APPENDIX D

UPDATED TRAFFIC IMPACT ANALYSIS

TIOGA INN WORKFORCE HOUSING PROJECT
TRAFFIC IMPACT ANALYSIS

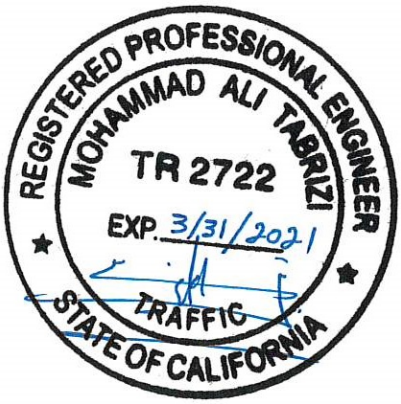
Mono County

Prepared for:

BAUER PLANNING & ENVIRONMENTAL SERVICES, INC.

Prepared by:

Mohammad A. Tabrizi, PE, TE



February 21, 2020

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF TABLES

LIST OF EXHIBITS

LIST OF APPENDICES

1.0 Introduction

This study analyzes the forecast traffic conditions associated with the proposed Tioga Inn Workforce Housing project.

The study has been prepared, revised, and refined based on extensive discussions with and input from Caltrans District 9 and County of Mono staff.

The proposed Tioga Workforce Housing project is located at 22 Vista Point Road, close to the intersection of Tioga Road (State Route 120 or SR-120) and Highway 395 (US-395). The project is located in the geographic center of Mono County, which covers an area of 3,132 square miles on the eastern slopes of the Sierra Nevada mountain range in east central California.

The project site is located about half a mile south of Lee Vining, 10 miles west of Yosemite National Park, 25 miles north of Mammoth and 1 mile east of the Mono Lake Tufa State National Reserve and Scenic National Forest.

Exhibit 1-1 shows the regional location of the project site. Exhibit 1-2 shows the project site location.

Access for the project site will continue to be provided via one unsignalized driveway located on Tioga Road (SR-120) approximately 950 feet west of the Highway 395 / Tioga Road (SR-120) intersection.

The existing bus stop serving the Yosemite Area Rapid Transit System (YARTS) located along the project site frontage on Tioga Road (SR-120) will remain in place.

The project site currently contains the following land uses:

- Approximately 16 units of workforce housing;
- Existing Whoa Nelli Deli; and
- Gasoline Station with Convenience Store and 8 vehicle fueling positions (4 two-sided fuel pumps).

Additionally, during summer Thursday evenings, concert-type events are held in the lawn area of the site.

Aside from the existing uses located on the project site, the site is currently approved for addition of the following traffic-generating land uses:

- 120-room hotel; and
- Restaurant use with 100 seats and a seating area of approximately 5,000 square feet (gross area of approximately 10,000 square feet).

The proposed project consists of the following additional traffic-generating land uses:

- Workforce housing with 100 units, which includes approximately 150 bedrooms with a total capacity of 300 residents; and
- An additional island to the existing gas station, adding a total of 4 vehicle fueling positions (2 two-sided fuel pumps).

Under current conditions, approximately 6 of the 37 total employees live on the project site; the remaining employees commute to and from the site.

Exhibit 1-3 shows the conceptual site plan.

The project is planned to open in 2023.

1.1 Study Area

The study area consists of the following study intersections in the vicinity of the project site:

1. Highway 395 (US-395) / Tioga Road (SR-120); and
2. Project Site Access / Tioga Road (SR-120).

Both of the study intersections are a part of the California State Highway system and are in the jurisdiction of Caltrans District 9 which holds jurisdiction over the State Highway system in the central-east portion of the State of California including Inyo, Mono, and eastern Kern Counties.

Study area traffic conditions are very seasonal in this area and vary by the time of the year. Tioga Road (SR-120) is generally closed during winter and peak traffic conditions generally occur in the summer time.

Generally, in terms of traffic volumes and activity, the area experiences four seasonal periods throughout the year:

- Winter season: very limited traffic activity with Tioga Road (SR-120) generally closed off to vehicular traffic;

- Non-peak spring shoulder season: traffic volumes begin to pick up as winter ends and summer approaches;

- Peak summer season: traffic volumes generally reach their highest. This season typically lasts approximately two or three months.

- Non-peak fall shoulder season: traffic volumes and activities begin to reduce as summer ends and winter approaches.

Hence, as requested by the County of Mono staff, to reflect traffic conditions and evaluate potential impacts during the peak traffic season for the area, this study evaluates traffic conditions during the month of July, for the following time periods:

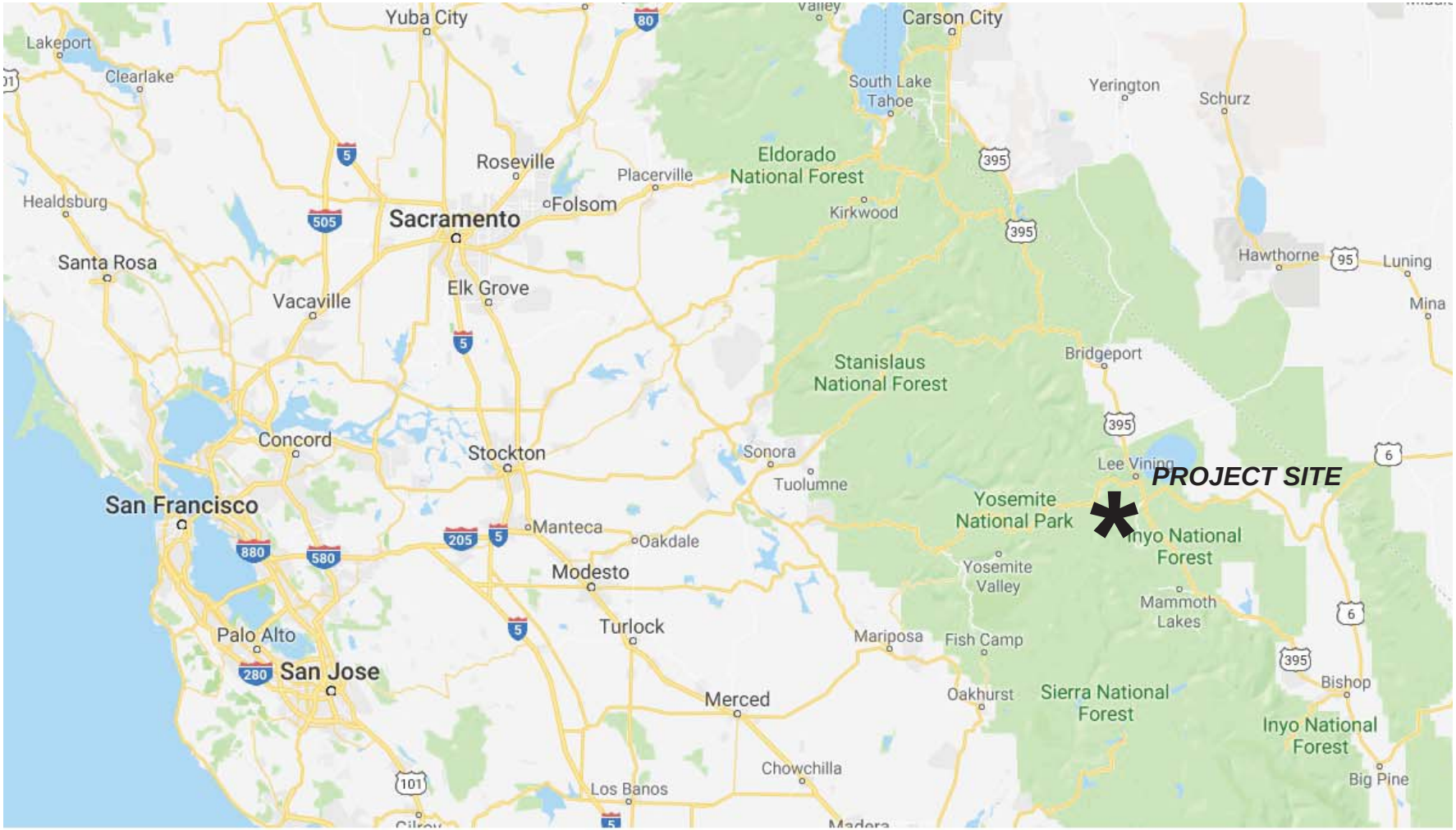
- AM: 8:00 AM to 10:00 AM;
- Mid-Day 12:00 PM to 2:00 PM; and
- PM: 4:00 PM to 6:00 PM.

As discussed in the forthcoming sections of the report, a mid-day analysis has also been prepared for nonpeak season (fall shoulder season conditions during the month of October).

Exhibit 1-4 shows the location of the study intersections which are analyzed for the following study scenarios:

- Existing Conditions;
- Existing Plus Project Conditions;
- Forecast Opening Year (2023) Without Project Conditions; and
- Forecast Opening Year (2023) With Project Conditions.

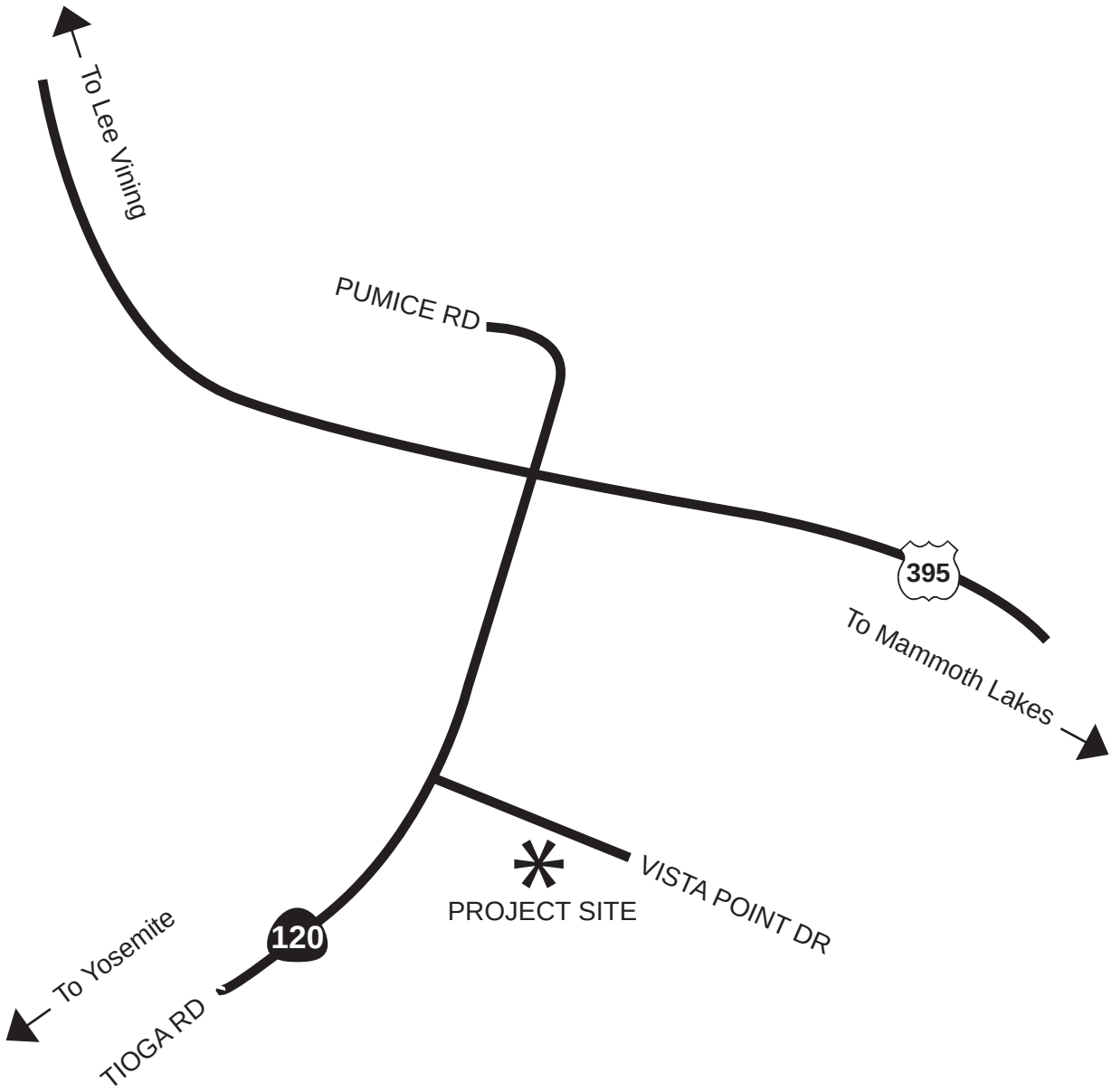
The analysis also evaluates vehicular queuing at the study intersections as requested by Caltrans.



