Total	145	423	128	95	1	0	792	31	268	4	1	0	0	304	188	60	38	13	0	0	299	13	47	43	95	0	0	198	1593
Approach %	18.3	53.4	16.2	12.0	0.1	-	-	10.2	88.2	1.3	0.3	0.0	-	-	62.9	20.1	12.7	4.3	0.0	-	-	6.6	23.7	21.7	48.0	0.0	-	-	-
Total %	9.1	26.6	8.0	6.0	0.1	-	49.7	1.9	16.8	0.3	0.1	0.0	-	19.1	11.8	3.8	2.4	0.8	0.0	-	18.8	0.8	3.0	2.7	6.0	0.0	-	12.4	-
PHF	0.806	0.912	0.800	0.819	0.250	-	0.938	0.705	0.859	0.333	0.250	0.000	-	0.905	0.825	0.833	0.679	0.813	0.000	-	0.946	0.542	0.839	0.566	0.848	0.000	-	0.798	0.930
Lights	143	421	124	95	1	-	784	31	266	4	1	0	-	302	184	59	38	13	0	-	294	12	47	43	95	0	-	197	1577
% Lights	98.6	99.5	96.9	100.0	100.0	-	99.0	100.0	99.3	100.0	100.0	-	-	99.3	97.9	98.3	100.0	100.0	-	-	98.3	92.3	100.0	100.0	100.0	-	-	99.5	99.0
Buses	0	1	0	0	0	-	1	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0	1
% Buses	0.0	0.2	0.0	0.0	0.0	-	0.1	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	-	-	0.0	0.1
Trucks	2	1	4	0	0	-	7	0	2	0	0	0	-	2	4	1	0	0	0	-	5	1	0	0	0	0	-	1	15
% Trucks	1.4	0.2	3.1	0.0	0.0	-	0.9	0.0	0.7	0.0	0.0	-	-	0.7	2.1	1.7	0.0	0.0	-	-	1.7	7.7	0.0	0.0	0.0	-	-	0.5	0.9
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Thursday, January 19, 2023
Location: 40.176298, -76.984881

Count Name: Rt. 114 & Kim Acres Dr
Site Code:
Start Date: 01/19/2023
Page No: 6



Turning Movement Peak Hour Data Plot (4:15 PM)

TRI-STATE TRAFFIC DATA
www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Saturday, January 21, 2023
Location: 40.176298, -76.984881

Count Name: Rt. 114 & Kim Acres Dr Sat
Site Code:
Start Date: 01/21/2023

Turning Movement Data

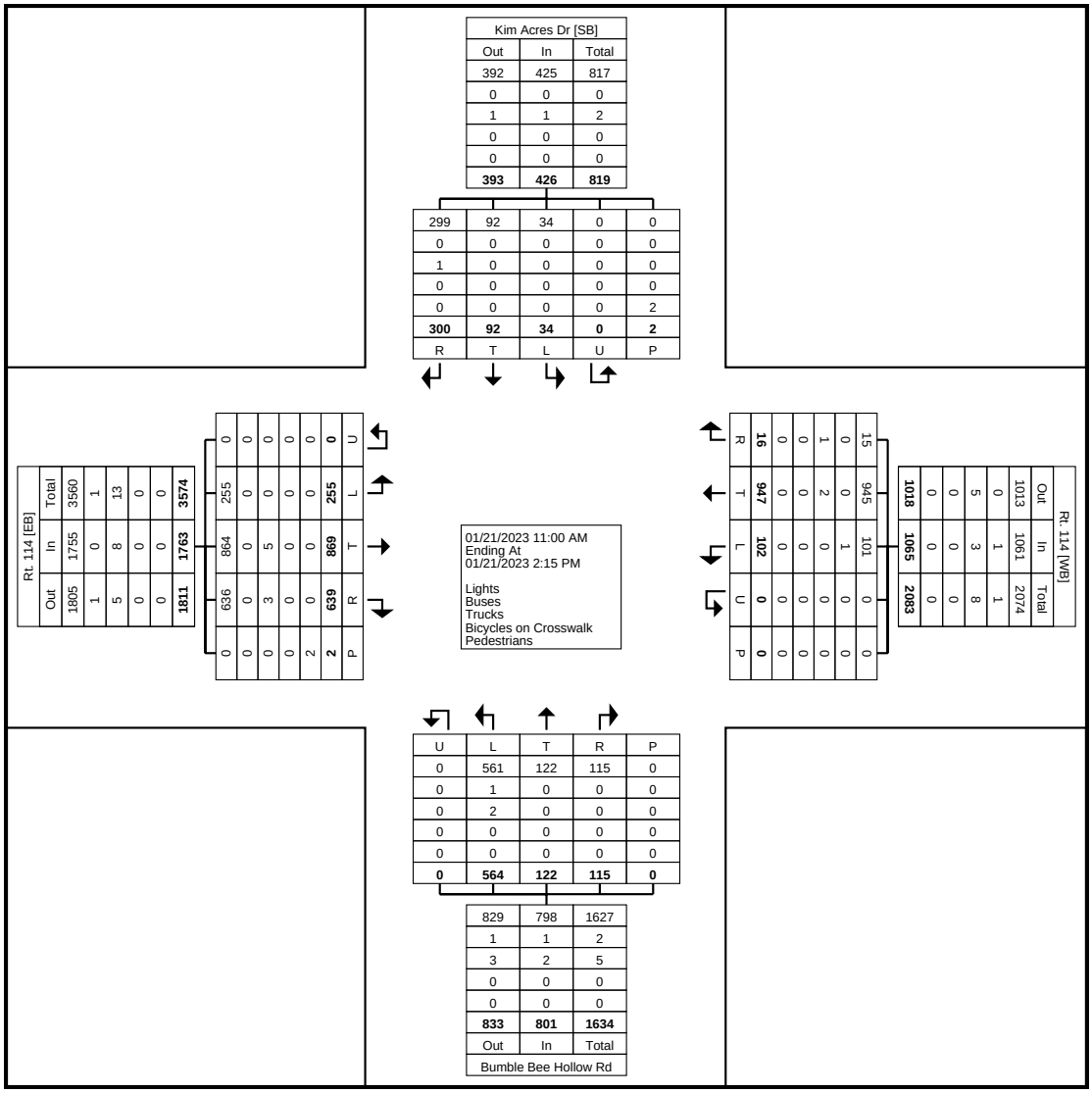
Start Time	Rt. 114 Eastbound							Rt. 114 Westbound							Bumble Bee Hollow Rd Northbound							Kim Acres Dr Southbound							
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
11:00 AM	16	60	43	6	0	0	125	10	79	0	0	0	0	89	50	15	4	8	0	0	77	3	6	6	14	0	2	29	320
11:15 AM	20	73	33	23	0	0	149	15	74	3	0	0	0	92	51	7	9	3	0	0	70	1	11	6	16	0	0	34	345
11:30 AM	22	61	41	9	0	0	133	2	87	0	0	0	0	89	49	12	4	6	0	0	71	1	4	7	23	0	0	35	328
11:45 AM	26	76	39	15	0	0	156	11	83	3	0	0	0	97	52	7	1	4	0	0	64	3	8	8	24	0	0	43	360
Hourly Total	84	270	156	53	0	0	563	38	323	6	0	0	0	367	202	41	18	21	0	0	282	8	29	27	77	0	2	141	1353
12:00 PM	27	80	45	13	0	0	165	4	74	1	0	0	0	79	50	10	8	3	0	0	71	3	9	13	18	0	0	43	358
12:15 PM	23	81	39	15	0	0	158	12	94	0	1	0	0	107	48	14	3	5	0	0	70	4	7	12	16	0	0	39	374
12:30 PM	17	82	37	13	0	0	149	6	77	2	0	0	0	85	40	10	6	4	0	0	60	3	7	7	18	0	0	35	329
12:45 PM	19	56	43	21	0	0	139	12	83	2	0	0	0	97	54	8	6	4	0	0	72	3	6	3	25	0	0	37	345
Hourly Total	86	299	164	62	0	0	611	34	328	5	1	0	0	368	192	42	23	16	0	0	273	13	29	35	77	0	0	154	1406
1:00 PM	23	78	38	16	0	0	155	8	79	2	0	0	0	89	45	8	1	8	0	0	62	2	12	4	13	0	0	31	337
1:15 PM	25	68	53	6	0	2	152	7	93	1	0	0	0	101	54	9	6	5	0	0	74	1	11	5	13	0	0	30	357
1:30 PM	17	70	39	14	0	0	140	6	59	0	0	0	0	65	33	13	4	6	0	0	56	6	5	5	14	0	0	30	291
1:45 PM	20	84	31	7	0	0	142	9	63	1	0	0	0	73	38	9	2	5	0	0	54	4	6	6	24	0	0	40	309
Hourly Total	85	300	161	43	0	2	589	30	294	4	0	0	0	328	170	39	13	24	0	0	246	13	34	20	64	0	0	131	1294
2:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Grand Total	255	869	481	158	0	2	1763	102	947	15	1	0	0	1065	564	122	54	61	0	0	801	34	92	82	218	0	2	426	4055
Approach %	14.5	49.3	27.3	9.0	0.0	-	-	9.6	88.9	1.4	0.1	0.0	-	-	70.4	15.2	6.7	7.6	0.0	-	-	8.0	21.6	19.2	51.2	0.0	-	-	-
Total %	6.3	21.4	11.9	3.9	0.0	-	43.5	2.5	23.4	0.4	0.0	0.0	-	26.3	13.9	3.0	1.3	1.5	0.0	-	19.8	0.8	2.3	2.0	5.4	0.0	-	10.5	-
Lights	255	864	478	158	0	-	1755	101	945	14	1	0	-	1061	561	122	54	61	0	-	798	34	92	82	217	0	-	425	4039
% Lights	100.0	99.4	99.4	100.0	-	-	99.5	99.0	99.8	93.3	100.0	-	-	99.6	99.5	100.0	100.0	100.0	-	-	99.6	100.0	100.0	100.0	99.5	-	-	99.8	99.6
Buses	0	0	0	0	0	-	0	1	0	0	0	0	-	1	1	0	0	0	0	-	1	0	0	0	0	0	-	0	2
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	1.0	0.0	0.0	0.0	-	-	0.1	0.2	0.0	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Trucks	0	5	3	0	0	-	8	0	2	1	0	0	-	3	2	0	0	0	0	-	2	0	0	0	1	0	-	1	14
% Trucks	0.0	0.6	0.6	0.0	-	-	0.5	0.0	0.2	6.7	0.0	-	-	0.3	0.4	0.0	0.0	0.0	-	-	0.2	0.0	0.0	0.0	0.5	-	-	0.2	0.3
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Saturday, January 21, 2023
Location: 40.176298, -76.984881

Count Name: Rt. 114 & Kim Acres Dr Sat
Site Code:
Start Date: 01/21/2023



Turning Movement Data Plot

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Saturday, January 21, 2023
Location: 40.176298, -76.984881

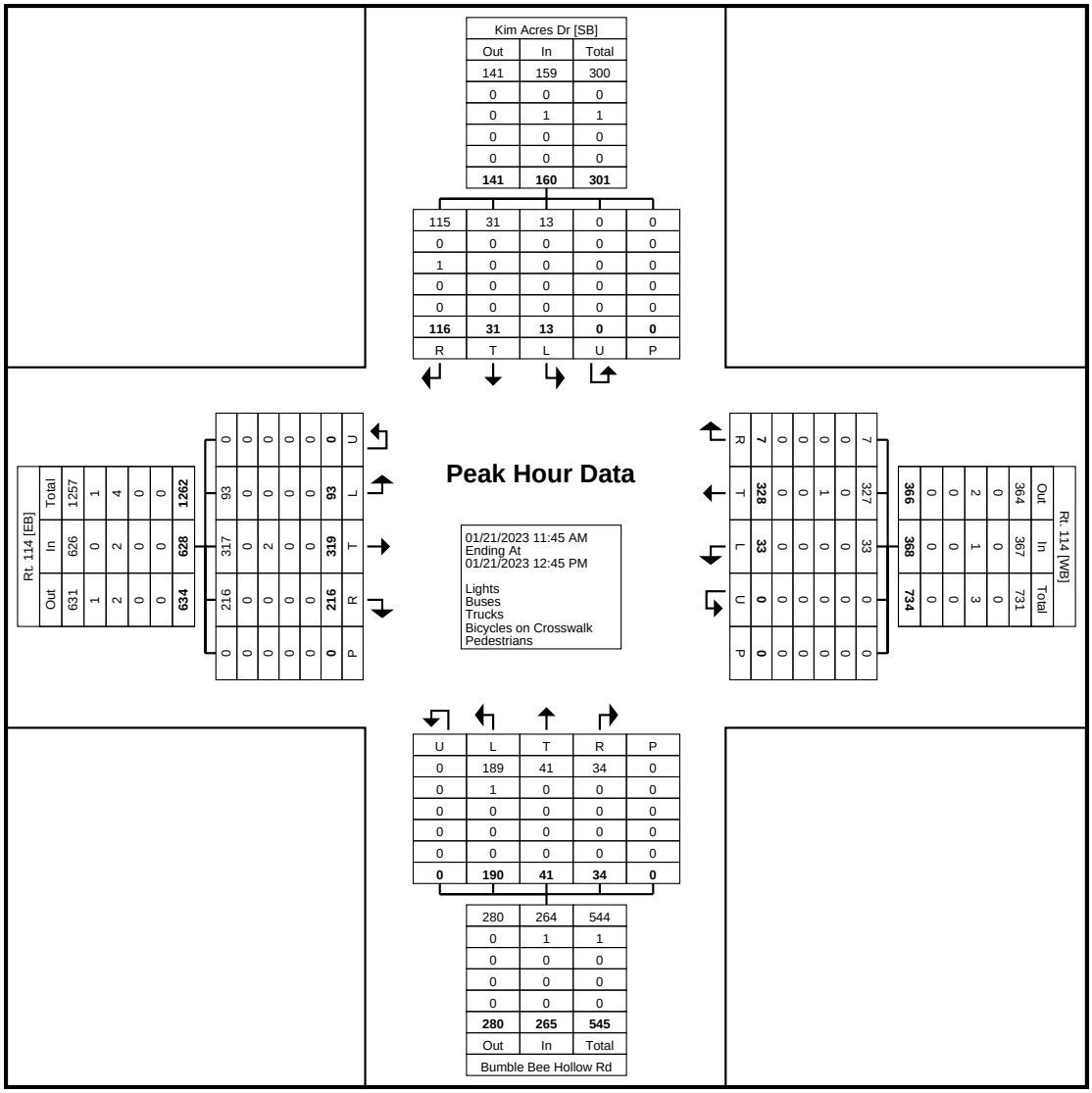
Count Name: Rt. 114 & Kim Acres Dr Sat
Site Code:
Start Date: 01/21/2023

Turning Movement Peak Hour Data (11:45 AM)

Start Time	Rt. 114 Eastbound							Rt. 114 Westbound							Bumble Bee Hollow Rd Northbound							Kim Acres Dr Southbound							
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
11:45 AM	26	76	39	15	0	0	156	11	83	3	0	0	0	97	52	7	1	4	0	0	64	3	8	8	24	0	0	43	360
12:00 PM	27	80	45	13	0	0	165	4	74	1	0	0	0	79	50	10	8	3	0	0	71	3	9	13	18	0	0	43	358
12:15 PM	23	81	39	15	0	0	158	12	94	0	1	0	0	107	48	14	3	5	0	0	70	4	7	12	16	0	0	39	374
12:30 PM	17	82	37	13	0	0	149	6	77	2	0	0	0	85	40	10	6	4	0	0	60	3	7	7	18	0	0	35	329
Total	93	319	160	56	0	0	628	33	328	6	1	0	0	368	190	41	18	16	0	0	265	13	31	40	76	0	0	160	1421
Approach %	14.8	50.8	25.5	8.9	0.0	-	-	9.0	89.1	1.6	0.3	0.0	-	-	71.7	15.5	6.8	6.0	0.0	-	-	8.1	19.4	25.0	47.5	0.0	-	-	-
Total %	6.5	22.4	11.3	3.9	0.0	-	44.2	2.3	23.1	0.4	0.1	0.0	-	25.9	13.4	2.9	1.3	1.1	0.0	-	18.6	0.9	2.2	2.8	5.3	0.0	-	11.3	-
PHF	0.861	0.973	0.889	0.933	0.000	-	0.952	0.688	0.872	0.500	0.250	0.000	-	0.860	0.913	0.732	0.563	0.800	0.000	-	0.933	0.813	0.861	0.769	0.792	0.000	-	0.930	0.950
Lights	93	317	160	56	0	-	626	33	327	6	1	0	-	367	189	41	18	16	0	-	264	13	31	40	75	0	-	159	1416
% Lights	100.0	99.4	100.0	100.0	-	-	99.7	100.0	99.7	100.0	100.0	-	-	99.7	99.5	100.0	100.0	100.0	-	-	99.6	100.0	100.0	100.0	98.7	-	-	99.4	99.6
Buses	0	0	0	0	0	-	0	0	0	0	0	0	-	0	1	0	0	0	0	-	1	0	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.5	0.0	0.0	0.0	-	-	0.4	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Trucks	0	2	0	0	0	-	2	0	1	0	0	0	-	1	0	0	0	0	0	-	0	0	0	0	1	0	-	1	4
% Trucks	0.0	0.6	0.0	0.0	-	-	0.3	0.0	0.3	0.0	0.0	-	-	0.3	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	1.3	-	-	0.6	0.3
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Upper Allen Twp, PA
Route 114 & Kim Acres Dr
Saturday, January 21, 2023
Location: 40.176298, -76.984881

Count Name: Rt. 114 & Kim Acres Dr Sat
Site Code:
Start Date: 01/21/2023
Page No: 4



Turning Movement Peak Hour Data Plot (11:45 AM)

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Thursday, January 19, 2023
Location: 40.177383, -76.983853

Count Name: Kim Acres Dr & Aspen Dr
Site Code:
Start Date: 01/19/2023

Turning Movement Data

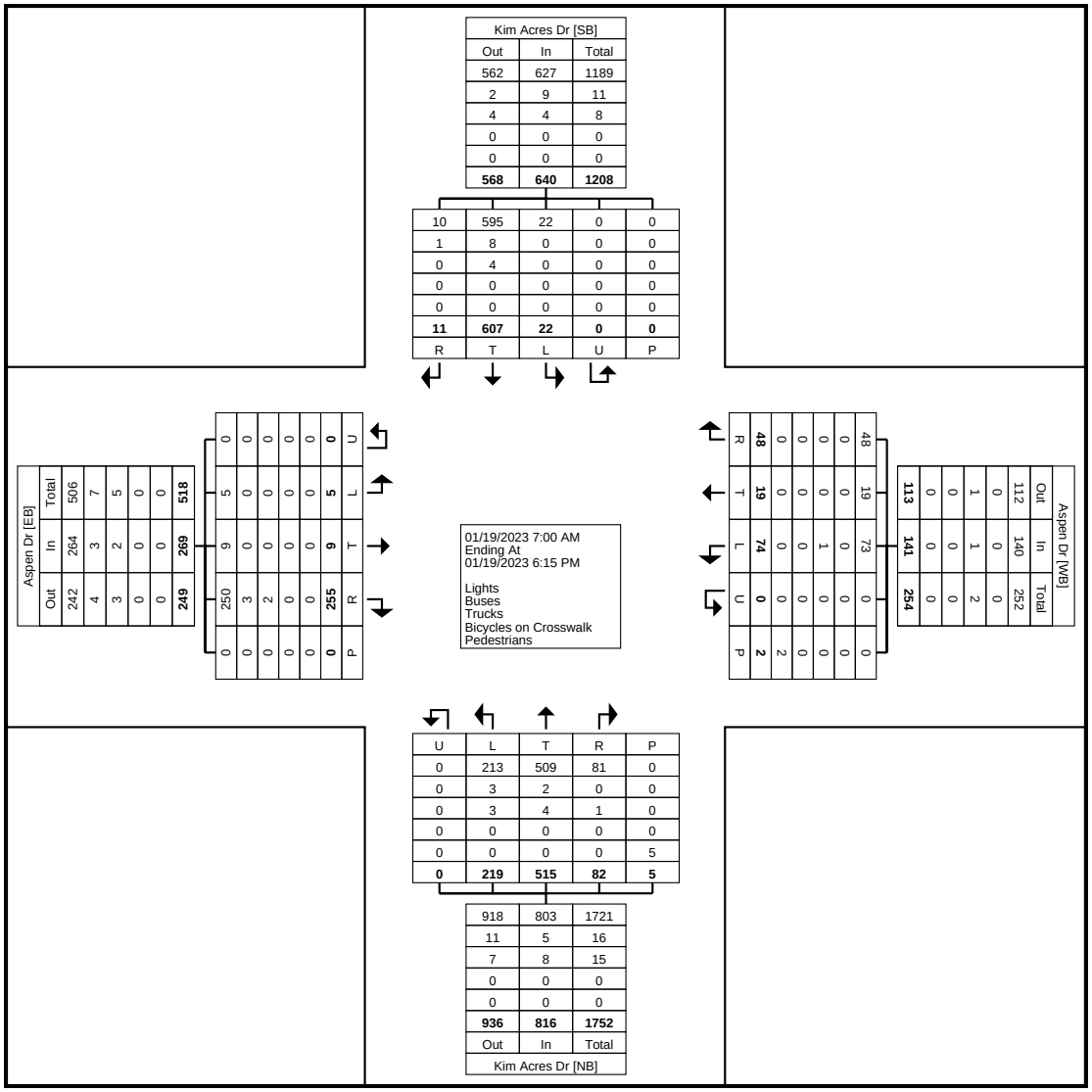
Start Time	Aspen Dr Eastbound						Aspen Dr Westbound						Kim Acres Dr Northbound						Kim Acres Dr Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	0	0	5	0	0	5	2	1	2	0	0	5	7	4	0	0	0	11	0	38	0	0	0	38	59
7:15 AM	0	0	11	0	0	11	4	1	2	0	0	7	5	21	1	0	0	27	0	39	2	0	0	41	86
7:30 AM	0	0	11	0	0	11	3	0	0	0	0	3	9	16	1	0	0	26	0	44	0	0	0	44	84
7:45 AM	0	1	13	0	0	14	2	2	4	0	0	8	16	11	1	0	0	28	1	51	3	0	0	55	105
Hourly Total	0	1	40	0	0	41	11	4	8	0	0	23	37	52	3	0	0	92	1	172	5	0	0	178	334
8:00 AM	2	0	14	0	0	16	7	1	4	0	0	12	12	13	1	0	0	26	0	36	0	0	0	36	90
8:15 AM	0	0	12	0	0	12	2	0	1	0	0	3	11	20	3	0	0	34	0	20	2	0	0	22	71
8:30 AM	0	0	5	0	0	5	0	3	2	0	0	5	22	13	0	0	0	35	0	20	1	0	0	21	66
8:45 AM	0	0	31	0	0	31	4	3	1	0	0	8	18	21	3	0	0	42	2	18	2	0	0	22	103
Hourly Total	2	0	62	0	0	64	13	7	8	0	0	28	63	67	7	0	0	137	2	94	5	0	0	101	330
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	0	14	0	0	15	3	2	1	0	0	6	13	26	2	0	1	41	0	28	0	0	0	28	90
3:15 PM	0	0	7	0	0	7	3	0	1	0	0	4	12	31	5	0	0	48	0	29	0	0	0	29	88
3:30 PM	0	0	13	0	0	13	3	0	1	0	0	4	12	41	1	0	0	54	1	25	0	0	0	26	97
3:45 PM	0	2	14	0	0	16	3	1	1	0	0	5	11	33	5	0	1	49	1	26	1	0	0	28	98
Hourly Total	1	2	48	0	0	51	12	3	4	0	0	19	48	131	13	0	2	192	2	108	1	0	0	111	373
4:00 PM	0	1	18	0	0	19	4	0	2	0	0	6	12	31	4	0	0	47	0	28	0	0	0	28	100
4:15 PM	0	0	14	0	0	14	2	0	2	0	1	4	11	36	4	0	1	51	2	24	0	0	0	26	95
4:30 PM	0	0	13	0	0	13	2	1	4	0	1	7	6	32	4	0	1	42	2	31	0	0	0	33	95
4:45 PM	2	2	23	0	0	27	4	1	3	0	0	8	10	39	8	0	0	57	2	36	0	0	0	38	130
Hourly Total	2	3	68	0	0	73	12	2	11	0	2	25	39	138	20	0	2	197	6	119	0	0	0	125	420
5:00 PM	0	0	12	0	0	12	9	0	2	0	0	11	12	37	15	0	0	64	3	29	0	0	0	32	119
5:15 PM	0	0	12	0	0	12	6	0	3	0	0	9	4	38	10	0	1	52	1	34	0	0	0	35	108
5:30 PM	0	0	6	0	0	6	8	1	6	0	0	15	6	26	9	0	0	41	2	25	0	0	0	27	89
5:45 PM	0	3	7	0	0	10	3	2	6	0	0	11	10	26	5	0	0	41	5	26	0	0	0	31	93
Hourly Total	0	3	37	0	0	40	26	3	17	0	0	46	32	127	39	0	1	198	11	114	0	0	0	125	409
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
Grand Total	5	9	255	0	0	269	74	19	48	0	2	141	219	515	82	0	5	816	22	607	11	0	0	640	1866
Approach %	1.9	3.3	94.8	0.0	-	-	52.5	13.5	34.0	0.0	-	-	26.8	63.1	10.0	0.0	-	-	3.4	94.8	1.7	0.0	-	-	-
Total %	0.3	0.5	13.7	0.0	-	14.4	4.0	1.0	2.6	0.0	-	7.6	11.7	27.6	4.4	0.0	-	43.7	1.2	32.5	0.6	0.0	-	34.3	-
Lights	5	9	250	0	-	264	73	19	48	0	-	140	213	509	81	0	-	803	22	595	10	0	-	627	1834
% Lights	100.0	100.0	98.0	-	-	98.1	98.6	100.0	100.0	-	-	99.3	97.3	98.8	98.8	-	-	98.4	100.0	98.0	90.9	-	-	98.0	98.3
Buses	0	0	3	0	-	3	0	0	0	0	-	0	3	2	0	0	-	5	0	8	1	0	-	9	17
% Buses	0.0	0.0	1.2	-	-	1.1	0.0	0.0	0.0	-	-	0.0	1.4	0.4	0.0	-	-	0.6	0.0	1.3	9.1	-	-	1.4	0.9
Trucks	0	0	2	0	-	2	1	0	0	0	-	1	3	4	1	0	-	8	0	4	0	0	-	4	15
% Trucks	0.0	0.0	0.8	-	-	0.7	1.4	0.0	0.0	-	-	0.7	1.4	0.8	1.2	-	-	1.0	0.0	0.7	0.0	-	-	0.6	0.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Thursday, January 19, 2023
Location: 40.177383, -76.983853

Count Name: Kim Acres Dr & Aspen Dr
Site Code:
Start Date: 01/19/2023
Page No: 2



Turning Movement Data Plot

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Thursday, January 19, 2023
Location: 40.177383, -76.983853

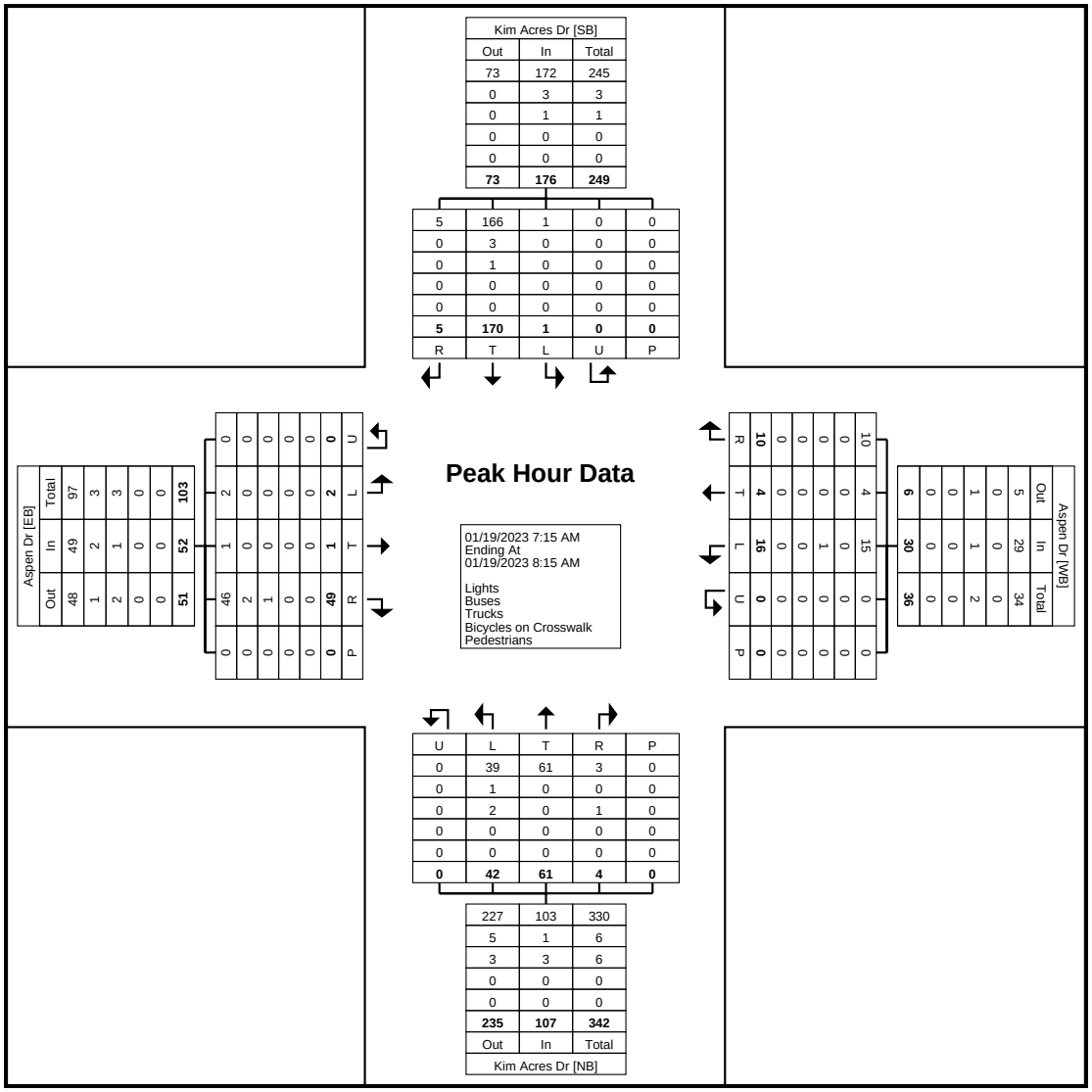
Count Name: Kim Acres Dr & Aspen Dr
Site Code:
Start Date: 01/19/2023