Not to Scale

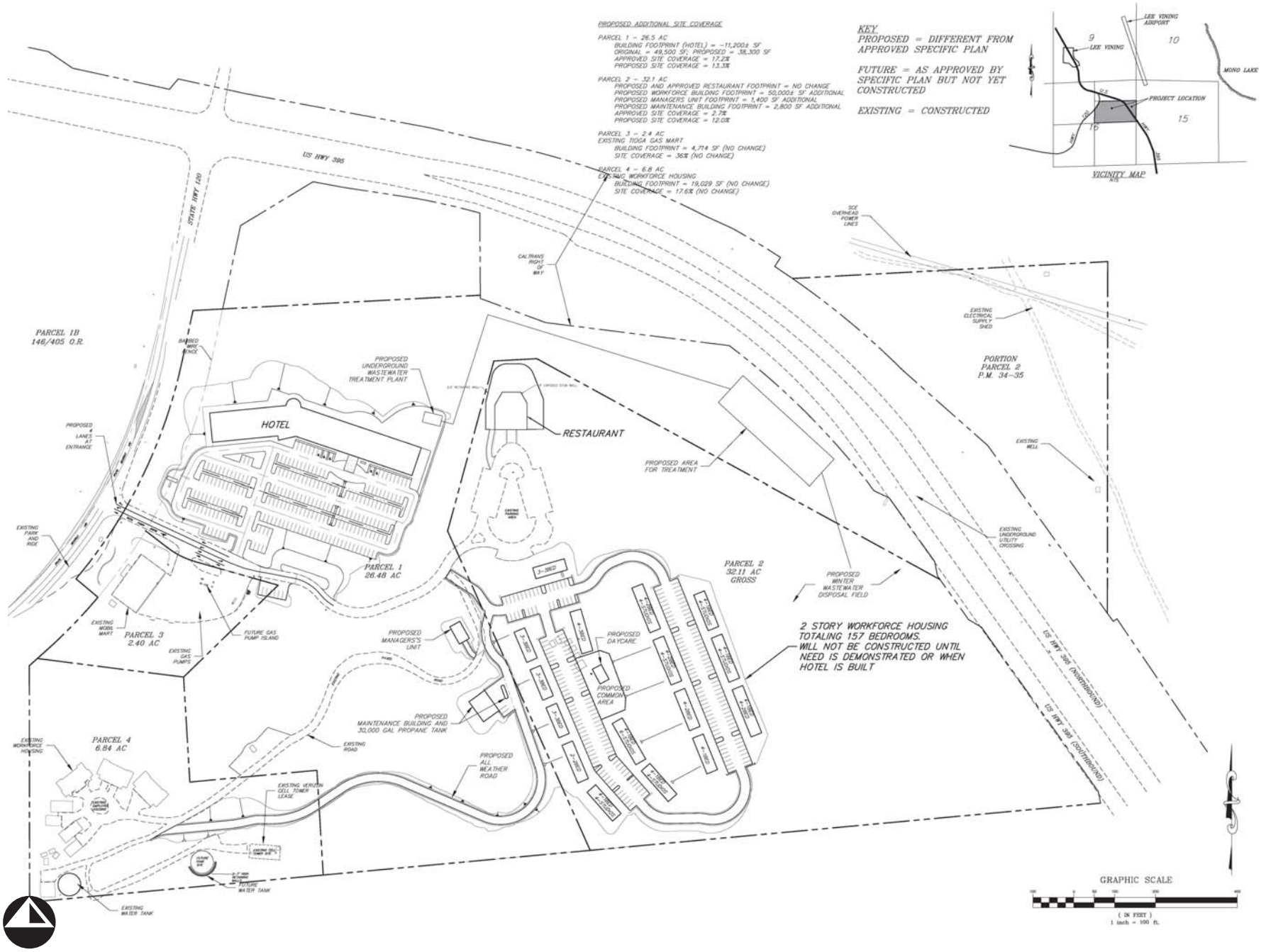
ENGINEERING

Regional Project Location



Not to Scale

Project Site Location

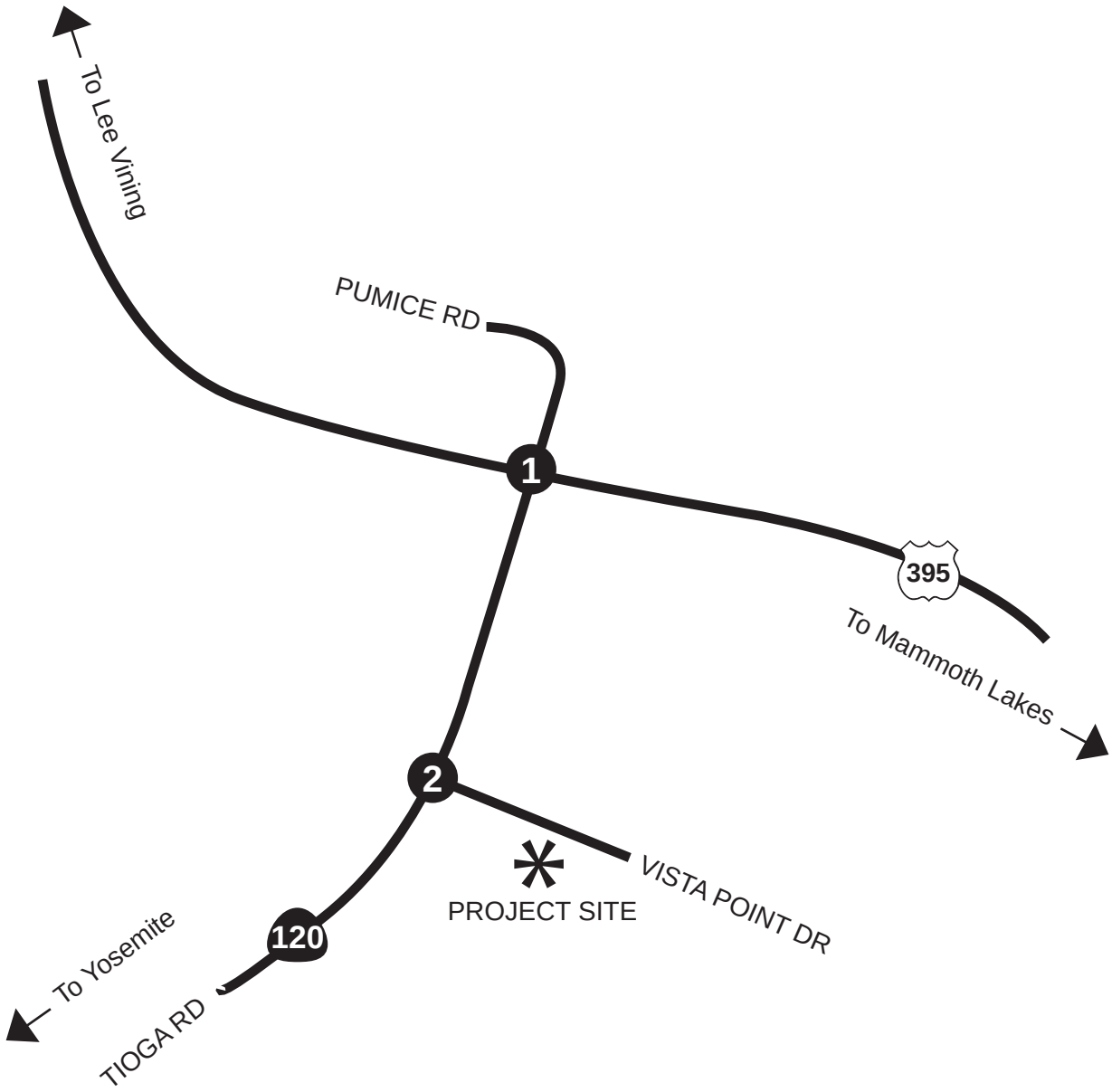


Not to Scale

MN ENGINEERING

Site Plan

Exhibit 1-3



Legend:

X Study Intersection

Not to Scale

Study Intersection Locations

2.0 Analysis Methodologies, Performance Criteria and Thresholds of Significance

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report in accordance with the County of Mono and Caltrans requirements.

This section also discusses the agency-established applicable performance criteria and thresholds of significance for the study facilities.

2.1 Intersection Analysis Methodology

Level of service (LOS) is commonly used as a qualitative description of intersection operation and is based on the capacity of the intersection and the volume of traffic using the intersection.

The Highway Capacity Manual (HCM) analysis methodology is utilized to determine the operating LOS of the study intersections consistent with the County of Mono and Caltrans requirements for evaluating intersection operations.

The *2010 HCM* analysis methodology describes the operation of an intersection using a range of LOS from LOS A (free-flow conditions) to LOS F (severely congested conditions), based on the corresponding ranges of stopped delay experienced per vehicle for signalized and unsignalized intersections shown in Table 2-1.

Table 2-1
Intersection LOS & Delay Ranges

LOS	Delay (seconds/vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10.0	≤ 10.0
B	> 10.0 to ≤ 20.0	> 10.0 to ≤ 15.0
C	> 20.0 to ≤ 35.0	> 15.0 to ≤ 25.0
D	> 35.0 to ≤ 55.0	> 25.0 to ≤ 35.0
E	> 55.0 to ≤ 80.0	> 35.0 to ≤ 50.0
F	> 80.0	> 50.0

Source: *2010 Highway Capacity Manual*

The definitions of level of service for uninterrupted flow (flow unrestrained by the existence of traffic control devices) are:

- LOS A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.

- LOS B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.

- LOS C is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream.

- LOS D represents high-density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.

- LOS E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.

- LOS F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations.

Level of service is based on the average stopped delay per vehicle for all movements of signalized intersections and all-way stop-controlled intersections; for one-way or two-way stop-controlled intersections, LOS is based on the worst stop-controlled approach.

2.2 Study Intersection Peak Hour Performance Criteria

The study intersections are all part of the State of California Highway System and under the jurisdiction and control of Caltrans.

In accordance with the *Caltrans Guide for the Preparation of Traffic Impact Studies (State of California Department of Transportation, December 2002),* Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State Highway facilities.

Hence, consistent with the *Tioga Inn Draft Specific Plan Environmental Impact Report (The Company of Eric Jay Toll, AICP, Inc., May 24, 1993),* this analysis assumes **LOS D** is the acceptable LOS for the study intersections evaluated in this study. Any study intersections operating at LOS E, or F will be considered deficient.

2.3 Study Intersection Thresholds of Significance

As previously noted, the study intersections are all part of the State of California Highway System and under the jurisdiction and control of Caltrans.

While Caltrans has not established traffic thresholds of significance, this traffic analysis utilizes the following traffic thresholds of significance:

- Any intersection operating at a deficient LOS (LOS E, or F) will be considered impacted and would require mitigation measures to achieve acceptable LOS operations (LOS A, B, C, or D).

3.0 Existing Traffic Volumes & Circulation System

This section provides a discussion of existing study area conditions and traffic volumes.

3.1 Roadway Description

The characteristics of the roadway system in the vicinity of the project site are described below:

Highway 395 (U.S. Route 395 or US-395) is a U.S. Route in the western United States. The southern terminus of the route is in the Mojave Desert at Interstate 15 near Hesperia. The northern terminus is at the Canada–US border near Laurier, where the road becomes Highway 395 upon entering British Columbia, Canada. At one time, the route extended south to San Diego. I-15 and I-215 replaced the stretch of 395 that ran from San Diego to Hesperia through Riverside and San Bernardino. "Old Highway 395" can be seen along or near I-15 in many locations before it branches off at Hesperia to head north.

US 395 runs along the Eastern Sierra in the Owens Valley and crosses through the Modoc Plateau along its route.

In the project vicinity, US-395 is a four-lane divided roadway (2 lanes in each direction of travel) traversing in the north-south direction.

Tioga Road (State Route 120 or SR-120) is located in central California. It runs from the San Joaquin Valley near Lathrop through Yosemite National Park, to its end at U.S. Route 6 in Mono County, eastern California. While the route is signed as a contiguous route through Yosemite National Park, the portion in park boundaries is federally maintained, and is not included in the state route logs. The portion at Tioga Pass is the highest paved through road in the California State Route system. This part is not maintained in the winter and is usually closed during the winter season. The road is a toll road through Yosemite National Park between the Big Oak Flats entrance and the Tioga Pass entrance. The National Park Service implemented the tolls along CA-120, along with the Central Yosemite Highway and Wawona Road to help restore funding after significant losses due to the Ferguson Fire and the construction of the rockshed underneath the site of the Ferguson Slide, which reopened the original alignment of the Central Yosemite Highway that had been closed since 2006.

In the project vicinity, SR-120 is a two-lane undivided roadway (1 lane in each direction of travel) traversing in the east-west direction.

As previously stated, generally, in terms of traffic volumes and activity, the area experiences four seasonal periods throughout the year:

- Winter season: very limited traffic activity with Tioga Road (SR-120) generally closed off to vehicular traffic;

- Non-peak spring shoulder season: traffic volumes begin to pick up as winter ends and summer approaches;

- Peak summer season: traffic volumes generally reach their highest. This season typically lasts approximately two or three months.

- Non-peak fall shoulder season: traffic volumes and activities begin to reduce as summer ends and winter approaches.

3.2 Existing Traffic Controls & Intersection Geometrics

Exhibit 3-1 identifies existing roadway conditions for the study area roadways. The number of through traffic lanes for existing roadways and the existing intersection controls are identified.

3.3 Existing Conditions Traffic Volumes

As previously noted, study area traffic conditions are very seasonal by time of day, month and vary by the time of the year. Tioga Road (SR-120) is generally closed during winter and peak traffic conditions generally occur in the summer time.

As also previously noted, during summer Thursday evenings, concert-type events are held in the lawn area of the site.

To evaluate and capture existing traffic conditions and volumes during peak traffic conditions of the study area, traffic counts were collected on Thursday July 12, 2018 and Thursday August 9, 2018 when concert-type events were being held at the project site.

As requested by the County of Mono staff, to reflect traffic conditions and evaluate potential impacts during the peak traffic season for the area, the counts were collected during the following time periods:

- AM: 8:00 AM to 10:00 AM;

- Mid-Day 12:00 PM to 2:00 PM

- PM: 4:00 PM to 6:00 PM.

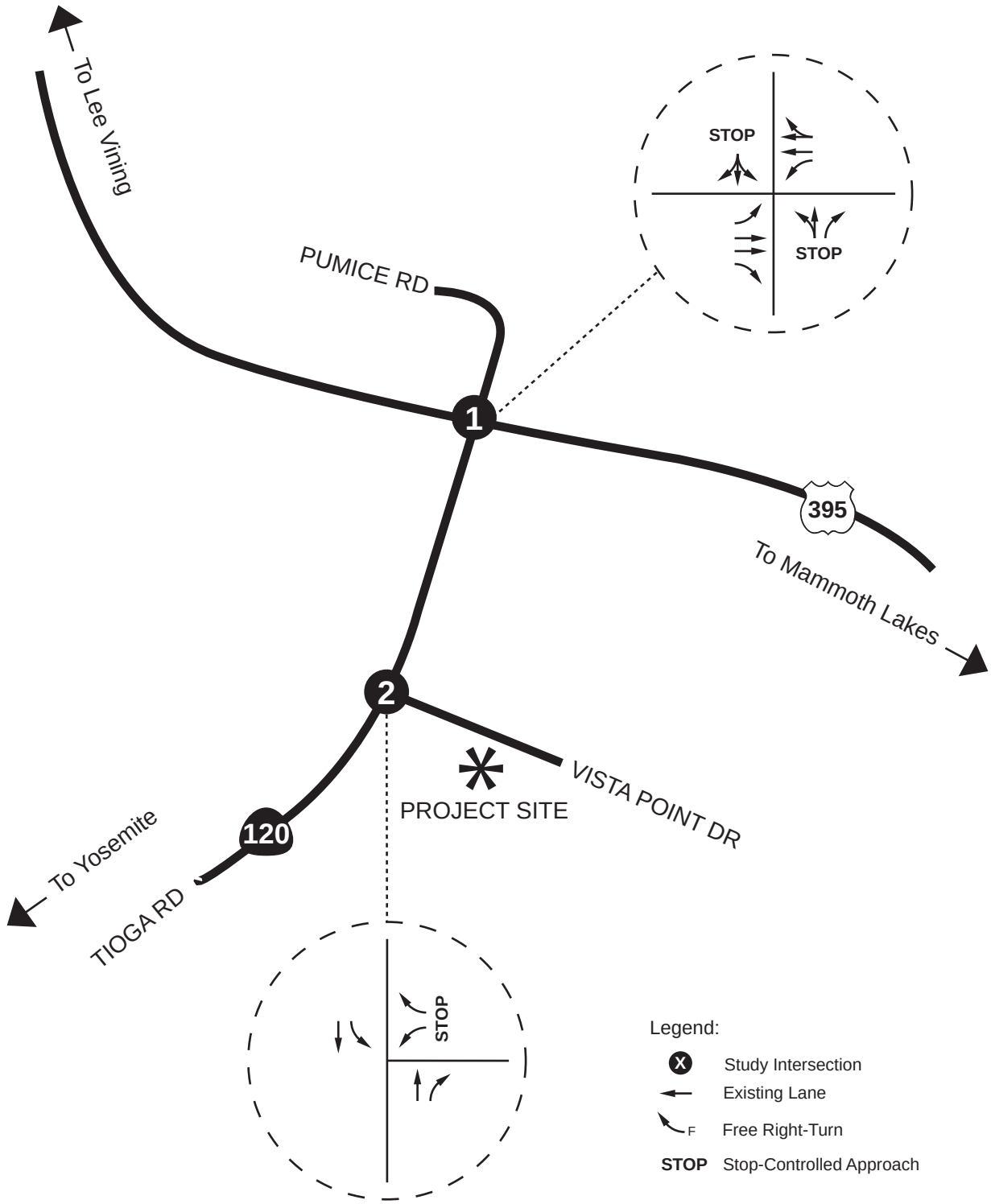
The counts used in this analysis were taken from the highest hour within the peak period counted.

Exhibit 3-2 show existing conditions traffic volumes at the study intersections; detailed traffic count data is contained in Appendix A.

The analysis also utilizes the truck percentage mix of vehicles on Highway 395 and State Route 120 based on truck traffic information published by Caltrans.

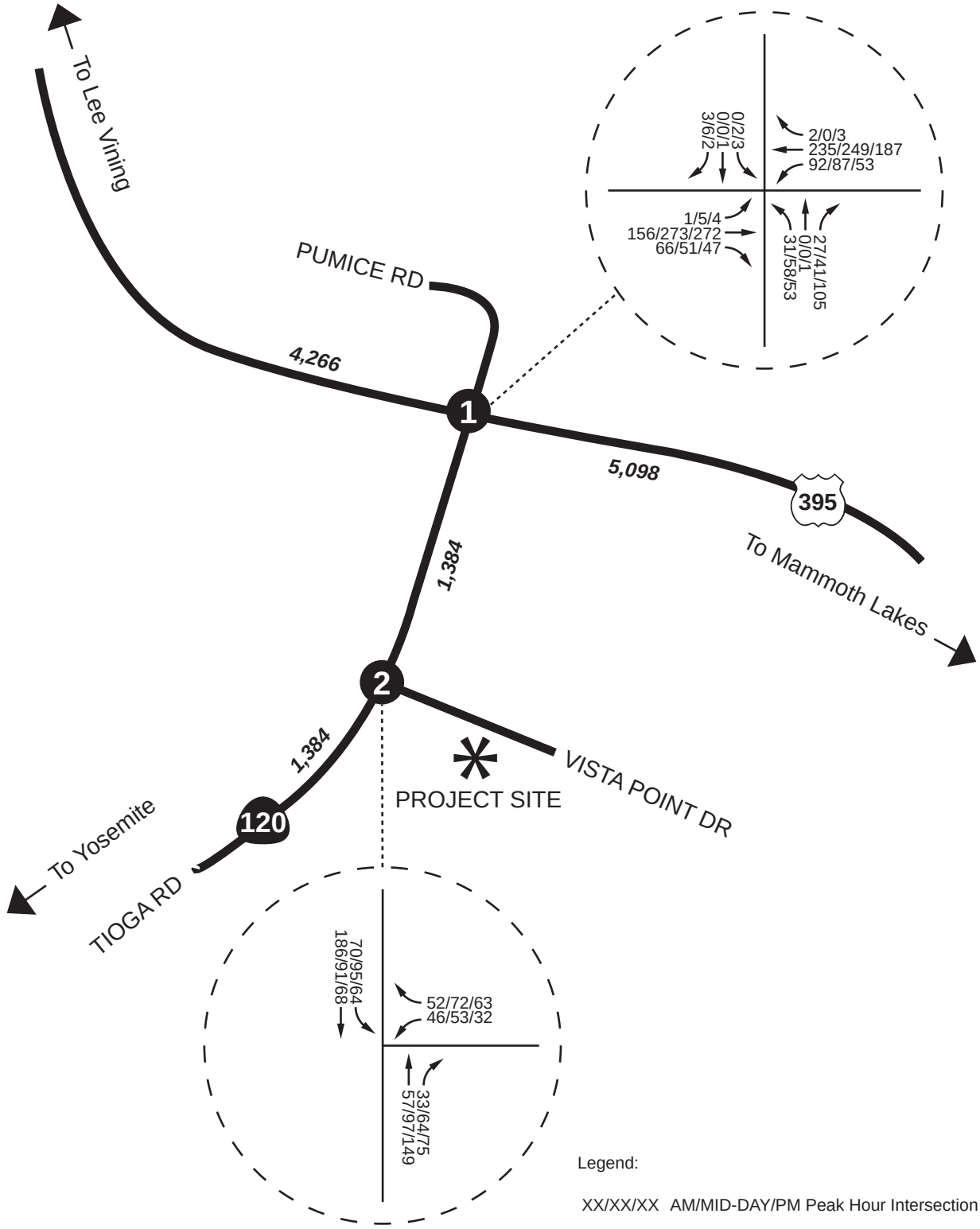
Based on the Caltrans data, on a daily basis, the traffic volume on State Route 120 in the study area vicinity consists of 14 trucks and heavy vehicles. Similarly, the traffic volume on Highway 395 in the study area vicinity consists of 19 trucks and heavy vehicles.

The level of service analysis accounts for this parameter.



Not to Scale

Existing Study Intersection Geometry & Control



Existing Conditions Traffic Volumes

4.0 Projected & Future Traffic Volumes

This section provides a discussion on methodologies utilized to derive future traffic volumes for the study area.

4.1 Project Traffic Conditions

This section provides a discussion on the methodologies utilized in determining the project's contribution of vehicular traffic to the study area.

4.1.1 Project ITE Trip Generation

Trip generation represents the amount of traffic that is attracted and produced by a development.

As previously noted, the proposed project consists of the following additional traffic-generating land uses:

- Workforce housing with 100 units, which includes approximately 150 bedrooms with a total capacity of 300 residents; and
- An additional island to the existing gas station, adding a total of 4 vehicle fueling positions (2 two-sided fuel pumps).

Trip generation for the proposed project is determined based on ITE 10th Edition trip generation rates for the proposed land uses as shown in Table 4-1.

Table 4-1
***ITE* Trip Generation Rates for Proposed Project Land Uses**

Land Use (*ITE* Code)	Units	AM Peak Hour Trip Generation Rate			Mid-Day Peak Hour Trip Generation Rate			PM Peak Hour Trip Generation Rate			Daily
		In	Out	Total	In	Out	Total	In	Out	Total	
Multi-Family Housing - Low-Rise (220)	Residents	0.05	0.23	0.28	0.20	0.12	0.32	0.20	0.12	0.32	1.42
Gas Station (944)	VFP	5.27	5.26	10.53	7.21	7.20	14.41	7.21	7.20	14.41	172.01

Source: *2017 ITE Trip Generation Manual, 10th Edition*.

Notes: Analysis utilizes the AM peak hour of generator rates for the AM Peak Hour and PM peak hour of generator rates for Mid-Day & PM Peak Hour.

VFP = Vehicle Fueling Positions

Utilizing the ITE trip generation rates shown in Table 4-1, Table 4-2 summarizes the daily and peak hour trip generation for the proposed project. It should be noted the trip generation for the proposed project has been reviewed by Mono County Department of Public Works staff prior to inclusion in this analysis.

Table 4-2
Trip Generation Summary for Proposed Project

Land Use	AM Peak Hour Trip Generation			Mid-Day Peak Hour Trip Generation			PM Peak Hour Trip Generation			Daily
	In	Out	Total	In	Out	Total	In	Out	Total	
300-Resident Workforce Housing	15	69	84	60	36	96	60	36	96	426
*Internal Trip Capture Adjustment (25%) **	*-4*	*-17*	*-21*	*-15*	*-9*	*-24*	*-15*	*-9*	*-24*	*-107*
Subtotal – Workforce Housing	***11***	***52***	***63***	***45***	***27***	***72***	***45***	***27***	***72***	***319***
Addition of 4-Vehicle Fueling Positions of Gas Station	21	21	42	29	29	58	29	29	58	688
*Internal Trip Capture Adjustment (25%) **	*-5*	*-5*	*-10*	*-7*	*-7*	*-14*	*-7*	*-7*	*-14*	*-172*
Subtotal – Gas Station	***16***	***16***	***32***	***22***	***22***	***44***	***22***	***22***	***44***	***516***
Total	**27**	**68**	**95**	**67**	**49**	**116**	**67**	**49**	**116**	**835**

Notes: * Consistent with the *Tioga Inn Specific Plan & Environmental Impact Report (The Company of Eric Jay Toll, AICP, Inc., May 24, 1993)*, the analysis assumes a 25% internal capture to account for the interaction between the compatible land uses on the site.

As shown in Table 4-2, the proposed project is forecast to generate approximately 835 daily trips which include approximately 95 AM peak hour trips, approximately 116 mid-day peak hour trips, and approximately 116 PM peak hour trips.

It should be noted the trip generation shown in Table 4-2 is considered conservative since it does not account for *ITE*'s pass-by trip reduction which is applicable to gas station and retail-related uses located along busy arterial highways attracting vehicle trips already on the roadway; this is particularly the case when the roadway is experiencing peak operating conditions. For example, a motorist already traveling along State Route 120 or Highway 395 between other destinations may stop at the proposed project site to get fuel.

4.1.2 Project Trip Distribution

Trip distribution represents the directional orientation of traffic to and from the project. Trip distribution is heavily influenced by the geographical location of the site, the location of retail, employment, recreational opportunities, and the proximity to the regional freeway system.

The project's trip distribution has been developed through discussions and review by Mono County Department of Public Works staff and is based on review of existing land uses and roadway circulation system in the project site vicinity.

Exhibit 4-1 shows the trip distribution for the project's workforce housing element.

Exhibit 4-2 shows the trip distribution for the project's gas station element.

4.1.3 Modal Split

The site currently sits adjacent to an existing bus stop serving the Yosemite Area Rapid Transit System (YARTS) located along the project site frontage on Tioga Road (SR-120). Additionally, the Eastern Sierra Transit Authority (ESTA) provides weekday service between Lone Pine and Reno (1 trip each way) with regular stops in Bishop, Mammoth Lakes and Lee Vining (the bus drop-off in Lee Vining is located about 1 miles north of the project site).

Modal split denotes the proportion of traffic generated by a project that would use any of the transportation modes, namely buses, cars, bicycles, motorcycles, trains, carpools, etc. The traffic reducing potential of public transit and other modes is significant. However, the traffic projections in this study are conservative in that public transit and alternative transportation may be able to reduce the traffic volumes, but, no modal split reduction is applied to the projections since precise quantification of the reduction is not feasible. With the implementation of additional transit service and provision of alternative transportation ideas and incentives, such as the ones discussed later in Section 8.4 of this report under Transportation Demand Management (TDM), the automobile traffic demand can be reduced significantly.

4.1.4 Project Traffic Volumes/Assignment

The assignment of traffic from the project site to the adjoining roadway system has been based upon the project's trip generation, trip distribution, and arterial highway and local street systems that are in place.

Project traffic volumes are shown on Exhibit 4-3.

4.2 Existing Plus Project Conditions Traffic Volumes

Existing Plus Project Conditions traffic volumes are derived by adding the project traffic volumes shown in Exhibit 4-3 to the existing traffic volumes shown in Exhibit 3-2.

Existing Plus Project Conditions traffic volumes are shown in Exhibit 4-4. The exhibit shows the project traffic added on top of the existing traffic volumes.

4.3 Background Traffic

4.3.1 Ambient Growth Method of Projection

To assess future conditions, project traffic is combined with existing traffic, area-wide growth, and cumulative projects' traffic.

For opening year (2023) conditions, to account for area wide/ambient growth in the study area, an annual growth rate of two percent (2%) has been applied to existing traffic volumes over a five-year period. This growth rate is based on review of past and present traffic volume data and traffic growth patterns in the study area as published by Caltrans through their annual traffic volume data and information for this area. Based on discussion with Caltrans, the 2 percent growth rate can be considered conservative for this area.

4.3.2 Cumulative Projects Traffic

The cumulative projects which are expected to affect the traffic conditions of the study area for project opening year (2023) consist of the currently approved but not yet constructed land uses on the project site which are as follows:

- 120-room hotel; and
- Restaurant use with 100 seats and a seating area of approximately 5,000 square feet (gross area of approximately 10,000 square feet).

Trip generation for the cumulative projects is determined based on ITE 10th Edition trip generation rates for the proposed land uses as shown in Table 4-3.

Table 4-3
***ITE* Trip Generation Rates for Cumulative Project Land Uses**

Land Use (*ITE* Code)	Units	AM Peak Hour Trip Generation Rate			Mid-Day Peak Hour Trip Generation Rate			PM Peak Hour Trip Generation Rate			Daily
		In	Out	Total	In	Out	Total	In	Out	Total	
High Turnover Sit-Down Restaurant (932)	TSF	8.00	6.04	14.04	9.05	8.36	17.41	9.05	8.36	17.41	112.18
Hotel (310)	Rooms	0.29	0.25	0.54	0.35	0.26	0.61	0.35	0.26	0.61	8.36

Source: *2017 ITE Trip Generation Manual, 10th Edition*.

Notes: Analysis utilizes the AM peak hour of generator rates for the AM Peak Hour and PM peak hour of generator rates for Mid-Day & PM Peak Hour.

TSF = Thousand Square Feet.

Utilizing the ITE trip generation rates shown in Table 4-3, Table 4-4 summarizes the daily and peak hour trip generation for the cumulative projects. It should be noted the trip generation for the cumulative projects has been reviewed by Mono County Department of Public Works staff prior to inclusion in this analysis.

Table 4-4
Trip Generation Summary for Cumulative Projects

Land Use (*ITE* Code)	AM Peak Hour Trip Generation			Mid-Day Peak Hour Trip Generation			PM Peak Hour Trip Generation			Daily
	In	Out	Total	In	Out	Total	In	Out	Total	
10,000 Square Feet – High Turnover Sit-Down Restaurant	80	60	140	91	83	174	91	83	174	1,122
*Internal Trip Capture Adjustment (25%) **	*-20*	*-15*	*-35*	*-23*	*-21*	*-44*	*-23*	*-21*	*-44*	*-281*
Subtotal – High Turnover Restaurant	***60***	***45***	***105***	***68***	***62***	***130***	***68***	***62***	***130***	***841***
120-Room Hotel	35	30	65	42	31	73	42	31	73	1,003
*Internal Trip Capture Adjustment (25%) **	*-9*	*-7*	*-16*	*-11*	*-7*	*-18*	*-11*	*-7*	*-18*	*-251*
Subtotal – Hotel	***26***	***23***	***49***	***31***	***24***	***55***	***31***	***24***	***55***	***752***
Total	**86**	**68**	**154**	**99**	**86**	**185**	**99**	**86**	**185**	**1,593**

Notes:

The cumulative projects consist of other currently-approved land uses planned to be constructed on the project site.

* Consistent with the *Tioga Inn Specific Plan & Environmental Impact Report (The Company of Eric Jay Toll, AICP, Inc., May 24, 1993)*, the analysis assumes a 25% internal capture to account for the interaction between the compatible land uses on the site.

As shown in Table 4-4, the cumulative projects are forecast to generate approximately 1,593 daily trips which include approximately 154 AM peak hour trips, approximately 185 mid-day peak hour trips, and approximately 185 PM peak hour trips.

It should again be noted the trip generation shown in Table 4-4 is considered conservative since it does not account for *ITE*'s pass-by trip reduction which is applicable to restaurant and retail-related uses located along busy arterial highways attracting vehicle trips already on the roadway; this is particularly the case when the roadway is experiencing peak operating conditions. For example, a motorist already traveling along State Route 120 or Highway 395 between other destinations may stop at the restaurant to get food.

Cumulative Projects traffic volumes are shown on Exhibit 4-5.

4.4 Forecast Opening Year (2023) Without Project Conditions Traffic Volumes

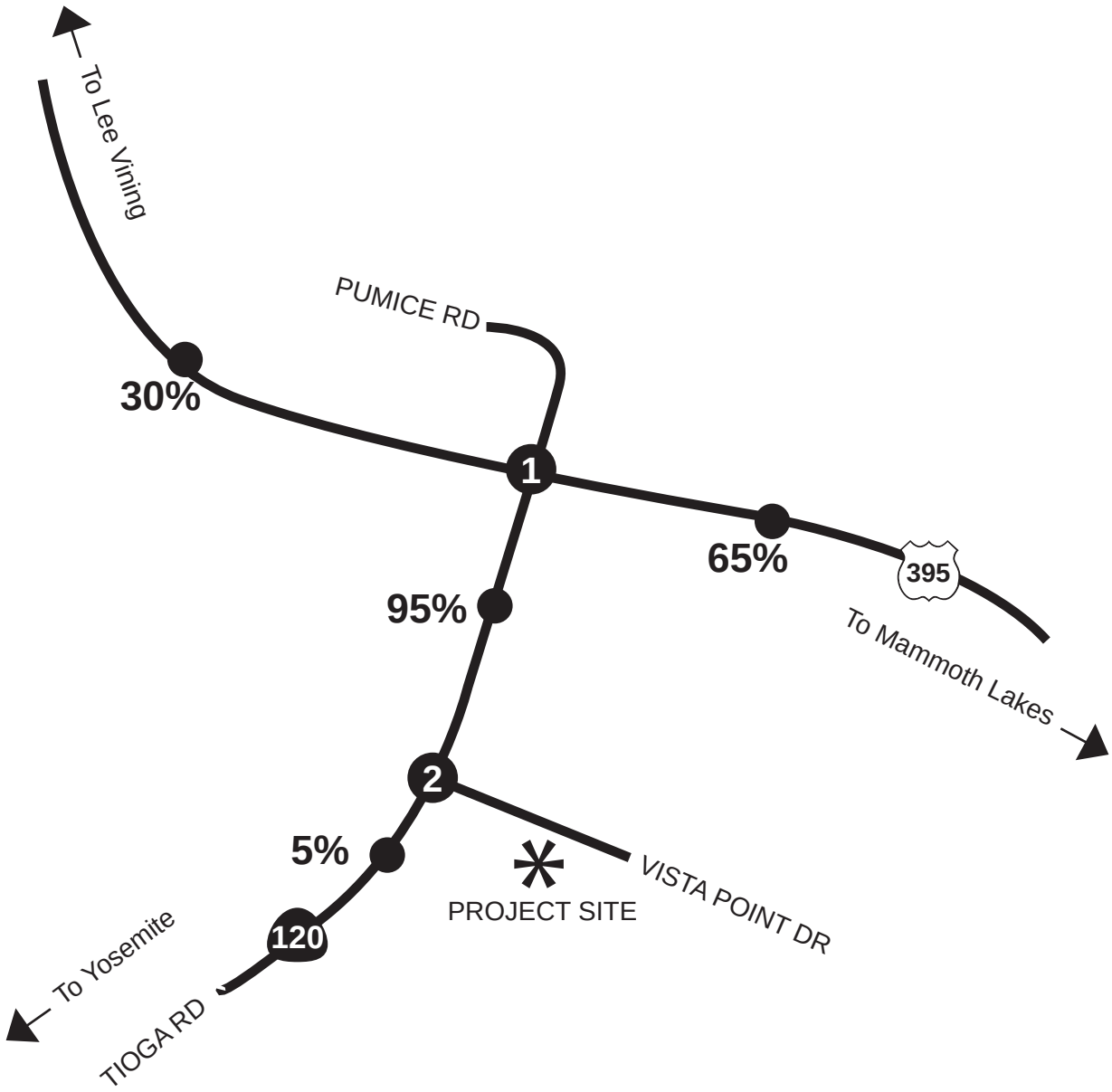
Forecast Opening Year (2023) Without Project Conditions traffic volumes consist of existing traffic volumes and a 10% growth rate (to account for five years of annual growth at a 2% rate) and also the traffic associated with cumulative projects in year 2023 as discussed in Section 4.3.2.

Forecast Opening Year (2023) Without Project Conditions traffic volumes are shown on Exhibit 4-6. The exhibit shows the traffic volumes for year 2023 after accounting for area-wide growth and background/cumulative projects, without the proposed project.

4.5 Forecast Opening Year (2023) With Project Conditions Traffic Volumes

Forecast Opening Year (2023) With Project Conditions traffic volumes are derived by adding project-generated traffic volumes to Forecast Opening Year (2023) Without Project Conditions traffic volumes.

Forecast Opening Year (2023) With Project Conditions traffic volumes are shown on Exhibit 4-7. The exhibit shows the traffic volumes for year 2023 after accounting for area-wide growth and background/cumulative projects, as well as the traffic associated with the proposed project.