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Aspen Dr Eastbound						Aspen Dr Westbound						Kim Acres Dr Northbound						Kim Acres Dr Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:15 AM	0	0	11	0	0	11	4	1	2	0	0	7	5	21	1	0	0	27	0	39	2	0	0	41	86
7:30 AM	0	0	11	0	0	11	3	0	0	0	0	3	9	16	1	0	0	26	0	44	0	0	0	44	84
7:45 AM	0	1	13	0	0	14	2	2	4	0	0	8	16	11	1	0	0	28	1	51	3	0	0	55	105
8:00 AM	2	0	14	0	0	16	7	1	4	0	0	12	12	13	1	0	0	26	0	36	0	0	0	36	90
Total	2	1	49	0	0	52	16	4	10	0	0	30	42	61	4	0	0	107	1	170	5	0	0	176	365
Approach %	3.8	1.9	94.2	0.0	-	-	53.3	13.3	33.3	0.0	-	-	39.3	57.0	3.7	0.0	-	-	0.6	96.6	2.8	0.0	-	-	-
Total %	0.5	0.3	13.4	0.0	-	14.2	4.4	1.1	2.7	0.0	-	8.2	11.5	16.7	1.1	0.0	-	29.3	0.3	46.6	1.4	0.0	-	48.2	-
PHF	0.250	0.250	0.875	0.000	-	0.813	0.571	0.500	0.625	0.000	-	0.625	0.656	0.726	1.000	0.000	-	0.955	0.250	0.833	0.417	0.000	-	0.800	0.869
Lights	2	1	46	0	-	49	15	4	10	0	-	29	39	61	3	0	-	103	1	166	5	0	-	172	353
% Lights	100.0	100.0	93.9	-	-	94.2	93.8	100.0	100.0	-	-	96.7	92.9	100.0	75.0	-	-	96.3	100.0	97.6	100.0	-	-	97.7	96.7
Buses	0	0	2	0	-	2	0	0	0	0	-	0	1	0	0	0	-	1	0	3	0	0	-	3	6
% Buses	0.0	0.0	4.1	-	-	3.8	0.0	0.0	0.0	-	-	0.0	2.4	0.0	0.0	-	-	0.9	0.0	1.8	0.0	-	-	1.7	1.6
Trucks	0	0	1	0	-	1	1	0	0	0	-	1	2	0	1	0	-	3	0	1	0	0	-	1	6
% Trucks	0.0	0.0	2.0	-	-	1.9	6.3	0.0	0.0	-	-	3.3	4.8	0.0	25.0	-	-	2.8	0.0	0.6	0.0	-	-	0.6	1.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Thursday, January 19, 2023
Location: 40.177383, -76.983853

Count Name: Kim Acres Dr & Aspen Dr
Site Code:
Start Date: 01/19/2023
Page No: 4



Turning Movement Peak Hour Data Plot (7:15 AM)

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Thursday, January 19, 2023
Location: 40.177383, -76.983853

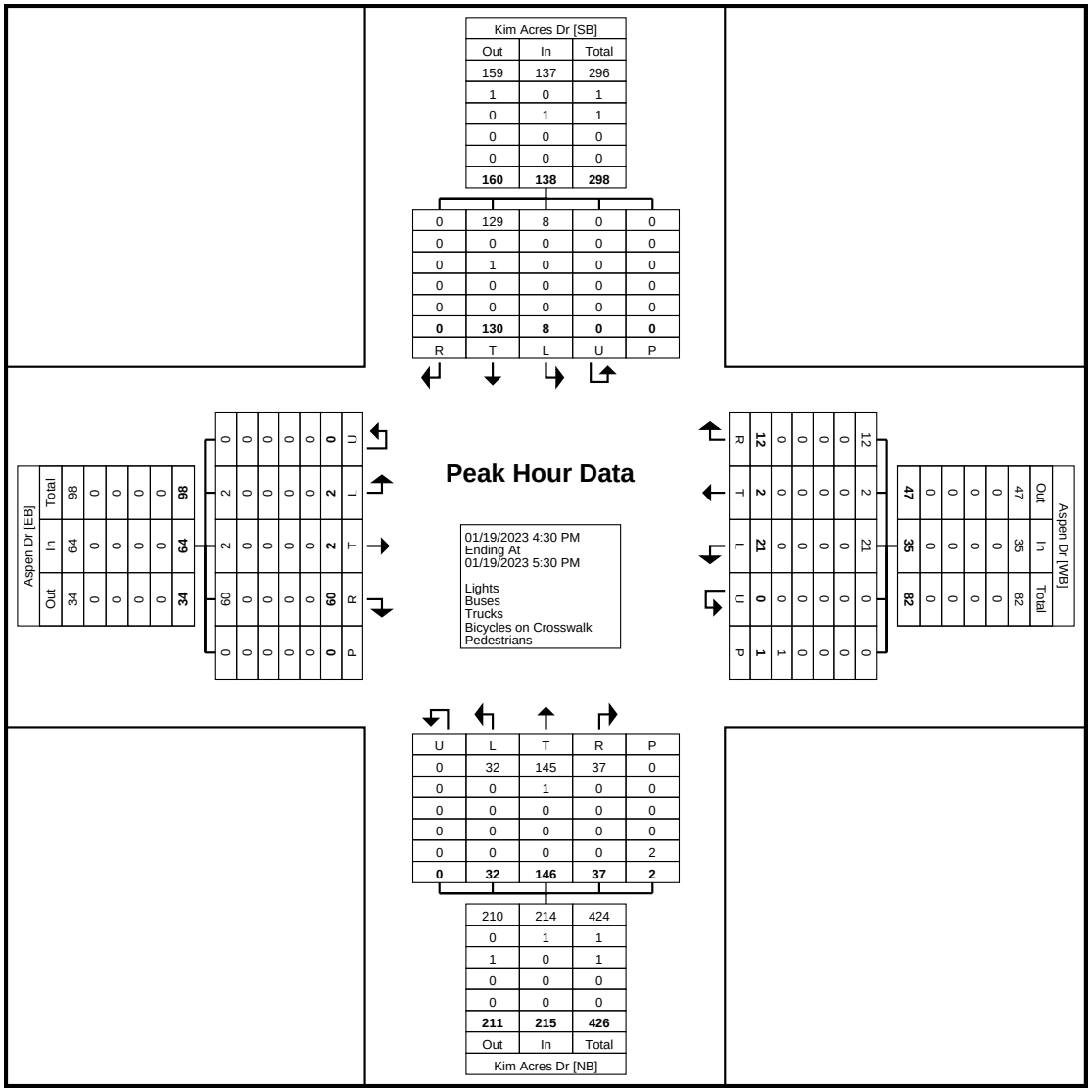
Count Name: Kim Acres Dr & Aspen Dr
Site Code:
Start Date: 01/19/2023

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Aspen Dr Eastbound						Aspen Dr Westbound						Kim Acres Dr Northbound						Kim Acres Dr Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	0	0	13	0	0	13	2	1	4	0	1	7	6	32	4	0	1	42	2	31	0	0	0	33	95
4:45 PM	2	2	23	0	0	27	4	1	3	0	0	8	10	39	8	0	0	57	2	36	0	0	0	38	130
5:00 PM	0	0	12	0	0	12	9	0	2	0	0	11	12	37	15	0	0	64	3	29	0	0	0	32	119
5:15 PM	0	0	12	0	0	12	6	0	3	0	0	9	4	38	10	0	1	52	1	34	0	0	0	35	108
Total	2	2	60	0	0	64	21	2	12	0	1	35	32	146	37	0	2	215	8	130	0	0	0	138	452
Approach %	3.1	3.1	93.8	0.0	-	-	60.0	5.7	34.3	0.0	-	-	14.9	67.9	17.2	0.0	-	-	5.8	94.2	0.0	0.0	-	-	-
Total %	0.4	0.4	13.3	0.0	-	14.2	4.6	0.4	2.7	0.0	-	7.7	7.1	32.3	8.2	0.0	-	47.6	1.8	28.8	0.0	0.0	-	30.5	-
PHF	0.250	0.250	0.652	0.000	-	0.593	0.583	0.500	0.750	0.000	-	0.795	0.667	0.936	0.617	0.000	-	0.840	0.667	0.903	0.000	0.000	-	0.908	0.869
Lights	2	2	60	0	-	64	21	2	12	0	-	35	32	145	37	0	-	214	8	129	0	0	-	137	450
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	99.3	100.0	-	-	99.5	100.0	99.2	-	-	-	99.3	99.6
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.5	0.0	0.0	-	-	-	0.0	0.2
Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Trucks	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	0.8	-	-	-	0.7	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Thursday, January 19, 2023
Location: 40.177383, -76.983853

Count Name: Kim Acres Dr & Aspen Dr
Site Code:
Start Date: 01/19/2023
Page No: 6



Turning Movement Peak Hour Data Plot (4:30 PM)

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Saturday, January 21, 2023
Location: 40.177383, -76.983853

Count Name: Kim Acres Dr & Aspen Dr Sat
Site Code:
Start Date: 01/21/2023

Turning Movement Data

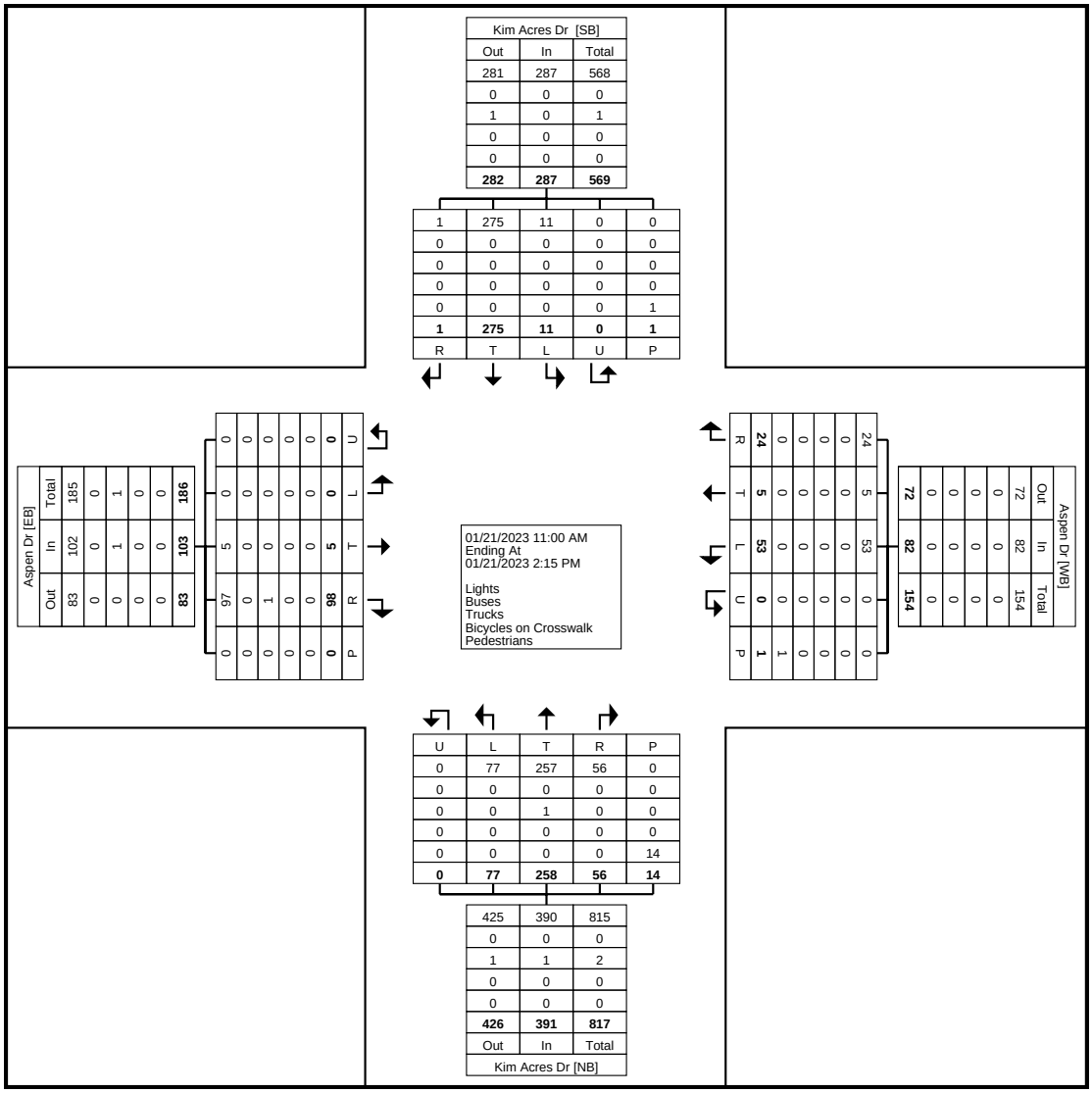
Start Time	Aspen Dr Eastbound						Aspen Dr Westbound						Kim Acres Dr Northbound						Kim Acres Dr Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
11:00 AM	0	1	3	0	0	4	2	1	1	0	0	4	5	24	1	0	0	30	1	25	0	0	0	26	64
11:15 AM	0	0	11	0	0	11	2	0	3	0	0	5	4	17	6	0	6	27	1	20	0	0	0	21	64
11:30 AM	0	1	4	0	0	5	3	1	1	0	0	5	10	19	7	0	1	36	1	28	0	0	0	29	75
11:45 AM	0	0	9	0	0	9	7	0	1	0	1	8	6	29	2	0	4	37	0	27	0	0	0	27	81
Hourly Total	0	2	27	0	0	29	14	2	6	0	1	22	25	89	16	0	11	130	3	100	0	0	0	103	284
12:00 PM	0	3	13	0	0	16	6	0	1	0	0	7	9	19	7	0	0	35	1	24	0	0	0	25	83
12:15 PM	0	0	11	0	0	11	5	1	2	0	0	8	10	23	8	0	0	41	1	23	1	0	1	25	85
12:30 PM	0	0	12	0	0	12	4	0	2	0	0	6	6	19	4	0	0	29	0	21	0	0	0	21	68
12:45 PM	0	0	9	0	0	9	6	1	2	0	0	9	6	13	7	0	3	26	1	21	0	0	0	22	66
Hourly Total	0	3	45	0	0	48	21	2	7	0	0	30	31	74	26	0	3	131	3	89	1	0	1	93	302
1:00 PM	0	0	9	0	0	9	6	0	2	0	0	8	7	22	5	0	0	34	4	16	0	0	0	20	71
1:15 PM	0	0	4	0	0	4	5	0	4	0	0	9	5	29	3	0	0	37	0	20	0	0	0	20	70
1:30 PM	0	0	9	0	0	9	2	0	1	0	0	3	5	21	3	0	0	29	1	20	0	0	0	21	62
1:45 PM	0	0	4	0	0	4	5	1	4	0	0	10	4	23	3	0	0	30	0	30	0	0	0	30	74
Hourly Total	0	0	26	0	0	26	18	1	11	0	0	30	21	95	14	0	0	130	5	86	0	0	0	91	277
2:00 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
Grand Total	0	5	98	0	0	103	53	5	24	0	1	82	77	258	56	0	14	391	11	275	1	0	1	287	863
Approach %	0.0	4.9	95.1	0.0	-	-	64.6	6.1	29.3	0.0	-	-	19.7	66.0	14.3	0.0	-	-	3.8	95.8	0.3	0.0	-	-	-
Total %	0.0	0.6	11.4	0.0	-	11.9	6.1	0.6	2.8	0.0	-	9.5	8.9	29.9	6.5	0.0	-	45.3	1.3	31.9	0.1	0.0	-	33.3	-
Lights	0	5	97	0	-	102	53	5	24	0	-	82	77	257	56	0	-	390	11	275	1	0	-	287	861
% Lights	-	100.0	99.0	-	-	99.0	100.0	100.0	100.0	-	-	100.0	100.0	99.6	100.0	-	-	99.7	100.0	100.0	100.0	-	-	100.0	99.8
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	-	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	-	-	0.0	0.0
Trucks	0	0	1	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	2
% Trucks	-	0.0	1.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	14	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Saturday, January 21, 2023
Location: 40.177383, -76.983853

Count Name: Kim Acres Dr & Aspen Dr Sat
Site Code:
Start Date: 01/21/2023
Page No: 2



Turning Movement Data Plot

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Saturday, January 21, 2023
Location: 40.177383, -76.983853

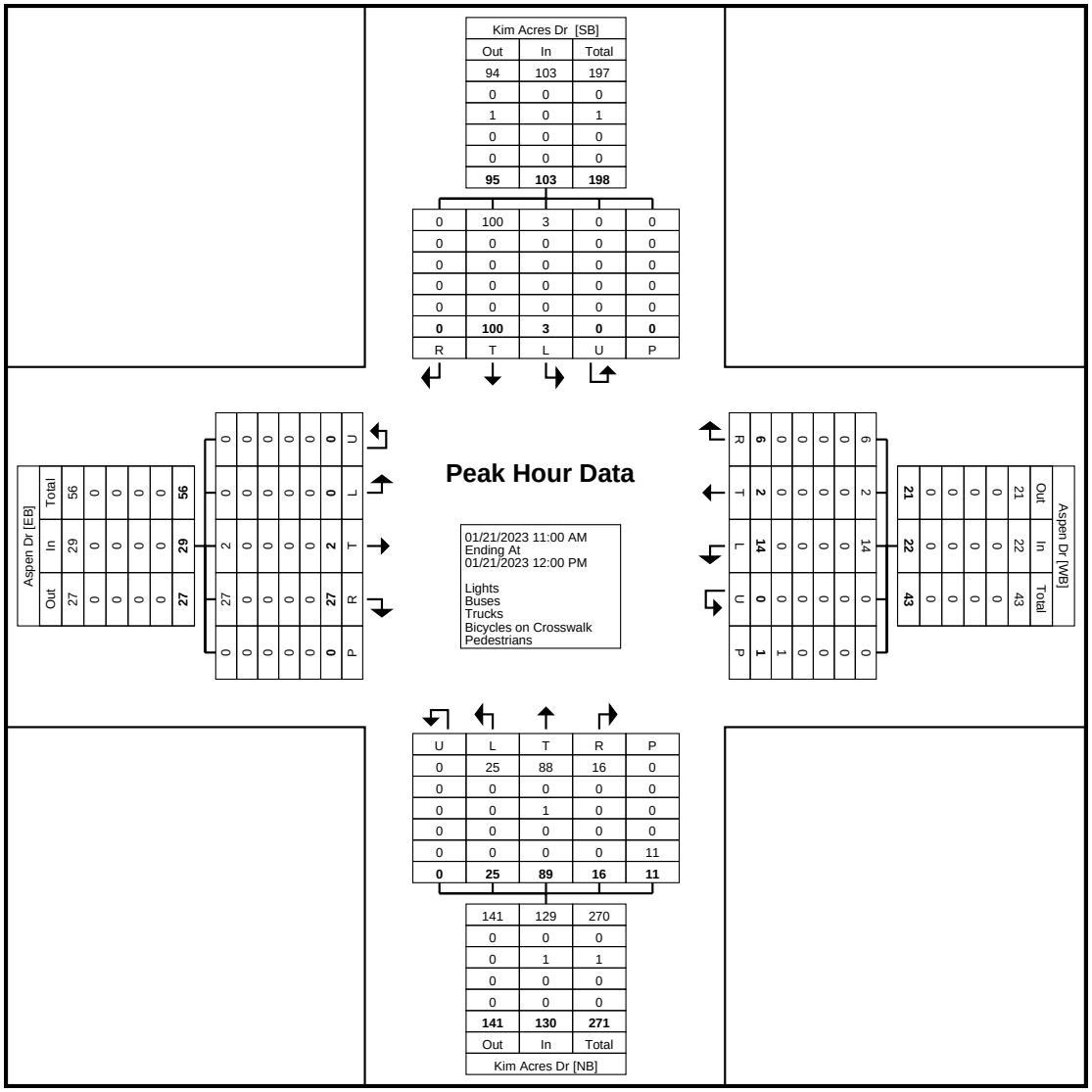
Count Name: Kim Acres Dr & Aspen Dr Sat
Site Code:
Start Date: 01/21/2023

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Aspen Dr Eastbound						Aspen Dr Westbound						Kim Acres Dr Northbound						Kim Acres Dr Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
11:00 AM	0	1	3	0	0	4	2	1	1	0	0	4	5	24	1	0	0	30	1	25	0	0	0	26	64
11:15 AM	0	0	11	0	0	11	2	0	3	0	0	5	4	17	6	0	6	27	1	20	0	0	0	21	64
11:30 AM	0	1	4	0	0	5	3	1	1	0	0	5	10	19	7	0	1	36	1	28	0	0	0	29	75
11:45 AM	0	0	9	0	0	9	7	0	1	0	1	8	6	29	2	0	4	37	0	27	0	0	0	27	81
Total	0	2	27	0	0	29	14	2	6	0	1	22	25	89	16	0	11	130	3	100	0	0	0	103	284
Approach %	0.0	6.9	93.1	0.0	-	-	63.6	9.1	27.3	0.0	-	-	19.2	68.5	12.3	0.0	-	-	2.9	97.1	0.0	0.0	-	-	-
Total %	0.0	0.7	9.5	0.0	-	10.2	4.9	0.7	2.1	0.0	-	7.7	8.8	31.3	5.6	0.0	-	45.8	1.1	35.2	0.0	0.0	-	36.3	-
PHF	0.000	0.500	0.614	0.000	-	0.659	0.500	0.500	0.500	0.000	-	0.688	0.625	0.767	0.571	0.000	-	0.878	0.750	0.893	0.000	0.000	-	0.888	0.877
Lights	0	2	27	0	-	29	14	2	6	0	-	22	25	88	16	0	-	129	3	100	0	0	-	103	283
% Lights	-	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	98.9	100.0	-	-	99.2	100.0	100.0	-	-	-	100.0	99.6
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	-	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	0.0
Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Trucks	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.1	0.0	-	-	0.8	0.0	0.0	-	-	-	0.0	0.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	11	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Saturday, January 21, 2023
Location: 40.177383, -76.983853

Count Name: Kim Acres Dr & Aspen Dr Sat
Site Code:
Start Date: 01/21/2023
Page No: 4



Turning Movement Peak Hour Data Plot (11:00 AM)

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Saturday, January 21, 2023
Location: 40.177383, -76.983853

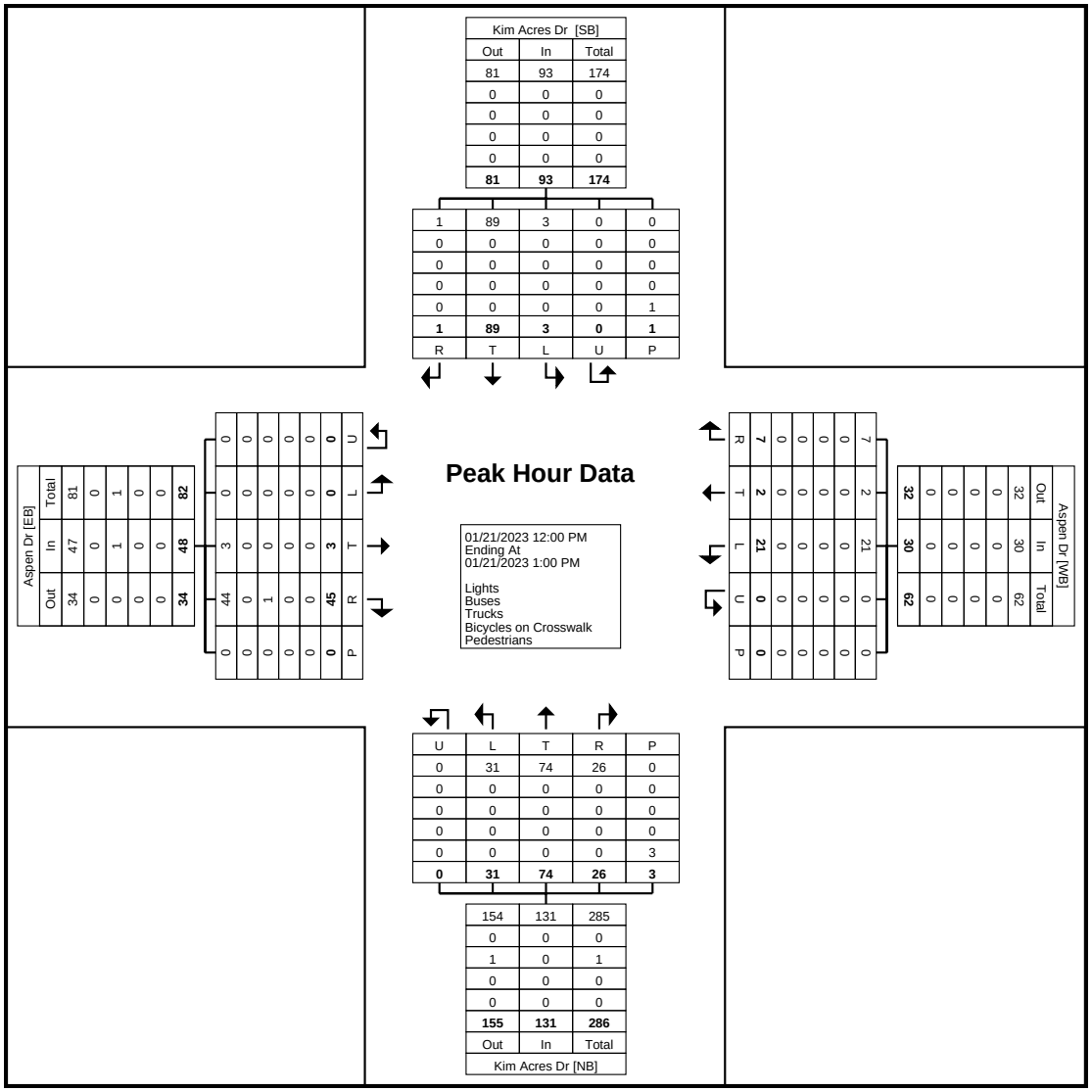
Count Name: Kim Acres Dr & Aspen Dr Sat
Site Code:
Start Date: 01/21/2023

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Aspen Dr Eastbound						Aspen Dr Westbound						Kim Acres Dr Northbound						Kim Acres Dr Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	0	3	13	0	0	16	6	0	1	0	0	7	9	19	7	0	0	35	1	24	0	0	0	25	83
12:15 PM	0	0	11	0	0	11	5	1	2	0	0	8	10	23	8	0	0	41	1	23	1	0	1	25	85
12:30 PM	0	0	12	0	0	12	4	0	2	0	0	6	6	19	4	0	0	29	0	21	0	0	0	21	68
12:45 PM	0	0	9	0	0	9	6	1	2	0	0	9	6	13	7	0	3	26	1	21	0	0	0	22	66
Total	0	3	45	0	0	48	21	2	7	0	0	30	31	74	26	0	3	131	3	89	1	0	1	93	302
Approach %	0.0	6.3	93.8	0.0	-	-	70.0	6.7	23.3	0.0	-	-	23.7	56.5	19.8	0.0	-	-	3.2	95.7	1.1	0.0	-	-	-
Total %	0.0	1.0	14.9	0.0	-	15.9	7.0	0.7	2.3	0.0	-	9.9	10.3	24.5	8.6	0.0	-	43.4	1.0	29.5	0.3	0.0	-	30.8	-
PHF	0.000	0.250	0.865	0.000	-	0.750	0.875	0.500	0.875	0.000	-	0.833	0.775	0.804	0.813	0.000	-	0.799	0.750	0.927	0.250	0.000	-	0.930	0.888
Lights	0	3	44	0	-	47	21	2	7	0	-	30	31	74	26	0	-	131	3	89	1	0	-	93	301
% Lights	-	100.0	97.8	-	-	97.9	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	99.7
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	-	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	-	-	0.0	0.0
Trucks	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Trucks	-	0.0	2.2	-	-	2.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Upper Allen Twp, PA
Kim Acres Dr & Aspen Dr
Saturday, January 21, 2023
Location: 40.177383, -76.983853

Count Name: Kim Acres Dr & Aspen Dr Sat
Site Code:
Start Date: 01/21/2023



Turning Movement Peak Hour Data Plot (12:00 PM)

APPENDIX B

PennDOT Sight Distance Form M-950S

M-950S (03-04)
PENNDOT

DRIVEWAY SIGHT DISTANCE MEASUREMENTS

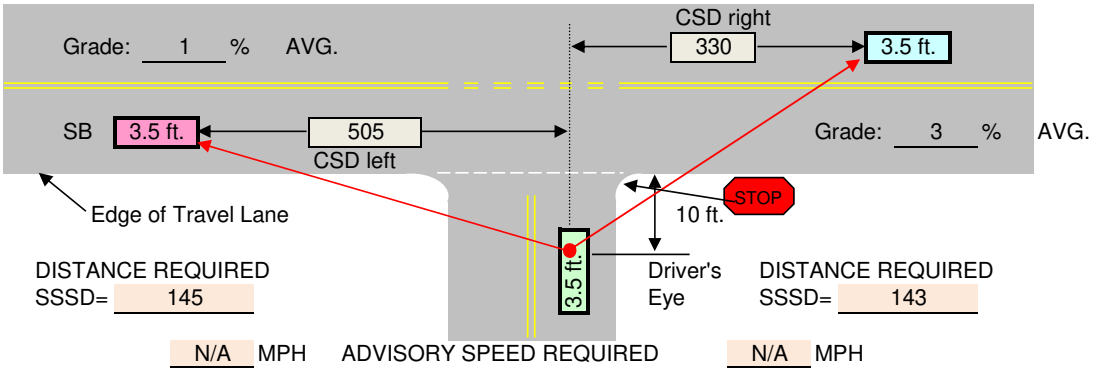
APPLICANT: Hutton APNO:

County: Cumberland SR: Kim Acres Dr Segment: NA Offset: NA Speed Limit: 25 MPH

Measured By: Wooster Intersecting Road: Site Drive Date: 16-Jan-23

A

Source: Title 67 Pa. Code § 212 Appendix (Engineering and Traffic Study Elements)



DISTANCE REQUIRED
SSSD= 145

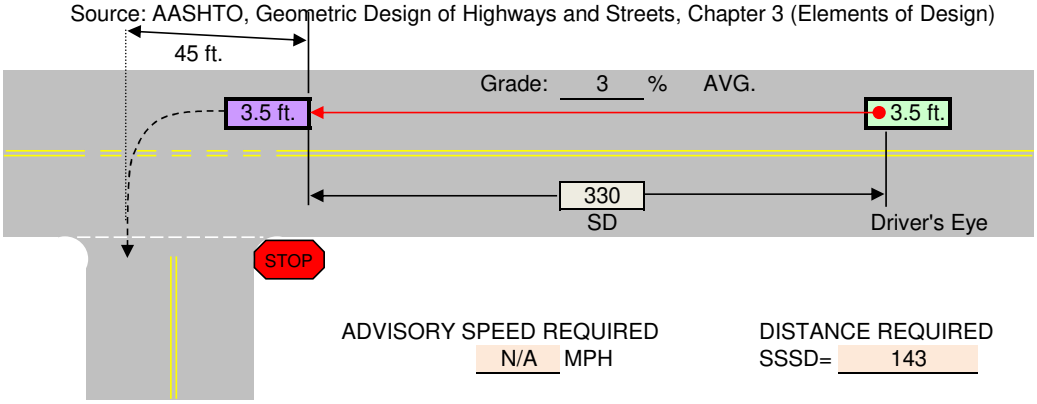
DISTANCE REQUIRED
SSSD= 143

N/A MPH ADVISORY SPEED REQUIRED N/A MPH

The maximum length of roadway along which a driver at a driveway location can continously see another vehicle approaching on the roadway.

B

Source: AASHTO, Geometric Design of Highways and Streets, Chapter 3 (Elements of Design)



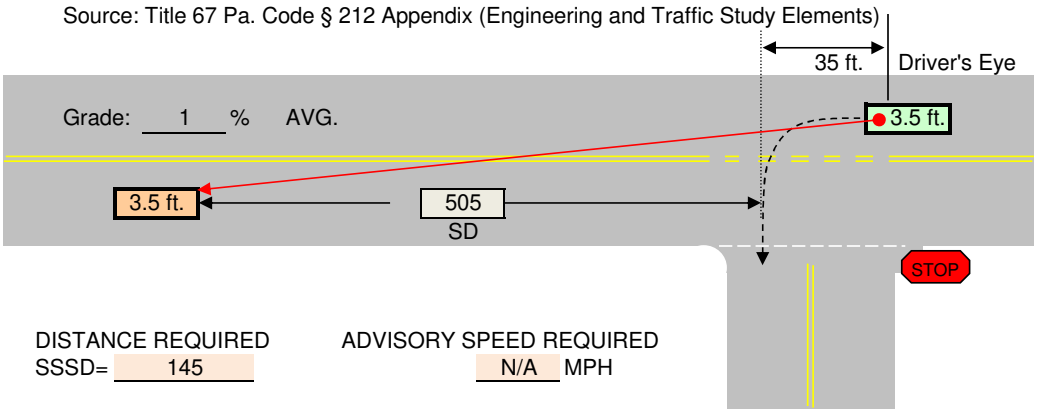
ADVISORY SPEED REQUIRED
N/A MPH

DISTANCE REQUIRED
SSSD= 143

The maximum length of roadway along which a driver on the roadway can continously see the rear of a vehicle which is located in the driver's travel lane and which is positioned to make a left turn into a driveway.

C

Source: Title 67 Pa. Code § 212 Appendix (Engineering and Traffic Study Elements)



DISTANCE REQUIRED
SSSD= 145

ADVISORY SPEED REQUIRED
N/A MPH

The maximum length of roadway along which a driver of a vehicle intended to make a left run into a driveway can continously see a vehicle approaching from the opposite direction.

SIGHT DISTANCE DEFICIENCIES ARE HIGHLIGHTED IN YELLOW

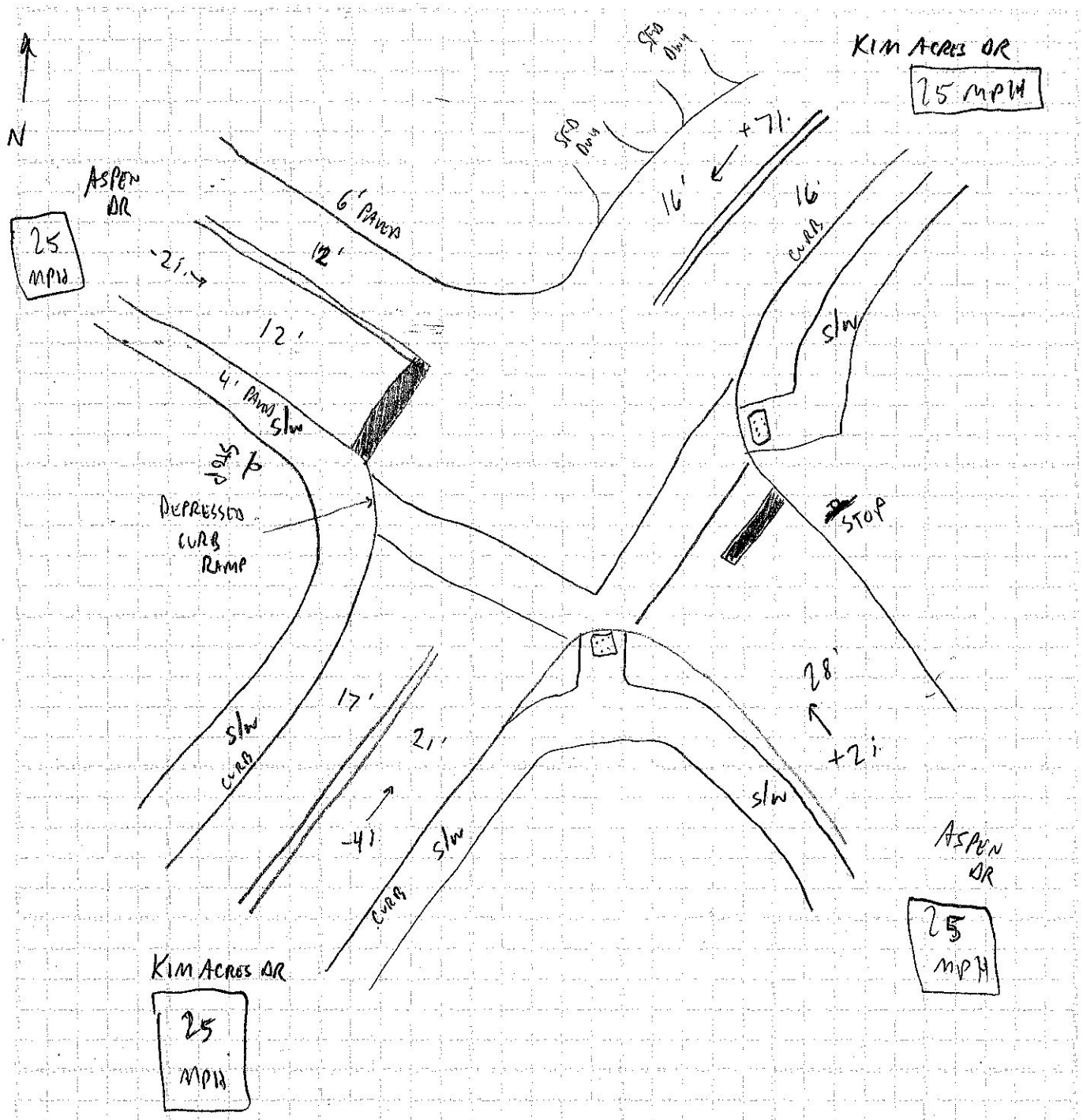
modified 07/21/09

APPENDIX C

Field Measurements Sketches/Photos

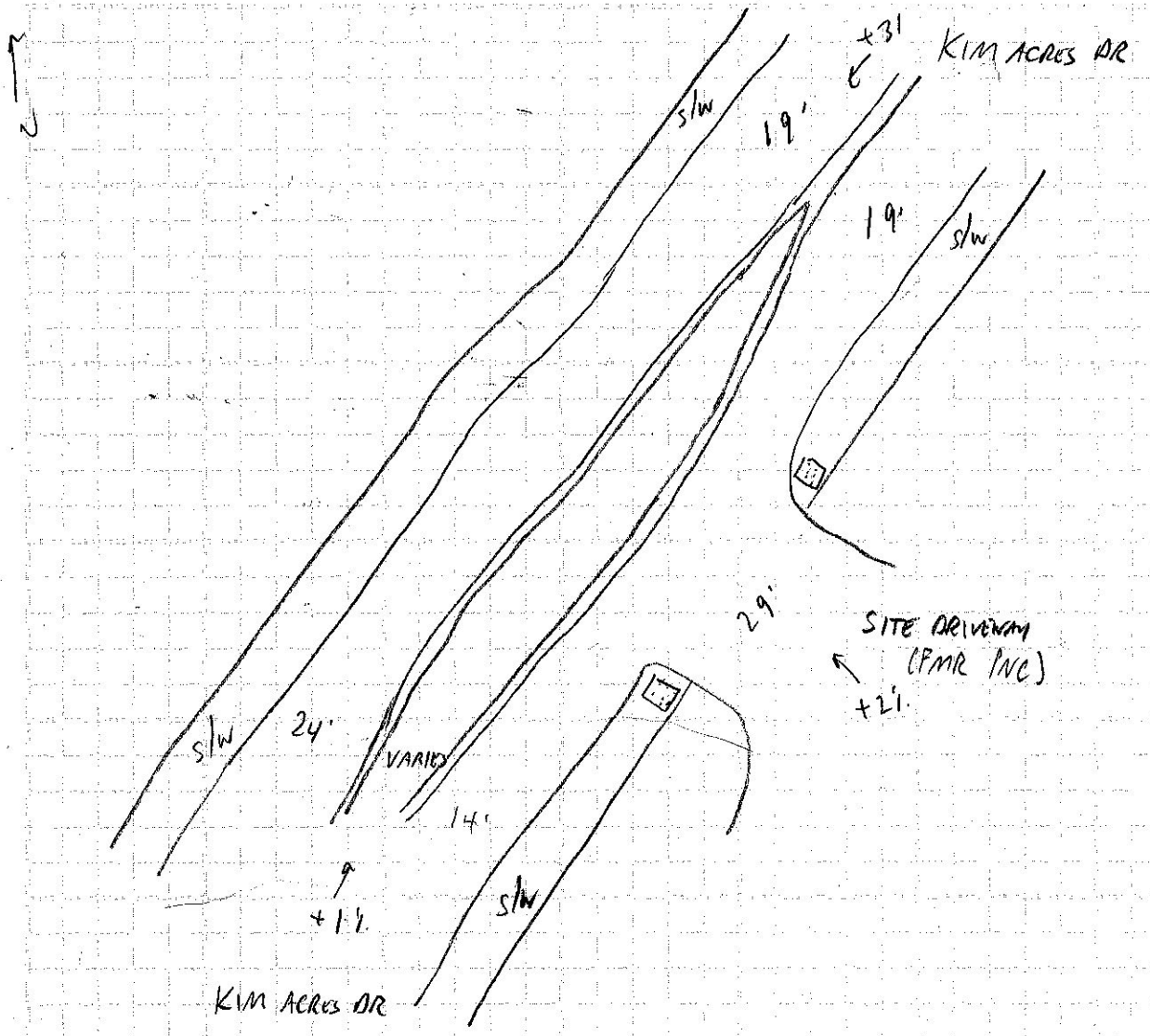
David E. Wooster and Associates, Inc.
2601 Gateway Drive, Suite 155
State College, PA 16801
(814) 231-2113
Fax (814) 231-2115
www.dewooster.com

#4074
Job Name: MODWASH UPPER ALLEN TWP Date: 1/16/23
Prepared By: DAH Chkd:
Subject: F.M. ⇒ KIM ACRES DRIVE + ASPEN DR



David E. Wooster and Associates, Inc.
2601 Gateway Drive, Suite 155
State College, PA 16801
(814) 231-2113
Fax (814) 231-2115
www.dewooster.com

#4074
Job Name: MODWASH UPPER ALLEN TWP Date: 1/16/23
Prepared By: DAH Chkd:
Subject: F.M. → KIM ACRES DR + SITE DR



On Route 114 Looking East Towards Kim Acres Dr

On Route 114 Looking West Towards Kim Acres Dr

On Kim Acres Dr Looking North Towards Route 114

On Kim Acres Dr Looking South Towards Route 114

On Aspen Dr Looking East Towards Kim Acres Dr

On Aspen Dr Looking West Towards Kim Acres Dr

On Kim Acres Dr Looking North Towards Aspen Dr

On Kim Acres Dr Looking South Towards Aspen Dr

On Kim Acres Dr Looking North Towards Site Dr

On Kim Acres Dr Looking South Towards Site Dr

On Existing Site Dr (Former Bank) Looking West Towards Kim Acres Dr

APPENDIX D

Level-of-Service Definitions

LEVEL-OF-SERVICE CRITERIA – AUTOMOBILE MODE

SIGNALIZED INTERSECTIONS

CONTROL DELAY (sec/veh)	LEVEL-OF-SERVICE BY VOLUME-TO-CAPACITY RATIO	
	≤ 1.0	**> 1.0**
≤ 10	A	F
>10 and ≤20	B	F
>20 and ≤35	C	F
>35 and ≤55	D	F
>55 and ≤80	E	F
>80	F	F

UNSIGNALIZED INTERSECTIONS

CONTROL DELAY (sec/veh)	LEVEL-OF-SERVICE BY VOLUME-TO-CAPACITY RATIO	
	≤ 1.0	**> 1.0**
≤ 10	A	F
>10 and ≤15	B	F
>15 and ≤25	C	F
>25 and ≤35	D	F
>35 and ≤50	E	F
>50	F	F

APPENDIX E

Capacity Calculations – Existing 2023 Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	162	165	29	484	5	196	14	17	13	38	188
Future Volume (veh/h)	89	162	165	29	484	5	196	14	17	13	38	188
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1738	1710	1738	1794	1766	1794	1780	1807	1752	1682	1794	1808
Adj Flow Rate, veh/h	99	180	183	32	538	6	218	16	19	14	42	209
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, %	4	6	4	0	2	0	4	7	6	8	0	4
Cap, veh/h	347	794	684	550	771	9	439	181	215	290	232	198
Arrive On Green	0.06	0.46	0.46	0.04	0.44	0.43	0.14	0.24	0.23	0.03	0.13	0.13
Sat Flow, veh/h	1655	1710	1473	1709	1743	19	1696	753	894	1602	1794	1532
Grp Volume(v), veh/h	99	180	183	32	0	544	218	0	35	14	42	209
Grp Sat Flow(s),veh/h/ln	1655	1710	1473	1709	0	1763	1696	0	1646	1602	1794	1532
Q Serve(g_s), s	2.7	5.4	6.5	0.8	0.0	21.2	8.9	0.0	1.4	0.6	1.8	11.0
Cycle Q Clear(g_c), s	2.7	5.4	6.5	0.8	0.0	21.2	8.9	0.0	1.4	0.6	1.8	11.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	347	794	684	550	0	780	439	0	397	290	232	198
V/C Ratio(X)	0.29	0.23	0.27	0.06	0.00	0.70	0.50	0.00	0.09	0.05	0.18	1.05
Avail Cap(c_a), veh/h	415	794	684	658	0	780	461	0	397	395	232	198
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.0	13.6	13.9	11.6	0.0	19.1	24.5	0.0	25.2	30.4	33.0	37.0
Incr Delay (d2), s/veh	0.4	0.7	1.0	0.0	0.0	5.1	0.9	0.0	0.1	0.1	0.4	78.9
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(50%),veh/ln	0.9	2.0	2.3	0.3	0.0	8.9	3.6	0.0	0.6	0.2	0.8	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.4	14.3	14.9	11.6	0.0	24.3	25.4	0.0	25.3	30.5	33.4	115.9
LnGrp LOS	B	B	B	B	A	C	C	A	C	C	C	F
Approach Vol, veh/h		462			576			253			265	
Approach Delay, s/veh		14.6			23.6			25.4			98.3	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	44.5	16.9	16.0	9.5	42.6	7.4	25.5
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	32.0	12.0	10.0	8.0	32.0	7.0	15.0
Max Q Clear Time (g_c+I1), s	2.8	8.5	10.9	13.0	4.7	23.2	2.6	3.4
Green Ext Time (p_c), s	0.0	8.2	0.1	0.0	0.1	5.9	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	33.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	49	16	4	10	42	61	4	1	170	5
Future Vol, veh/h	2	1	49	16	4	10	42	61	4	1	170	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	6	6	0	0	7	0	25	0	2	0
Mvmt Flow	2	1	56	18	5	11	48	70	5	1	195	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	377	371	198	398	372	73	201	0	0	75	0	0
Stage 1	200	200	-	169	169	-	-	-	-	-	-	-
Stage 2	177	171	-	229	203	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.06	7.56	6.9	6.4	4.4	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.2	3.1	4	3.1	3.1	-	-	3	-	-
Pot Cap-1 Maneuver	693	586	879	595	539	1052	989	-	-	1132	-	-
Stage 1	949	756	-	917	748	-	-	-	-	-	-	-
Stage 2	975	776	-	843	721	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	653	556	879	534	511	1052	989	-	-	1132	-	-
Mov Cap-2 Maneuver	653	556	-	534	511	-	-	-	-	-	-	-
Stage 1	901	755	-	870	710	-	-	-	-	-	-	-
Stage 2	909	736	-	787	720	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	11	3.5	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	989	-	-	858	634	1132	-	-
HCM Lane V/C Ratio	0.049	-	-	0.07	0.054	0.001	-	-
HCM Control Delay (s)	8.8	0	-	9.5	11	8.2	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	423	223	31	268	5	188	60	51	13	47	138
Future Volume (veh/h)	145	423	223	31	268	5	188	60	51	13	47	138
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1780	1780	1766	1794	1780	1794	1809	1881	1837	1682	1794	1866
Adj Flow Rate, veh/h	156	455	240	33	288	5	202	65	55	14	51	148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	2	0	1	0	2	2	0	8	0	0
Cap, veh/h	621	946	796	419	869	15	348	177	149	268	226	200
Arrive On Green	0.08	0.53	0.53	0.04	0.50	0.49	0.09	0.19	0.18	0.03	0.13	0.13
Sat Flow, veh/h	1696	1780	1497	1709	1745	30	1723	941	796	1602	1794	1582
Grp Volume(v), veh/h	156	455	240	33	0	293	202	0	120	14	51	148
Grp Sat Flow(s),veh/h/ln	1696	1780	1497	1709	0	1775	1723	0	1738	1602	1794	1582
Q Serve(g_s), s	3.8	14.5	8.1	0.8	0.0	8.9	8.0	0.0	5.4	0.7	2.3	8.1
Cycle Q Clear(g_c), s	3.8	14.5	8.1	0.8	0.0	8.9	8.0	0.0	5.4	0.7	2.3	8.1
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.46	1.00		1.00
Lane Grp Cap(c), veh/h	621	946	796	419	0	885	348	0	326	268	226	200
V/C Ratio(X)	0.25	0.48	0.30	0.08	0.00	0.33	0.58	0.00	0.37	0.05	0.23	0.74
Avail Cap(c_a), veh/h	681	946	796	536	0	885	348	0	326	367	299	264
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	13.3	11.8	10.4	0.0	13.6	30.3	0.0	32.1	32.5	35.4	37.9
Incr Delay (d2), s/veh	0.2	1.7	1.0	0.1	0.0	1.0	2.4	0.0	0.7	0.1	0.5	7.6
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.6	2.8	0.3	0.0	3.5	4.0	0.0	2.4	0.3	1.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	15.0	12.7	10.5	0.0	14.6	32.7	0.0	32.8	32.6	35.9	45.5
LnGrp LOS	A	B	B	B	A	B	C	A	C	C	D	D
Approach Vol, veh/h		851			326			322			213	
Approach Delay, s/veh		13.3			14.2			32.7			42.4	
Approach LOS		B			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	52.8	13.0	16.4	10.8	49.9	7.5	21.9
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	37.0	7.0	14.0	9.0	37.0	7.0	14.0
Max Q Clear Time (g_c+I1), s	2.8	16.5	10.0	10.1	5.8	10.9	2.7	7.4
Green Ext Time (p_c), s	0.0	13.6	0.0	0.2	0.1	7.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	60	21	2	12	32	146	37	8	130	0
Future Vol, veh/h	2	2	60	21	2	12	32	146	37	8	130	0
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	2	2	69	24	2	14	37	168	43	9	149	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	439	453	151	470	432	191	149	0	0	212	0	0
Stage 1	167	167	-	265	265	-	-	-	-	-	-	-
Stage 2	272	286	-	205	167	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	633	532	963	545	495	897	1068	-	-	1016	-	-
Stage 1	987	778	-	829	673	-	-	-	-	-	-	-
Stage 2	872	701	-	902	750	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	598	505	961	483	470	896	1068	-	-	1015	-	-
Mov Cap-2 Maneuver	598	505	-	483	470	-	-	-	-	-	-	-
Stage 1	949	770	-	796	646	-	-	-	-	-	-	-
Stage 2	822	673	-	824	743	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	11.8	1.3	0.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1068	-	-	918	573	1015	-	-
HCM Lane V/C Ratio	0.034	-	-	0.08	0.07	0.009	-	-
HCM Control Delay (s)	8.5	0	-	9.3	11.8	8.6	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	319	216	33	328	7	190	41	34	13	31	116
Future Volume (veh/h)	93	319	216	33	328	7	190	41	34	13	31	116
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1794	1780	1794	1794	1780	1794	1823	1911	1837	1794	1794	1852
Adj Flow Rate, veh/h	98	336	227	35	345	7	200	43	36	14	33	122
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	0	1	0	1	0	0	0	0	1
Cap, veh/h	531	847	723	465	786	16	401	185	155	295	209	183
Arrive On Green	0.07	0.48	0.48	0.05	0.45	0.44	0.11	0.19	0.18	0.03	0.12	0.12
Sat Flow, veh/h	1709	1780	1521	1709	1739	35	1736	961	805	1709	1794	1569
Grp Volume(v), veh/h	98	336	227	35	0	352	200	0	79	14	33	122
Grp Sat Flow(s),veh/h/ln	1709	1780	1521	1709	0	1774	1736	0	1766	1709	1794	1569
Q Serve(g_s), s	2.2	9.1	6.9	0.8	0.0	10.2	7.3	0.0	2.9	0.5	1.2	5.6
Cycle Q Clear(g_c), s	2.2	9.1	6.9	0.8	0.0	10.2	7.3	0.0	2.9	0.5	1.2	5.6
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.46	1.00		1.00
Lane Grp Cap(c), veh/h	531	847	723	465	0	802	401	0	341	295	209	183
V/C Ratio(X)	0.18	0.40	0.31	0.08	0.00	0.44	0.50	0.00	0.23	0.05	0.16	0.67
Avail Cap(c_a), veh/h	614	847	723	589	0	802	401	0	341	426	311	272
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.8	12.7	12.1	9.9	0.0	14.0	23.9	0.0	25.8	27.5	29.8	31.7
Incr Delay (d2), s/veh	0.2	1.4	1.1	0.1	0.0	1.7	1.0	0.0	0.3	0.1	0.3	4.2
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(50%),veh/ln	0.7	3.5	2.4	0.3	0.0	3.9	3.0	0.0	1.2	0.2	0.5	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.0	14.1	13.2	10.0	0.0	15.8	24.9	0.0	26.1	27.6	30.2	35.9
LnGrp LOS	A	B	B	B	A	B	C	A	C	C	C	D
Approach Vol, veh/h		661			387			279			169	
Approach Delay, s/veh		13.2			15.3			25.2			34.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	40.7	13.0	13.7	9.4	38.9	7.3	19.5
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	25.0	7.0	12.0	8.0	25.0	7.0	12.0
Max Q Clear Time (g_c+I1), s	2.8	11.1	9.3	7.6	4.2	12.2	2.5	4.9
Green Ext Time (p_c), s	0.0	8.4	0.0	0.2	0.1	5.4	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	18.3
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	3	45	21	2	7	31	74	26	3	89	1
Future Vol, veh/h	0	3	45	21	2	7	31	74	26	3	89	1
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	2	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	3	51	24	2	8	35	83	29	3	100	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	281	289	104	305	275	99	101	0	0	112	0	0
Stage 1	107	107	-	168	168	-	-	-	-	-	-	-
Stage 2	174	182	-	137	107	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.02	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	798	645	1020	720	617	1016	1109	-	-	1099	-	-
Stage 1	1059	820	-	949	749	-	-	-	-	-	-	-
Stage 2	979	768	-	992	801	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	766	621	1016	660	594	1015	1109	-	-	1099	-	-
Mov Cap-2 Maneuver	766	621	-	660	594	-	-	-	-	-	-	-
Stage 1	1023	818	-	917	724	-	-	-	-	-	-	-
Stage 2	934	742	-	932	799	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	10.3	2	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1109	-	-	977	713	1099	-	-
HCM Lane V/C Ratio	0.031	-	-	0.055	0.047	0.003	-	-
HCM Control Delay (s)	8.4	0	-	8.9	10.3	8.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

APPENDIX F

Critical Headway and Follow-up Calculations

Critical Headway and Follow-up Headway Calculations - HCM 6th Edition

ModWash Along Kim Acres Drive
Upper Allen Township, Cumberland County, PA

Intersection: Kim Acres Drive & Aspen Drive
Major Street: Kim Acres Drive
Minor Street: Aspen Drive

CRITICAL HEADWAY

$t_{c,x} = t_{c,base} + t_{c,HV}P_{HV} + t_{c,G}G - t3_{,LT}$

where:

$t_{c,x}$ =	critical headway for movement x (s)
$t_{c,base}$ =	base critical headway from PennDOT Publication 46 - Pennsylvania Defaults (s)
$t_{c,HV}$ =	adjustment factor for heavy vehicles (1.0 for major streets with one lane in each direction, 2.0 for major streets with 2 or 3 lanes in each direction) (s)
P_{HV} =	proportion of heavy vehicles for movement (expressed as a decimal; e.g. P_{HV} = 0.02 for 2% heavy vehicles)
$t_{c,G}$ =	adjustment factor for grade (0.1 for Movements 9 and 12; 0.2 for Movements 7, 8, 10, & 11) (s)
G =	percent grade (expressed as an integer; e.g. G=-2 for a 2% downhill grade)
$t_{3,LT}$ =	adjustment factor for intersection geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

AM PEAK HOUR
EB Minor/NB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{c,base}$ =	7.1	$t_{c,base}$ =	6.2	$t_{c,base}$ =	6.5	$t_{c,base}$ =	4.3
$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0
P_{HV} =	0.00	P_{HV} =	0.06	P_{HV} =	0.00	P_{HV} =	0.07
$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.1	$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.0
G =	-2.0	G =	-2.0	G =	-2.0	G =	-4.0
$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0
$t_{c,x}$ =	**6.70** seconds	**$t_{c,x}$ =**	**6.06** seconds	**$t_{c,x}$ =**	**6.10** seconds	**$t_{c,x}$ =**	**4.37** seconds

AM PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{c,base}$ =	7.1	$t_{c,base}$ =	6.2	$t_{c,base}$ =	6.5	$t_{c,base}$ =	4.3
$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0
P_{HV} =	0.06	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.1	$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.0
G =	2.0	G =	2.0	G =	2.0	G =	7.0
$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0
$t_{c,x}$ =	**7.56** seconds	**$t_{c,x}$ =**	**6.40** seconds	**$t_{c,x}$ =**	**6.90** seconds	**$t_{c,x}$ =**	**4.30** seconds

PM PEAK HOUR
EB Minor/NB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{c,base}$ =	7.1	$t_{c,base}$ =	6.2	$t_{c,base}$ =	6.5	$t_{c,base}$ =	4.3
$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.1	$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.0
G =	-2.0	G =	-2.0	G =	-2.0	G =	-4.0
$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0
$t_{c,x}$ =	**6.70** seconds	**$t_{c,x}$ =**	**6.00** seconds	**$t_{c,x}$ =**	**6.10** seconds	**$t_{c,x}$ =**	**4.30** seconds

PM PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{c,base}$ =	7.1	$t_{c,base}$ =	6.2	$t_{c,base}$ =	6.5	$t_{c,base}$ =	4.3
$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.1	$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.0
G =	2.0	G =	2.0	G =	2.0	G =	7.0
$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0
$t_{c,x}$ =	**7.50** seconds	**$t_{c,x}$ =**	**6.40** seconds	**$t_{c,x}$ =**	**6.90** seconds	**$t_{c,x}$ =**	**4.30** seconds

SAT PEAK HOUR
EB Minor/NB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{c,base}$ =	7.1	$t_{c,base}$ =	6.2	$t_{c,base}$ =	6.5	$t_{c,base}$ =	4.3
$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0
P_{HV} =	0.00	P_{HV} =	0.02	P_{HV} =	0.00	P_{HV} =	0.00
$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.1	$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.0
G =	-2.0	G =	-2.0	G =	-2.0	G =	-4.0
$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0
$t_{c,x}$ =	**6.70** seconds	**$t_{c,x}$ =**	**6.02** seconds	**$t_{c,x}$ =**	**6.10** seconds	**$t_{c,x}$ =**	**4.30** seconds

SAT PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{c,base}$ =	7.1	$t_{c,base}$ =	6.2	$t_{c,base}$ =	6.5	$t_{c,base}$ =	4.3
$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.1	$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.0
G =	2.0	G =	2.0	G =	2.0	G =	7.0
$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0
$t_{c,x}$ =	**7.50** seconds	**$t_{c,x}$ =**	**6.40** seconds	**$t_{c,x}$ =**	**6.90** seconds	**$t_{c,x}$ =**	**4.30** seconds

Critical Headway and Follow-up Headway Calculations - HCM 6th Edition

ModWash Along Kim Acres Drive
Upper Allen Township, Cumberland County, PA

Intersection: Kim Acres Drive & Aspen Drive
Major Street: Kim Acres Drive
Minor Street: Aspen Drive

FOLLOW-UP HEADWAY

$t_{f,x} = t_{f,base} + t_{f,HV}P_{HV}$

where:

$t_{f,x}$ =	follow-up headway for movement x (s)
$t_{f,base}$ =	base follow-up headway from PennDOT Publication 46 - Pennsylvania Defaults (s)
$t_{f,HV}$ =	adjustment factor for heavy vehicles (0.9 for major streets with one lane in each direction, 1.0 for major streets with 2 or 3 lanes in each direction) (s)
P_{HV} =	proportion of heavy vehicles for movement (expressed as a decimal; e.g. P_{HV} = 0.02 for 2% heavy vehicles)