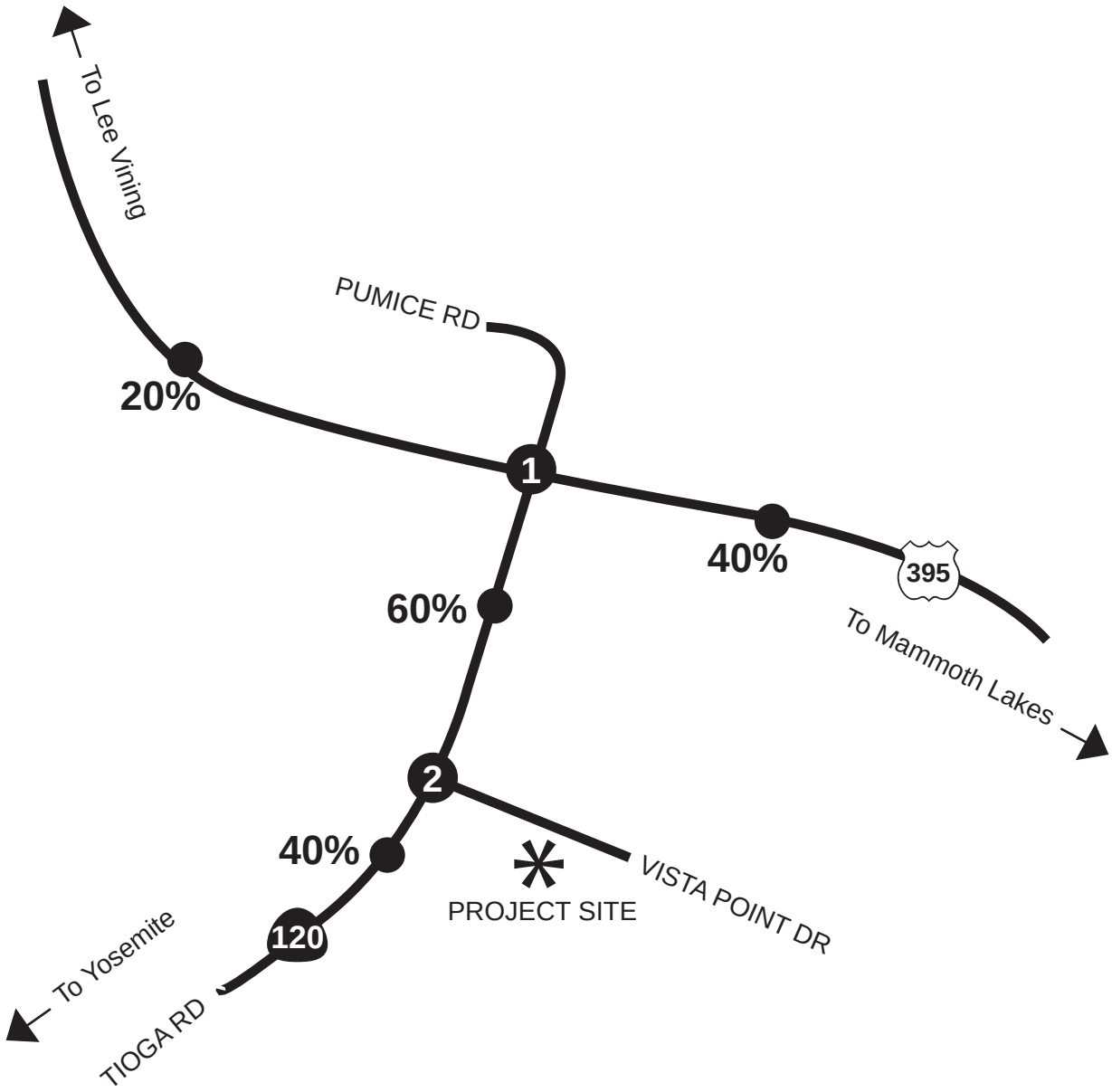


Legend:

● **XX%** Percent Trip Distribution

Not to Scale

Forecast Trip Percent Distribution of Proposed Project (Workforce Housing Element)

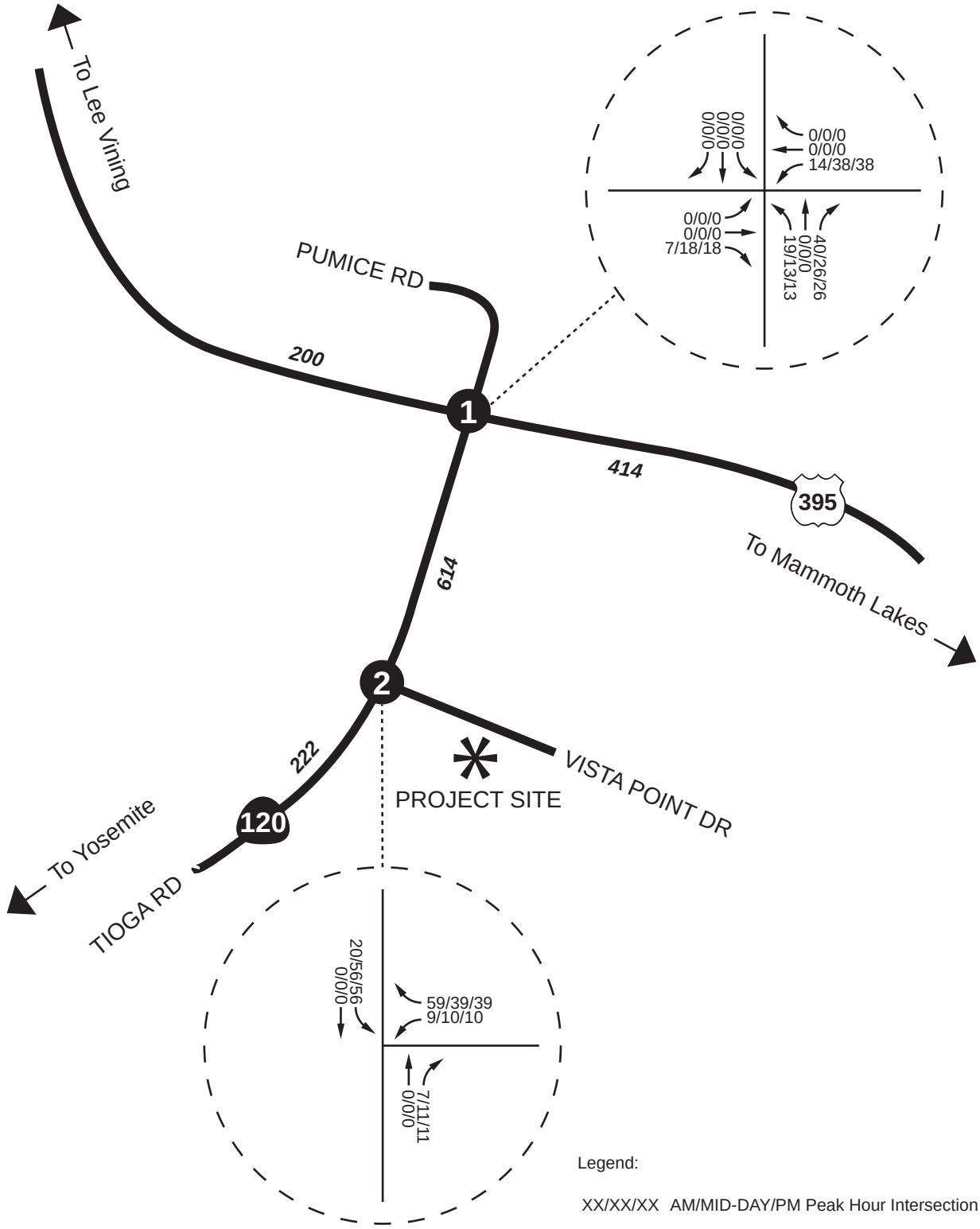


Legend:

● **XX%** Percent Trip Distribution

Not to Scale

Forecast Trip Percent Distribution of Proposed Project (Gas Station Element)



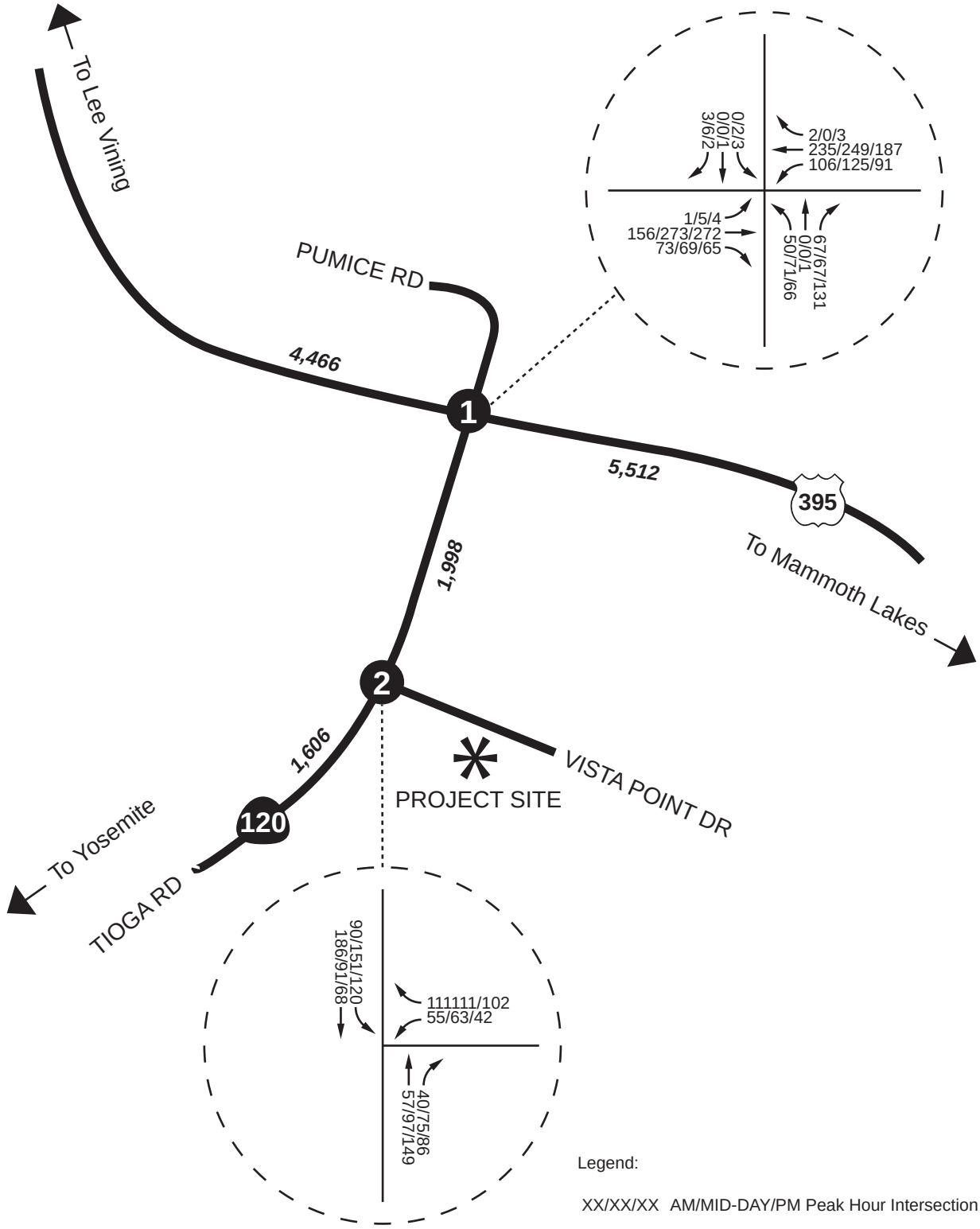
Legend:

XX/XX/XX AM/MID-DAY/PM Peak Hour Intersection Volumes

XXX Roadway Segment Average Daily Traffic Volume

Not to Scale

Project Traffic Volumes



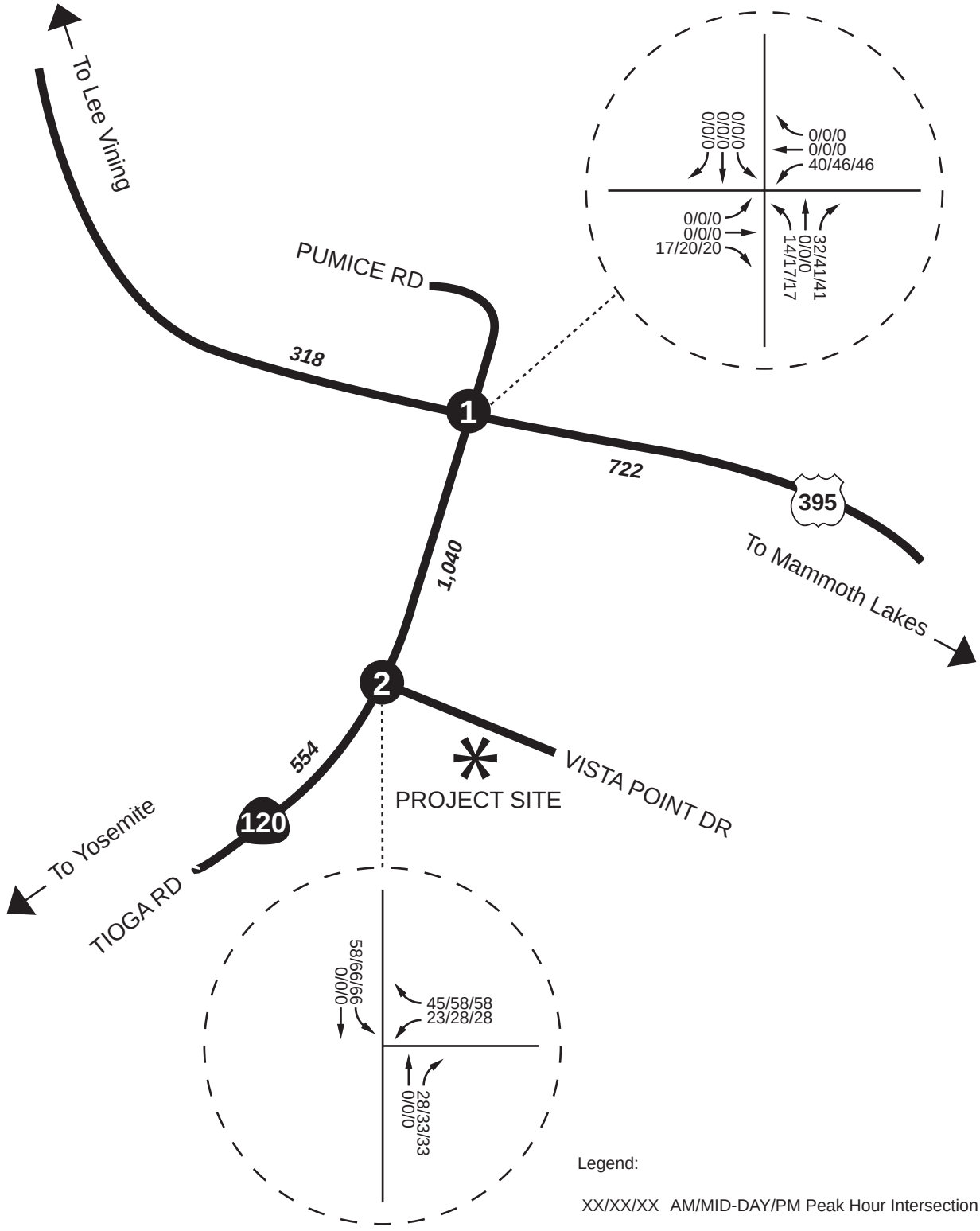
Legend:

XX/XX/XX AM/MID-DAY/PM Peak Hour Intersection Volumes

XXX Roadway Segment Average Daily Traffic Volume

Not to Scale

Existing Plus Project Conditions Traffic Volumes



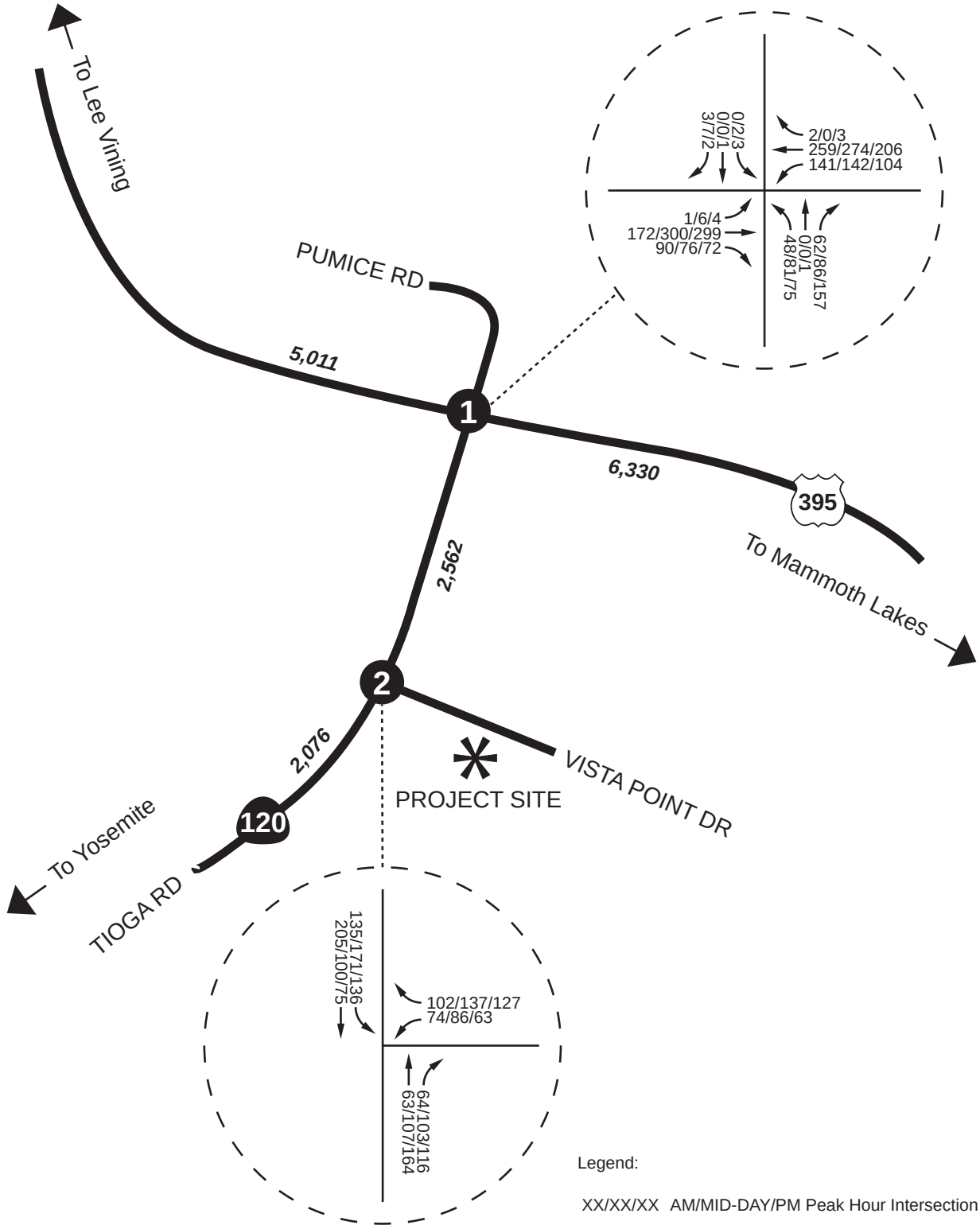
Legend:

XX/XX/XX AM/MID-DAY/PM Peak Hour Intersection Volumes

XXX Roadway Segment Average Daily Traffic Volume

Not to Scale

Cumulative Projects Traffic Volumes



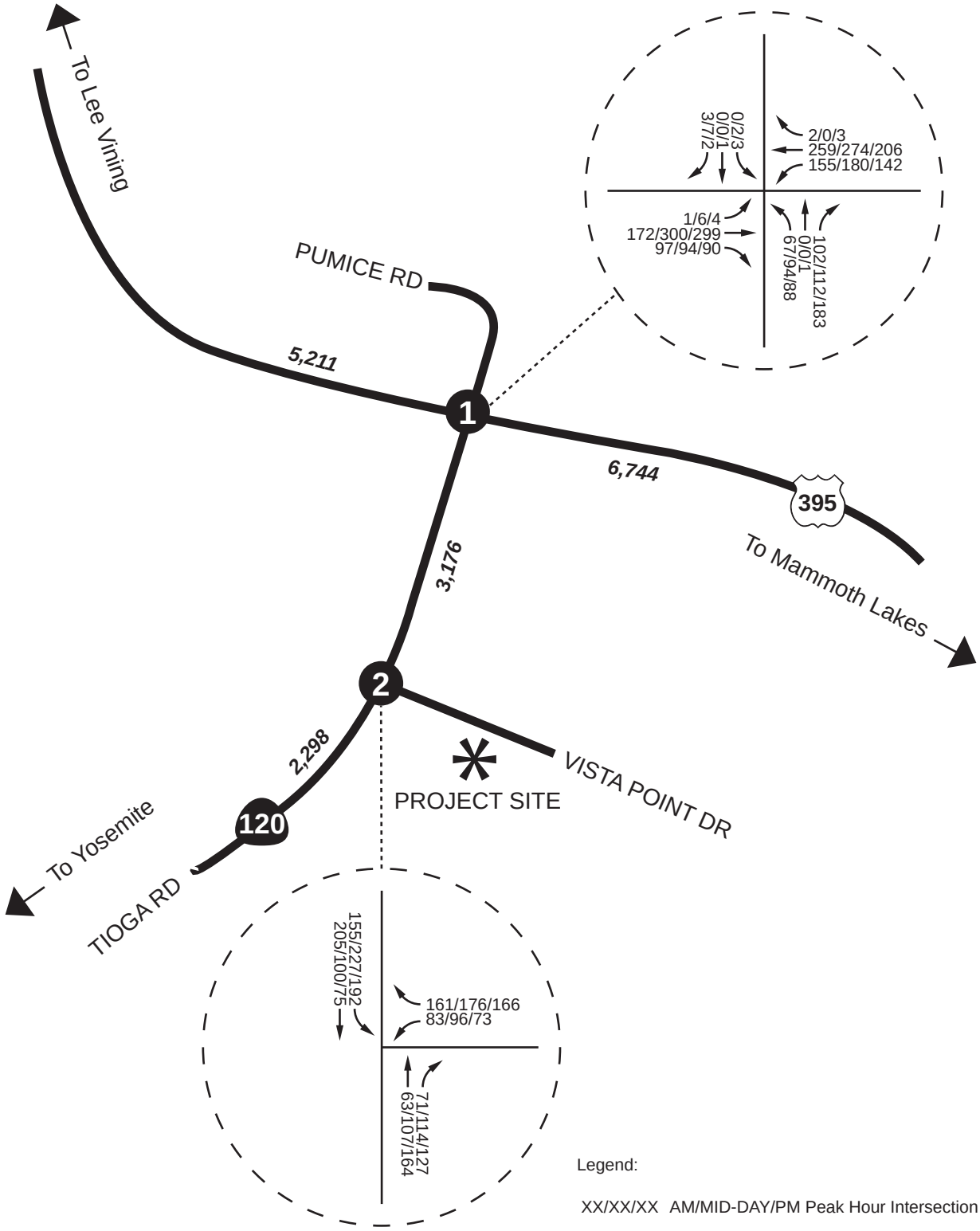
Legend:

XX/XX/XX AM/MID-DAY/PM Peak Hour Intersection Volumes

XXX Roadway Segment Average Daily Traffic Volume

Not to Scale

Forecast Opening Year (2023) Without Project Conditions Traffic Volumes



Legend:

XX/XX/XX AM/MID-DAY/PM Peak Hour Intersection Volumes

XXX Roadway Segment Average Daily Traffic Volume

Not to Scale

Forecast Opening Year (2023) With Project Conditions Traffic Volumes

5.0 MUTCD Traffic Signal Warrant Analysis

The existing Highway 395 / Tioga Road (SR-120) unsignalized study intersection has been evaluated for signalization based on the peak hour and daily warrants and procedures contained in the *California Manual on Uniform Traffic Control Devices (CA MUTCD).* The MUTCD is utilized by Caltrans.

The *California Manual on Uniform Traffic Control Devices (CA MUTCD)* peak hour methodology for evaluation of signal warrants determines if a traffic signal is warranted based on the magnitude of the traffic entering the intersection during a single hour.

Per direction received from Caltrans staff, the traffic signal warrants do not include the eastbound Tioga Road (SR-120) traffic volumes in evaluation of signal warrants since the eastbound right-turn traffic has minimal conflict with the opposing through traffic at this location

Table 5-1 summarizes the results of the *MUTCD* peak hour and daily signal warrant analysis at the Highway 395 / Tioga Road (SR-120) unsignalized study intersection for the analysis scenarios evaluated as part of this report; detailed *MUTCD* signal warrant analysis sheets are contained in Appendix B.

Table 5-1
Highway 395 / Tioga Road (SR-120) MUTCD Traffic Signal Warrant Analysis Summary

Analysis Scenario	Signal Warrant Satisfied?			
	AM Peak Hour	Mid-Day Peak Hour	PM Peak Hour	Daily
Existing Conditions	NO	NO	NO	NO
Existing Plus Project Conditions	NO	NO	NO	NO
Forecast Opening Year (2023) Without Project Conditions	NO	NO	NO	NO
Forecast Opening year (2023) With Project Conditions	NO	NO	NO	NO

As shown in Table 5-1, the Highway 395 / Tioga Road (SR-120) unsignalized study intersection does not satisfy the MUTCD traffic signal warrants for any of the analysis scenarios evaluated as part of this report.

6.0 Peak Hour Level of Service Analysis

This section provides a discussion on the study intersection peak hour level of service analysis and findings.

6.1 Existing Conditions Level of Service Analysis

Existing Conditions Level of Service (LOS) calculations for the study intersections are shown in Table 6-1 and are based upon peak hour turning movement manual counts compiled in July and August 2018; results are shown in Exhibit 3-2 and the existing geometry shown in Exhibit 3-1.

Table 6-1
Existing Conditions
Study Intersection Level of Service Analysis Summary

Study Intersection	Existing Conditions					
	AM Peak Hour		Mid-Day Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS
Highway 395 / Tioga Road (SR-120)	15.3	C	23.6	C	15.9	C
Project Access / Tioga Road (SR-120)	12.5	B	13.7	B	12.2	B

Notes:
delay shown in seconds based on 2010 Highway Capacity Manual methodology & Synchro 10 Analysis Software.

As shown in Table 6-1, all study area intersections are currently operating at an acceptable level of service (LOS D or better) during the peak hours for Existing Conditions.

Detailed LOS analysis sheets for Existing Conditions are contained in Appendix C.

6.2 Existing Plus Project Conditions Level of Service Analysis

Existing Plus Project Conditions Level of Service (LOS) calculations for the study intersections are shown in Table 6-2 and are based on the Existing Plus Project Conditions traffic volumes shown in Exhibit 4-4 and the existing geometry shown in Exhibit 3-1.

Table 6-2
Existing Plus Project Conditions
Study Intersection Level of Service Analysis Summary

Study Intersection	Existing Conditions						Existing Plus Project Conditions						Significant Impact?
	AM Peak Hour		Mid-Day Peak Hour		PM Peak Hour		AM Peak Hour		Mid-Day Peak Hour		PM Peak Hour		
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	
Highway 395 / Tioga Road (SR-120)	15.3	C	23.6	C	15.9	C	16.8	C	32.4	D	19.1	C	NO
Project Access / Tioga Road (SR-120)	12.5	B	13.7	B	12.2	B	13.3	B	17.2	C	14.6	B	NO

Notes:
Delay shown in seconds based on 2010 Highway Capacity Manual methodology & Synchro 10 Analysis Software.

As shown in Table 6-2, all study area intersections are forecast to continue to operate at an acceptable level of service (LOS D or better) during the peak hours for Existing Plus Project Conditions.

As also shown in Table 6-2, based on agency-established thresholds of significance, the proposed project is forecast to result in a less-than significant traffic impact at the study intersections for Existing Plus Project Conditions.

Detailed LOS analysis sheets for Existing Plus Project Conditions are contained in Appendix D.

6.3 Forecast Opening Year (2023) Without Project Conditions Level of Service Analysis

Forecast Opening Year (2023) Without Project Conditions Level of Service (LOS) calculations for the study intersections are shown in Table 6-3; the calculations are based on the Forecast Opening Year (2023) Without Project Conditions traffic volumes shown in Exhibit 4-6 and the existing geometry shown in Exhibit 3-1.

Table 6-3
Forecast Opening Year (2023) Without Project Conditions
Study Intersection Level of Service Analysis Summary

Study Intersection	Forecast Opening Year (2023) Without Project Conditions					
	AM Peak Hour		Mid-Day Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS
Highway 395 / Tioga Road (SR-120)	20.2	C	**48.5**	**E**	22.4	C
Project Access / Tioga Road (SR-120)	16.4	C	21.3	C	16.8	C

Notes:
delay shown in seconds based on 2010 Highway Capacity Manual methodology & Synchro 10 Analysis Software.

Deficient operation and significant impact shown in **bold.**

As shown in Table 6-3, all study area intersections are forecast to continue to operate at an acceptable level of service (LOS D or better) during the peak hours for Forecast Opening year (2023) Without Project Conditions with the exception of the following study intersection which is forecast to operate at a deficient level of service (LOS E or worse) during one or more of the analysis peak hours:

- Highway 395 / Tioga Road (SR-120) (Mid-day peak hour).

The deficiency is resulted from the addition of background trips and the traffic associated with the background/cumulative projects in the area, without the project traffic being added.

Detailed LOS analysis sheets for Forecast Opening Year (2023) Without Project Conditions are contained in Appendix E.

6.4 Forecast Opening Year (2023) With Project Conditions Level of Service Analysis

Forecast Opening Year (2023) With Project Conditions Level of Service (LOS) calculations for the study intersections are shown in Table 6-4 and are based on the Forecast Opening Year (2023) With Project Conditions traffic volumes shown in Exhibit 4-7 and the existing geometry shown in Exhibit 3-1.

Table 6-4
Forecast Opening Year (2023) With Project Conditions
Study Intersection Level of Service Analysis Summary

Study Intersection	Forecast Opening Year (2023) Without Project Conditions						Forecast Opening Year (2023) With Project Conditions						Significant Impact?
	AM Peak Hour		Mid-Day Peak Hour		PM Peak Hour		AM Peak Hour		Mid-Day Peak Hour		PM Peak Hour		
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	
Highway 395 / Tioga Road (SR-120)	20.2	C	**48.5**	**E**	22.4	C	23.2	C	**88.5**	**F**	29.6	D	**YES**
With Traffic Signal	---	---	---	---	---	---	*10.8*	*B*	*11.4*	*B*	*11.0*	*B*	*NO*
With One-Lane Roundabout	---	---	---	---	---	---	*9.9*	*A*	*15.9*	*C*	*11.4*	*B*	*NO*
Project Access / Tioga Road (SR-120)	16.4	C	21.3	C	16.8	C	18.1	C	32.0	D	22.4	C	NO

Notes:
For unsignalized and signalized locations, delay shown in seconds based on 2010 Highway Capacity Manual methodology & Synchro 10 Analysis Software.

For roundabouts, delay shown in seconds based on 2010 Highway Capacity Manual methodology & aaSIDRA 6.1 Analysis Software.

Deficient operation and significant impact shown in **bold.**

As shown in Table 6-4, all study area intersections are forecast to continue to operate at an acceptable level of service (LOS D or better) during the peak hours for Forecast Opening year (2023) With Project Conditions with the exception of the following study intersection which is forecast to continue to operate at a deficient level of service (LOS E or worse) during one or more of the analysis peak hours:

- Highway 395 / Tioga Road (SR-120) (Mid-day peak hour).

As also shown in Table 6-4, based on agency-established thresholds of significance, the proposed project is forecast to result in a significant traffic impact at the following study intersection for Forecast Opening Year (2023) With Project Conditions:

- Highway 395 / Tioga Road (SR-120) (Mid-day peak hour).

It should be noted in accordance with the HCM methodology, for one-way or two-way stop-controlled intersections, LOS is based on the worst stop-controlled approach.

Hence, the identified deficient operation and excess delay at the Highway 395 / Tioga Road (SR-120) intersection is experienced only by vehicles on the minor street (stop controlled Tioga Road approach) of the intersection which are performing a left-turn maneuver onto northbound Highway 395. Vehicles traveling along the major roadway (Highway 395) have free flow movement with minimal delay and the overall average delay of the intersection is 10.6 seconds (equivalent to LOS B).

Detailed LOS analysis sheets for Forecast Opening Year (2023) With Project Conditions are contained in Appendix F.

As previously shown in Section 5.0 of this report, the Highway 395 / Tioga Road (SR-120) unsignalized study intersection does not satisfy MUTCD traffic signal warrants for any of the analysis scenarios evaluated as part of this report. Hence, installation of a traffic signal is not warranted and recommended.

Extensive discussions have been held with both Caltrans District 9 and County of Mono staff regarding potential mitigation measures for the Highway 395 / Tioga Road (SR-120) study intersection. Various mitigation measures including signalization, installation of a roundabout, and other less significant modifications have been discussed and evaluated for feasibility and none of the potential modifications have found to be feasible by the agencies.

Hence, the project is found to have a significant and unavoidable impact at the Highway 395 / Tioga Road (SR-120) study intersection during mid-day conditions for Forecast Opening Year (2023) With Project Conditions.

For information purposes, the following two alternatives mitigation measures have been evaluated to improve the operation of the intersection to an acceptable level (LOS D or better). The options are presented as alternatives for consideration by Caltrans for this intersection since both are forecast to achieve acceptable level of service:

- *Highway 395 / Tioga Rd (SR-120) Improvement Alternative A:* Signalize the intersection.

  As shown in Table 6-4, installation of a traffic signal is forecast to achieve acceptable level of service (LOS D or better) at the study intersection for Forecast Opening Year (2023) With Project Conditions and the project's identified significant impact would be reduced to a level considered less than significant.

  Detailed LOS analysis sheets for Forecast Opening Year (2023) With Project Conditions with traffic signal are contained in Appendix G.

- *Highway 395 / Tioga Rd (SR-120) Improvement Alternative B: Convert to a Single-Lane Roundabout*.

  As shown in Table 6-4, conversion of the intersection to a single-lane roundabout is forecast to achieve acceptable level of service (LOS D or better) at the study intersection for Forecast Opening Year (2023) With Project Conditions and the project's identified significant impact would be reduced to a level considered less than significant.

  Detailed LOS analysis sheets for Forecast Opening Year (2023) With Project Conditions with single-lane roundabout are contained in Appendix H.

  If a two-lane roundabout is installed, it is expected to provide even further increased capacity compared to a single-lane roundabout.

However, as previously noted, none of the potential modifications have found to be feasible by the Caltrans and Mono County staff. Hence, the project is found to have a significant and unavoidable impact at the Highway 395 / Tioga Road (SR-120) study intersection during mid-day conditions for Forecast Opening Year (2023) With Project Conditions

As also previously noted, this analysis evaluates traffic conditions during the peak traffic season which is approximately two to three months in length. As requested by Caltrans, to further evaluate the extent of the project's identified mid-day traffic impact for Forecast Opening Year (2023) With Project Conditions, MAT Engineering, Inc., has collected mid-day traffic volumes at the intersection of Highway 395 / Tioga Road (SR-120) during the non-peak season in October 2019. The non-peak season October 2019 mid-day counts are contained in Appendix A.