AM PEAK HOUR
EB Minor/NB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{f,base}$ =	3.0	$t_{f,base}$ =	3.1	$t_{f,base}$ =	4.0	$t_{f,base}$ =	3.0
$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9
P_{HV} =	0.00	P_{HV} =	0.06	P_{HV} =	0.00	P_{HV} =	0.07
$t_{f,x}$ =	**3.00** seconds	**$t_{f,x}$ =**	**3.15** seconds	**$t_{f,x}$ =**	**4.00** seconds	**$t_{f,x}$ =**	**3.06** seconds

AM PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{f,base}$ =	3.0	$t_{f,base}$ =	3.1	$t_{f,base}$ =	4.0	$t_{f,base}$ =	3.0
$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9
P_{HV} =	0.06	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{f,x}$ =	**3.05** seconds	**$t_{f,x}$ =**	**3.10** seconds	**$t_{f,x}$ =**	**4.00** seconds	**$t_{f,x}$ =**	**3.00** seconds

PM PEAK HOUR
EB Minor/NB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{f,base}$ =	3.0	$t_{f,base}$ =	3.1	$t_{f,base}$ =	4.0	$t_{f,base}$ =	3.0
$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{f,x}$ =	**3.00** seconds	**$t_{f,x}$ =**	**3.10** seconds	**$t_{f,x}$ =**	**4.00** seconds	**$t_{f,x}$ =**	**3.00** seconds

PM PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{f,base}$ =	3.0	$t_{f,base}$ =	3.1	$t_{f,base}$ =	4.0	$t_{f,base}$ =	3.0
$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{f,x}$ =	**3.00** seconds	**$t_{f,x}$ =**	**3.10** seconds	**$t_{f,x}$ =**	**4.00** seconds	**$t_{f,x}$ =**	**3.00** seconds

Critical Headway and Follow-up Headway Calculations - HCM 6th Edition

ModWash Along Kim Acres Drive
Upper Allen Township, Cumberland County, PA

Intersection: Kim Acres Drive & Site Drive
Major Street: Kim Acres Drive
Minor Street: Site Drive

CRITICAL HEADWAY

$t_{c,x} = t_{c,base} + t_{C,HV}P_{HV} + t_{c,G}G\text{-}t3_{,LT}$

where:

$t_{c,x}$ = critical headway for movement x (s)
$t_{c,base}$ = base critical headway from PennDOT Publication 46 - Pennsylvania Defaults (s)
$t_{c,HV}$ = adjustment factor for heavy vehicles (1.0 for major streets with one lane in each direction, 2.0 for major streets with 2 or 3 lanes in each direction) (s)
P_{HV} = proportion of heavy vehicles for movement (expressed as a decimal; e.g. P_{HV} = 0.02 for 2% heavy vehicles)
$t_{c,G}$ = adjustment factor for grade (0.1 for Movements 9 and 12; 0.2 for Movements 7, 8, 10, & 11) (s)
G = percent grade (expressed as an integer; e.g. G=-2 for a 2% downhill grade)
$t_{3,LT}$ = adjustment factor for intersection geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

AM PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{c,base}$ =	7.1	$t_{c,base}$ =	6.2	$t_{c,base}$ =	6.5	$t_{c,base}$ =	4.3
$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.1	$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.0
G =	2.0	G =	2.0	G =	2.0	G =	3.0
$t_{3,LT}$ =	0.7	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0
$t_{c,x}$ =	**6.80** seconds	**$t_{c,x}$ =**	**6.40** seconds	**$t_{c,x}$ =**	**6.90** seconds	**$t_{c,x}$ =**	**4.30** seconds

PM PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{c,base}$ =	7.1	$t_{c,base}$ =	6.2	$t_{c,base}$ =	6.5	$t_{c,base}$ =	4.3
$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.1	$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.0
G =	2.0	G =	2.0	G =	2.0	G =	3.0
$t_{3,LT}$ =	0.7	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0
$t_{c,x}$ =	**6.80** seconds	**$t_{c,x}$ =**	**6.40** seconds	**$t_{c,x}$ =**	**6.90** seconds	**$t_{c,x}$ =**	**4.30** seconds

SAT PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{c,base}$ =	7.1	$t_{c,base}$ =	6.2	$t_{c,base}$ =	6.5	$t_{c,base}$ =	4.3
$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0	$t_{c,HV}$ =	1.0
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.1	$t_{c,G}$ =	0.2	$t_{c,G}$ =	0.0
G =	2.0	G =	2.0	G =	2.0	G =	3.0
$t_{3,LT}$ =	0.7	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0	$t_{3,LT}$ =	0.0
$t_{c,x}$ =	**6.80** seconds	**$t_{c,x}$ =**	**6.40** seconds	**$t_{c,x}$ =**	**6.90** seconds	**$t_{c,x}$ =**	**4.30** seconds

FOLLOW-UP HEADWAY

$t_{f,x} = t_{f,base} + t_{f,HV}P_{HV}$

where:

$t_{f,x}$ = follow-up headway for movement x (s)
$t_{f,base}$ = base follow-up headway from PennDOT Publication 46 - Pennsylvania Defaults (s)
$t_{f,HV}$ = adjustment factor for heavy vehicles (0.9 for major streets with one lane in each direction, 1.0 for major streets with 2 or 3 lanes in each direction) (s)
P_{HV} = proportion of heavy vehicles for movement (expressed as a decimal; e.g. P_{HV} = 0.02 for 2% heavy vehicles)

AM PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{f,base}$ =	3.0	$t_{f,base}$ =	3.1	$t_{f,base}$ =	4.0	$t_{f,base}$ =	3.0
$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{f,x}$ =	**3.00** seconds	**$t_{f,x}$ =**	**3.10** seconds	**$t_{f,x}$ =**	**4.00** seconds	**$t_{f,x}$ =**	**3.00** seconds

PM PEAK HOUR
WB Minor/SB L Major

Minor street left turn		**Minor street right turn**		**Minor Street Through**		**Major Street Left**	
$t_{f,base}$ =	3.0	$t_{f,base}$ =	3.1	$t_{f,base}$ =	4.0	$t_{f,base}$ =	3.0
$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9	$t_{f,HV}$ =	0.9
P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00	P_{HV} =	0.00
$t_{f,x}$ =	**3.00** seconds	**$t_{f,x}$ =**	**3.10** seconds	**$t_{f,x}$ =**	**4.00** seconds	**$t_{f,x}$ =**	**3.00** seconds

APPENDIX G

Traffic Signal Plan

TE-964 (2-19)

pennsylvania
DEPARTMENT OF TRANSPORTATION
www.penndot.gov

TRAFFIC SIGNAL PERMIT

Permit No. 001909

Sheet 1 of 4

In accordance with the Vehicle Code, the Secretary of Transportation hereby approves the installation and operation of a traffic signal at the intersection of South Market Street (SR 0114) & Kim Acres Drive/ Bumble Bee Hollow Road in the Township of Upper Allen, County of Cumberland.

This permit is issued to, and accepted by the Township of Upper Allen hereinafter known as the Permittee, as follows:

This installation shall be in accordance with the Vehicle Code and the Regulations for traffic signs, signals and markings of the Department of Transportation, and shall conform to the following requirements and those contained on the attached sheets.

Type of Controller
Volume Density

Type of Signal Mounting
Post Mounted and Overhead

Hours of Operation as "Stop" and "Go"
Continuously

Hours of Operation as "FLASHING"
Equipped for Emergency Flashing

Controller Operation
Controller to provide the phasing, timing, and signal display indicated on the attached diagrams. Controller to be coordinated with adjacent signal controller through the use of time based cooridinates to provide progressive movement along S. Market St.

All work performed by the Permittee in the erection of the traffic signal shall be under and subject to the direction of the Secretary of Transportation or their authorized representatives. The said Permittee shall use due diligence in the execution of the work authorized under this permit and shall not obstruct or endanger travel along the said road. All operations must be conducted so as to permit safe and reasonable free travel at all times over the road within the limits of the work herein permitted.

The Permittee covenants and agrees to fully indemnify and save harmless the Department of Transportation and assume all liability for damages or injury, occurring to any person, persons or property through or in consequence of any act or omission of anyone working on the construction, or from faulty maintenance or operation of such traffic signal.

The Secretary of Transportation, by law, reserves the right to revoke and annul this permit if the Permittee shall at any time willfully or negligently fail to comply with the conditions contained in this permit, or, upon changes in traffic conditions, fail to make any changes in the construction or operation of this signal, or to remove it, when so ordered by the Secretary of Transportation; of if this installation is not in operation within twenty-four (24) months of the receipt of this permit. The Permittee shall maintain the signal in a safe condition at all times. The Permittee shall not make any change in the construction or operation of this traffic signal without prior written approval of the Secretary of Transportation.

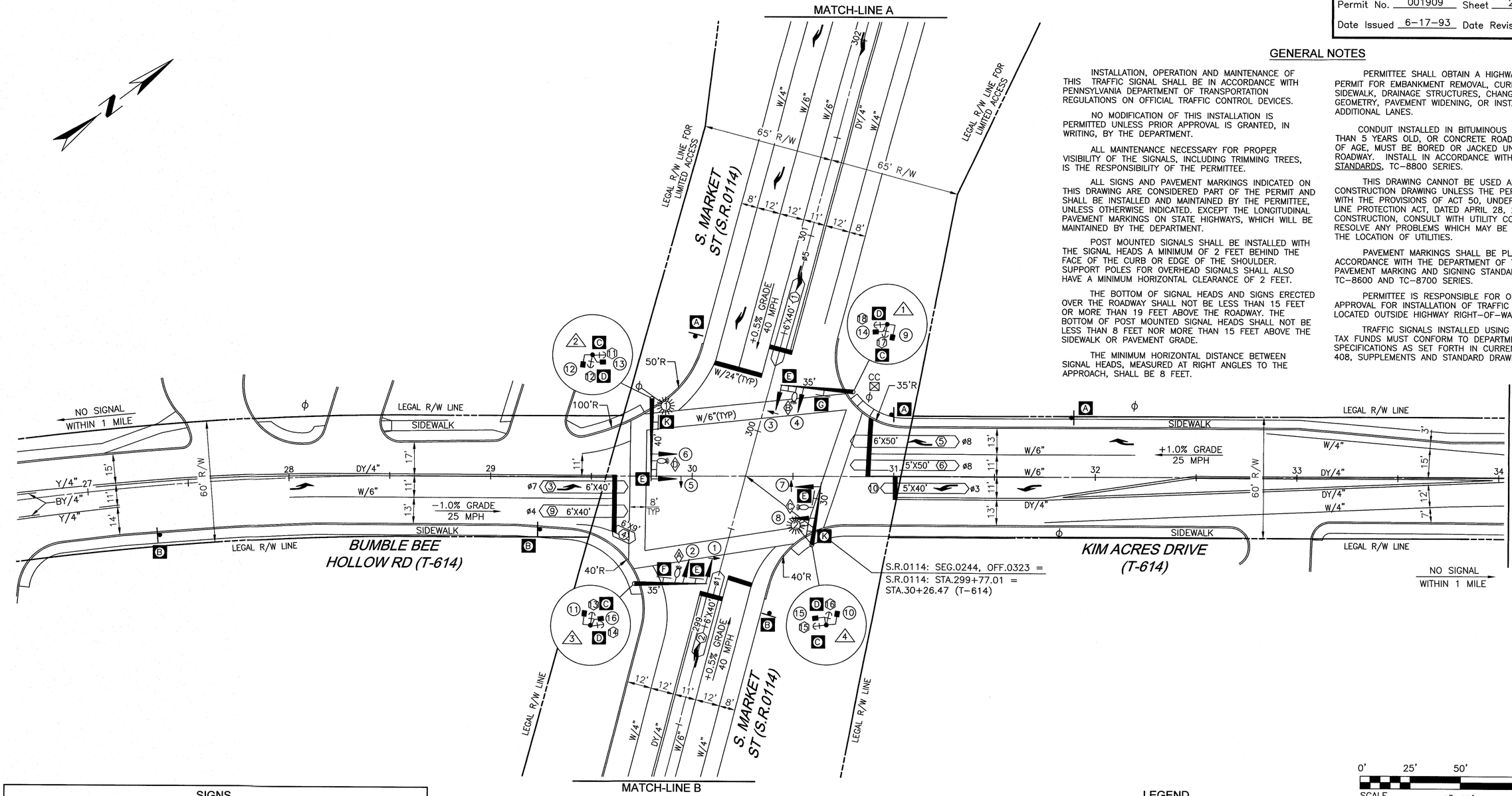
This permit cancels and supersedes all previous permits issued for this location upon completion of the installation specified herein.

INITIAL DATE: 06/17/1993 APPROVED Yassmin Gramian, P.E.

REVISION DATE: 03/11/2022 BY Matthew S. Clouser Digitally signed by Matthew S. Clouser Date: 2022.03.15 10:16:50 -04'00'

District Executive

Permit No. 001909	Sheet 2 of 4
Date Issued 6-17-93	Date Revised 3-11-22



GENERAL NOTES

INSTALLATION, OPERATION AND MAINTENANCE OF THIS TRAFFIC SIGNAL SHALL BE IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION REGULATIONS ON OFFICIAL TRAFFIC CONTROL DEVICES.

NO MODIFICATION OF THIS INSTALLATION IS PERMITTED UNLESS PRIOR APPROVAL IS GRANTED, IN WRITING, BY THE DEPARTMENT.

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

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED BY THE PERMITTEE, UNLESS OTHERWISE INDICATED. EXCEPT THE LONGITUDINAL PAVEMENT MARKINGS ON STATE HIGHWAYS, WHICH WILL BE MAINTAINED BY THE DEPARTMENT.

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

THE BOTTOM OF SIGNAL HEADS AND SIGNS ERECTED OVER THE ROADWAY SHALL NOT BE LESS THAN 15 FEET OR MORE THAN 19 FEET ABOVE THE ROADWAY. THE BOTTOM OF POST MOUNTED SIGNAL HEADS SHALL NOT BE LESS THAN 8 FEET NOR MORE THAN 15 FEET ABOVE THE SIDEWALK OR PAVEMENT GRADE.

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

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR EMBANKMENT REMOVAL, CURBING AND/OR SIDEWALK, DRAINAGE STRUCTURES, CHANGES IN HIGHWAY GEOMETRY, PAVEMENT WIDENING, OR INSTALLATION OF ADDITIONAL LANES.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS, TC-8800 SERIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 50, UNDERGROUND UTILITY LINE PROTECTION ACT, DATED APRIL 28, 2018. PRIOR TO CONSTRUCTION, CONSULT WITH UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

PAVEMENT MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORTATION PAVEMENT MARKING AND SIGNING STANDARDS, PUB. 111, TC-8600 AND TC-8700 SERIES.

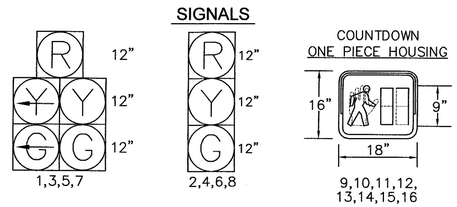
PERMITTEE IS RESPONSIBLE FOR OBTAINING APPROVAL FOR INSTALLATION OF TRAFFIC SIGNAL DEVICES LOCATED OUTSIDE HIGHWAY RIGHT-OF-WAY.

TRAFFIC SIGNALS INSTALLED USING LIQUID FUELS TAX FUNDS MUST CONFORM TO DEPARTMENT SPECIFICATIONS AS SET FORTH IN CURRENT PUBLICATION 408, SUPPLEMENTS AND STANDARD DRAWINGS.

SIGNS

PLAN SYMBOL	DESCRIPTION	SIZE W x H	SERIES DESIGNATION
A	LANE USE CONTROL	48"x30"	R3-8B(L-S-R)
B	LANE USE CONTROL	30"x30"	R3-8A(L-SR)
C	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER ←	9"x15"	R10-3E
D	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER →	9"x15"	R10-3E
E	LEFT TURN YIELD ON GREEN ●	30"x36"	R10-12
F	← Kim Acres Dr Bumble Bee Hollow Rd →	84"x32"	D3-5
G	← Bumble Bee Hollow Rd Kim Acres Dr →	96"x40"	D3-5
K	S Market St	96"x16"	D3-4

SIGNALS



SIGNALS TO BE EQUIPPED WITH ALUMINUM BACKPLATES AND YELLOW REFLECTIVE TAPE AND TUNNEL VISORS _____

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS AND LOUVERS _____

ALL SIGNALS TO BE L.E.D.

LEGEND

- MAST ARM
- PEDESTAL
- VEHICULAR SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- SIGN
- VEHICLE DETECTOR
- PEDESTRIAN PUSH BUTTON/SIGN
- CC — CONTROLLER ASSEMBLY
- W/4", W/6", W/24" — SOLID WHITE LINE/WIDTH
- Y/4" — SOLID YELLOW LINE/WIDTH
- BY/4" — BROKEN YELLOW LINE/WIDTH
- DY/4" — DOUBLE SOLID YELLOW LINE/WIDTH
- OVERHEAD LUMINAIRE
- EMERGENCY PRE-EMPTION OPTICAL DETECTOR & FAIL-SAFE INDICATOR

0' 25' 50' 100'
SCALE 1"=25' FEET

County: CUMBERLAND

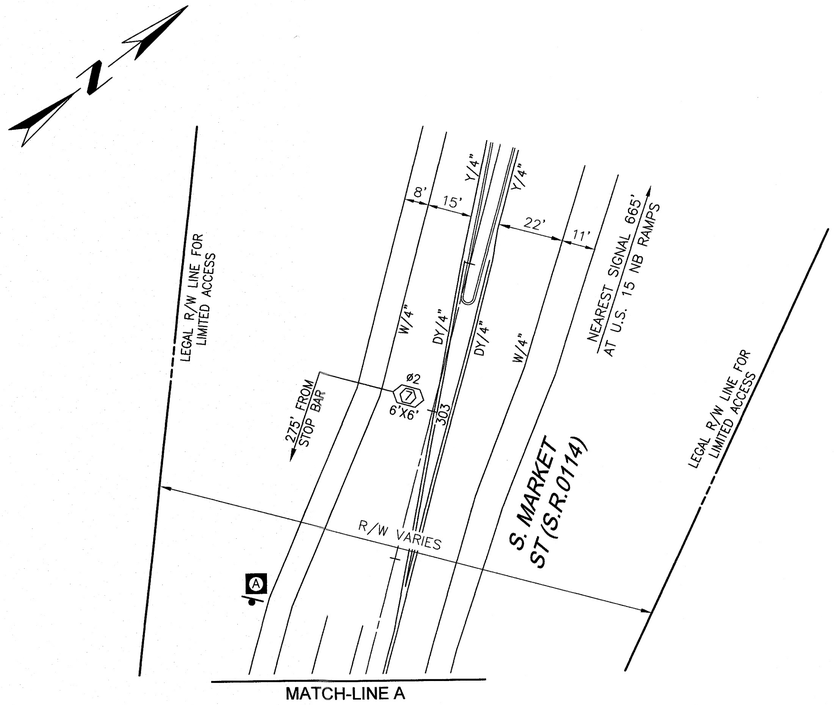
Municipality: UPPER ALLEN TOWNSHIP

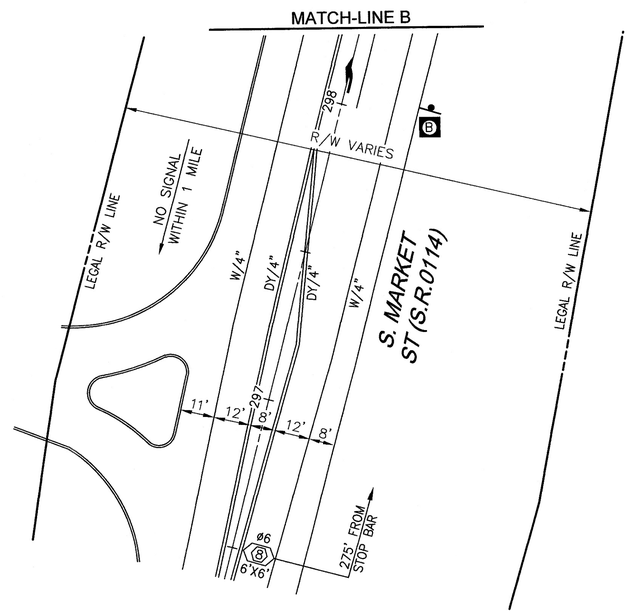
Intersection: S. MARKET STREET (S.R.0114) & KIM ACRES DRIVE (T-614) / BUMBLE BEE HOLLOW ROAD (T-614)

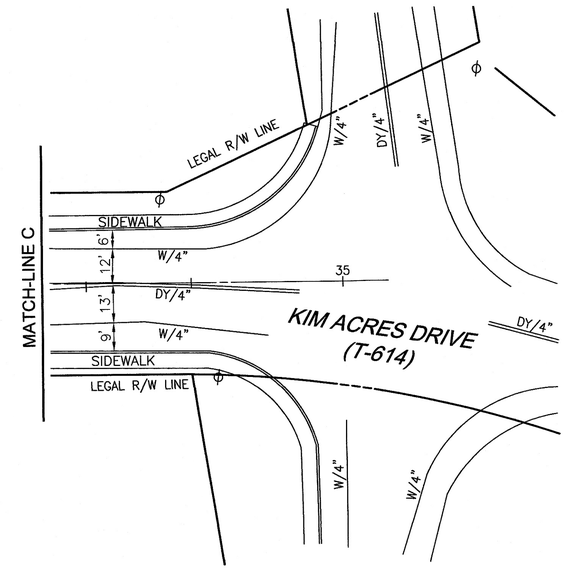
Approved By: _____ Municipal Official — 3/10/2022 Date

Recommended: Matthew S. Clouser Digitally signed by Matthew S. Clouser Date: 2022.03.15 10:17:07 -04'00' — District Traffic Engineer — Date

Permit No. 001909	Sheet 3	of 4	
Date Issued 6-17-93	Date Revised 3-11-22		







0' 25' 50' 100'
SCALE 1"=25' FEET

LEGEND

- MAST ARM
- PEDESTAL
- VEHICULAR SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- SIGN
- VEHICLE DETECTOR
- PEDESTRIAN PUSH BUTTON/SIGN
- CC — CONTROLLER ASSEMBLY
- W/4", W/6", W/24" — SOLID WHITE LINE/WIDTH
- Y/4" — SOLID YELLOW LINE/WIDTH
- BY/4" — BROKEN YELLOW LINE/WIDTH
- DY/4" — DOUBLE SOLID YELLOW LINE/WIDTH
- OVERHEAD LUMINAIRE
- EMERGENCY PRE-EMPTION OPTICAL DETECTOR & FAIL-SAFE INDICATOR

County: CUMBERLAND

Municipality: UPPER ALLEN TOWNSHIP

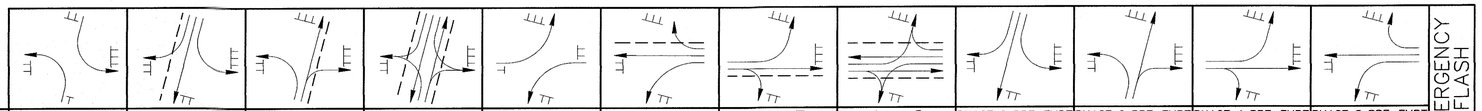
Intersection: S. MARKET STREET (S.R.0114) & KIM ACRES DRIVE (T-614) / BUMBLE BEE HOLLOW ROAD (T-614)

Approved By: [signature] 3/10/2022
Municipal Official — Date

Recommended: Matthew S. Clouser Digitally signed by Matthew S. Clouser Date: 2022.03.15 10:17:24 -04'00'
District Traffic Engineer — Date

Permit No. 001909 Sheet 4 of 4
Date Issued 6-17-93 Date Revised 3-11-22

MOVEMENT, SEQUENCE AND TIMING CHART



PHASE	1 + 5				2 + 5				1 + 6				2 + 6				3 + 7				3 + 8				4 + 7				4 + 8				PHASE 2 PRE-EMPT				PHASE 6 PRE-EMPT				PHASE 4 PRE-EMPT				PHASE 8 PRE-EMPT				EMERGENCY FLASH
INTERVAL / SIGNAL	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	SELECTIVE YELLOW	1	2	3	SELECTIVE YELLOW	1	2	3	SELECTIVE YELLOW	1	2	3	SELECTIVE YELLOW	1	2	3	
1	R	R	R②/G	R②	G	G	Y③/G	R④	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		G	Y③/G	R④		R	R	R		R	R	R		R	R	R		Y
2	R	R	R	R	G	G	Y④	R④	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		G	Y④	R④		R	R	R		R	R	R		R	R	R		Y
3	R	R	R①/G	R①	R	R	R	R	G	G	Y③/G	R④	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		R	R	R		G	Y③/G	R④		R	R	R		R	R	R		Y
4	R	R	R	R	R	R	R	R	G	G	Y④	R④	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		R	R	R		G	Y④	R④		R	R	R		R	R	R		Y
5	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R/G	R/G	R⑥/Y	R⑤	G/G	G/G	Y⑦	R⑧	R	R	R	R	G	G	Y	R		R	R	R		R	R	R		R	R	R		G/G	Y/Y	R		R
6	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	Y⑧	R⑧	R	R	R	R	G	G	Y	R		R	R	R		R	R	R		R	R	R		G	Y	R		R
7	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R/G	R/G	R⑥/Y	R⑥	R	R	R	R	G/G	G/G	Y⑦	R⑧	G	G	Y	R		R	R	R		R	R	R		G/G	Y/Y	R		R	R	R		R
8	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	Y⑧	R⑧	G	G	Y	R		R	R	R		R	R	R		G	Y	R		R	R	R		R
9,10	H	H	H	H	H	H	H	H	M	FH	H	H	M	FH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		OFF
11,12	H	H	H	H	M	FH	H	H	H	H	H	H	M	FH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		OFF
13,14	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	FH	H	H	H	H	H	H	M	FH	H	H		H	H	H		H	H	H		H	H	H		H	H	H		OFF
15,16	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	FH	H	H	M	FH	H	H		H	H	H		H	H	H		H	H	H		H	H	H		OFF
FAIL-SAFE LAMP Ⓐ	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		ON	OFF	OFF		OFF	OFF	OFF		OFF	OFF	OFF		OFF	OFF	OFF		OFF
FAIL-SAFE LAMP Ⓑ	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF		ON	OFF	OFF		OFF	OFF	OFF		OFF	OFF	OFF		OFF
FAIL-SAFE LAMP Ⓒ	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF		OFF	OFF	OFF		ON	OFF	OFF		OFF	OFF	OFF		OFF
FAIL-SAFE LAMP Ⓓ	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		OFF	OFF	OFF		OFF	OFF	OFF		OFF	OFF	OFF		ON	OFF	OFF		OFF
FIXED			3	2			4	2			4	2			4	2			3	3			3	3			3	3			3	3		⑪	⑫	⑬	⑬	⑪	⑫	⑬	⑬	⑪	⑫	⑬	⑬	⑪	⑫	⑬	⑬	
MINIMUM	4				4				4				15				4				4				4				4																				
SEC/ACT													2.5																																				
MAX INT													30																																				
PASSAGE	3				3				3				6				3				3				3				3																				
TBR													30																																				
TTR													20																																				
MIN GAP													3																																				
MAX I	15				15				15				50				15				15				15				40																				
PED *					⑨				⑨				7	20							⑩				⑩				7	33																			
MEMORY	NON-LOCK				NON-LOCK				NON-LOCK				MIN-RECALL				NON-LOCK				NON-LOCK				NON-LOCK				NON-LOCK																				

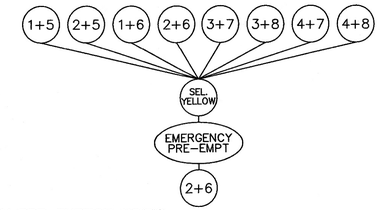
* UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE HAND (H) AT ALL TIMES

M = MAN
FH = FLASHING HAND
H = HAND

SIGNAL OPERATION NOTES

① R/G IF FOLLOWED BY 1+6
② R/G IF FOLLOWED BY 2+5
③ R/G IF FOLLOWED BY 2+6
④ G IF FOLLOWED BY 2+6
⑤ R/G IF FOLLOWED BY 3+8
⑥ R/G IF FOLLOWED BY 4+7
⑦ R/G IF FOLLOWED BY 4+8
⑧ G IF FOLLOWED BY 4+8
⑨ TIMING WILL BE AS SHOWN IN ø2+6. IT MAY TIME OUT IN THIS ø, OR IT MAY BE COMPLETED IN ø2+6.
⑩ TIMING WILL BE AS SHOWN IN ø4+8. IT MAY TIME OUT IN THIS ø, OR IT MAY BE COMPLETED IN ø4+8.
⑪ SELECTIVE YELLOW INTERVAL INCLUDES THE NORMAL ALL RED PHASE INTERVAL
⑫ FOR DURATION OF PRE-EMPTION
⑬ NORMAL YELLOW AND ALL-RED PHASE TIMINGS SHALL BE UTILIZED.

EMERGENCY VEHICLE - PRE-EMPTION SEQUENCE



EMERGENCY PRE-EMPTION NOTES

CONTROLLER TO BE EQUIPPED WITH EMERGENCY PREEMPTION FOR ALL APPROACHES TO THE INTERSECTION WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.

THIS FAIL SAFE DEVICE 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 SIGNAL WHEN ACTIVATED BY EMERGENCY VEHICLE SHALL TERMINATE ALL GREEN INDICATIONS EXCEPT THE GREEN INDICATIONS FOR THE PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE, FOLLOWED BY SELECTIVE CLEARANCES DEPENDENT UPON THE PHASE IN WHICH THE PREEMPTION OCCURS. THE GREEN INDICATIONS FOR THE PREEMPTED PHASE SHALL REMAIN GREEN FOR THE DURATION OF THE SIGNAL PREEMPTION AND RED INDICATIONS DISPLAYED FOR ALL OTHERS PHASES.

FOR WIRELESS PREEMPTION, THE GREEN INTERVAL SHALL BE THE LENGTH OF THE PREEMPTION DETECTOR CALL PLUS SUFFICIENT TIME TO ALLOW THE EMERGENCY VEHICLE TO CLEAR THE INTERSECTION A MINIMUM DISTANCE OF 100' IN ANY DIRECTION.

IF SIGNALS HAVE BEEN ACTUATED BY PEDESTRIAN PUSH BUTTON, AND SIGNAL IS PREEMPTED, 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 PREEMPTION.

IF THE SIGNALS WHEN ACTIVATED BY AN EMERGENCY VEHICLE ARE FLASHING, ALL SIGNALS SHALL REMAIN FLASHING.