Exhibit 6-1 shows the Non-peak season mid-day traffic volumes at the Highway 395 / Tioga Road (SR-120) study intersections for the study scenarios evaluated as part of this report.

The same methodologies previously discussed in Section 4.0 of this report were utilized to derive all future non-peak season traffic volumes at this intersection.

Non-peak Season Mid-Day Level of Service (LOS) calculations at the Highway 395 / Tioga Road (SR-120) study intersection for the analysis scenarios evaluated as part of the report are shown in Table 6-5.

Table 6-5
Highway 395 / Tioga Road (SR-120) Study Intersection
***Non-Peak Season Mid-Day* Conditions**
Level of Service Analysis Summary

Study Intersection	Existing Conditions		Existing Plus Project Conditions		Forecast Opening Year (2023) Without Project Conditions		Forecast Opening Year (2023) With Project Conditions	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Highway 395 / Tioga Road (SR-120)	12.7	B	14.9	B	16.5	C	20.6	C

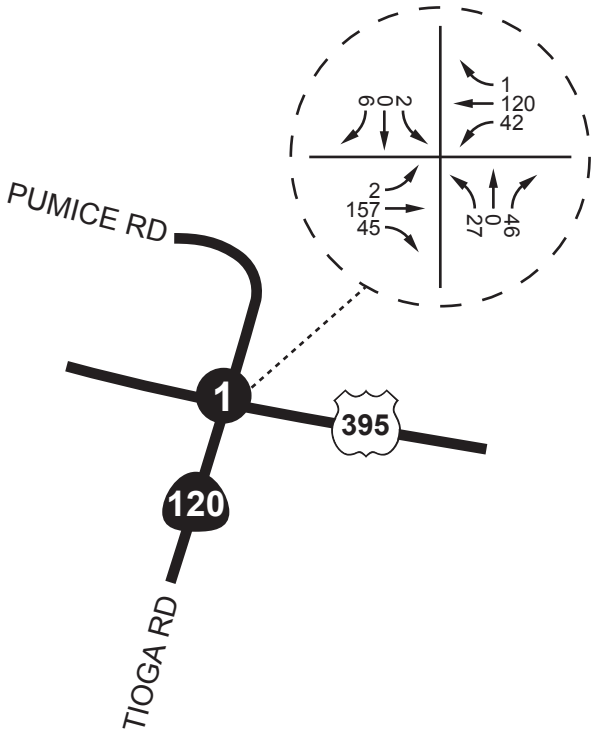
Notes:
Delay shown in seconds based on 2010 Highway Capacity Manual methodology & Synchro 10 Analysis Software.

As shown in Table 6-5, during non-peak season mid-day conditions the Highway 395 / Tioga Road (SR-120) is currently operating at an acceptable level of service (LOS D or better) and is forecast to continue to operate at an acceptable level of service (LOS D or better) for all the analysis scenarios evaluated as part of this report.

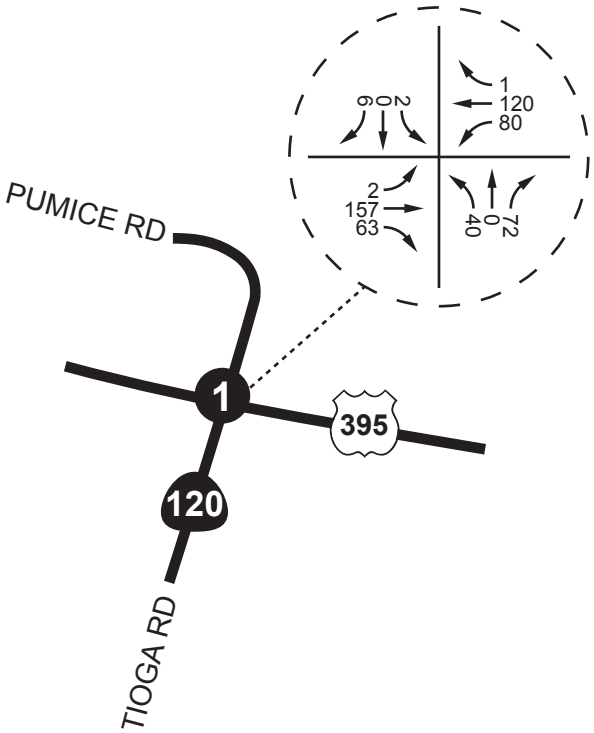
Detailed LOS analysis sheets for Non-Peak Season Mid-Day Conditions at the Highway 395 / Tioga Road (SR-120) are contained in Appendix I.

Hence, the deficient mid-day level of service deficiency and related traffic impact is forecast to only occur during the two to three months of peak traffic conditions in the area.

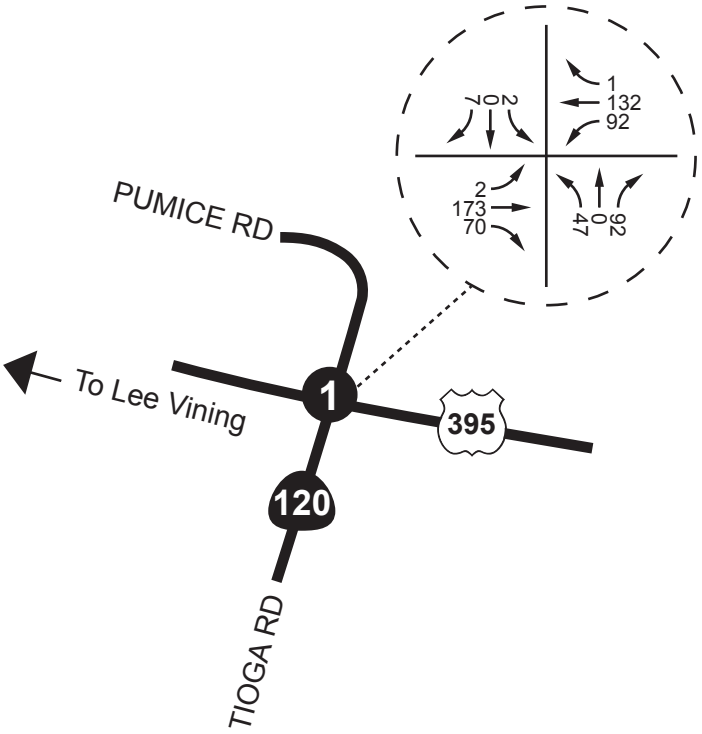
Nevertheless, based on the peak season traffic conditions and volumes, the project is found to have a significant and unavoidable impact at the Highway 395 / Tioga Road (SR-120) study intersection during mid-day conditions for Forecast Opening Year (2023) With Project Conditions.



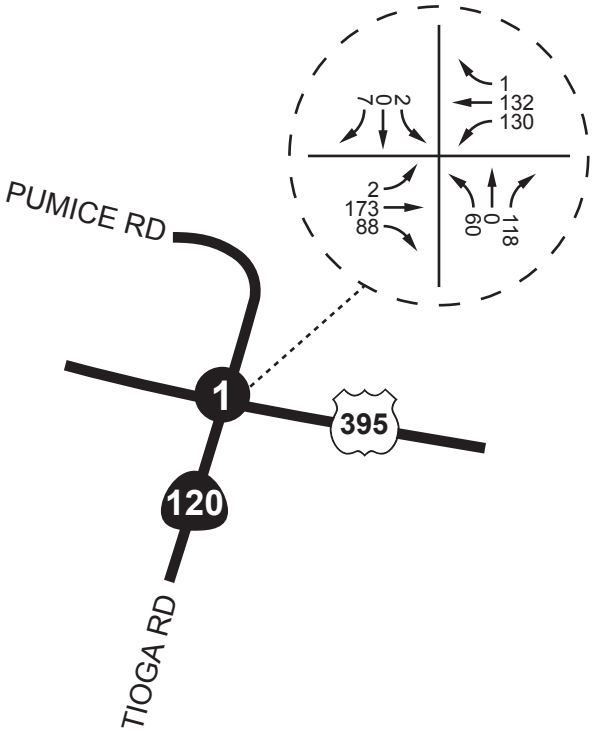
Existing Conditions



Existing Plus Project Conditions



Forecast Opening Year (2023) Without Project Conditions



Forecast Opening Year (2023) With Project Conditions

Not to Scale

Legend:
XX MID-DAY Peak Hour Intersection Volumes

Highway 395 / Tioga Road (SR-120) Study Intersection Non-Peak Season Mid-Day Conditions Traffic Volumes

7.0 Peak Hour Vehicular Queue Analysis

Caltrans has previously reviewed the Notice of Preparation for the proposed project and has provided comments which were contained in a comment letter dated November 17, 2016.

As requested by Caltrans in the comment letter, a peak hour 95th percentile vehicular queue evaluation has been prepared to determine the required turn lane storage to accommodate the forecast traffic volumes at the study intersections. The queue analysis has been prepared for Forecast Opening Year (2023) With Project Conditions, which is the most trip-intensive scenario evaluated as part of this report.

The analysis utilizes the Highway Capacity Manual (HCM) 95th percentile methodology which estimates the vehicular queues with a probability of five percent or less of being exceeded. This methodology is commonly utilized for design of storage lanes and determination of turn lane pocket lengths.

It should be noted, Caltrans does not have established and adopted performance criteria and significant impact thresholds for vehicular queuing. Hence, the vehicular queuing analysis presented in this report is strictly for informational purposes.

Table 7-1 summarizes the results of the HCM 95th percentile vehicular queue evaluation.

Table 7-1
Forecast Opening Year With Project Conditions
HCM 95th Percentile Vehicular Queue Analysis Summary

Study Intersection & Movement	Existing Turn Lane Storage (Feet)	AM Peak Hour		Mid-Day Peak Hour		PM Peak Hour		Adequate Storage?
		Peak Hour Volume	Queue (Feet)	Peak Hour Volume	Queue (Feet)	Peak Hour Volume	Queue (Feet)	
Highway 395 / Tioga Road (SR-120)								
NB Highway 395 Left-Turn Lane	270	155	*12.5*	180	*20.0*	142	*12.5*	YES
SB Highway 395 Right-Turn Lane	380	97	*Nom*	94	*Nom*	90	*Nom*	YES
EB Tioga Rd (SR-120) Shared Through/Left-Turn Lane	800*	67	*27.5*	94	*125.0*	89	*45.0*	YES
Project Access / Tioga Road (SR-120)								
NB Project Access Left-Turn Lane	95	83	*25.0*	96	*60.0*	73	*30.0*	YES
SB Project Access Right-Turn Lane	95	161	*17.5*	176	*25.0*	166	*22.5*	YES
EB Tioga Rd (SR-120) Right-Turn Lane	275	71	*Nom*	114	*Nom*	127	*Nom*	YES
WB Tioga Rd (SR-120) Left-Turn Lane	70	155	*10.0*	227	*22.5*	192	*17.5*	YES

Notes:
Vehicular queue is based on 2010 Highway Capacity Manual 95th percentile methodology & Synchro 10 Analysis Software.

* Distance measured to the nearest/next intersection; Nom = Nominal

As shown in Table 7-1, the existing vehicular storage capacities are forecast to be adequate to accommodate the 95th percentile vehicular queues at the study intersections for Forecast Opening Year (2023) With Project Conditions.

As also shown in Table 7-1, for Forecast Opening Year (2023) With Project Conditions, approximately 227 vehicles are expected to turn left into the project site from Tioga Road (SR-120) during the mid-day peak hour. If needed in the future, this left-turn storage can be extended to provide additional storage capacity beyond the existing capacity by restriping within the existing right-of-way.

8.0 Evaluation of Other Elements

This section provides a discussion and recommendations on the following elements related to the study area and circulation system:

- Collision History and Patterns at the Highway 395 / Tioga Road (SR-120) study intersection;
- Pedestrian & Bicycle Circulation System;
- Caltrans Right-of-Way Acquisition and parking along the Tioga Road frontage; and
- Transportation Demand Management (TDM) recommendations.

8.1 Highway 395 / Tioga Road (SR-120) Collision History

To determine the frequency and patterns of collisions at the Highway 395 / Tioga Road (SR-120) intersection, MAT Engineering reviewed the collision history at the intersection through the California Highway Patrol Statewide Integrated Traffic Records System (SWITRS) database.

The database contains collision history for all jurisdictions reported through local police department and also the Highway Patrol. Data was reviewed for years 2010 through present (2018).

Table 8-1 summarizes the collision history for the intersection.

Table 8-1
Highway 395 / Tioga Road (SR-120) Collision History

Year	Collisions by Category						
	Improper Turn	Unsafe Speed	Right of Way	Travel on Wrong Side	Lane Change	Other *	Total
2010	1	2	1	1	1	1	**7**
2011	1	2	3	0	1	5	**12**
2012	3	5	0	0	0	3	**11**
2013	0	1	1	0	0	1	**3**
2014	1	1	1	0	0	3	**6**
2015	2	3	2	0	0	0	**7**
2016	1	4	0	0	0	0	**5**
2017	2	0	1	0	0	1	**4**
2018	0	2	1	0	0	2	**5**
Total	***11***	***20***	***10***	***1***	***2***	***16***	***60***

Notes:
Source: Statewide Integrated Traffic Records System (SWITRS) for Mono County region accessed in October 2018.

* Mostly consists of collisions of vehicles with wildlife.

As shown in Table 8-1, based on the SWITRS database, there are a total of 60 reported collisions at the Highway 395 / Tioga Road (SR-120) intersection from 2010 to present (2018).

Twenty of the 60 collisions are attributed to high travel speeds.

A substantial number of the collisions are suspected to be a result of high rates of travel speed on Highway 395 near the Tioga Road intersection in addition to limited visibility and sight distance for vehicles approaching the Highway 395 / Tioga Road (SR-120) intersection.

Based on the review of the SWITRS data, there are not a substantial number of collisions reported at the Project Site Access / Tioga Road (SR-120) intersection.

However, based on field observations, drivers traveling eastbound on Tioga Road and approaching the project site access from the Yosemite Park area, appear to sometimes mistakenly shift into the existing right-turn lane into the project site access as they are looking to turn right and southbound onto Highway 395.

Caltrans is considering plans to integrate 'Traffic Calming' improvements on US 395 through Lee Vining, and enhanced safety upgrades at the intersection of Highway 395/ Tioga Road (SR-120) as well as along the apron on both sides of the entry to Tioga Mart, and pedestrian access along 395. Other relevant improvements may also be considered.

Based on the foregoing analysis, it is recommended as part of the improvement project for the State Highway system in this area, that Caltrans consider the following:

- Reduce travel speeds on Highway 395 by implementation of effective traffic calming measures such as narrowing of travel lanes, etc.,
- Provide additional advanced warning signs and/or flashing beacons for vehicles approaching the Highway 395 / Tioga Road (SR-120) intersection;
- Provide additional advanced warning signs and lane assignment information for vehicles approaching the Project Site Access / Tioga Road (SR-120) intersection;
- Consider alternative lane striping options to better and more clearly delineate the right-turn lane entering the project site access from Tioga Road; and
- Increase law enforcement presence.

8.2 Pedestrian & Bicycle Circulation System

To improve the pedestrian and bicycle circulation between the project site and Lee Vining, it is recommended a pedestrian link between the project site and Lee Vining be provided by Caltrans to increase walkability, reduce parking demand in town, and enhance the visitor experience.

Caltrans might want to consider a pedestrian connection across Tioga Road (SR-120), and work with applicable agencies to identify additional alternatives and options for improving pedestrian and bicycle connectivity and circulation.

8.3 Caltrans Right-of-Way Acquisition

Another project element pertains to Caltrans' sale of a 70-foot wide portion of the Tioga Road (SR-120) right-of-way easement to the project applicant. The easement extends for a distance of 1,170-feet adjacent to the Tioga site. A portion of this easement (west of the entry) has long

been used informally by Tioga Mart customers as a picnic and play area. The ownership transfer will facilitate long-term use of the picnic area by customers, and provide greater flexibility in design of the land adjacent to and north of the hotel.

Caltrans will continue to own the remaining SR120 right of way, which includes an apron (east and west of the entry) that is used heavily by motorists as a Mono Lake vista point, and also used as an overflow parking area by Tioga Mart patrons.

The following is recommended for implementation by Caltrans and the project applicant:

- Improve and maintain the area to continue to provide parking for patrons and visitors;
- To reduce conflicts between vehicles traveling along Tioga Road (SR-120) and vehicles accessing the parking area, consider implementing a designated point of ingress and egress for this parking area.
- Provide a parking arrangement that maintains adequate sight distance at the project site access on Tioga Road (SR-120); and
- Relocate the existing YARTS bus stop in a manner to maintain adequate sight distance for the Project Site Access / Tioga Road (SR-120) intersection and also minimize conflicts between the busses and vehicles parking in this area or accessing the project site.

8.4 Transportation Demand Management (TDM) Recommendations

TDM is a program of information, encouragement and incentives provided by local or regional organizations to help people know about and use all their transportation options to optimize all modes in the system – and to counterbalance the incentives to drive that are so prevalent in subsidies of parking and roads. These are both traditional and innovative technology-based services to help people use transit, ridesharing, walking, biking, and telework.

8.5 Vehicle Miles Traveled (VMT) Analysis

The County of Mono and Caltrans do not currently have adopted and established threshold of significance for vehicles miles traveled (VMT) analysis and impact. An analysis of VMT has been included in this report for informational purposes.