UPON COMPLETION OF THE PREEMPTION PHASE, RETURN TO INTERVAL 1 OF PHASE 2+6.

IN EMERGENCY PREEMPTION, NO PRIORITY SHALL BE ESTABLISHED. PREEMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

PREEMPTION LINE-OF-SIGHT TO BE WITHIN PUBLIC RIGHT-OF-WAY.

County:
CUMBERLAND
Municipality:
UPPER ALLEN TOWNSHIP
Intersection:
S. MARKET STREET (S.R.0114) & KIM ACRES DRIVE (T-614) / BUMBLE BEE HOLLOW ROAD (T-614)

Approved By:
Municipal Official — Date 3/10/2022

Recommended:
Matthew S. Clouser Digitally signed by Matthew S. Clouser Date: 2022.03.15 10:17:42 -04'00'
District Traffic Engineer — Date

PERMIT NO. I-0010 SHEET 1 OF 1
DATE ISSUED 6/13/2012 DATE REVISED 08/22/2016

CLOSED LOOP SIGNAL NOTES

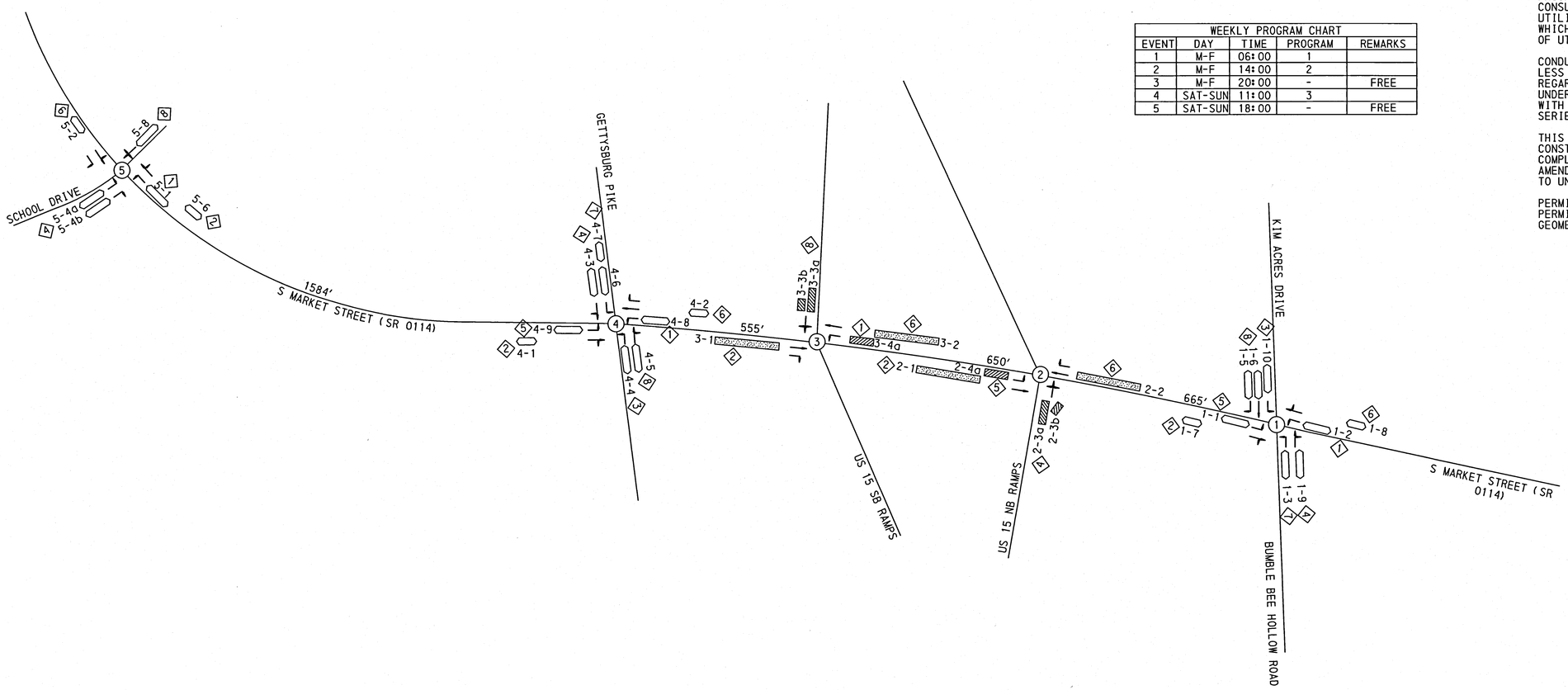
1. PROGRAMS TO BE SELECTED BY CLOSED LOOP SYSTEM (TIME OF DAY) OR TIME BASED COORDINATION BACKUP.
2. OFFSET REFERENCED TO THE BEGINNING OF PHASE 2+6 YELLOW.
3. ACTUAL GREEN TIME DETERMINED BY CYCLE LENGTH.
4. SYSTEM LIMITS: NORTH ON S MARKET STREET TO SCHOOL DRIVE
   SOUTH ON MARKET STREET TO BUMBLE BEE DRIVE
5. PRIMARY COORDINATION: SPREAD SPECTRUM RADIO INTERCONNECT
   SECONDARY COORDINATION: TIME BASED COORDINATION (DEFAULT TO BACKUP TIME BASED COORDINATION)
6. SYSTEM IS DESIGNED FOR THE SYSTEM SOFTWARE:
7. MASTER CONTROLLER LOCATED ON S MARKET STREET (SR 0114) AT US 15 SB RAMPS

LEGEND

- ① - INTERSECTION ADDRESS
- LOOP SENSOR
- ADVANCE RADAR DETECTOR
- STOP BAR RADAR DETECTOR
- 1-1 - INTERSECTION # - DETECTOR #
- ② - PHASE NUMBER

	PROGRAM 1		PHASE								CYCLE	OFFSET
	INTERSECTIONS	FILE	1	2	3	4	5	6	7	8		
1	S MARKET STREET AND BUMBLE BEE HOLLOW ROAD/KIM ACRES DRIVE	T 032	13	38	13	21	13	38	18	16	85	45
2	S MARKET STREET AND US 15 NB RAMPS	T 151		64		21	20	44			85	56
3	S MARKET STREET AND US 15 SB RAMPS	T 152	13	51		21		64			85	0
4	S MARKET STREET AND GETTYSBURG PIKE	T 059	13	38	13	21	13	38	13	21	85	77
5	S MARKET STREET AND SCHOOL DRIVE	T 109	19	41		25		60		25	85	50
	PROGRAM 2											
	INTERSECTIONS											
1	S MARKET STREET AND BUMBLE BEE HOLLOW ROAD/KIM ACRES DRIVE	T 032	14	43	13	20	14	43	13	20	90	22
2	S MARKET STREET AND US 15 NB RAMPS	T 151		69		21	14	55			90	18
3	S MARKET STREET AND US 15 SB RAMPS	T 152	13	45		32		58			90	0
4	S MARKET STREET AND GETTYSBURG PIKE	T 059	15	42	13	20	15	42	13	20	90	59
5	S MARKET STREET AND SCHOOL DRIVE	T 109	13	45		32		58		32	90	39
	PROGRAM 3											
	INTERSECTIONS											
1	S MARKET STREET AND BUMBLE BEE HOLLOW ROAD/KIM ACRES DRIVE	T 032	13	31	13	18	13	31	13	18	75	7
2	S MARKET STREET AND US 15 NB RAMPS	T 151		54		21	14	40			75	7
3	S MARKET STREET AND US 15 SB RAMPS	T 152	13	40		22		53			75	0
4	S MARKET STREET AND GETTYSBURG PIKE	T 059	13	30	13	19	13	30	13	19	75	70
5	S MARKET STREET AND SCHOOL DRIVE	T 109	14	49		12		63		12	75	45

WEEKLY PROGRAM CHART				
EVENT	DAY	TIME	PROGRAM	REMARKS
1	M-F	06:00	1	
2	M-F	14:00	2	
3	M-F	20:00	-	FREE
4	SAT-SUN	11:00	3	
5	SAT-SUN	18:00	-	FREE



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 BY 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.

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, WHERE APPLICABLE.

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.

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.

THIS DRAWING CAN NOT 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, LATEST EDITION.

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

COUNTY: CUMBERLAND

MUNICIPALITY: UPPER ALLEN

INTERSECTION: SOUTH MARKET STREET (S.R. 0114) INTERCONNECT SYSTEM PLAN

REVIEWED: Lou Fogelsonger — MUNICIPAL OFFICIAL — DATE 8/3/16

RECOMMENDED: Jason C. Burley — DISTRICT TRAFFIC ENGINEER — DATE 08/22/16

APPENDIX H

Conflict Factor Calculations

Left Turn Signalization - Conflict Factor Calculation Sheets
ModWash
Upper Allen Township, Cumberland County, PA

REQUIRED CONFLICT FACTOR

Protected/Permitted Phasing	
Without separate turning lane:	
1 opposing lane	35,000
2 opposing lanes	45,000
With separate turning lane	
1 opposing lane	50,000
2 opposing lanes	65,000
Protected/Prohibited Phasing	
With separate turning lane	
1 opposing lane	67,500
2 opposing lanes	90,000

CONDITION	PEAK	DIRECTION	EXCLUSIVE LANE?	**LEFT TURN VOLUME**	CYCLE	CYCLES/HR	LEFT TURNS/ CYCLE	OPPOSING THROUGH	OPPOSING RIGHT	**TOTAL OPPOSING**	**CONFLICT FACTOR**	# OPPOSING LANES	**PHASING**
Intersection of Atherton Street (S.R. 3014) and Woodycrest Street													
2023	AM	NB	Y	**196**	85	42	5	38	188	**226**	**44,296**	2	**Perm**
	PM	NB	Y	**188**	90	40	5	47	138	**185**	**34,780**	2	**Perm**
	SAT	NB	Y	**190**	75	48	4	31	116	**147**	**27,930**	2	**Perm**
	AM	SB	Y	**13**	85	42	0	14	17	**31**	**403**	1	**Perm**
	PM	SB	Y	**13**	90	40	0	60	51	**111**	**1,443**	1	**Perm**
	SAT	SB	Y	**13**	75	48	0	41	34	**75**	**975**	1	**Perm**
	AM	EB	Y	**89**	85	42	2	484	5	**489**	**43,521**	1	**Perm**
	PM	EB	Y	**145**	90	40	4	268	5	**273**	**39,585**	1	**Perm**
	SAT	EB	Y	**93**	75	48	2	328	7	**335**	**31,155**	1	**Perm**
	AM	WB	Y	**29**	85	42	1	162	165	**327**	**9,483**	2	**Perm**
	PM	WB	Y	**31**	90	40	1	423	223	**646**	**20,026**	2	**Perm**
	SAT	WB	Y	**33**	75	48	1	319	216	**535**	**17,655**	2	**Perm**
Intersection of Atherton Street (S.R. 3014) and Woodycrest Street													
2024 Without Dev	AM	NB	Y	**197**	85	42	5	38	189	**227**	**44,719**	2	**Perm**
	PM	NB	Y	**189**	90	40	5	47	139	**186**	**35,154**	2	**Perm**
	SAT	NB	Y	**191**	75	48	4	31	117	**148**	**28,268**	2	**Perm**
	AM	SB	Y	**13**	85	42	0	14	17	**31**	**403**	1	**Perm**
	PM	SB	Y	**13**	90	40	0	60	51	**111**	**1,443**	1	**Perm**
	SAT	SB	Y	**13**	75	48	0	41	34	**75**	**975**	1	**Perm**
	AM	EB	Y	**90**	85	42	2	487	5	**492**	**44,280**	1	**Perm**
	PM	EB	Y	**146**	90	40	4	270	5	**275**	**40,150**	1	**Perm**
	SAT	EB	Y	**94**	75	48	2	330	7	**337**	**31,678**	1	**Perm**
	AM	WB	Y	**29**	85	42	1	163	166	**329**	**9,541**	2	**Perm**
	PM	WB	Y	**31**	90	40	1	425	224	**649**	**20,119**	2	**Perm**
	SAT	WB	Y	**33**	75	48	1	321	217	**538**	**17,754**	2	**Perm**
Intersection of Atherton Street (S.R. 3014) and Woodycrest Street													
2029 Without Dev	AM	NB	Y	**203**	85	42	5	39	195	**234**	**47,502**	2	**Perm**
	PM	NB	Y	**195**	90	40	5	49	143	**192**	**37,440**	2	**Perm**
	SAT	NB	Y	**197**	75	48	4	32	120	**152**	**29,944**	2	**Perm**
	AM	SB	Y	**13**	85	42	0	15	18	**33**	**429**	1	**Perm**
	PM	SB	Y	**13**	90	40	0	62	53	**115**	**1,495**	1	**Perm**
	SAT	SB	Y	**13**	75	48	0	42	35	**77**	**1,001**	1	**Perm**
	AM	EB	Y	**92**	85	42	2	501	5	**506**	**46,552**	1	**Perm**
	PM	EB	Y	**150**	90	40	4	278	5	**283**	**42,450**	1	**Perm**
	SAT	EB	Y	**96**	75	48	2	340	7	**347**	**33,312**	1	**Perm**
	AM	WB	Y	**30**	85	42	1	168	171	**339**	**10,170**	2	**Perm**
	PM	WB	Y	**32**	90	40	1	438	231	**669**	**21,408**	2	**Perm**
	SAT	WB	Y	**34**	75	48	1	330	224	**554**	**18,836**	2	**Perm**
Intersection of Atherton Street (S.R. 3014) and Woodycrest Street													
2024 Following Dev	AM	NB	Y	**197**	85	42	5	41	196	**237**	**46,689**	2	**Perm**
	PM	NB	Y	**189**	90	40	5	55	157	**212**	**40,068**	2	**Perm**
	SAT	NB	Y	**191**	75	48	4	44	149	**193**	**36,863**	2	**Perm**
	AM	SB	Y	**17**	85	42	0	18	17	**35**	**595**	1	**Perm**
	PM	SB	Y	**24**	90	40	1	68	51	**119**	**2,856**	1	**Perm**
	SAT	SB	Y	**31**	75	48	1	55	34	**89**	**2,759**	1	**Perm**
	AM	EB	Y	**99**	85	42	2	487	10	**497**	**49,203**	1	**Perm**
	PM	EB	Y	**165**	90	40	4	270	16	**286**	**47,190**	1	**Perm**
	SAT	EB	Y	**128**	75	48	3	330	27	**357**	**45,696**	1	**Perm**
	AM	WB	Y	**29**	85	42	1	163	166	**329**	**9,541**	2	**Perm**
	PM	WB	Y	**31**	90	40	1	425	224	**649**	**20,119**	2	**Perm**
	SAT	WB	Y	**33**	75	48	1	321	217	**538**	**17,754**	2	**Perm**
Intersection of Atherton Street (S.R. 3014) and Woodycrest Street													
2029 Following Dev	AM	NB	Y	**203**	85	42	5	42	202	**244**	**49,532**	2	**Perm**
	PM	NB	Y	**195**	90	40	5	57	161	**218**	**42,510**	2	**Perm**
	SAT	NB	Y	**197**	75	48	4	45	152	**197**	**38,809**	2	**Perm**
	AM	SB	Y	**17**	85	42	0	19	18	**37**	**629**	1	**Perm**
	PM	SB	Y	**24**	90	40	1	70	53	**123**	**2,952**	1	**Perm**
	SAT	SB	Y	**31**	75	48	1	56	35	**91**	**2,821**	1	**Perm**
	AM	EB	Y	**101**	85	42	2	501	10	**511**	**51,611**	1	**Prot/Perm**
	PM	EB	Y	**169**	90	40	4	278	16	**294**	**49,686**	1	**Perm**
	SAT	EB	Y	**130**	75	48	3	340	27	**367**	**47,710**	1	**Perm**
	AM	WB	Y	**30**	85	42	1	168	171	**339**	**10,170**	2	**Perm**
	PM	WB	Y	**32**	90	40	1	438	231	**669**	**21,408**	2	**Perm**
	SAT	WB	Y	**34**	75	48	1	330	224	**554**	**18,836**	2	**Perm**

APPENDIX I

Capacity Calculations – Forecasted 2024 Conditions Without Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	163	166	29	487	5	197	14	17	13	38	189
Future Volume (veh/h)	90	163	166	29	487	5	197	14	17	13	38	189
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1738	1710	1738	1794	1766	1794	1780	1807	1752	1682	1794	1808
Adj Flow Rate, veh/h	100	181	184	32	541	6	219	16	19	14	42	210
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, %	4	6	4	0	2	0	4	7	6	8	0	4
Cap, veh/h	345	793	683	549	770	9	439	182	216	290	232	198
Arrive On Green	0.07	0.46	0.46	0.04	0.44	0.43	0.14	0.24	0.23	0.03	0.13	0.13
Sat Flow, veh/h	1655	1710	1473	1709	1744	19	1696	753	894	1602	1794	1532
Grp Volume(v), veh/h	100	181	184	32	0	547	219	0	35	14	42	210
Grp Sat Flow(s),veh/h/ln	1655	1710	1473	1709	0	1763	1696	0	1646	1602	1794	1532
Q Serve(g_s), s	2.7	5.4	6.5	0.8	0.0	21.4	8.9	0.0	1.4	0.6	1.8	11.0
Cycle Q Clear(g_c), s	2.7	5.4	6.5	0.8	0.0	21.4	8.9	0.0	1.4	0.6	1.8	11.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	345	793	683	549	0	779	439	0	398	290	232	198
V/C Ratio(X)	0.29	0.23	0.27	0.06	0.00	0.70	0.50	0.00	0.09	0.05	0.18	1.06
Avail Cap(c_a), veh/h	412	793	683	656	0	779	461	0	398	395	232	198
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.1	13.7	14.0	11.6	0.0	19.2	24.5	0.0	25.2	30.4	33.0	37.0
Incr Delay (d2), s/veh	0.5	0.7	1.0	0.0	0.0	5.3	0.9	0.0	0.1	0.1	0.4	80.4
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.0	2.3	0.3	0.0	8.9	3.6	0.0	0.6	0.2	0.8	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.5	14.3	14.9	11.6	0.0	24.5	25.4	0.0	25.3	30.5	33.4	117.4
LnGrp LOS	B	B	B	B	A	C	C	A	C	C	C	F
Approach Vol, veh/h		465			579			254			266	
Approach Delay, s/veh		14.6			23.8			25.3			99.6	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	44.4	16.9	16.0	9.5	42.5	7.4	25.5
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	32.0	12.0	10.0	8.0	32.0	7.0	15.0
Max Q Clear Time (g_c+I1), s	2.8	8.5	10.9	13.0	4.7	23.4	2.6	3.4
Green Ext Time (p_c), s	0.0	8.2	0.1	0.0	0.1	5.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	34.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	49	16	4	10	42	61	4	1	171	5
Future Vol, veh/h	2	1	49	16	4	10	42	61	4	1	171	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	6	6	0	0	7	0	25	0	2	0
Mvmt Flow	2	1	56	18	5	11	48	70	5	1	197	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	379	373	200	400	374	73	203	0	0	75	0	0
Stage 1	202	202	-	169	169	-	-	-	-	-	-	-
Stage 2	177	171	-	231	205	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.06	7.56	6.9	6.4	4.4	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.2	3.1	4	3.1	3.1	-	-	3	-	-
Pot Cap-1 Maneuver	691	584	877	593	537	1052	988	-	-	1132	-	-
Stage 1	947	755	-	917	748	-	-	-	-	-	-	-
Stage 2	975	776	-	841	719	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	652	554	877	532	509	1052	988	-	-	1132	-	-
Mov Cap-2 Maneuver	652	554	-	532	509	-	-	-	-	-	-	-
Stage 1	899	754	-	870	710	-	-	-	-	-	-	-
Stage 2	909	736	-	785	718	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	11	3.5	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	988	-	-	856	632	1132	-	-
HCM Lane V/C Ratio	0.049	-	-	0.07	0.055	0.001	-	-
HCM Control Delay (s)	8.8	0	-	9.5	11	8.2	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	146	425	224	31	270	5	189	60	51	13	47	139
Future Volume (veh/h)	146	425	224	31	270	5	189	60	51	13	47	139
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1780	1780	1766	1794	1780	1794	1809	1881	1837	1682	1794	1866
Adj Flow Rate, veh/h	157	457	241	33	290	5	203	65	55	14	51	149
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	2	0	1	0	2	2	0	8	0	0
Cap, veh/h	618	945	795	417	868	15	349	177	150	269	227	200
Arrive On Green	0.08	0.53	0.53	0.04	0.50	0.49	0.09	0.19	0.18	0.03	0.13	0.13
Sat Flow, veh/h	1696	1780	1497	1709	1745	30	1723	941	796	1602	1794	1582
Grp Volume(v), veh/h	157	457	241	33	0	295	203	0	120	14	51	149
Grp Sat Flow(s),veh/h/ln	1696	1780	1497	1709	0	1775	1723	0	1738	1602	1794	1582
Q Serve(g_s), s	3.8	14.6	8.1	0.8	0.0	9.0	8.0	0.0	5.4	0.7	2.3	8.2
Cycle Q Clear(g_c), s	3.8	14.6	8.1	0.8	0.0	9.0	8.0	0.0	5.4	0.7	2.3	8.2
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.46	1.00		1.00
Lane Grp Cap(c), veh/h	618	945	795	417	0	883	349	0	327	269	227	200
V/C Ratio(X)	0.25	0.48	0.30	0.08	0.00	0.33	0.58	0.00	0.37	0.05	0.22	0.74
Avail Cap(c_a), veh/h	678	945	795	534	0	883	349	0	327	367	299	264
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	13.3	11.8	10.5	0.0	13.6	30.3	0.0	32.1	32.5	35.3	37.9
Incr Delay (d2), s/veh	0.2	1.8	1.0	0.1	0.0	1.0	2.4	0.0	0.7	0.1	0.5	7.8
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.6	2.8	0.3	0.0	3.5	4.0	0.0	2.4	0.3	1.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	15.1	12.8	10.6	0.0	14.7	32.7	0.0	32.8	32.5	35.8	45.6
LnGrp LOS	A	B	B	B	A	B	C	A	C	C	D	D
Approach Vol, veh/h		855			328			323			214	
Approach Delay, s/veh		13.4			14.2			32.7			42.4	
Approach LOS		B			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	52.8	13.0	16.4	10.8	49.8	7.5	21.9
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	37.0	7.0	14.0	9.0	37.0	7.0	14.0
Max Q Clear Time (g_c+I1), s	2.8	16.6	10.0	10.2	5.8	11.0	2.7	7.4
Green Ext Time (p_c), s	0.0	13.6	0.0	0.2	0.1	7.1	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	60	21	2	12	32	147	37	8	131	0
Future Vol, veh/h	2	2	60	21	2	12	32	147	37	8	131	0
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	2	2	69	24	2	14	37	169	43	9	151	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	442	456	153	473	435	192	151	0	0	213	0	0
Stage 1	169	169	-	266	266	-	-	-	-	-	-	-
Stage 2	273	287	-	207	169	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	630	530	960	542	493	896	1066	-	-	1015	-	-
Stage 1	984	777	-	828	672	-	-	-	-	-	-	-
Stage 2	871	700	-	899	748	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	595	503	958	481	468	895	1066	-	-	1014	-	-
Mov Cap-2 Maneuver	595	503	-	481	468	-	-	-	-	-	-	-
Stage 1	945	769	-	794	644	-	-	-	-	-	-	-
Stage 2	820	671	-	821	741	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	11.8	1.3	0.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1066	-	-	915	571	1014	-	-
HCM Lane V/C Ratio	0.035	-	-	0.08	0.07	0.009	-	-
HCM Control Delay (s)	8.5	0	-	9.3	11.8	8.6	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	321	217	33	330	7	191	41	34	13	31	117
Future Volume (veh/h)	94	321	217	33	330	7	191	41	34	13	31	117
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1794	1780	1794	1794	1780	1794	1823	1911	1837	1794	1794	1852
Adj Flow Rate, veh/h	99	338	228	35	347	7	201	43	36	14	33	123
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	0	1	0	1	0	0	0	0	1
Cap, veh/h	528	846	723	463	785	16	402	186	156	296	210	184
Arrive On Green	0.07	0.48	0.48	0.05	0.45	0.44	0.11	0.19	0.18	0.03	0.12	0.12
Sat Flow, veh/h	1709	1780	1521	1709	1739	35	1736	961	805	1709	1794	1569
Grp Volume(v), veh/h	99	338	228	35	0	354	201	0	79	14	33	123
Grp Sat Flow(s),veh/h/ln	1709	1780	1521	1709	0	1774	1736	0	1766	1709	1794	1569
Q Serve(g_s), s	2.2	9.2	6.9	0.8	0.0	10.3	7.4	0.0	2.8	0.5	1.2	5.6
Cycle Q Clear(g_c), s	2.2	9.2	6.9	0.8	0.0	10.3	7.4	0.0	2.8	0.5	1.2	5.6
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.46	1.00		1.00
Lane Grp Cap(c), veh/h	528	846	723	463	0	801	402	0	342	296	210	184
V/C Ratio(X)	0.19	0.40	0.32	0.08	0.00	0.44	0.50	0.00	0.23	0.05	0.16	0.67
Avail Cap(c_a), veh/h	611	846	723	587	0	801	402	0	342	426	311	272
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.8	12.8	12.2	10.0	0.0	14.1	23.9	0.0	25.7	27.5	29.8	31.7
Incr Delay (d2), s/veh	0.2	1.4	1.1	0.1	0.0	1.8	1.0	0.0	0.3	0.1	0.3	4.2
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(50%),veh/ln	0.7	3.5	2.4	0.3	0.0	4.0	3.0	0.0	1.2	0.2	0.5	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.0	14.2	13.3	10.1	0.0	15.9	24.9	0.0	26.1	27.6	30.1	35.9
LnGrp LOS	B	B	B	B	A	B	C	A	C	C	C	D
Approach Vol, veh/h		665			389			280			170	
Approach Delay, s/veh		13.2			15.3			25.2			34.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	40.6	13.0	13.8	9.4	38.9	7.3	19.5
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	25.0	7.0	12.0	8.0	25.0	7.0	12.0
Max Q Clear Time (g_c+I1), s	2.8	11.2	9.4	7.6	4.2	12.3	2.5	4.8
Green Ext Time (p_c), s	0.0	8.4	0.0	0.2	0.1	5.4	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	18.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	3	45	21	2	7	31	74	26	3	90	1
Future Vol, veh/h	0	3	45	21	2	7	31	74	26	3	90	1
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	2	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	3	51	24	2	8	35	83	29	3	101	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	282	290	105	306	276	99	102	0	0	112	0	0
Stage 1	108	108	-	168	168	-	-	-	-	-	-	-
Stage 2	174	182	-	138	108	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.02	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	797	644	1019	719	616	1016	1108	-	-	1099	-	-
Stage 1	1058	820	-	949	749	-	-	-	-	-	-	-
Stage 2	979	768	-	990	800	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	765	620	1015	659	593	1015	1108	-	-	1099	-	-
Mov Cap-2 Maneuver	765	620	-	659	593	-	-	-	-	-	-	-
Stage 1	1022	818	-	917	724	-	-	-	-	-	-	-
Stage 2	934	742	-	930	798	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	10.3	2	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1108	-	-	976	712	1099	-	-
HCM Lane V/C Ratio	0.031	-	-	0.055	0.047	0.003	-	-
HCM Control Delay (s)	8.4	0	-	8.9	10.3	8.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

APPENDIX J

Capacity Calculations – Forecasted 2029 Conditions Without Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	168	171	30	501	5	203	15	18	13	39	195
Future Volume (veh/h)	92	168	171	30	501	5	203	15	18	13	39	195
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1738	1710	1738	1794	1766	1794	1780	1807	1752	1682	1794	1808
Adj Flow Rate, veh/h	102	187	190	33	557	6	226	17	20	14	43	217
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, %	4	6	4	0	2	0	4	7	6	8	0	4
Cap, veh/h	330	786	677	539	764	8	443	185	218	290	232	198
Arrive On Green	0.07	0.46	0.46	0.04	0.44	0.43	0.14	0.24	0.23	0.03	0.13	0.13
Sat Flow, veh/h	1655	1710	1473	1709	1744	19	1696	757	890	1602	1794	1532
Grp Volume(v), veh/h	102	187	190	33	0	563	226	0	37	14	43	217
Grp Sat Flow(s),veh/h/ln	1655	1710	1473	1709	0	1763	1696	0	1647	1602	1794	1532
Q Serve(g_s), s	2.8	5.6	6.8	0.9	0.0	22.4	9.2	0.0	1.5	0.6	1.8	11.0
Cycle Q Clear(g_c), s	2.8	5.6	6.8	0.9	0.0	22.4	9.2	0.0	1.5	0.6	1.8	11.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	330	786	677	539	0	772	443	0	403	290	232	198
V/C Ratio(X)	0.31	0.24	0.28	0.06	0.00	0.73	0.51	0.00	0.09	0.05	0.19	1.09
Avail Cap(c_a), veh/h	397	786	677	645	0	772	459	0	403	395	232	198
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.6	13.9	14.2	11.7	0.0	19.7	24.4	0.0	25.0	30.4	33.0	37.0
Incr Delay (d2), s/veh	0.5	0.7	1.0	0.0	0.0	6.0	0.9	0.0	0.1	0.1	0.4	91.4
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	2.1	2.4	0.3	0.0	9.5	3.7	0.0	0.6	0.2	0.8	9.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	14.6	15.3	11.8	0.0	25.7	25.3	0.0	25.1	30.5	33.4	128.4
LnGrp LOS	B	B	B	B	A	C	C	A	C	C	C	F
Approach Vol, veh/h		479			596			263			274	
Approach Delay, s/veh		15.0			24.9			25.3			108.5	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	44.1	17.2	16.0	9.6	42.2	7.4	25.8
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	32.0	12.0	10.0	8.0	32.0	7.0	15.0
Max Q Clear Time (g_c+I1), s	2.9	8.8	11.2	13.0	4.8	24.4	2.6	3.5
Green Ext Time (p_c), s	0.0	8.4	0.1	0.0	0.1	5.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	36.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	51	17	4	10	44	63	4	1	176	5
Future Vol, veh/h	2	1	51	17	4	10	44	63	4	1	176	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	6	6	0	0	7	0	25	0	2	0
Mvmt Flow	2	1	59	20	5	11	51	72	5	1	202	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	392	386	205	414	387	75	208	0	0	77	0	0
Stage 1	207	207	-	177	177	-	-	-	-	-	-	-
Stage 2	185	179	-	237	210	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.06	7.56	6.9	6.4	4.4	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.2	3.1	4	3.1	3.1	-	-	3	-	-
Pot Cap-1 Maneuver	678	575	871	579	527	1050	984	-	-	1130	-	-
Stage 1	941	751	-	907	742	-	-	-	-	-	-	-
Stage 2	966	770	-	834	715	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	638	543	871	516	498	1050	984	-	-	1130	-	-
Mov Cap-2 Maneuver	638	543	-	516	498	-	-	-	-	-	-	-
Stage 1	890	750	-	858	702	-	-	-	-	-	-	-
Stage 2	898	728	-	776	714	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	11.2	3.5	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	984	-	-	850	614	1130	-	-
HCM Lane V/C Ratio	0.051	-	-	0.073	0.058	0.001	-	-
HCM Control Delay (s)	8.9	0	-	9.6	11.2	8.2	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	438	231	32	278	5	195	62	53	13	49	143
Future Volume (veh/h)	150	438	231	32	278	5	195	62	53	13	49	143
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1780	1780	1766	1794	1780	1794	1809	1881	1837	1682	1794	1866
Adj Flow Rate, veh/h	161	471	248	34	299	5	210	67	57	14	53	154
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	2	0	1	0	2	2	0	8	0	0
Cap, veh/h	608	939	789	405	861	14	350	179	153	271	233	205
Arrive On Green	0.08	0.53	0.53	0.04	0.49	0.48	0.09	0.19	0.18	0.03	0.13	0.13
Sat Flow, veh/h	1696	1780	1497	1709	1746	29	1723	939	799	1602	1794	1582
Grp Volume(v), veh/h	161	471	248	34	0	304	210	0	124	14	53	154
Grp Sat Flow(s),veh/h/ln	1696	1780	1497	1709	0	1775	1723	0	1737	1602	1794	1582
Q Serve(g_s), s	3.9	15.3	8.4	0.8	0.0	9.4	8.0	0.0	5.6	0.7	2.4	8.4
Cycle Q Clear(g_c), s	3.9	15.3	8.4	0.8	0.0	9.4	8.0	0.0	5.6	0.7	2.4	8.4
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.46	1.00		1.00
Lane Grp Cap(c), veh/h	608	939	789	405	0	875	350	0	332	271	233	205
V/C Ratio(X)	0.26	0.50	0.31	0.08	0.00	0.35	0.60	0.00	0.37	0.05	0.23	0.75
Avail Cap(c_a), veh/h	666	939	789	521	0	875	350	0	332	369	299	264
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.4	13.7	12.1	10.8	0.0	14.0	30.4	0.0	31.9	32.2	35.1	37.8
Incr Delay (d2), s/veh	0.2	1.9	1.0	0.1	0.0	1.1	2.8	0.0	0.7	0.1	0.5	8.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	5.9	2.9	0.3	0.0	3.7	0.7	0.0	2.4	0.3	1.1	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	15.6	13.1	10.9	0.0	15.1	33.2	0.0	32.6	32.3	35.6	46.3
LnGrp LOS	A	B	B	B	A	B	C	A	C	C	D	D
Approach Vol, veh/h		880			338			334			221	
Approach Delay, s/veh		13.8			14.6			33.0			42.8	
Approach LOS		B			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.9	52.5	13.0	16.7	11.0	49.4	7.5	22.2
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	37.0	7.0	14.0	9.0	37.0	7.0	14.0
Max Q Clear Time (g_c+I1), s	2.8	17.3	10.0	10.4	5.9	11.4	2.7	7.6
Green Ext Time (p_c), s	0.0	13.6	0.0	0.2	0.1	7.2	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	21.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	62	22	2	12	33	151	38	8	135	0
Future Vol, veh/h	2	2	62	22	2	12	33	151	38	8	135	0
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	2	2	71	25	2	14	38	174	44	9	155	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	453	468	157	485	446	197	155	0	0	219	0	0
Stage 1	173	173	-	273	273	-	-	-	-	-	-	-
Stage 2	280	295	-	212	173	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	620	522	956	531	485	890	1063	-	-	1011	-	-
Stage 1	980	774	-	820	667	-	-	-	-	-	-	-
Stage 2	864	695	-	893	745	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	585	495	954	469	460	889	1063	-	-	1010	-	-
Mov Cap-2 Maneuver	585	495	-	469	460	-	-	-	-	-	-	-
Stage 1	940	766	-	786	639	-	-	-	-	-	-	-
Stage 2	813	666	-	814	738	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	12	1.3	0.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1063	-	-	911	556	1010	-	-
HCM Lane V/C Ratio	0.036	-	-	0.083	0.074	0.009	-	-
HCM Control Delay (s)	8.5	0	-	9.3	12	8.6	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	330	224	34	340	7	197	42	35	13	32	120
Future Volume (veh/h)	96	330	224	34	340	7	197	42	35	13	32	120
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1794	1780	1794	1794	1780	1794	1823	1911	1837	1794	1794	1852
Adj Flow Rate, veh/h	101	347	236	36	358	7	207	44	37	14	34	126
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	0	1	0	1	0	0	0	0	1
Cap, veh/h	518	841	719	454	782	15	403	187	158	298	213	187
Arrive On Green	0.07	0.47	0.47	0.05	0.45	0.44	0.11	0.20	0.18	0.03	0.12	0.12
Sat Flow, veh/h	1709	1780	1521	1709	1740	34	1736	959	806	1709	1794	1569
Grp Volume(v), veh/h	101	347	236	36	0	365	207	0	81	14	34	126
Grp Sat Flow(s),veh/h/ln	1709	1780	1521	1709	0	1774	1736	0	1766	1709	1794	1569
Q Serve(g_s), s	2.3	9.6	7.3	0.8	0.0	10.7	7.6	0.0	2.9	0.5	1.3	5.8
Cycle Q Clear(g_c), s	2.3	9.6	7.3	0.8	0.0	10.7	7.6	0.0	2.9	0.5	1.3	5.8
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.46	1.00		1.00
Lane Grp Cap(c), veh/h	518	841	719	454	0	797	403	0	345	298	213	187
V/C Ratio(X)	0.20	0.41	0.33	0.08	0.00	0.46	0.51	0.00	0.23	0.05	0.16	0.68
Avail Cap(c_a), veh/h	600	841	719	576	0	797	403	0	345	429	311	272
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.0	13.0	12.3	10.1	0.0	14.3	23.9	0.0	25.6	27.4	29.7	31.7
Incr Delay (d2), s/veh	0.2	1.5	1.2	0.1	0.0	1.9	1.1	0.0	0.3	0.1	0.3	4.2
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(50%),veh/ln	0.7	3.6	2.6	0.3	0.0	4.2	3.1	0.0	1.2	0.2	0.6	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.2	14.5	13.6	10.2	0.0	16.2	25.0	0.0	26.0	27.4	30.0	35.9
LnGrp LOS	B	B	B	B	A	B	C	A	C	C	C	D
Approach Vol, veh/h		684			401			288			174	
Approach Delay, s/veh		13.5			15.7			25.3			34.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	40.4	13.0	13.9	9.4	38.7	7.3	19.7
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	25.0	7.0	12.0	8.0	25.0	7.0	12.0
Max Q Clear Time (g_c+I1), s	2.8	11.6	9.6	7.8	4.3	12.7	2.5	4.9
Green Ext Time (p_c), s	0.0	8.5	0.0	0.2	0.1	5.4	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	3	47	22	2	7	32	77	27	3	92	1
Future Vol, veh/h	0	3	47	22	2	7	32	77	27	3	92	1
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	2	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	3	53	25	2	8	36	87	30	3	103	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	290	299	107	315	284	103	104	0	0	117	0	0
Stage 1	110	110	-	174	174	-	-	-	-	-	-	-
Stage 2	180	189	-	141	110	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.02	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	787	637	1016	708	609	1010	1106	-	-	1095	-	-
Stage 1	1055	818	-	942	744	-	-	-	-	-	-	-
Stage 2	972	763	-	986	798	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	755	613	1012	646	586	1009	1106	-	-	1095	-	-
Mov Cap-2 Maneuver	755	613	-	646	586	-	-	-	-	-	-	-
Stage 1	1018	816	-	909	718	-	-	-	-	-	-	-
Stage 2	927	736	-	924	796	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	10.4	2	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1106	-	-	974	698	1095	-	-
HCM Lane V/C Ratio	0.033	-	-	0.058	0.05	0.003	-	-
HCM Control Delay (s)	8.4	0	-	8.9	10.4	8.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-	-

APPENDIX K

Trip Generation Calculations from Existing ModWash Facilities Study

Trip Generation Rate Calculations -ModWash

Trip Generation of 4 Existing Sites:

Corapolis, PA
548 Carnot Road, Coraopolis, PA 15108

1 Wash Bay

TRIPS				DISTRIBUTION			
Period	**IN**	**OUT**	**TOTAL**	**Period**	**IN**	**OUT**	**TOTAL**
AM Peak Hour	16	9	25	**AM Peak Hour**	64%	36%	100%
PM Peak Hour	23	20	43	**PM Peak Hour**	53%	47%	100%
SAT Peak Hour	71	81	152	**SAT Peak Hour**	47%	53%	100%

Erie, PA
4234 Buffalo Road, Erie, PA 16510

1 Wash Bay

TRIPS				DISTRIBUTION			
Period	**IN**	**OUT**	**TOTAL**	**Period**	**IN**	**OUT**	**TOTAL**
AM Peak Hour	23	20	43	**AM Peak Hour**	53%	47%	100%
PM Peak Hour	60	54	114	**PM Peak Hour**	53%	47%	100%
SAT Peak Hour	82	65	147	**SAT Peak Hour**	56%	44%	100%

Hermitage, PA
2945 East State Street, Hermitage, PA 16148

1 Wash Bay

TRIPS				DISTRIBUTION			
Period	**IN**	**OUT**	**TOTAL**	**Period**	**IN**	**OUT**	**TOTAL**
AM Peak Hour	28	22	50	**AM Peak Hour**	56%	44%	100%
PM Peak Hour	55	61	116	**PM Peak Hour**	47%	53%	100%
SAT Peak Hour	84	75	159	**SAT Peak Hour**	53%	47%	100%

Washington, PA
1410 Washington Road, Washington, PA 15301

1 Wash Bay

TRIPS				DISTRIBUTION			
Period	**IN**	**OUT**	**TOTAL**	**Period**	**IN**	**OUT**	**TOTAL**
AM Peak Hour	16	15	31	**AM Peak Hour**	52%	48%	100%
PM Peak Hour	39	37	76	**PM Peak Hour**	51%	49%	100%
SAT Peak Hour	74	71	145	**SAT Peak Hour**	51%	49%	100%

AVERAGE TRIP PER WASH TUNNEL		**AVERAGE DISTRIBUTION**			
Period	**Trips/Tunnel**	**Period**	**IN**	**OUT**	**TOTAL**
AM Peak Hour	37.25	**AM Peak Hour**	56%	44%	100%
PM Peak Hour	87.25	**PM Peak Hour**	51%	49%	100%
SAT Peak Hour	150.75	**SAT Peak Hour**	52%	48%	100%

Trip Generation Weighted Average Rate Calcs - ModWash

Trip Gen based on Car Wash Stalls

AM PEAK HOUR

Site	# Wash Stalls	Number of Trips	Trip Rate	Site Trip Rate minus Weighted Average Rate		Weight	Weight * Value Squared
				Value	Value Squared		
Corapolis, PA	1	25	25.00	-12.25	150.06	0.25	37.52
Erie, PA	1	43	43.00	5.75	33.06	0.25	8.27
Hermitage, PA	1	50	50.00	12.75	162.56	0.25	40.64
Washington, PA	1	31	31.00	-6.25	39.06	0.25	9.77
Total	4	149	**37.25**			Variance	96.2
						Factor (4/3)	1.333333333
Weighted Average	**37.25**					Weighted Sample Variance	128.27
						Weighted Standard Deviation	11.33

PM PEAK HOUR

Site	# Wash Stalls	Number of Trips	Trip Rate	Site Trip Rate minus Weighted Average Rate		Weight	Weight * Value Squared
				Value	Value Squared		
Corapolis, PA	1	43	43.00	-44.25	1958.06	0.25	489.52
Erie, PA	1	114	114.00	26.75	715.56	0.25	178.89
Hermitage, PA	1	116	116.00	28.75	826.56	0.25	206.64
Washington, PA	1	76	76.00	-11.25	126.56	0.25	31.64
Total	4	349	**87.25**			Variance	906.69
						Factor (4/3)	1.333333333
Weighted Average	**87.25**					Weighted Sample Variance	1208.92
						Weighted Standard Deviation	34.77

SAT PEAK HOUR

Site	# Wash Stalls	Number of Trips	Trip Rate	Site Trip Rate minus Weighted Average Rate		Weight	Weight * Value Squared
				Value	Value Squared		
Corapolis, PA	1	152	152.00	1.25	1.56	0.25	0.39
Erie, PA	1	147	147.00	-3.75	14.06	0.25	3.52
Hermitage, PA	1	159	159.00	8.25	68.06	0.25	17.02
Washington, PA	1	145	145.00	-5.75	33.06	0.25	8.27
Total	4	603	**150.75**			Variance	29.2
						Factor (4/3)	1.333333333
Weighted Average	**150.75**					Weighted Sample Variance	38.93
						Weighted Standard Deviation	6.24

APPENDIX L

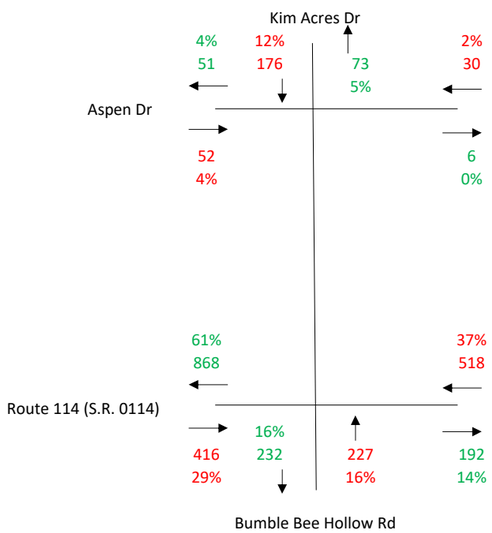
Trip Distribution Calculations

Trip Distribution Calculations
ModWash along Kim Acres Drive
Upper Allen Township, Cumberland County, PA

Calculate study area approach/exit volume percentages to determine distribution of Primary Trips

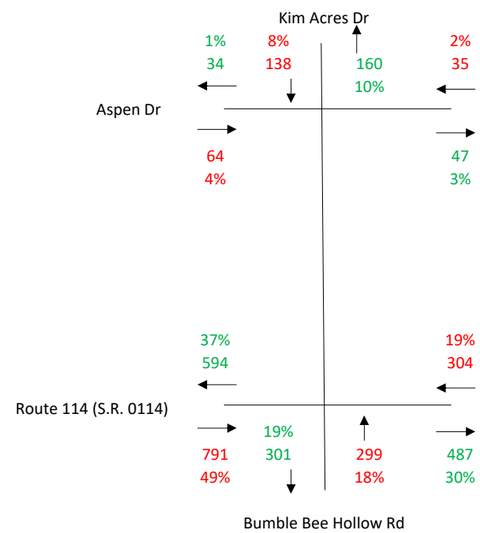
2023 AM Peak Hour Volumes/Percentage Split

x =	2023 Entering Volume		
x =	2023 Exiting Volume		
x% =	Entering Percentage Split	Total Enter =	1419
x% =	Exiting Percentage Split	Total Exit =	1422



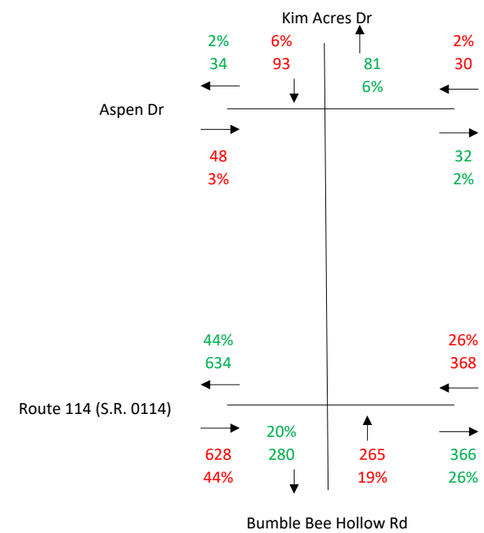
2023 PM Peak Hour Volumes/Percentage Split

x =	2023 Entering Volume		
x =	2023 Exiting Volume		
x% =	Entering Percentage Split	Total Enter =	1631
x% =	Exiting Percentage Split	Total Exit =	1623

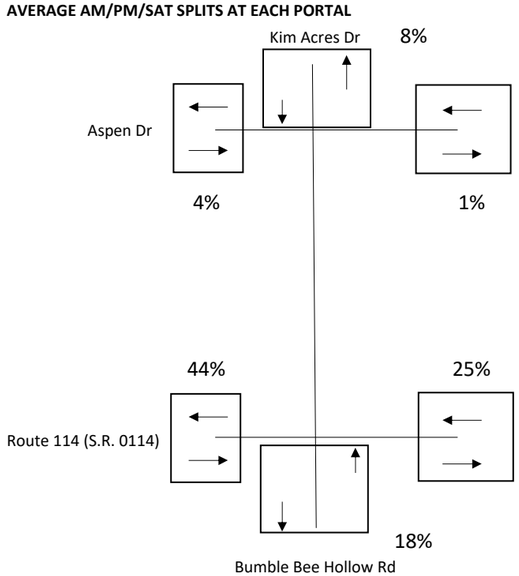


2023 SAT Peak Hour Volumes/Percentage Split

x =	2023 Entering Volume		
x =	2023 Exiting Volume		
x% =	Entering Percentage Split	Total Enter =	1432
x% =	Exiting Percentage Split	Total Exit =	1427



AVERAGE AM/PM/SAT SPLITS AT EACH PORTAL



APPENDIX M

Capacity Calculations – Forecasted 2024 Conditions With Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	163	166	29	487	10	197	18	17	17	41	196
Future Volume (veh/h)	99	163	166	29	487	10	197	18	17	17	41	196
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1738	1710	1738	1794	1766	1794	1780	1807	1752	1682	1794	1808
Adj Flow Rate, veh/h	110	181	184	32	541	11	219	20	19	19	46	218
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, %	4	6	4	0	2	0	4	7	6	8	0	4
Cap, veh/h	342	793	683	549	759	15	436	202	192	297	232	198
Arrive On Green	0.07	0.46	0.46	0.04	0.44	0.43	0.14	0.24	0.22	0.03	0.13	0.13
Sat Flow, veh/h	1655	1710	1473	1709	1725	35	1696	852	809	1602	1794	1532
Grp Volume(v), veh/h	110	181	184	32	0	552	219	0	39	19	46	218
Grp Sat Flow(s),veh/h/ln	1655	1710	1473	1709	0	1760	1696	0	1662	1602	1794	1532
Q Serve(g_s), s	3.0	5.4	6.5	0.8	0.0	21.8	8.9	0.0	1.6	0.9	1.9	11.0
Cycle Q Clear(g_c), s	3.0	5.4	6.5	0.8	0.0	21.8	8.9	0.0	1.6	0.9	1.9	11.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.49	1.00		1.00
Lane Grp Cap(c), veh/h	342	793	683	549	0	774	436	0	393	297	232	198
V/C Ratio(X)	0.32	0.23	0.27	0.06	0.00	0.71	0.50	0.00	0.10	0.06	0.20	1.10
Avail Cap(c_a), veh/h	406	793	683	656	0	774	457	0	393	395	232	198
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.3	13.7	14.0	11.7	0.0	19.4	24.5	0.0	25.5	30.2	33.1	37.0
Incr Delay (d2), s/veh	0.5	0.7	1.0	0.0	0.0	5.5	0.9	0.0	0.1	0.1	0.4	93.1
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	2.0	2.3	0.3	0.0	9.2	3.6	0.0	0.6	0.3	0.9	9.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	14.3	14.9	11.7	0.0	25.0	25.4	0.0	25.7	30.3	33.5	130.1
LnGrp LOS	B	B	B	B	A	C	C	A	C	C	C	F
Approach Vol, veh/h		475			584			258			283	
Approach Delay, s/veh		14.7			24.2			25.4			107.7	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	44.4	16.9	16.0	9.7	42.4	7.8	25.1
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	32.0	12.0	10.0	8.0	32.0	7.0	15.0
Max Q Clear Time (g_c+I1), s	2.8	8.5	10.9	13.0	5.0	23.8	2.9	3.6
Green Ext Time (p_c), s	0.0	8.2	0.1	0.0	0.1	5.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	36.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	50	16	4	10	43	62	4	1	173	5
Future Vol, veh/h	2	1	50	16	4	10	43	62	4	1	173	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	6	6	0	0	7	0	25	0	2	0
Mvmt Flow	2	1	57	18	5	11	49	71	5	1	199	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	384	378	202	405	379	74	205	0	0	76	0	0
Stage 1	204	204	-	172	172	-	-	-	-	-	-	-
Stage 2	180	174	-	233	207	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.06	7.56	6.9	6.4	4.4	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.2	3.1	4	3.1	3.1	-	-	3	-	-
Pot Cap-1 Maneuver	686	581	875	588	533	1051	986	-	-	1131	-	-
Stage 1	945	753	-	913	746	-	-	-	-	-	-	-
Stage 2	972	774	-	838	718	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	647	550	875	526	505	1051	986	-	-	1131	-	-
Mov Cap-2 Maneuver	647	550	-	526	505	-	-	-	-	-	-	-
Stage 1	896	752	-	866	707	-	-	-	-	-	-	-
Stage 2	905	734	-	781	717	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	11.1	3.5	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	986	-	-	854	627	1131	-	-
HCM Lane V/C Ratio	0.05	-	-	0.071	0.055	0.001	-	-
HCM Control Delay (s)	8.8	0	-	9.5	11.1	8.2	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	2	109	18	3	240
Future Vol, veh/h	14	2	109	18	3	240
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, %	2	-	1	-	-	3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	5	0	0	3
Mvmt Flow	16	2	121	20	3	267

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	404	131	0	0	141	0
Stage 1	131	-	-	-	-	-
Stage 2	273	-	-	-	-	-
Critical Hdwy	6.8	6.4	-	-	4.3	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	659	973	-	-	1075	-
Stage 1	1026	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	657	973	-	-	1075	-
Mov Cap-2 Maneuver	657	-	-	-	-	-
Stage 1	1026	-	-	-	-	-
Stage 2	861	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	685	1075	-
HCM Lane V/C Ratio	-	-	0.026	0.003	-
HCM Control Delay (s)	-	-	10.4	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	163	166	29	487	10	197	18	17	17	41	196
Future Volume (veh/h)	99	163	166	29	487	10	197	18	17	17	41	196
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1738	1710	1738	1794	1766	1794	1780	1807	1752	1682	1794	1808
Adj Flow Rate, veh/h	110	181	184	32	541	11	219	20	19	19	46	218
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, %	4	6	4	0	2	0	4	7	6	8	0	4
Cap, veh/h	331	777	669	538	741	15	445	210	199	311	253	216
Arrive On Green	0.07	0.45	0.45	0.04	0.43	0.42	0.14	0.25	0.23	0.03	0.14	0.14
Sat Flow, veh/h	1655	1710	1473	1709	1725	35	1696	852	809	1602	1794	1532
Grp Volume(v), veh/h	110	181	184	32	0	552	219	0	39	19	46	218
Grp Sat Flow(s),veh/h/ln	1655	1710	1473	1709	0	1760	1696	0	1662	1602	1794	1532
Q Serve(g_s), s	3.0	5.5	6.6	0.9	0.0	22.2	8.8	0.0	1.6	0.8	1.9	12.0
Cycle Q Clear(g_c), s	3.0	5.5	6.6	0.9	0.0	22.2	8.8	0.0	1.6	0.8	1.9	12.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.49	1.00		1.00
Lane Grp Cap(c), veh/h	331	777	669	538	0	756	445	0	409	311	253	216
V/C Ratio(X)	0.33	0.23	0.28	0.06	0.00	0.73	0.49	0.00	0.10	0.06	0.18	1.01
Avail Cap(c_a), veh/h	395	777	669	646	0	756	450	0	409	428	253	216
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.8	14.2	14.5	12.1	0.0	20.1	23.8	0.0	24.9	29.3	32.2	36.5
Incr Delay (d2), s/veh	0.6	0.7	1.0	0.0	0.0	6.1	0.8	0.0	0.1	0.1	0.3	63.2
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(50%),veh/ln	1.0	2.1	2.3	0.3	0.0	9.4	3.6	0.0	0.6	0.3	0.9	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	14.9	15.5	12.2	0.0	26.3	24.7	0.0	25.0	29.4	32.5	99.7
LnGrp LOS	B	B	B	B	A	C	C	A	C	C	C	F
Approach Vol, veh/h		475			584			258			283	
Approach Delay, s/veh		15.2			25.5			24.7			84.1	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	43.6	16.7	17.0	9.7	41.5	7.8	25.9
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	32.0	11.0	11.0	8.0	32.0	8.0	14.0
Max Q Clear Time (g_c+I1), s	2.9	8.6	10.8	14.0	5.0	24.2	2.8	3.6
Green Ext Time (p_c), s	0.0	8.2	0.0	0.0	0.1	5.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	32.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	425	224	31	270	16	189	68	51	24	55	157
Future Volume (veh/h)	165	425	224	31	270	16	189	68	51	24	55	157
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1780	1780	1766	1794	1780	1794	1809	1881	1837	1682	1794	1866
Adj Flow Rate, veh/h	177	457	241	33	290	17	203	73	55	26	59	169
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	2	0	1	0	2	2	0	8	0	0
Cap, veh/h	596	924	777	405	797	47	355	189	143	283	249	219
Arrive On Green	0.08	0.52	0.52	0.04	0.48	0.47	0.09	0.19	0.18	0.04	0.14	0.14
Sat Flow, veh/h	1696	1780	1497	1709	1665	98	1723	996	750	1602	1794	1582
Grp Volume(v), veh/h	177	457	241	33	0	307	203	0	128	26	59	169
Grp Sat Flow(s),veh/h/ln	1696	1780	1497	1709	0	1763	1723	0	1746	1602	1794	1582
Q Serve(g_s), s	4.4	15.0	8.3	0.8	0.0	9.9	8.0	0.0	5.8	1.2	2.6	9.3
Cycle Q Clear(g_c), s	4.4	15.0	8.3	0.8	0.0	9.9	8.0	0.0	5.8	1.2	2.6	9.3
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.43	1.00		1.00
Lane Grp Cap(c), veh/h	596	924	777	405	0	843	355	0	332	283	249	219
V/C Ratio(X)	0.30	0.49	0.31	0.08	0.00	0.36	0.57	0.00	0.39	0.09	0.24	0.77
Avail Cap(c_a), veh/h	644	924	777	523	0	843	355	0	332	365	299	264
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.8	14.0	12.4	11.3	0.0	14.8	29.7	0.0	32.1	31.0	34.5	37.4
Incr Delay (d2), s/veh	0.3	1.9	1.0	0.1	0.0	1.2	2.2	0.0	0.7	0.1	0.5	10.9
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(50%),veh/ln	1.5	5.8	2.9	0.3	0.0	3.9	3.9	0.0	2.5	0.5	1.2	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.1	15.9	13.5	11.4	0.0	16.1	31.8	0.0	32.8	31.2	35.0	48.3
LnGrp LOS	B	B	B	B	A	B	C	A	C	C	C	D
Approach Vol, veh/h		875			340			331			254	
Approach Delay, s/veh		14.0			15.6			32.2			43.4	
Approach LOS		B			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	51.7	13.0	17.5	11.5	48.1	8.4	22.1
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	37.0	7.0	14.0	9.0	37.0	7.0	14.0
Max Q Clear Time (g_c+I1), s	2.8	17.0	10.0	11.3	6.4	11.9	3.2	7.8
Green Ext Time (p_c), s	0.0	13.4	0.0	0.2	0.1	7.3	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	21.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	62	21	2	12	34	151	37	8	135	0
Future Vol, veh/h	2	2	62	21	2	12	34	151	37	8	135	0
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	2	2	71	24	2	14	39	174	43	9	155	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	455	469	157	487	448	197	155	0	0	218	0	0
Stage 1	173	173	-	275	275	-	-	-	-	-	-	-
Stage 2	282	296	-	212	173	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	618	522	956	529	484	890	1063	-	-	1011	-	-
Stage 1	980	774	-	817	666	-	-	-	-	-	-	-
Stage 2	862	694	-	893	745	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	582	494	954	467	458	889	1063	-	-	1010	-	-
Mov Cap-2 Maneuver	582	494	-	467	458	-	-	-	-	-	-	-
Stage 1	939	766	-	782	637	-	-	-	-	-	-	-
Stage 2	810	664	-	814	738	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	12	1.3	0.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1063	-	-	911	557	1010	-	-
HCM Lane V/C Ratio	0.037	-	-	0.083	0.072	0.009	-	-
HCM Control Delay (s)	8.5	0	-	9.3	12	8.6	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	6	211	38	6	199
Future Vol, veh/h	37	6	211	38	6	199
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, %	2	-	1	-	-	3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	41	7	234	42	7	221