Table 8-2 summarizes the project's weekday, Saturday, Sunday and overall VMT based on data from the air quality model analysis. The table shows the VMT for both the proposed project as well as the cumulative projects (currently approved hotel and restaurant).

Table 8-2
Forecast Vehicle Miles Traveled (VMT)

Land Use	Annual VMT (miles)
Proposed Project	
Housing	913,057
Gas Station	276,785
Total Proposed Project	1,189,842
Cumulative Projects	
Restaurant	950,261
Hotel	1,511,699
Total Cumulative Projects	2,461,960
Total Proposed Project & Cumulative Projects	***3,651,802***

Notes:
Source: Proposed Project's Air Quality Analysis Model.

As shown in Table 8-2, the proposed project is forecast to result in an annual VMT of 1,189,842 miles.

As also shown in Table 8-2, the cumulative projects are forecast to result in an annual VMT of 2,461,960 miles.

Hence, the proposed project and the cumulative projects combined are forecast to result in an annual VMT of 3,651,802 miles.

9.0 Findings, Conclusions & Recommendations

Provided below is a summary of key findings, conclusions and recommendation of this traffic impact assessment:

9.1 Level of Service & Impact Analysis Summary

Existing Conditions

All study area intersections are currently operating at an acceptable level of service (LOS D or better) during the peak hours for Existing Conditions.

Existing Plus Project Conditions

All study area intersections are forecast to continue to operate at an acceptable level of service (LOS D or better) during the peak hours for Existing Plus Project Conditions.

Based on agency-established thresholds of significance, the proposed project is forecast to not result in a significant traffic impact at the study intersections for Existing Plus Project Conditions.

Forecast Opening Year (2023) Without Project Conditions

All study area intersections are forecast to continue to operate at an acceptable level of service (LOS D or better) during the peak hours for Forecast Opening year Without Project Conditions with the exception of the following study intersection which is forecast to operate at a deficient level of service (LOS E or worse) during one or more of the analysis peak hours:

- Highway 395 / Tioga Road (SR-120) (Mid-day peak hour).

Forecast Opening Year (2023) With Project Conditions

All study area intersections are forecast to continue to operate at an acceptable level of service (LOS D or better) during the peak hours for Forecast Opening year (2023) With Project Conditions with the exception of the following study intersection which is forecast to continue to operate at a deficient level of service (LOS E or worse) during one or more of the analysis peak hours:

- Highway 395 / Tioga Road (SR-120) (Mid-day peak hour).

Based on agency-established thresholds of significance, the proposed project is forecast to result in a significant traffic impact at the following study intersection for Forecast Opening Year (2023) With Project Conditions:

- Highway 395 / Tioga Road (SR-120) (Mid-day peak hour).

It should be noted in accordance with the HCM methodology, for one-way or two-way stop-controlled intersections, LOS is based on the worst stop-controlled approach.

Hence, the identified deficient operation and excess delay at the Highway 395 / Tioga Road (SR-120) intersection is experienced only by vehicles on the minor street (stop controlled Tioga Road approach) of the intersection which are performing a left-turn maneuver onto northbound Highway 395. Vehicles traveling along the major roadway (Highway 395) have free flow movement with minimal delay and the overall average delay of the intersection is 10.6 seconds (equivalent to LOS B).

As previously shown in Section 5.0 of this report, the Highway 395 / Tioga Road (SR-120) unsignalized study intersection does not satisfy MUTCD traffic signal warrants for any of the analysis scenarios evaluated as part of this report. Hence, installation of a traffic signal is not warranted and recommended.

Extensive discussions have been held with both Caltrans District 9 and County of Mono staff regarding potential mitigation measures for the Highway 395 / Tioga Road (SR-120) study intersection. Various mitigation measures including signalization, installation of a roundabout, and other less significant modifications have been discussed and evaluated for feasibility and none of the potential modifications have found to be feasible by the agencies.

Hence, the project is found to have a significant and unavoidable impact at the Highway 395 / Tioga Road (SR-120) study intersection during mid-day conditions for Forecast Opening Year (2023) With Project Conditions.

For information purposes, the following two alternatives mitigation measures have been evaluated to improve the operation of the intersection to an acceptable level (LOS D or better). The options are presented as alternatives for consideration by Caltrans for this intersection since both are forecast to achieve acceptable level of service:

- *Highway 395 / Tioga Rd (SR-120) Improvement Alternative A:* Signalize the intersection.

Installation of a traffic signal is forecast to achieve acceptable level of service (LOS D or better) at the study intersection for Forecast Opening Year (2023) With Project Conditions and the project's identified significant impact would be reduced to a level considered less than significant.

- *Highway 395 / Tioga Rd (SR-120) Improvement Alternative B: Convert to a Single-Lane Roundabout*.

  Conversion of the intersection to a single-lane roundabout is forecast to achieve acceptable level of service (LOS D or better) at the study intersection for Forecast Opening Year (2023) With Project Conditions and the project's identified significant impact would be reduced to a level considered less than significant.

  If a two-lane roundabout is installed, it is expected to provide even further increased capacity compared to a single-lane roundabout.

However, as previously noted, none of the potential modifications have found to be feasible by the Caltrans and Mono County staff. Hence, the project is found to have a significant and unavoidable impact at the Highway 395 / Tioga Road (SR-120) study intersection during mid-day conditions for Forecast Opening Year (2023) With Project Conditions

As also previously noted, this analysis evaluates traffic conditions during the peak traffic season which is approximately two to three months in length. As requested by Caltrans, to further evaluate the extent of the project's identified mid-day traffic impact for Forecast Opening Year (2023) With Project Conditions, MAT Engineering, Inc., has collected mid-day traffic volumes at the intersection of Highway 395 / Tioga Road (SR-120) during the non-peak season in October 2019. The non-peak season October 2019 mid-day counts are contained in Appendix A.

During non-peak season mid-day conditions the Highway 395 / Tioga Road (SR-120) is currently operating at an acceptable level of service (LOS D or better) and is forecast to continue to operate at an acceptable level of service (LOS D or better) for all the analysis scenarios evaluated as part of this report.

Hence, the deficient mid-day level of service deficiency and related traffic impact is forecast to only occur during the two to three months of peak traffic conditions in the area.

Nevertheless, based on the peak season traffic conditions and volumes, the project is found to have a significant and unavoidable impact at the Highway 395 / Tioga Road (SR-120) study intersection during mid-day conditions for Forecast Opening Year (2023) With Project Conditions

9.2 Peak Hour Vehicular Queue Analysis Summary

The existing vehicular storage capacities are forecast to be adequate to accommodate the 95th percentile vehicular queues at the study intersections for Forecast Opening Year (2023) With Project Conditions.

For Forecast Opening Year (2023) With Project Conditions, approximately 227 vehicles are expected to turn left into the project site from Tioga Road (SR-120) during the mid-day peak hour. If needed in the future, this left-turn storage can be extended to provide additional storage capacity beyond the existing capacity by restriping within the existing right-of-way.

9.3 Evaluation of Other Elements Summary

Highway 395 / Tioga Road (SR-120) Collision History

Based on the SWITRS database, there are a total of 60 reported collisions at the Highway 395 / Tioga Road (SR-120) intersection from 2010 to present (2018).

Twenty of the 60 collisions are attributed to high travel speeds.

A substantial number of the collisions are suspected to be a result of high rates of travel speed on Highway 395 near the Tioga Road intersection in addition to limited visibility and sight distance for vehicles approaching the Highway 395 / Tioga Road (SR-120) intersection.

Based on the review of the SWITRS data, there are not a substantial number of collisions reported at the Project Site Access / Tioga Road (SR-120) intersection.

However, based on field observations, drivers traveling eastbound on Tioga Road and approaching the project site access from the Yosemite Park area, appear to sometimes mistakenly shift into the existing right-turn lane into the project site access as they are looking to turn right and southbound onto Highway 395.

Caltrans is considering plans to integrate 'Traffic Calming' improvements on US 395 through Lee Vining, and enhanced safety upgrades at the intersection of Highway 395/ Tioga Road (SR-120) as well as along the apron on both sides of the entry to Tioga Mart, and pedestrian access along 395. Other relevant improvements may also be considered.

Based on the foregoing analysis, it is recommended as part of the improvement project for the State Highway system in this area, that Caltrans consider the following:

- Reduce travel speeds on Highway 395 by implementation of effective traffic calming measures such as narrowing of travel lanes, etc.,

- Provide additional advanced warning signs and/or flashing beacons for vehicles approaching the Highway 395 / Tioga Road (SR-120) intersection;

- Provide additional advanced warning signs and lane assignment information for vehicles approaching the Project Site Access / Tioga Road (SR-120) intersection;

- Consider alternative lane striping options to better and more clearly delineate the right-turn lane entering the project site access from Tioga Road; and

- Increase law enforcement presence.

Pedestrian & Bicycle Circulation System

To improve the pedestrian and bicycle circulation between the project site and Lee Vining, it is recommended a pedestrian link between the project site and Lee Vining be provided by Caltrans to increase walkability, reduce parking demand in town, and enhance the visitor experience.

Caltrans might want to consider a pedestrian connection across Tioga Road (SR-120), and work with applicable agencies to identify additional alternatives and options for improving pedestrian and bicycle connectivity and circulation.

Caltrans Right-of-Way Acquisition

Another project element pertains to Caltrans' sale of a 70-foot wide portion of the Tioga Road (SR-120) right-of-way easement to the project applicant. The easement extends for a distance of 1,170-feet adjacent to the Tioga site. A portion of this easement (west of the entry) has long been used informally by Tioga Mart customers as a picnic and play area. The ownership transfer will facilitate long-term use of the picnic area by customers, and provide greater flexibility in design of the land adjacent to and north of the hotel.

Caltrans will continue to own the remaining SR120 right of way, which includes an apron (east and west of the entry) that is used heavily by motorists as a Mono Lake vista point, and also used as an overflow parking area by Tioga Mart patrons.

The following is recommended for implementation by Caltrans and the project applicant:

- Improve and maintain the area to continue to provide parking for patrons and visitors;

- To reduce conflicts between vehicles traveling along Tioga Road (SR-120) and vehicles accessing the parking area, consider implementing a designated point of ingress and egress for this parking area.

- Provide a parking arrangement that maintains adequate sight distance at the project site access on Tioga Road (SR-120); and

Relocate the existing YARTS bus stop in a manner to maintain adequate sight distance for the Project Site Access / Tioga Road (SR-120) intersection and also minimize conflicts between the busses and vehicles parking in this area or accessing the project

Transportation Demand Management (TDM)

TDM is a program of information, encouragement and incentives provided by local or regional organizations to help people know about and use all their transportation options to optimize all modes in the system – and to counterbalance the incentives to drive that are so prevalent in subsidies of parking and roads. These are both traditional and innovative technology-based services to help people use transit, ridesharing, walking, biking, and telework.

Vehicles Miles Traveled (VMT)

The County of Mono and Caltrans do not currently have adopted and established threshold of significance for vehicles miles traveled (VMT) analysis and impact. An analysis of VMT has been included in this report for informational purposes.

The proposed project is forecast to result in an annual VMT of 1,189,842 miles.

The cumulative projects are forecast to result in an annual VMT of 2,461,960 miles.

Hence, the proposed project and the cumulative projects combined are forecast to result in an annual VMT of 3,651,802 miles.

APPENDIX A
Existing Traffic Count Worksheets

Location: State Highway 395 / State Route 120
Day: Thursday 8/9/2018
Time: 8:00 AM to 10:00 AM

15-Minute Counts

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			Westbound Pumice Road			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
8:00 - 8:15	14	26	0	3	21	9	7	0	1	0	0	0	81
8:15-8:30	3	31	0	1	19	9	1	0	2	1	0	2	69
8:30-8:45	22	41	0	0	36	10	5	0	12	0	0	1	127
8:45-9:00	24	40	1	0	26	12	6	0	10	0	0	1	120
Hour Total	**63**	**138**	**1**	**4**	**102**	**40**	**19**	**0**	**25**	**1**	**0**	**4**	**397**
9:00-9:15	26	45	1	0	27	8	10	0	4	0	0	1	122
9:15-9:30	20	69	1	1	50	20	4	0	8	0	0	1	174
9:30-9:45	22	57	0	0	36	17	8	0	4	0	0	1	145
9:45-10:00	24	64	0	0	43	21	9	0	11	0	0	0	172
Hour Total	**92**	**235**	**2**	**1**	**156**	**66**	**31**	**0**	**27**	**0**	**0**	**3**	**613**
Total	***155***	***373***	***3***	***5***	***258***	***106***	***50***	***0***	***52***	***1***	***0***	***7***	***1010***

60-Minute Counts

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			Westbound Pumice Road			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
8:00 - 9:00	63	138	1	4	102	40	19	0	25	1	0	4	**397**
8:15 - 9:15	75	157	2	1	108	39	22	0	28	1	0	5	**438**
8:30 - 9:30	92	195	3	1	139	50	25	0	34	0	0	4	**543**
8:45 - 9:45	92	211	3	1	139	57	28	0	26	0	0	4	**561**
9:00 - 10:00	92	235	2	1	156	66	31	0	27	0	0	3	**613**

Peak Hour

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			---			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
9:00 - 10:00	92	235	2	1	156	66	31	0	27	0	0	3	**613**

Peak Hour Factor: 0.88

Location: State Highway 395 / State Route 120
Day: Thursday 8/9/2018
Time: 12:00 PM to 2:00 PM

15-Minute Counts

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			Westbound Pumice Road			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
12:00 - 12:15	26	85	0	2	93	11	12	0	8	1	0	2	240
12:15 - 12:30	29	55	0	0	61	12	15	0	6	1	0	1	180
12:30 - 12:45	20	54	0	0	54	12	15	0	12	0	0	2	169
12:45 - 1:00	12	55	0	3	65	16	16	0	15	0	0	1	183
Hour Total	**87**	**249**	**0**	**5**	**273**	**51**	**58**	**0**	**41**	**2**	**0**	**6**	**772**
1:00 - 1:15	8	71	0	0	60	14	18	0	13	1	0	0	185
1:15 - 1:30	11	58	0	0	62	21	23	0	21	0	0	1	197
1:30 - 1:45	13	39	0	0	51	20	13	4	20	0	0	1	161
1:45 - 2:00	17	66	0	0	73	8	20	0	9	0	0	0	193
Hour Total	**49**	**234**	**0**	**0**	**246**	**63**	**74**	**4**	**63**	**1**	**0**	**2**	**736**
Total	***136***	***483***	***0***	***5***	***519***	***114***	***132***	***4***	***104***	***3***	***0***	***8***	***1508***

60-Minute Counts

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			Westbound Pumice Road			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
12:00 - 1:00	87	249	0	5	273	51	58	0	41	2	0	6	**772**
12:15 - 1:15	69	235	0	3	240	54	64	0	46	2	0	4	**717**
12:30 - 1:30	51	238	0	3	241	63	72	0	61	1	0	4	**734**
12:45 - 1:45	44	223	0	3	238	71	70	4	69	1	0	3	**726**
1:00 - 2:00	49	234	0	0	246	63	74	4	63	1	0	2	**736**

Peak Hour

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			---			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
12:00 - 1:00	87	249	0	5	273	51	58	0	41	2	0	6	**772**

Peak Hour Factor: 0.8

Location: State Highway 395 / State Route 120
Day: Thursday 8/9/2018
Time: 4:00 PM to 6:00 PM

15-Minute Counts

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			Westbound Pumice Road			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
4:00 - 4:15	14	50	0	0	65	8	17	0	24	0	0	0	178
4:15 - 4:30	9	54	1	0	61	12	15	0	24	0	0	0	176
4:30 - 4:45	16	49	0	2	79	5	16	0	30	1	0	2	200
4:45 - 5:00	11	40	2	1	54	19	14	0	26	1	1	0	169
Hour Total	**50**	**193**	**3**	**3**	**259**	**44**	**62**	**0**	**104**	**2**	**1**	**2**	**723**
5:00 - 5:15	17	44	0	1	78	11	8	1	25	1	0	0	186
5:15 - 5:30	10	44	0	0	59	13	16	0	22	0	1	1	166
5:30 - 5:45	11	44	0	1	53	9	18	0	14	1	0	0	151
5:45 - 6:00	16	46	0	0	40	10	16	1	20	0	1	1	151
Hour Total	**54**	**178**	**0**	**2**	**230**	**43**	**58**	**2**	**81**	**2**	**2**	**2**	**654**
Total	***104***	***371***	***3***	***5***	***489***	***87***	***120***	***2***	***185***	***4***	***3***	***4***	***1377***

60-Minute Counts

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			Westbound Pumice Road			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
4:00 - 5:00	50	193	3	3	259	44	62	0	104	2	1	2	**723**
4:15 - 5:15	53	187	3	4	272	47	53	1	105	3	1	2	**731**
4:30 - 5:30	54	177	2	4	270	48	54	1	103	3	2	3	**721**
4:45 - 5:45	49	172	2	3	244	52	56	1	87	3	2	1	**672**
5:00 - 6:00	54	178	0	2	230	43	58	2	81	2	2	2	**654**

Peak Hour

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			---			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
4:15 - 5:15	53	187	3	4	272	47	53	1	105	3	1	2	**731**