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	490	255	0	0	276	0
Stage 1	255	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.8	6.4	-	-	4.3	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	579	822	-	-	966	-
Stage 1	883	-	-	-	-	-
Stage 2	905	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	574	822	-	-	966	-
Mov Cap-2 Maneuver	574	-	-	-	-	-
Stage 1	883	-	-	-	-	-
Stage 2	898	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	599	966	-
HCM Lane V/C Ratio	-	-	0.08	0.007	-
HCM Control Delay (s)	-	-	11.5	8.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	321	217	33	330	27	191	55	34	31	44	149
Future Volume (veh/h)	128	321	217	33	330	27	191	55	34	31	44	149
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1794	1780	1794	1794	1780	1794	1823	1911	1837	1794	1794	1852
Adj Flow Rate, veh/h	135	338	228	35	347	28	201	58	36	33	46	157
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	0	1	0	1	0	0	0	0	1
Cap, veh/h	488	808	690	442	687	55	414	219	136	348	248	217
Arrive On Green	0.08	0.45	0.45	0.05	0.42	0.41	0.11	0.20	0.19	0.05	0.14	0.14
Sat Flow, veh/h	1709	1780	1521	1709	1626	131	1736	1103	685	1709	1794	1569
Grp Volume(v), veh/h	135	338	228	35	0	375	201	0	94	33	46	157
Grp Sat Flow(s),veh/h/ln	1709	1780	1521	1709	0	1757	1736	0	1788	1709	1794	1569
Q Serve(g_s), s	3.2	9.6	7.2	0.8	0.0	11.8	7.2	0.0	3.4	1.2	1.7	7.2
Cycle Q Clear(g_c), s	3.2	9.6	7.2	0.8	0.0	11.8	7.2	0.0	3.4	1.2	1.7	7.2
Prop In Lane	1.00		1.00	1.00		0.07	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	488	808	690	442	0	742	414	0	355	348	248	217
V/C Ratio(X)	0.28	0.42	0.33	0.08	0.00	0.51	0.49	0.00	0.27	0.09	0.19	0.72
Avail Cap(c_a), veh/h	558	808	690	565	0	742	414	0	355	451	311	272
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.1	13.8	13.2	11.1	0.0	15.9	23.0	0.0	25.6	25.4	28.6	30.9
Incr Delay (d2), s/veh	0.3	1.6	1.3	0.1	0.0	2.4	0.9	0.0	0.4	0.1	0.4	7.0
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(50%),veh/ln	1.1	3.7	2.6	0.3	0.0	4.7	3.0	0.0	1.4	0.5	0.7	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.4	15.4	14.4	11.2	0.0	18.4	23.9	0.0	26.0	25.5	28.9	37.9
LnGrp LOS	B	B	B	B	A	B	C	A	C	C	C	D
Approach Vol, veh/h		701			410			295			236	
Approach Delay, s/veh		14.3			17.8			24.6			34.4	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	39.0	13.0	15.4	9.9	36.7	8.5	19.9
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	25.0	7.0	12.0	8.0	25.0	7.0	12.0
Max Q Clear Time (g_c+I1), s	2.8	11.6	9.2	9.2	5.2	13.8	3.2	5.4
Green Ext Time (p_c), s	0.0	8.2	0.0	0.2	0.1	5.2	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	19.9
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	3	48	22	2	7	34	80	27	3	96	1
Future Vol, veh/h	0	3	48	22	2	7	34	80	27	3	96	1
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	2	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	3	54	25	2	8	38	90	30	3	108	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	302	311	112	327	296	106	109	0	0	120	0	0
Stage 1	115	115	-	181	181	-	-	-	-	-	-	-
Stage 2	187	196	-	146	115	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.02	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	774	628	1010	694	599	1006	1102	-	-	1093	-	-
Stage 1	1049	815	-	932	739	-	-	-	-	-	-	-
Stage 2	964	759	-	979	794	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	741	603	1006	632	575	1005	1102	-	-	1093	-	-
Mov Cap-2 Maneuver	741	603	-	632	575	-	-	-	-	-	-	-
Stage 1	1010	813	-	898	712	-	-	-	-	-	-	-
Stage 2	917	731	-	916	792	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	10.5	2	0.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1102	-	-	968	685	1093	-	-
HCM Lane V/C Ratio	0.035	-	-	0.059	0.051	0.003	-	-
HCM Control Delay (s)	8.4	0	-	9	10.5	8.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	63	10	142	68	10	161
Future Vol, veh/h	63	10	142	68	10	161
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, %	2	-	1	-	-	3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	1
Mvmt Flow	70	11	158	76	11	179

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	397	196	0	0	234	0
Stage 1	196	-	-	-	-	-
Stage 2	201	-	-	-	-	-
Critical Hdwy	6.8	6.4	-	-	4.3	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	666	891	-	-	999	-
Stage 1	948	-	-	-	-	-
Stage 2	943	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	658	891	-	-	999	-
Mov Cap-2 Maneuver	658	-	-	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	932	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	682	999	-
HCM Lane V/C Ratio	-	-	0.119	0.011	-
HCM Control Delay (s)	-	-	11	8.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

APPENDIX N

Capacity Calculations – Forecasted 2029 Conditions With Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	168	171	30	501	10	203	19	18	17	42	202
Future Volume (veh/h)	101	168	171	30	501	10	203	19	18	17	42	202
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1738	1710	1738	1794	1766	1794	1780	1807	1752	1682	1794	1808
Adj Flow Rate, veh/h	112	187	190	33	557	11	226	21	20	19	47	224
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, %	4	6	4	0	2	0	4	7	6	8	0	4
Cap, veh/h	328	786	677	539	752	15	440	204	194	297	232	198
Arrive On Green	0.07	0.46	0.46	0.04	0.44	0.42	0.14	0.24	0.23	0.03	0.13	0.13
Sat Flow, veh/h	1655	1710	1473	1709	1726	34	1696	851	810	1602	1794	1532
Grp Volume(v), veh/h	112	187	190	33	0	568	226	0	41	19	47	224
Grp Sat Flow(s),veh/h/ln	1655	1710	1473	1709	0	1760	1696	0	1661	1602	1794	1532
Q Serve(g_s), s	3.1	5.6	6.8	0.9	0.0	22.9	9.2	0.0	1.6	0.9	2.0	11.0
Cycle Q Clear(g_c), s	3.1	5.6	6.8	0.9	0.0	22.9	9.2	0.0	1.6	0.9	2.0	11.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.49	1.00		1.00
Lane Grp Cap(c), veh/h	328	786	677	539	0	767	440	0	399	297	232	198
V/C Ratio(X)	0.34	0.24	0.28	0.06	0.00	0.74	0.51	0.00	0.10	0.06	0.20	1.13
Avail Cap(c_a), veh/h	391	786	677	645	0	767	456	0	399	394	232	198
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.8	13.9	14.2	11.8	0.0	20.0	24.4	0.0	25.4	30.2	33.1	37.0
Incr Delay (d2), s/veh	0.6	0.7	1.0	0.0	0.0	6.4	0.9	0.0	0.1	0.1	0.4	103.2
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(50%),veh/ln	1.1	2.1	2.4	0.3	0.0	9.7	3.7	0.0	0.7	0.3	0.9	9.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	14.6	15.3	11.9	0.0	26.4	25.3	0.0	25.5	30.3	33.5	140.2
LnGrp LOS	B	B	B	B	A	C	C	A	C	C	C	F
Approach Vol, veh/h		489			601			267			290	
Approach Delay, s/veh		15.1			25.6			25.3			115.7	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	44.1	17.2	16.0	9.8	42.0	7.8	25.4
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	32.0	12.0	10.0	8.0	32.0	7.0	15.0
Max Q Clear Time (g_c+I1), s	2.9	8.8	11.2	13.0	5.1	24.9	2.9	3.6
Green Ext Time (p_c), s	0.0	8.4	0.1	0.0	0.1	5.0	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	38.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	52	17	4	10	45	64	4	1	178	5
Future Vol, veh/h	2	1	52	17	4	10	45	64	4	1	178	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	6	6	0	0	7	0	25	0	2	0
Mvmt Flow	2	1	60	20	5	11	52	74	5	1	205	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	399	393	208	422	394	77	211	0	0	79	0	0
Stage 1	210	210	-	181	181	-	-	-	-	-	-	-
Stage 2	189	183	-	241	213	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.06	7.56	6.9	6.4	4.4	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.56	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.2	3.1	4	3.1	3.1	-	-	3	-	-
Pot Cap-1 Maneuver	671	571	868	571	522	1047	981	-	-	1128	-	-
Stage 1	938	749	-	902	739	-	-	-	-	-	-	-
Stage 2	962	767	-	829	713	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	631	539	868	508	493	1047	981	-	-	1128	-	-
Mov Cap-2 Maneuver	631	539	-	508	493	-	-	-	-	-	-	-
Stage 1	886	748	-	852	698	-	-	-	-	-	-	-
Stage 2	893	725	-	770	712	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	11.3	3.5	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	981	-	-	847	606	1128	-	-
HCM Lane V/C Ratio	0.053	-	-	0.075	0.059	0.001	-	-
HCM Control Delay (s)	8.9	0	-	9.6	11.3	8.2	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	2	112	18	3	247
Future Vol, veh/h	14	2	112	18	3	247
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, %	2	-	1	-	-	3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	5	0	0	3
Mvmt Flow	16	2	124	20	3	274

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	414	134	0	0	144	0
Stage 1	134	-	-	-	-	-
Stage 2	280	-	-	-	-	-
Critical Hdwy	6.8	6.4	-	-	4.3	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	649	969	-	-	1072	-
Stage 1	1022	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	647	969	-	-	1072	-
Mov Cap-2 Maneuver	647	-	-	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	854	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	675	1072	-
HCM Lane V/C Ratio	-	-	0.026	0.003	-
HCM Control Delay (s)	-	-	10.5	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	168	171	30	501	10	203	19	18	17	42	202
Future Volume (veh/h)	101	168	171	30	501	10	203	19	18	17	42	202
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1738	1710	1738	1794	1766	1794	1780	1807	1752	1682	1794	1808
Adj Flow Rate, veh/h	112	187	190	33	557	11	226	21	20	19	47	224
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, %	4	6	4	0	2	0	4	7	6	8	0	4
Cap, veh/h	317	770	664	529	735	15	449	212	202	311	253	216
Arrive On Green	0.07	0.45	0.45	0.04	0.43	0.41	0.14	0.25	0.24	0.03	0.14	0.14
Sat Flow, veh/h	1655	1710	1473	1709	1726	34	1696	851	810	1602	1794	1532
Grp Volume(v), veh/h	112	187	190	33	0	568	226	0	41	19	47	224
Grp Sat Flow(s),veh/h/ln	1655	1710	1473	1709	0	1760	1696	0	1661	1602	1794	1532
Q Serve(g_s), s	3.1	5.7	6.9	0.9	0.0	23.3	9.1	0.0	1.6	0.8	2.0	12.0
Cycle Q Clear(g_c), s	3.1	5.7	6.9	0.9	0.0	23.3	9.1	0.0	1.6	0.8	2.0	12.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.49	1.00		1.00
Lane Grp Cap(c), veh/h	317	770	664	529	0	749	449	0	414	311	253	216
V/C Ratio(X)	0.35	0.24	0.29	0.06	0.00	0.76	0.50	0.00	0.10	0.06	0.19	1.04
Avail Cap(c_a), veh/h	379	770	664	635	0	749	449	0	414	428	253	216
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.4	14.4	14.7	12.3	0.0	20.7	23.7	0.0	24.7	29.3	32.2	36.5
Incr Delay (d2), s/veh	0.7	0.7	1.1	0.0	0.0	7.1	0.9	0.0	0.1	0.1	0.3	70.8
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	2.2	2.4	0.3	0.0	10.0	3.7	0.0	0.6	0.3	0.9	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.0	15.2	15.8	12.3	0.0	27.8	24.6	0.0	24.9	29.4	32.5	107.3
LnGrp LOS	B	B	B	B	A	C	C	A	C	C	C	F
Approach Vol, veh/h		489			601			267			290	
Approach Delay, s/veh		15.6			26.9			24.7			90.1	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	43.3	17.0	17.0	9.8	41.2	7.8	26.2
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	32.0	11.0	11.0	8.0	32.0	8.0	14.0
Max Q Clear Time (g_c+I1), s	2.9	8.9	11.1	14.0	5.1	25.3	2.8	3.6
Green Ext Time (p_c), s	0.0	8.4	0.0	0.0	0.1	4.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	34.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	438	231	32	278	16	195	70	53	24	57	161
Future Volume (veh/h)	169	438	231	32	278	16	195	70	53	24	57	161
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1780	1780	1766	1794	1780	1794	1809	1881	1837	1682	1794	1866
Adj Flow Rate, veh/h	182	471	248	34	299	17	210	75	57	26	61	173
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	2	0	1	0	2	2	0	8	0	0
Cap, veh/h	587	919	772	394	791	45	356	191	145	283	253	223
Arrive On Green	0.08	0.52	0.52	0.04	0.47	0.46	0.09	0.19	0.18	0.04	0.14	0.14
Sat Flow, veh/h	1696	1780	1497	1709	1668	95	1723	992	754	1602	1794	1582
Grp Volume(v), veh/h	182	471	248	34	0	316	210	0	132	26	61	173
Grp Sat Flow(s),veh/h/ln	1696	1780	1497	1709	0	1763	1723	0	1745	1602	1794	1582
Q Serve(g_s), s	4.6	15.7	8.7	0.9	0.0	10.3	8.0	0.0	6.0	1.2	2.7	9.5
Cycle Q Clear(g_c), s	4.6	15.7	8.7	0.9	0.0	10.3	8.0	0.0	6.0	1.2	2.7	9.5
Prop In Lane	1.00		1.00	1.00		0.05	1.00		0.43	1.00		1.00
Lane Grp Cap(c), veh/h	587	919	772	394	0	836	356	0	336	283	253	223
V/C Ratio(X)	0.31	0.51	0.32	0.09	0.00	0.38	0.59	0.00	0.39	0.09	0.24	0.78
Avail Cap(c_a), veh/h	632	919	772	510	0	836	356	0	336	365	299	264
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.0	14.3	12.6	11.5	0.0	15.2	29.8	0.0	32.0	30.9	34.4	37.3
Incr Delay (d2), s/veh	0.3	2.0	1.1	0.1	0.0	1.3	2.6	0.0	0.7	0.1	0.5	11.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	6.1	3.0	0.3	0.0	4.1	0.6	0.0	2.6	0.5	1.2	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.2	16.4	13.7	11.6	0.0	16.5	32.3	0.0	32.7	31.0	34.9	48.8
LnGrp LOS	B	B	B	B	A	B	C	A	C	C	C	D
Approach Vol, veh/h		901			350			342			260	
Approach Delay, s/veh		14.4			16.0			32.5			43.7	
Approach LOS		B			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.9	51.4	13.0	17.7	11.6	47.7	8.4	22.3
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	37.0	7.0	14.0	9.0	37.0	7.0	14.0
Max Q Clear Time (g_c+I1), s	2.9	17.7	10.0	11.5	6.6	12.3	3.2	8.0
Green Ext Time (p_c), s	0.0	13.3	0.0	0.2	0.1	7.4	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	22.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	64	22	2	12	35	155	38	8	139	0
Future Vol, veh/h	2	2	64	22	2	12	35	155	38	8	139	0
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	2	2	74	25	2	14	40	178	44	9	160	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	466	481	162	499	459	201	160	0	0	223	0	0
Stage 1	178	178	-	281	281	-	-	-	-	-	-	-
Stage 2	288	303	-	218	178	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	608	514	950	519	477	885	1059	-	-	1007	-	-
Stage 1	974	771	-	810	661	-	-	-	-	-	-	-
Stage 2	855	690	-	885	741	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	572	486	948	456	451	884	1059	-	-	1006	-	-
Mov Cap-2 Maneuver	572	486	-	456	451	-	-	-	-	-	-	-
Stage 1	932	763	-	774	632	-	-	-	-	-	-	-
Stage 2	803	660	-	804	734	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	12.2	1.3	0.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1059	-	-	905	543	1006	-	-
HCM Lane V/C Ratio	0.038	-	-	0.086	0.076	0.009	-	-
HCM Control Delay (s)	8.5	0	-	9.4	12.2	8.6	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	6	217	38	6	205
Future Vol, veh/h	37	6	217	38	6	205
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, %	2	-	1	-	-	3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	41	7	241	42	7	228

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	504	262	0	0	283	0
Stage 1	262	-	-	-	-	-
Stage 2	242	-	-	-	-	-
Critical Hdwy	6.8	6.4	-	-	4.3	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	567	814	-	-	961	-
Stage 1	876	-	-	-	-	-
Stage 2	897	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	562	814	-	-	961	-
Mov Cap-2 Maneuver	562	-	-	-	-	-
Stage 1	876	-	-	-	-	-
Stage 2	890	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	587	961	-
HCM Lane V/C Ratio	-	-	0.081	0.007	-
HCM Control Delay (s)	-	-	11.7	8.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	330	224	34	340	27	197	56	35	31	45	152
Future Volume (veh/h)	130	330	224	34	340	27	197	56	35	31	45	152
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1794	1780	1794	1794	1780	1794	1823	1911	1837	1794	1794	1852
Adj Flow Rate, veh/h	137	347	236	36	358	28	207	59	37	33	47	160
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	0	1	0	1	0	0	0	0	1
Cap, veh/h	478	804	687	433	684	54	415	220	138	350	251	220
Arrive On Green	0.08	0.45	0.45	0.05	0.42	0.41	0.11	0.20	0.19	0.05	0.14	0.14
Sat Flow, veh/h	1709	1780	1521	1709	1630	127	1736	1098	689	1709	1794	1569
Grp Volume(v), veh/h	137	347	236	36	0	386	207	0	96	33	47	160
Grp Sat Flow(s),veh/h/ln	1709	1780	1521	1709	0	1757	1736	0	1787	1709	1794	1569
Q Serve(g_s), s	3.2	10.0	7.6	0.9	0.0	12.3	7.4	0.0	3.4	1.2	1.7	7.3
Cycle Q Clear(g_c), s	3.2	10.0	7.6	0.9	0.0	12.3	7.4	0.0	3.4	1.2	1.7	7.3
Prop In Lane	1.00		1.00	1.00		0.07	1.00		0.39	1.00		1.00
Lane Grp Cap(c), veh/h	478	804	687	433	0	738	415	0	358	350	251	220
V/C Ratio(X)	0.29	0.43	0.34	0.08	0.00	0.52	0.50	0.00	0.27	0.09	0.19	0.73
Avail Cap(c_a), veh/h	546	804	687	555	0	738	415	0	358	453	311	272
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.2	14.0	13.4	11.2	0.0	16.2	23.0	0.0	25.5	25.3	28.5	30.9
Incr Delay (d2), s/veh	0.3	1.7	1.4	0.1	0.0	2.6	0.9	0.0	0.4	0.1	0.4	7.3
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(50%),veh/ln	1.1	3.9	2.7	0.3	0.0	4.9	3.1	0.0	1.5	0.5	0.8	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.6	15.7	14.7	11.3	0.0	18.9	23.9	0.0	25.9	25.4	28.8	38.2
LnGrp LOS	B	B	B	B	A	B	C	A	C	C	C	D
Approach Vol, veh/h		720			422			303			240	
Approach Delay, s/veh		14.6			18.2			24.5			34.6	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	38.9	13.0	15.5	10.0	36.5	8.5	20.0
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	8.0	25.0	7.0	12.0	8.0	25.0	7.0	12.0
Max Q Clear Time (g_c+I1), s	2.9	12.0	9.4	9.3	5.2	14.3	3.2	5.4
Green Ext Time (p_c), s	0.0	8.3	0.0	0.2	0.1	5.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	20.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	3	50	23	2	7	35	83	28	3	98	1
Future Vol, veh/h	0	3	50	23	2	7	35	83	28	3	98	1
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	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	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	-4	-	-	7	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	0	2	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	3	56	26	2	8	39	93	31	3	110	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	310	319	114	336	304	110	111	0	0	124	0	0
Stage 1	117	117	-	187	187	-	-	-	-	-	-	-
Stage 2	193	202	-	149	117	-	-	-	-	-	-	-
Critical Hdwy	6.7	6.1	6.02	7.5	6.9	6.4	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.7	5.1	-	6.5	5.9	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	765	623	1008	683	592	1001	1100	-	-	1089	-	-
Stage 1	1046	813	-	925	734	-	-	-	-	-	-	-
Stage 2	957	755	-	975	792	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	732	597	1004	619	568	1000	1100	-	-	1089	-	-
Mov Cap-2 Maneuver	732	597	-	619	568	-	-	-	-	-	-	-
Stage 1	1006	811	-	890	706	-	-	-	-	-	-	-
Stage 2	909	726	-	910	790	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	10.7	2	0.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1100	-	-	967	671	1089	-	-
HCM Lane V/C Ratio	0.036	-	-	0.062	0.054	0.003	-	-
HCM Control Delay (s)	8.4	0	-	9	10.7	8.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	63	10	145	68	10	165
Future Vol, veh/h	63	10	145	68	10	165
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, %	2	-	1	-	-	3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	1
Mvmt Flow	70	11	161	76	11	183

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	404	199	0	0	237	0
Stage 1	199	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.8	6.4	-	-	4.3	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	659	887	-	-	996	-
Stage 1	945	-	-	-	-	-
Stage 2	938	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	651	887	-	-	996	-
Mov Cap-2 Maneuver	651	-	-	-	-	-
Stage 1	945	-	-	-	-	-
Stage 2	927	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	676	996	-
HCM Lane V/C Ratio	-	-	0.12	0.011	-
HCM Control Delay (s)	-	-	11.1	8.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

APPENDIX O

Turn Lane Warrants Analysis

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - WB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	501	2.0%	507
	Right	-	5	0.0%	5

Advancing Volume:	512
Right Turn Volume:	5

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:	Signalized
Design Hour Volume of Turning Lane:	5
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	42
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - WB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	278	1.0%	280
	Right	-	5	0.0%	5

Advancing Volume:	285
Right Turn Volume:	5

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:	Signalized
Design Hour Volume of Turning Lane:	5
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	40
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - WB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	340	1.0%	342
	Right	-	7	0.0%	7

Advancing Volume:	349
Right Turn Volume:	7

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:	Signalized
Design Hour Volume of Turning Lane:	7
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	48
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - WB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	501	2.0%	507
	Right	-	10	0.0%	10

Advancing Volume:	517
Right Turn Volume:	10

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:	Signalized
Design Hour Volume of Turning Lane:	10
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	42
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - WB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	278	1.0%	280
	Right	-	16	0.0%	16

Advancing Volume:	296
Right Turn Volume:	16

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:	Signalized
Design Hour Volume of Turning Lane:	16
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	40

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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - WB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	340	1.0%	342
	Right	-	27	0.0%	27

Advancing Volume:	369
Right Turn Volume:	27

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:	Signalized
Design Hour Volume of Turning Lane:	27
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	48
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - NB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	15	7.0%	16
	Right	-	18	6.0%	19

Advancing Volume:	35
Right Turn Volume:	19

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:	Signalized
Design Hour Volume of Turning Lane:	19
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	42
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - NB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	62	2.0%	63
	Right	-	53	0.0%	53

Advancing Volume:	116
Right Turn Volume:	53

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:	Signalized
Design Hour Volume of Turning Lane:	53
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	40
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - NB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	42	0.0%	42
	Right	-	35	0.0%	35

Advancing Volume:	77
Right Turn Volume:	35

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:	Signalized
Design Hour Volume of Turning Lane:	35
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	48
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - NB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	19	7.0%	20
	Right	-	18	6.0%	19

Advancing Volume:	39
Right Turn Volume:	19

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:	Signalized
Design Hour Volume of Turning Lane:	19
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	42
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - NB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	70	2.0%	71
	Right	-	53	0.0%	53

Advancing Volume:	124
Right Turn Volume:	53

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:	Signalized
Design Hour Volume of Turning Lane:	53
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	40
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Route 114 (S.R. 0114) & Kim Acres Drive - NB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	40		Type of Analysis
Type of Terrain:	Level	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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	No	0	0.0%	N/A
	Through	-	56	0.0%	56
	Right	-	35	0.0%	35

Advancing Volume:	91
Right Turn Volume:	35

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:	Signalized
Design Hour Volume of Turning Lane:	35
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	48
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Left

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	44	7.0%	49
	Through	-	63	0.0%	63
	Right	Yes	4	25.0%	6
Opposing	Left	Yes	1	0.0%	1
	Through	-	176	2.0%	182
	Right	Yes	5	0.0%	5

Advancing Volume:	118
Opposing Volume:	188
Left Turn Volume:	49
% Left Turns in Advancing Volume:	41.53%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	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:	49
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Left

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	33	0.0%	33
	Through	-	151	1.0%	154
	Right	Yes	38	0.0%	38
Opposing	Left	Yes	8	0.0%	8
	Through	-	135	1.0%	138
	Right	Yes	0	0.0%	0

Advancing Volume:	225
Opposing Volume:	146
Left Turn Volume:	33
% Left Turns in Advancing Volume:	14.67%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	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:	33
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Left

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	32	0.0%	32
	Through	-	77	0.0%	77
	Right	Yes	27	0.0%	27
Opposing	Left	Yes	3	0.0%	3
	Through	-	92	0.0%	92
	Right	Yes	1	0.0%	1

Advancing Volume:	136
Opposing Volume:	96
Left Turn Volume:	32
% Left Turns in Advancing Volume:	23.53%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	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:	32
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Left

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	45	7.0%	50
	Through	-	64	0.0%	64
	Right	Yes	4	25.0%	6
Opposing	Left	Yes	1	0.0%	1
	Through	-	178	2.0%	184
	Right	Yes	5	0.0%	5

Advancing Volume:	120
Opposing Volume:	190
Left Turn Volume:	50
% Left Turns in Advancing Volume:	41.67%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	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:	50
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Left

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	35	0.0%	35
	Through	-	155	1.0%	158
	Right	Yes	38	0.0%	38
Opposing	Left	Yes	8	0.0%	8
	Through	-	139	1.0%	142
	Right	Yes	0	0.0%	0

Advancing Volume:	231
Opposing Volume:	150
Left Turn Volume:	35
% Left Turns in Advancing Volume:	15.15%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	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:	35
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Left

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	35	0.0%	35
	Through	-	83	0.0%	83
	Right	Yes	28	0.0%	28
Opposing	Left	Yes	3	0.0%	3
	Through	-	98	0.0%	98
	Right	Yes	1	0.0%	1

Advancing Volume:	146
Opposing Volume:	102
Left Turn Volume:	35
% Left Turns in Advancing Volume:	23.97%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	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:	35
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	44	7.0%	49
	Through	-	63	0.0%	63
	Right	-	4	25.0%	6

Advancing Volume:	118
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 9**

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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	33	0.0%	33
	Through	-	151	1.0%	154
	Right	-	38	0.0%	38

Advancing Volume:	225
Right Turn Volume:	38

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:	38
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	32	0.0%	32
	Through	-	77	0.0%	77
	Right	-	27	0.0%	27

Advancing Volume:	136
Right Turn Volume:	27

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:	27
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	45	7.0%	50
	Through	-	64	0.0%	64
	Right	-	4	25.0%	6

Advancing Volume:	120
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 9**

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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	35	0.0%	35
	Through	-	155	1.0%	158
	Right	-	38	0.0%	38

Advancing Volume:	231
Right Turn Volume:	38

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:	38
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - NB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	35	0.0%	35
	Through	-	83	0.0%	83
	Right	-	28	0.0%	28

Advancing Volume:	146
Right Turn Volume:	28

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:	28
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - SB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	1	0.0%	1
	Through	-	176	2.0%	182
	Right	-	5	0.0%	5

Advancing Volume:	188
Right Turn Volume:	5

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:	5
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - SB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	8	0.0%	8
	Through	-	135	2.0%	140
	Right	-	0	0.0%	0

Advancing Volume:	148
Right Turn Volume:	0

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:	0
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - SB Right

Analysis Period:	2029 Without Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	3	0.0%	3
	Through	-	92	0.0%	92
	Right	-	1	0.0%	1

Advancing Volume:	96
Right Turn Volume:	1

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:	1
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - SB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	1	0.0%	1
	Through	-	178	2.0%	184
	Right	-	5	0.0%	5

Advancing Volume:	190
Right Turn Volume:	5

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:	5
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - SB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	8	0.0%	8
	Through	-	139	2.0%	144
	Right	-	0	0.0%	0

Advancing Volume:	152
Right Turn Volume:	0

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:	0
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Aspen Drive - SB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	3	0.0%	3
	Through	-	98	0.0%	98
	Right	-	1	0.0%	1

Advancing Volume:	102
Right Turn Volume:	1

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:	1
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Site Drive - NB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	-	112	5.0%	121
	Right	-	18	0.0%	18

Advancing Volume:	139
Right Turn Volume:	18

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:	18
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Site Drive - NB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	-	217	1.0%	221
	Right	-	38	0.0%	38

Advancing Volume:	259
Right Turn Volume:	38

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:	38
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Site Drive - NB Right

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	0	0.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	0	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	-	145	0.0%	145
	Right	-	68	0.0%	68

Advancing Volume:	213
Right Turn Volume:	68

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:	68
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Site Drive - SB Left

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	AM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	3	0.0%	3
	Through	-	247	3.0%	259
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	112	5.0%	121
	Right	Yes	18	0.0%	18

Advancing Volume:	262
Opposing Volume:	139
Left Turn Volume:	3
% Left Turns in Advancing Volume:	1.15%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	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:	3
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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Site Drive - SB Left

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	PM Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	-	205	1.0%	209
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	217	1.0%	221
	Right	Yes	38	0.0%	38

Advancing Volume:	215
Opposing Volume:	259
Left Turn Volume:	6
% Left Turns in Advancing Volume:	2.79%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	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:	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

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:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Upper Allen Township	Analysis Date:	1/27/2023
County:	Cumberland County	Conducted By:	DH
PennDOT Engineering District:	8	Checked By:	
		Agency/Company Name:	Wooster

Intersection & Approach Description: Kim Acres Drive & Site Drive - SB Left

Analysis Period:	2029 With Dev	Number of Approach Lanes:	1
Design Hour:	SAT Peak Hour	Undivided or Divided Highway:	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	25		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	10	0.0%	10
	Through	-	165	1.0%	168
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	145	0.0%	145
	Right	Yes	68	0.0%	68

Advancing Volume:	178
Opposing Volume:	213
Left Turn Volume:	10
% Left Turns in Advancing Volume:	5.62%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	0	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:	10
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:

APPENDIX P

Queue Summary Printouts

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	99	180	183	32	544	218	35	14	42	209
v/c Ratio	0.32	0.22	0.23	0.05	0.68	0.58	0.08	0.06	0.24	0.61
Control Delay	11.3	15.6	3.5	8.6	26.0	29.8	15.8	20.5	37.8	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	15.6	3.5	8.6	26.0	29.8	15.8	20.5	37.8	13.7
Queue Length 50th (ft)	22	59	0	7	237	92	6	5	21	0
Queue Length 95th (ft)	47	112	38	20	#422	149	32	18	50	61
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	321	828	811	670	797	382	461	263	224	377
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.22	0.23	0.05	0.68	0.57	0.08	0.05	0.19	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	49	16	4	10	42	61	4	1	170	5
Future Volume (Veh/h)	2	1	49	16	4	10	42	61	4	1	170	5
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	1	56	18	5	11	48	70	5	1	195	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	382	371	198	425	372	72	201			75		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	382	371	198	425	372	72	201			75		
tC, single (s)	7.1	6.5	6.3	7.2	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.6	4.0	3.3	2.3			2.2		
p0 queue free %	100	100	93	96	99	99	96			100		
cM capacity (veh/h)	554	542	833	482	541	995	1342			1537		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	59	34	123	202
Volume Left	2	18	48	1
Volume Right	56	11	5	6
cSH	812	590	1342	1537
Volume to Capacity	0.07	0.06	0.04	0.00
Queue Length 95th (ft)	6	5	3	0
Control Delay (s)	9.8	11.5	3.2	0.0
Lane LOS	A	B	A	A
Approach Delay (s)	9.8	11.5	3.2	0.0
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	156	455	240	33	293	202	120	14	51	148
v/c Ratio	0.27	0.46	0.26	0.07	0.34	0.71	0.29	0.06	0.27	0.46
Control Delay	8.1	16.0	2.8	7.2	16.4	43.8	22.0	24.3	39.2	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	16.0	2.8	7.2	16.4	43.8	22.0	24.3	39.2	9.0
Queue Length 50th (ft)	30	159	0	6	97	99	36	6	27	0
Queue Length 95th (ft)	66	287	41	19	178	#163	91	19	58	39
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	594	987	937	541	864	286	418	254	288	403
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.46	0.26	0.06	0.34	0.71	0.29	0.06	0.18	0.37

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	60	21	2	12	32	146	37	8	130	0
Future Volume (Veh/h)	2	2	60	21	2	12	32	146	37	8	130	0
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	2	69	24	2	14	37	168	43	9	149	0
Pedestrians					1			2				
Lane Width (ft)					14.0			16.0				
Walking Speed (ft/s)					3.5			3.5				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	446	453	151	504	432	190	149			212		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	430	437	151	488	415	171	149			193		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	92	94	100	98	97			99		
cM capacity (veh/h)	508	492	898	434	505	864	1445			1371		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	73	40	248	158
Volume Left	2	24	37	9
Volume Right	69	14	43	0
cSH	861	530	1445	1371
Volume to Capacity	0.08	0.08	0.03	0.01
Queue Length 95th (ft)	7	6	2	0
Control Delay (s)	9.6	12.3	1.3	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.6	12.3	1.3	0.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	98	336	227	35	352	200	79	14	33	122
v/c Ratio	0.19	0.35	0.24	0.06	0.42	0.68	0.19	0.05	0.17	0.34
Control Delay	8.0	14.0	3.2	7.4	17.6	36.1	16.4	18.8	31.2	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	14.0	3.2	7.4	17.6	36.1	16.4	18.8	31.2	3.3
Queue Length 50th (ft)	17	72	0	6	114	76	15	5	14	0
Queue Length 95th (ft)	41	195	41	19	207	#132	54	16	37	8
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	536	970	935	627	846	292	439	290	300	438
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.35	0.24	0.06	0.42	0.68	0.18	0.05	0.11	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	3	45	21	2	7	31	74	26	3	89	1
Future Volume (Veh/h)	0	3	45	21	2	7	31	74	26	3	89	1
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	3	51	24	2	8	35	83	29	3	100	1
Pedestrians								3			1	
Lane Width (ft)								16.0			16.0	
Walking Speed (ft/s)								3.5			3.5	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	284	288	104	330	274	98	101			112		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284	288	104	330	274	98	101			112		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	95	96	100	99	98			100		
cM capacity (veh/h)	652	609	948	578	620	962	1504			1490		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	54	34	147	104
Volume Left	0	24	35	3
Volume Right	51	8	29	1
cSH	919	641	1504	1490
Volume to Capacity	0.06	0.05	0.02	0.00
Queue Length 95th (ft)	5	4	2	0
Control Delay (s)	9.2	10.9	1.9	0.2
Lane LOS	A	B	A	A
Approach Delay (s)	9.2	10.9	1.9	0.2
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

01/27/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	100	181	184	32	547	219	35	14	42	210
v/c Ratio	0.32	0.22	0.23	0.05	0.69	0.58	0.08	0.06	0.24	0.61
Control Delay	11.4	15.6	3.5	8.6	26.2	29.8	15.8	20.5	37.8	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	15.6	3.5	8.6	26.2	29.8	15.8	20.5	37.8	13.7
Queue Length 50th (ft)	22	59	0	7	239	93	6	5	21	0
Queue Length 95th (ft)	47	112	38	20	#424	150	32	18	50	61
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	319	828	811	669	796	383	461	263	224	378
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.22	0.23	0.05	0.69	0.57	0.08	0.05	0.19	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	49	16	4	10	42	61	4	1	171	5
Future Volume (Veh/h)	2	1	49	16	4	10	42	61	4	1	171	5
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	1	56	18	5	11	48	70	5	1	197	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	384	373	200	427	374	72	203			75		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	384	373	200	427	374	72	203			75		
tC, single (s)	7.1	6.5	6.3	7.2	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.6	4.0	3.3	2.3			2.2		
p0 queue free %	100	100	93	96	99	99	96			100		
cM capacity (veh/h)	552	540	831	481	540	995	1339			1537		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	59	34	123	204
Volume Left	2	18	48	1
Volume Right	56	11	5	6
cSH	810	588	1339	1537
Volume to Capacity	0.07	0.06	0.04	0.00
Queue Length 95th (ft)	6	5	3	0
Control Delay (s)	9.8	11.5	3.2	0.0
Lane LOS	A	B	A	A
Approach Delay (s)	9.8	11.5	3.2	0.0
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	157	457	241	33	295	203	120	14	51	149
v/c Ratio	0.27	0.46	0.26	0.07	0.34	0.71	0.29	0.06	0.27	0.46
Control Delay	8.1	16.0	2.8	7.2	16.5	44.1	22.0	24.3	39.2	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	16.0	2.8	7.2	16.5	44.1	22.0	24.3	39.2	9.2
Queue Length 50th (ft)	30	160	0	6	98	100	36	6	27	0
Queue Length 95th (ft)	66	288	41	19	179	#165	91	19	58	39
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	593	987	937	540	864	286	418	254	288	403
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.46	0.26	0.06	0.34	0.71	0.29	0.06	0.18	0.37

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	60	21	2	12	32	147	37	8	131	0
Future Volume (Veh/h)	2	2	60	21	2	12	32	147	37	8	131	0
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	2	69	24	2	14	37	169	43	9	151	0
Pedestrians					1			2				
Lane Width (ft)					14.0			16.0				
Walking Speed (ft/s)					3.5			3.5				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	448	456	153	506	434	192	151			213		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	432	440	153	491	418	171	151			193		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	92	94	100	98	97			99		
cM capacity (veh/h)	506	490	896	432	503	863	1442			1370		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	73	40	249	160
Volume Left	2	24	37	9
Volume Right	69	14	43	0
cSH	859	528	1442	1370
Volume to Capacity	0.09	0.08	0.03	0.01
Queue Length 95th (ft)	7	6	2	0
Control Delay (s)	9.6	12.4	1.3	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.6	12.4	1.3	0.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

01/27/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	99	338	228	35	354	201	79	14	33	123
v/c Ratio	0.19	0.35	0.24	0.06	0.42	0.69	0.19	0.05	0.17	0.35
Control Delay	8.0	14.0	3.2	7.4	17.6	36.3	16.4	18.8	31.2	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	14.0	3.2	7.4	17.6	36.3	16.4	18.8	31.2	3.5
Queue Length 50th (ft)	18	72	0	6	115	77	15	5	14	0
Queue Length 95th (ft)	42	196	42	19	208	#135	54	16	37	8
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	534	970	935	624	846	292	439	290	300	438
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.35	0.24	0.06	0.42	0.69	0.18	0.05	0.11	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	3	45	21	2	7	31	74	26	3	90	1
Future Volume (Veh/h)	0	3	45	21	2	7	31	74	26	3	90	1
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	3	51	24	2	8	35	83	29	3	101	1
Pedestrians								3			1	
Lane Width (ft)								16.0			16.0	
Walking Speed (ft/s)								3.5			3.5	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	285	290	104	330	276	98	102			112		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	285	290	104	330	276	98	102			112		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	95	96	100	99	98			100		
cM capacity (veh/h)	651	608	947	577	619	962	1503			1490		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	54	34	147	105
Volume Left	0	24	35	3
Volume Right	51	8	29	1
cSH	918	640	1503	1490
Volume to Capacity	0.06	0.05	0.02	0.00
Queue Length 95th (ft)	5	4	2	0
Control Delay (s)	9.2	10.9	1.9	0.2
Lane LOS	A	B	A	A
Approach Delay (s)	9.2	10.9	1.9	0.2
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	102	187	190	33	563	226	37	14	43	217
v/c Ratio	0.34	0.23	0.23	0.05	0.71	0.60	0.08	0.06	0.24	0.62
Control Delay	11.8	15.7	3.5	8.6	27.1	30.4	15.8	20.5	37.9	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	15.7	3.5	8.6	27.1	30.4	15.8	20.5	37.9	13.7
Queue Length 50th (ft)	22	61	0	7	251	96	6	5	22	0
Queue Length 95th (ft)	48	116	39	20	#445	155	33	18	51	62
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	307	826	813	666	795	383	463	263	224	384
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.23	0.23	0.05	0.71	0.59	0.08	0.05	0.19	0.57

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	51	17	4	10	44	63	4	1	176	5
Future Volume (Veh/h)	2	1	51	17	4	10	44	63	4	1	176	5
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	1	59	20	5	11	51	72	5	1	202	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	397	386	205	443	386	74	208			77		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	386	205	443	386	74	208			77		
tC, single (s)	7.1	6.5	6.3	7.2	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.6	4.0	3.3	2.3			2.2		
p0 queue free %	100	100	93	96	99	99	96			100		
cM capacity (veh/h)	540	530	826	466	529	993	1334			1535		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	62	36	128	209
Volume Left	2	20	51	1
Volume Right	59	11	5	6
cSH	805	567	1334	1535
Volume to Capacity	0.08	0.06	0.04	0.00
Queue Length 95th (ft)	6	5	3	0
Control Delay (s)	9.8	11.8	3.3	0.0
Lane LOS	A	B	A	A
Approach Delay (s)	9.8	11.8	3.3	0.0
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	161	471	248	34	304	210	124	14	53	154
v/c Ratio	0.28	0.48	0.26	0.07	0.35	0.73	0.30	0.06	0.28	0.48
Control Delay	8.2	16.3	2.8	7.2	16.7	45.8	22.3	24.2	39.3	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	16.3	2.8	7.2	16.7	45.8	22.3	24.2	39.3	9.8
Queue Length 50th (ft)	31	167	0	6	102	104	37	6	28	0
Queue Length 95th (ft)	68	301	42	20	185	#177	94	19	60	43
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	583	985	939	528	863	286	419	253	288	403
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.48	0.26	0.06	0.35	0.73	0.30	0.06	0.18	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	62	22	2	12	33	151	38	8	135	0
Future Volume (Veh/h)	2	2	62	22	2	12	33	151	38	8	135	0
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	2	71	25	2	14	38	174	44	9	155	0
Pedestrians					1			2				
Lane Width (ft)					14.0			16.0				
Walking Speed (ft/s)					3.5			3.5				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	460	468	157	520	446	197	155			219		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	441	449	157	502	427	173	155			196		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	92	94	100	98	97			99		
cM capacity (veh/h)	497	482	892	422	496	859	1438			1363		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	75	41	256	164
Volume Left	2	25	38	9
Volume Right	71	14	44	0
cSH	854	515	1438	1363
Volume to Capacity	0.09	0.08	0.03	0.01
Queue Length 95th (ft)	7	6	2	0
Control Delay (s)	9.6	12.6	1.3	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.6	12.6	1.3	0.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

01/27/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	101	347	236	36	365	207	81	14	34	126
v/c Ratio	0.19	0.38	0.26	0.06	0.43	0.71	0.20	0.05	0.17	0.35
Control Delay	8.1	15.7	3.3	7.5	17.9	37.6	16.3	18.8	31.2	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	15.7	3.3	7.5	17.9	37.6	16.3	18.8	31.2	3.7
Queue Length 50th (ft)	18	109	0	6	120	79	15	5	15	0
Queue Length 95th (ft)	43	202	42	19	216	#141	55	16	38	10
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	532	915	899	594	844	293	440	291	300	438
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.38	0.26	0.06	0.43	0.71	0.18	0.05	0.11	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	3	47	22	2	7	32	77	27	3	92	1
Future Volume (Veh/h)	0	3	47	22	2	7	32	77	27	3	92	1
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	3	53	25	2	8	36	87	30	3	103	1
Pedestrians								3			1	
Lane Width (ft)								16.0			16.0	
Walking Speed (ft/s)								3.5			3.5	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	294	298	106	341	284	103	104			117		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	294	298	106	341	284	103	104			117		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	94	96	100	99	98			100		
cM capacity (veh/h)	642	601	944	566	612	956	1500			1484		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	56	35	153	107
Volume Left	0	25	36	3
Volume Right	53	8	30	1
cSH	916	627	1500	1484
Volume to Capacity	0.06	0.06	0.02	0.00
Queue Length 95th (ft)	5	4	2	0
Control Delay (s)	9.2	11.1	1.9	0.2
Lane LOS	A	B	A	A
Approach Delay (s)	9.2	11.1	1.9	0.2
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	110	181	184	32	552	219	39	19	46	218
v/c Ratio	0.35	0.22	0.23	0.05	0.70	0.58	0.09	0.08	0.26	0.62
Control Delay	11.7	15.7	3.5	8.6	26.7	29.9	18.4	20.8	38.2	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.7	3.5	8.6	26.7	29.9	18.4	20.8	38.2	13.7
Queue Length 50th (ft)	24	59	0	7	244	92	7	7	23	0
Queue Length 95th (ft)	51	112	38	20	#433	150	35	21	54	62
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	325	826	810	667	793	380	421	264	224	385
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.22	0.23	0.05	0.70	0.58	0.09	0.07	0.21	0.57

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	50	16	4	10	43	62	4	1	173	5
Future Volume (Veh/h)	2	1	50	16	4	10	43	62	4	1	173	5
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	1	57	18	5	11	49	71	5	1	199	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	389	378	202	433	378	74	205			76		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389	378	202	433	378	74	205			76		
tC, single (s)	7.1	6.5	6.3	7.2	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.6	4.0	3.3	2.3			2.2		
p0 queue free %	100	100	93	96	99	99	96			100		
cM capacity (veh/h)	547	536	829	475	536	994	1337			1536		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	60	34	125	206
Volume Left	2	18	49	1
Volume Right	57	11	5	6
cSH	808	583	1337	1536
Volume to Capacity	0.07	0.06	0.04	0.00
Queue Length 95th (ft)	6	5	3	0
Control Delay (s)	9.8	11.6	3.2	0.0
Lane LOS	A	B	A	A
Approach Delay (s)	9.8	11.6	3.2	0.0
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	2	109	18	3	240
Future Volume (Veh/h)	14	2	109	18	3	240
Sign Control	Stop		Free			Free
Grade	2%		1%			3%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	2	121	20	3	267
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			261			
pX, platoon unblocked	0.98	0.98			0.98	
vC, conflicting volume	404	131			141	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	381	103			113	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	611	938			1459	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	18	141	270
Volume Left	16	0	3
Volume Right	2	20	0
cSH	635	1700	1459
Volume to Capacity	0.03	0.08	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	10.8	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.8	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	177	457	241	33	307	203	128	26	59	169
v/c Ratio	0.31	0.47	0.26	0.07	0.36	0.71	0.34	0.10	0.29	0.51
Control Delay	8.8	16.7	2.9	7.5	17.2	43.3	25.8	24.4	38.7	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	16.7	2.9	7.5	17.2	43.3	25.8	24.4	38.7	11.3
Queue Length 50th (ft)	35	162	0	6	103	99	42	11	32	0
Queue Length 95th (ft)	74	288	41	19	185	#162	100	29	65	53
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	578	972	927	537	844	287	387	261	288	403
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.47	0.26	0.06	0.36	0.71	0.33	0.10	0.20	0.42

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	62	21	2	12	34	151	37	8	135	0
Future Volume (Veh/h)	2	2	62	21	2	12	34	151	37	8	135	0
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	2	71	24	2	14	39	174	43	9	155	0
Pedestrians					1			2				
Lane Width (ft)					14.0			16.0				
Walking Speed (ft/s)					3.5			3.5				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	462	469	157	522	448	196	155			218		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	461	468	157	521	447	196	155			217		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	92	94	100	98	97			99		
cM capacity (veh/h)	491	478	892	417	491	849	1438			1362		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	75	40	256	164
Volume Left	2	24	39	9
Volume Right	71	14	43	0
cSH	853	512	1438	1362
Volume to Capacity	0.09	0.08	0.03	0.01
Queue Length 95th (ft)	7	6	2	0
Control Delay (s)	9.6	12.6	1.4	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.6	12.6	1.4	0.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	37	6	211	38	6	199
Future Volume (Veh/h)	37	6	211	38	6	199
Sign Control	Stop		Free			Free
Grade	2%		1%			3%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	41	7	234	42	7	221
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			261			
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	490	255			276	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	439	192			214	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	99			99	
cM capacity (veh/h)	548	814			1302	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	276	228
Volume Left	41	0	7
Volume Right	7	42	0
cSH	575	1700	1302
Volume to Capacity	0.08	0.16	0.01
Queue Length 95th (ft)	7	0	0
Control Delay (s)	11.8	0.0	0.3
Lane LOS	B		A
Approach Delay (s)	11.8	0.0	0.3
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	135	338	228	35	375	201	94	33	46	157
v/c Ratio	0.29	0.38	0.26	0.06	0.49	0.61	0.22	0.11	0.22	0.43
Control Delay	9.4	15.3	3.4	7.9	19.6	30.5	19.1	19.0	31.2	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	15.3	3.4	7.9	19.6	30.5	19.1	19.0	31.2	5.8
Queue Length 50th (ft)	25	74	0	6	125	76	20	11	20	0
Queue Length 95th (ft)	56	200	42	19	226	123	63	28	46	27
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	472	898	884	582	767	327	439	321	300	438
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.38	0.26	0.06	0.49	0.61	0.21	0.10	0.15	0.36

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	3	48	22	2	7	34	80	27	3	96	1
Future Volume (Veh/h)	0	3	48	22	2	7	34	80	27	3	96	1
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	3	54	25	2	8	38	90	30	3	108	1
Pedestrians								3			1	
Lane Width (ft)								16.0			16.0	
Walking Speed (ft/s)								3.5			3.5	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	306	310	112	354	296	106	109			120		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	306	310	112	354	296	106	109			120		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	94	95	100	99	97			100		
cM capacity (veh/h)	630	591	938	554	602	952	1494			1480		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	57	35	158	112
Volume Left	0	25	38	3
Volume Right	54	8	30	1
cSH	910	615	1494	1480
Volume to Capacity	0.06	0.06	0.03	0.00
Queue Length 95th (ft)	5	5	2	0
Control Delay (s)	9.2	11.2	2.0	0.2
Lane LOS	A	B	A	A
Approach Delay (s)	9.2	11.2	2.0	0.2
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	63	10	142	68	10	161
Future Volume (Veh/h)	63	10	142	68	10	161
Sign Control	Stop		Free			Free
Grade	2%		1%			3%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	70	11	158	76	11	179
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			261			
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	397	196			234	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	362	155			194	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	99			99	
cM capacity (veh/h)	616	869			1349	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	81	234	190
Volume Left	70	0	11
Volume Right	11	76	0
cSH	641	1700	1349
Volume to Capacity	0.13	0.14	0.01
Queue Length 95th (ft)	11	0	1
Control Delay (s)	11.4	0.0	0.5
Lane LOS	B		A
Approach Delay (s)	11.4	0.0	0.5
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	112	187	190	33	568	226	41	19	47	224
v/c Ratio	0.37	0.23	0.23	0.05	0.72	0.60	0.10	0.08	0.26	0.63
Control Delay	12.2	15.8	3.5	8.7	27.7	30.4	18.3	20.7	38.2	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	15.8	3.5	8.7	27.7	30.4	18.3	20.7	38.2	13.6
Queue Length 50th (ft)	25	62	0	7	255	95	8	7	24	0
Queue Length 95th (ft)	52	116	39	20	#453	155	36	21	54	63
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	311	824	811	664	791	381	424	264	224	390
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.23	0.23	0.05	0.72	0.59	0.10	0.07	0.21	0.57

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	52	17	4	10	45	64	4	1	178	5
Future Volume (Veh/h)	2	1	52	17	4	10	45	64	4	1	178	5
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	1	60	20	5	11	52	74	5	1	205	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	404	393	208	451	394	76	211			79		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	404	393	208	451	394	76	211			79		
tC, single (s)	7.1	6.5	6.3	7.2	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.6	4.0	3.3	2.3			2.2		
p0 queue free %	100	100	93	96	99	99	96			100		
cM capacity (veh/h)	534	525	822	459	524	990	1330			1532		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	63	36	131	212
Volume Left	2	20	52	1
Volume Right	60	11	5	6
cSH	801	561	1330	1532
Volume to Capacity	0.08	0.06	0.04	0.00
Queue Length 95th (ft)	6	5	3	0
Control Delay (s)	9.9	11.9	3.3	0.0
Lane LOS	A	B	A	A
Approach Delay (s)	9.9	11.9	3.3	0.0
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	2	112	18	3	247
Future Volume (Veh/h)	14	2	112	18	3	247
Sign Control	Stop		Free			Free
Grade	2%		1%			3%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	2	124	20	3	274
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			261			
pX, platoon unblocked	0.98	0.98			0.98	
vC, conflicting volume	414	134			144	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	390	104			114	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	603	936			1456	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	18	144	277
Volume Left	16	0	3
Volume Right	2	20	0
cSH	628	1700	1456
Volume to Capacity	0.03	0.08	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	10.9	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.9	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	182	471	248	34	316	210	132	26	61	173
v/c Ratio	0.32	0.49	0.27	0.07	0.38	0.73	0.35	0.10	0.30	0.51
Control Delay	9.0	17.0	2.9	7.6	17.4	44.9	26.1	24.4	38.8	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	17.0	2.9	7.6	17.4	44.9	26.1	24.4	38.8	11.4
Queue Length 50th (ft)	36	169	0	6	107	103	43	11	33	0
Queue Length 95th (ft)	76	301	42	20	192	#173	104	29	66	55
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	569	970	929	524	842	288	387	262	288	406
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.49	0.27	0.06	0.38	0.73	0.34	0.10	0.21	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	64	22	2	12	35	155	38	8	139	0
Future Volume (Veh/h)	2	2	64	22	2	12	35	155	38	8	139	0
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	2	74	25	2	14	40	178	44	9	160	0
Pedestrians					1			2				
Lane Width (ft)					14.0			16.0				
Walking Speed (ft/s)					3.5			3.5				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	473	481	162	536	459	201	160			223		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	468	476	162	532	454	195	160			217		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	92	94	100	98	97			99		
cM capacity (veh/h)	483	471	886	407	484	847	1432			1357		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	78	41	262	169
Volume Left	2	25	40	9
Volume Right	74	14	44	0
cSH	849	499	1432	1357
Volume to Capacity	0.09	0.08	0.03	0.01
Queue Length 95th (ft)	8	7	2	1
Control Delay (s)	9.7	12.9	1.4	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.7	12.9	1.4	0.5
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	37	6	217	38	6	205
Future Volume (Veh/h)	37	6	217	38	6	205
Sign Control	Stop		Free			Free
Grade	2%		1%			3%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	41	7	241	42	7	228
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			261			
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	504	262			283	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	451	196			218	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	99			99	
cM capacity (veh/h)	538	807			1294	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	283	235
Volume Left	41	0	7
Volume Right	7	42	0
cSH	565	1700	1294
Volume to Capacity	0.08	0.17	0.01
Queue Length 95th (ft)	7	0	0
Control Delay (s)	12.0	0.0	0.3
Lane LOS	B		A
Approach Delay (s)	12.0	0.0	0.3
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

1: Bumble Bee Hollow Rd/Kim Acres Dr & Route 114 (S.R. 0114)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	137	347	236	36	386	207	96	33	47	160
v/c Ratio	0.30	0.41	0.28	0.07	0.50	0.63	0.23	0.11	0.22	0.43
Control Delay	9.6	17.1	3.5	8.0	20.0	31.1	19.2	18.9	31.1	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.6	17.1	3.5	8.0	20.0	31.1	19.2	18.9	31.1	6.1
Queue Length 50th (ft)	25	110	0	6	130	78	21	11	20	0
Queue Length 95th (ft)	57	207	43	20	234	126	65	28	47	29
Internal Link Dist (ft)		1158			1114		302		181	
Turn Bay Length (ft)	185		200	120		140		85		100
Base Capacity (vph)	468	843	847	551	765	329	439	322	300	438
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.41	0.28	0.07	0.50	0.63	0.22	0.10	0.16	0.37

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	3	50	23	2	7	35	83	28	3	98	1
Future Volume (Veh/h)	0	3	50	23	2	7	35	83	28	3	98	1
Sign Control		Stop			Stop			Free			Free	
Grade		-2%			2%			-4%			7%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	3	56	26	2	8	39	93	31	3	110	1
Pedestrians								3			1	
Lane Width (ft)								16.0			16.0	
Walking Speed (ft/s)								3.5			3.5	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								497				
pX, platoon unblocked												
vC, conflicting volume	313	318	114	364	304	110	111			124		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	313	318	114	364	304	110	111			124		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	94	95	100	99	97			100		
cM capacity (veh/h)	622	585	936	544	596	948	1492			1475		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	59	36	163	114
Volume Left	0	26	39	3
Volume Right	56	8	31	1
cSH	908	604	1492	1475
Volume to Capacity	0.06	0.06	0.03	0.00
Queue Length 95th (ft)	5	5	2	0
Control Delay (s)	9.2	11.3	1.9	0.2
Lane LOS	A	B	A	A
Approach Delay (s)	9.2	11.3	1.9	0.2
Approach LOS	A	B		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	63	10	145	68	10	165
Future Volume (Veh/h)	63	10	145	68	10	165
Sign Control	Stop		Free			Free
Grade	2%		1%			3%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	70	11	161	76	11	183
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			261			
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	404	199			237	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	366	153			193	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	99			99	
cM capacity (veh/h)	611	867			1346	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	81	237	194
Volume Left	70	0	11
Volume Right	11	76	0
cSH	637	1700	1346
Volume to Capacity	0.13	0.14	0.01
Queue Length 95th (ft)	11	0	1
Control Delay (s)	11.5	0.0	0.5
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	0.5
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX Q

On-Site Queuing Calculations

Car Wash Queue Analysis (AM)

Assumptions:

Weekday Morning (AM) Peak Hour of Adjacent Street Traffic (7-9am)

21	**vehicles arriving per one hour (per Trip Gen)**
21	Mean Arrival Rate (veh/hr)
90	**vehicles serviced per one hour**
90	Mean Service Rate (veh/hr)
1	Available Servers (i.e. service tunnels)

Mean Arrival Rate:	λ =	21	veh/hr
Mean Service Rate:	μ =	90	veh/hr
	M =	1	servers

P(0) = 1 - λ/μ (probability of exactly zero units in the system)

P(0) = 76.67%

Probability of (n) *OR MORE* units in the system:

P(n)	(n)
100.00%	0
23.33%	1
5.44%	2
1.27%	3
0.30%	4
0.07%	5
0.02%	6
0.00%	7
0.00%	8
0.00%	9
0.00%	10
0.00%	11
0.00%	12
0.00%	13
0.00%	14
0.00%	15
0.00%	16
0.00%	17
0.00%	18
0.00%	19
0.00%	20
0.00%	21
0.00%	22
0.00%	23
0.00%	24
0.00%	25
0.00%	26
0.00%	27
0.00%	28
0.00%	29
0.00%	30
0.00%	31
0.00%	32
0.00%	33

Ls = λ/μ-λ

0.30 Average Number of Vehicles in the System

Lq = λ^2/μ(μ-λ)

0.07 Average Number of Vehicles in Queue

Car Wash Queue Analysis (PM)

Assumptions:

Weekday Evening (PM) Peak Hour of Adjacent Street Traffic (4-6pm)

44	**vehicles arriving per one hour (per Trip Gen)**
44	Mean Arrival Rate (veh/hr)
90	**vehicles serviced per one hour**
90	Mean Service Rate (veh/hr)
1	Available Servers (i.e. service tunnels)

Mean Arrival Rate:	λ =	44	veh/hr
Mean Service Rate:	μ =	90	veh/hr
	M =	1	servers

P(0) = 1 - λ/μ (probability of exactly zero units in the system)

P(0) = 51.11%

Probability of (n) *OR MORE* units in the system:

P(n)	(n)
100.00%	0
48.89%	1
23.90%	2
11.69%	3
5.71%	4
2.79%	5
1.37%	6
0.67%	7
0.33%	8
0.16%	9
0.08%	10
0.04%	11
0.02%	12
0.01%	13
0.00%	14
0.00%	15
0.00%	16
0.00%	17
0.00%	18
0.00%	19
0.00%	20
0.00%	21
0.00%	22
0.00%	23
0.00%	24
0.00%	25
0.00%	26
0.00%	27
0.00%	28
0.00%	29
0.00%	30
0.00%	31
0.00%	32
0.00%	33

Ls = λ/μ-λ

0.96 Average Number of Vehicles in the System

Lq = λ^2/μ(μ-λ)

0.47 Average Number of Vehicles in Queue

Car Wash Queue Analysis (SAT)

Assumptions:

Saturday (SAT) Peak Hour of Site-Generated Traffic

78	**vehicles arriving per one hour (per Trip Gen)**
78	Mean Arrival Rate (veh/hr)
90	**vehicles serviced per one hour (per operator)**
90	Mean Service Rate (veh/hr)
1	Available Servers (i.e. service tunnels)

Mean Arrival Rate:	λ =	78	veh/hr
Mean Service Rate:	μ =	90	veh/hr
	M =	1	servers

P(0) = 1 - λ/μ (probability of exactly zero units in the system)

P(0) = 13.33%

Probability of (n) *OR MORE* units in the system:

P(n)	(n)
100.00%	0
86.67%	1
75.11%	2
65.10%	3
56.42%	4
48.89%	5
42.38%	6
36.73%	7
31.83%	8
27.58%	9
23.91%	10
20.72%	11
17.96%	12
15.56%	13
13.49%	14
11.69%	15
10.13%	16
8.78%	17
7.61%	18
6.59%	19
5.72%	20
4.95%	21
4.29%	22
3.72%	23
3.22%	24
2.79%	25
2.42%	26
2.10%	27
1.82%	28
1.58%	29
1.37%	30
1.18%	31
1.03%	32
0.89%	33

Ls = λ/μ-λ

6.50 Average Number of Vehicles in the System

Lq = λ^2/μ(μ-λ)

5.63 Average Number of Vehicles in Queue