Peak Hour Factor: 0.91

Location: Project Access / State Route 120
Day: Thursday 7/12/2018
Time: 8:00 AM to 10:00 AM

15-Minute Counts

Time	Northbound Project Access			---			Eastbound SR 120			Westbound SR 120			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
8:00 - 8:15	3	0	5	0	0	0	0	4	3	11	31	0	57
8:15-8:30	6	0	5	0	0	0	0	14	7	9	30	0	71
8:30-8:45	7	0	12	0	0	0	0	8	12	21	34	0	94
8:45-9:00	10	0	6	0	0	0	0	6	10	13	37	0	82
Hour Total	**26**	**0**	**28**	**0**	**0**	**0**	**0**	**32**	**32**	**54**	**132**	**0**	**304**
9:00-9:15	21	0	12	0	0	0	0	10	5	25	33	0	106
9:15-9:30	9	0	8	0	0	0	0	12	9	12	44	0	94
9:30-9:45	10	0	16	0	0	0	0	17	9	21	47	0	120
9:45-10:00	6	0	16	0	0	0	0	18	10	12	62	0	124
Hour Total	**46**	**0**	**52**	**0**	**0**	**0**	**0**	**57**	**33**	**70**	**186**	**0**	**444**
Total	***72***	***0***	***80***	***0***	***0***	***0***	***0***	***89***	***65***	***124***	***318***	***0***	***748***

60-Minute Counts

Time	Northbound Project Access			---			Eastbound SR 120			Westbound SR 120			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
8:00 - 9:00	26	0	28	0	0	0	0	32	32	54	132	0	**304**
8:15 - 9:15	44	0	35	0	0	0	0	38	34	68	134	0	**353**
8:30 - 9:30	47	0	38	0	0	0	0	36	36	71	148	0	**376**
8:45 - 9:45	50	0	42	0	0	0	0	45	33	71	161	0	**402**
9:00 - 10:00	46	0	52	0	0	0	0	57	33	70	186	0	**444**

Peak Hour

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			---			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
9:00 - 10:00	46	0	52	0	0	0	0	57	33	70	186	0	**444**

Peak Hour Factor: 0.9

Location: Project Access / State Route 120
Day: Thursday 7/12/2018
Time: 12:00 PM to 2:00 PM

15-Minute Counts

Time	Northbound Project Access			---			Eastbound SR 120			Westbound SR 120			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
12:00 - 12:15	8	0	9	0	0	0	0	26	9	13	45	0	110
12:15 - 12:30	9	0	13	0	0	0	0	22	13	15	26	0	98
12:30 - 12:45	4	0	14	0	0	0	0	24	21	20	25	0	108
12:45 - 1:00	12	0	18	0	0	0	0	27	15	21	14	0	107
Hour Total	**33**	**0**	**54**	**0**	**0**	**0**	**0**	**99**	**58**	**69**	**110**	**0**	**423**
1:00 - 1:15	10	0	18	0	0	0	0	21	8	22	23	0	102
1:15 - 1:30	11	0	17	0	0	0	0	22	18	19	28	0	115
1:30 - 1:45	20	0	19	0	0	0	0	27	23	33	26	0	148
1:45 - 2:00	15	0	16	0	0	0	0	27	9	16	22	0	105
Hour Total	**56**	**0**	**70**	**0**	**0**	**0**	**0**	**97**	**58**	**90**	**99**	**0**	**470**
Total	***89***	***0***	***124***	***0***	***0***	***0***	***0***	***196***	***116***	***159***	***209***	***0***	***893***

60-Minute Counts

Time	Northbound Project Access			---			Eastbound SR 120			Westbound SR 120			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
12:00 - 1:00	33	0	54	0	0	0	0	99	58	69	110	0	**423**
12:15 - 1:15	35	0	63	0	0	0	0	94	57	78	88	0	**415**
12:30 - 1:30	37	0	67	0	0	0	0	94	62	82	90	0	**432**
12:45 - 1:45	53	0	72	0	0	0	0	97	64	95	91	0	**472**
1:00 - 2:00	56	0	70	0	0	0	0	97	58	90	99	0	**470**

Peak Hour

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			---			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
12:45 - 1:45	53	0	72	0	0	0	0	97	64	95	91	0	**472**

Peak Hour Factor: 0.8

Location: Project Access / State Route 120
Day: Thursday 7/12/2018
Time: 4:00 PM to 6:00 PM

15-Minute Counts

Time	Northbound Project Access			---			Eastbound SR 120			Westbound SR 120			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
4:00 - 4:15	10	0	14	0	0	0	0	38	25	17	21	0	125
4:15 - 4:30	7	0	16	0	0	0	0	43	17	19	18	0	120
4:30 - 4:45	10	0	17	0	0	0	0	47	13	15	17	0	119
4:45 - 5:00	5	0	16	0	0	0	0	21	20	13	12	0	87
Hour Total	**32**	**0**	**63**	**0**	**0**	**0**	**0**	**149**	**75**	**64**	**68**	**0**	**451**
5:00 - 5:15	6	0	15	0	0	0	0	38	12	9	14	0	94
5:15 - 5:30	7	0	13	0	0	0	0	35	11	19	19	0	104
5:30 - 5:45	6	0	22	0	0	0	0	26	14	15	18	0	101
5:45 - 6:00	10	0	24	0	0	0	0	50	14	20	16	0	134
Hour Total	**29**	**0**	**74**	**0**	**0**	**0**	**0**	**149**	**51**	**63**	**67**	**0**	**433**
Total	***61***	***0***	***137***	***0***	***0***	***0***	***0***	***298***	***126***	***127***	***135***	***0***	***884***

60-Minute Counts

Time	Northbound Project Access			---			Eastbound SR 120			Westbound SR 120			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
4:00 - 5:00	32	0	63	0	0	0	0	149	75	64	68	0	**451**
4:15 - 5:15	28	0	64	0	0	0	0	149	62	56	61	0	**420**
4:30 - 5:30	28	0	61	0	0	0	0	141	56	56	62	0	**404**
4:45 - 5:45	24	0	66	0	0	0	0	120	57	56	63	0	**386**
5:00 - 6:00	29	0	74	0	0	0	0	149	51	63	67	0	**433**

Peak Hour

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			---			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
4:00 - 5:00	32	0	63	0	0	0	0	149	75	64	68	0	**451**

Peak Hour Factor: 0.84

Location: State Highway 395 / State Route 120
Day: Tuesday 10/29/2019
Time: 12:00 PM to 2:00 PM

15-Minute Counts

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			Westbound Pumice Road			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
12:00 - 12:15	9	32	0	0	30	14	7	0	15	1	0	2	110
12:15 - 12:30	13	28	0	0	47	12	7	0	9	1	0	1	118
12:30 - 12:45	15	26	1	1	40	8	3	0	12	0	0	2	108
12:45 - 1:00	5	34	0	1	40	11	10	0	10	0	0	1	112
Hour Total	**42**	**120**	**1**	**2**	**157**	**45**	**27**	**0**	**46**	**2**	**0**	**6**	**448**
1:00 - 1:15	8	22	1	0	36	7	11	0	7	1	0	0	93
1:15 - 1:30	6	31	0	1	39	8	3	0	10	0	0	1	99
1:30 - 1:45	9	28	0	0	29	11	3	4	9	0	0	1	94
1:45 - 2:00	6	39	0	0	35	9	10	0	9	0	0	0	108
Hour Total	**29**	**120**	**1**	**1**	**139**	**35**	**27**	**4**	**35**	**1**	**0**	**2**	**394**
Total	***71***	***240***	***2***	***3***	***296***	***80***	***54***	***4***	***81***	***3***	***0***	***8***	***842***

60-Minute Counts

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			Westbound Pumice Road			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
12:00 - 1:00	42	120	1	2	157	45	27	0	46	2	0	6	**448**
12:15 - 1:15	41	110	2	2	163	38	31	0	38	2	0	4	**431**
12:30 - 1:30	34	113	2	3	155	34	27	0	39	1	0	4	**412**
12:45 - 1:45	28	115	1	2	144	37	27	4	36	1	0	3	**398**
1:00 - 2:00	29	120	1	1	139	35	27	4	35	1	0	2	**394**

Peak Hour

Time	Northbound Highway 395			Southbound Highway 395			Eastbound SR 120			---			Total
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
12:00 - 1:00	42	120	1	2	157	45	27	0	46	2	0	6	**448**

Peak Hour Factor: 0.95

APPENDIX B
MUTCD Traffic Signal Analysis Worksheets

Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

Urban/Rural (1/2) = **2**

SCENARIO: **Existing Conditions**

MAJOR STREET: **Highway 395** ADT = **4,682** Lanes= **2**

MINOR STREET: **Tioga Rd (SR-120)** ADT = **692** Lanes= **1**

(Based on Estimated Average Daily Traffic-See Note)

URBAN RURAL **XX**

	Minimum Requirements EADT	
1A - Minimum Vehicular Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied / Not Satisfied **XX**		
Number of lanes for moving traffic on each approach.		
Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	8,000 / 5,600	2,400 / 1,680
2 or More / 1 (692)	9,600 / 6,720	2,400 / 1,680
2 or More / 2 or More	9,600 / 6,720	3,200 / 2,240
1 / 2 or More	8,000 / 5,600	3,200 / 2,240
1B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)
Satisfied / Not Satisfied **XX**		
Number of lanes for moving traffic on each approach.		
Major Street / Minor Street	Urban / Rural	Urban / Rural
1 / 1	12,000 / 8,400	1,200 / 850
2 or More / 1 (692)	14,400 / 10,080	1,200 / 850
2 or More / 2 or More	14,400 / 10,080	1,600 / 1,120
1 / 2 or More	12,000 / 8,400	1,600 / 1,120
1A&B - Combinations		
Satisfied / Not Satisfied **XX**		
No one warrant satisfied, but following warrants fulfilled 80% or more…	2 Warrants	2 Warrants
41% 1A / 46% 1B		

Note: Use only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

10/4/2018

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing Conditions - AM Peak Hour**

Major Street Name = **Highway 395**

Total of Both Approaches (VPH) = **552**

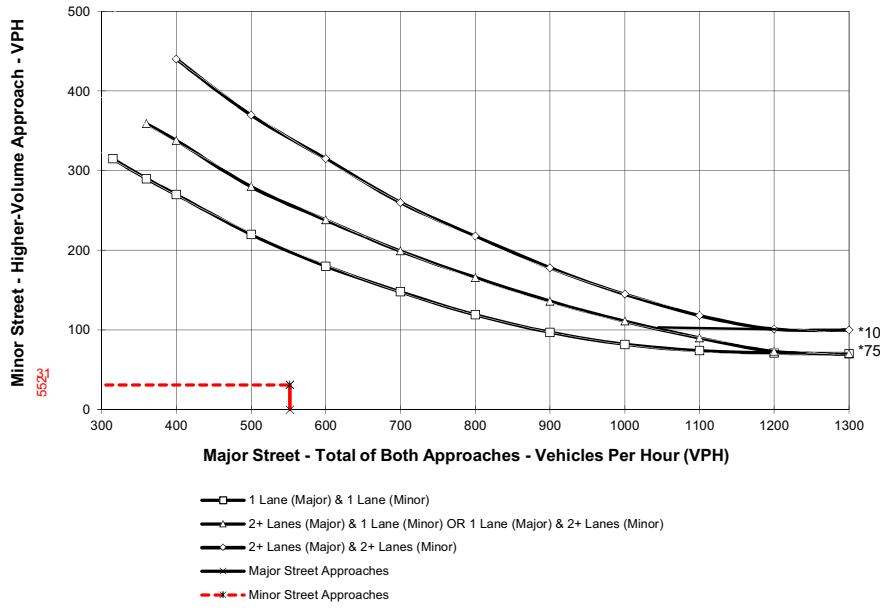
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**

High Volume Approach (VPH) = **31**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing Conditions - PM Peak Hour**

Major Street Name = **Highway 395**

Total of Both Approaches (VPH) = **566**

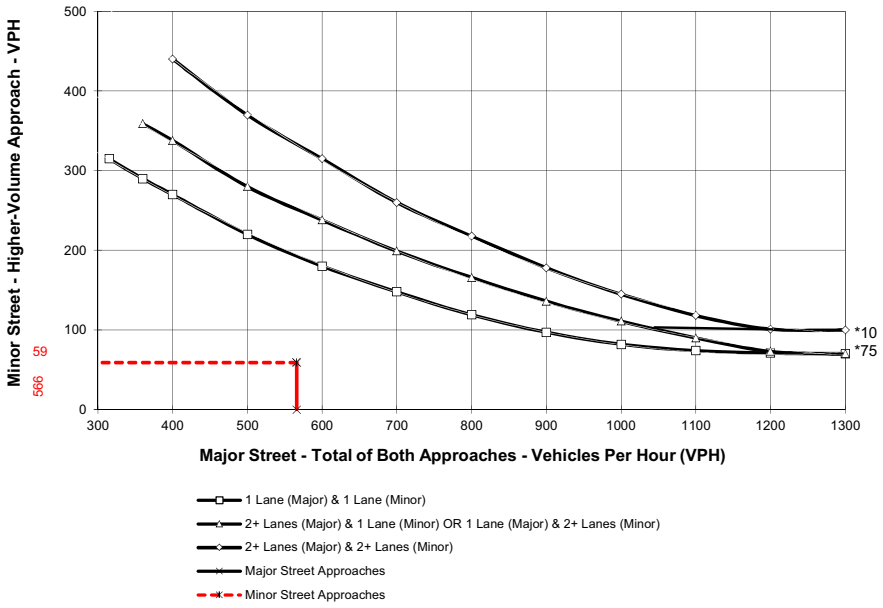
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**

High Volume Approach (VPH) = **59**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = Existing Conditions - PM Peak Hour

Major Street Name = Highway 395

Total of Both Approaches (VPH) = 566

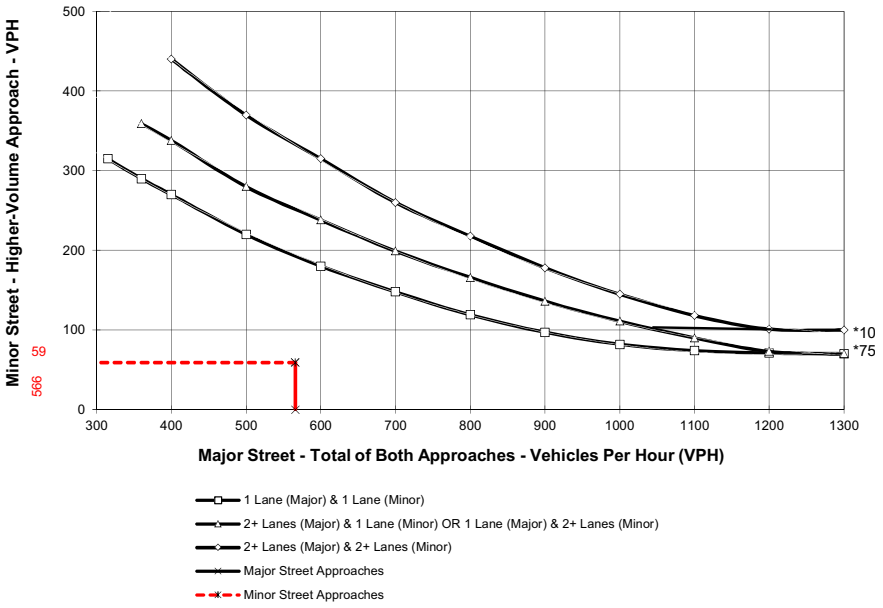
Number of Approach Lanes Major Street = 2

Minor Street Name = Tioga Rd (SR-120)

High Volume Approach (VPH) = 59

Number of Approach Lanes Minor Street = 1

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

01_395 at 120_EX_PM.XLS

Sect. 4C.06

Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

Urban/Rural (1/2) = **2**

SCENARIO: **Existing + Project Conditions**

MAJOR STREET: **Highway 395** ADT = **4,989** Lanes= **2**

MINOR STREET: **Tioga Rd (SR-120)** ADT = **999** Lanes= **1**

(Based on Estimated Average Daily Traffic-See Note)

URBAN RURAL **XX**

				Minimum Requirements EADT			
1A - Minimum Vehicular Traffic				Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied		Not Satisfied **XX**					
Number of lanes for moving traffic on each approach.							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1		1		8,000	5,600	2,400	1,680
2 or More	4,989	1	999	9,600	6,720	2,400	1,680
2 or More		2 or More		9,600	6,720	3,200	2,240
1		2 or More		8,000	5,600	3,200	2,240
1B - Interruption of Continuous Traffic				Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied		Not Satisfied **XX**					
Number of lanes for moving traffic on each approach.							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1		1		12,000	8,400	1,200	850
2 or More	4,989	1	999	14,400	10,080	1,200	850 *
2 or More		2 or More		14,400	10,080	1,600	1,120
1		2 or More		12,000	8,400	1,600	1,120
1A&B - Combinations							
Satisfied		Not Satisfied **XX**					
No one warrant satisfied, but following warrants fulfilled 80% or more…				2 Warrants		2 Warrants	
59% 1A		49% 1B					

Note: Use only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

10/4/2018

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing + Project Conditions - AM Peak Hour**

Major Street Name = **Highway 395**

Total of Both Approaches (VPH) = **573**

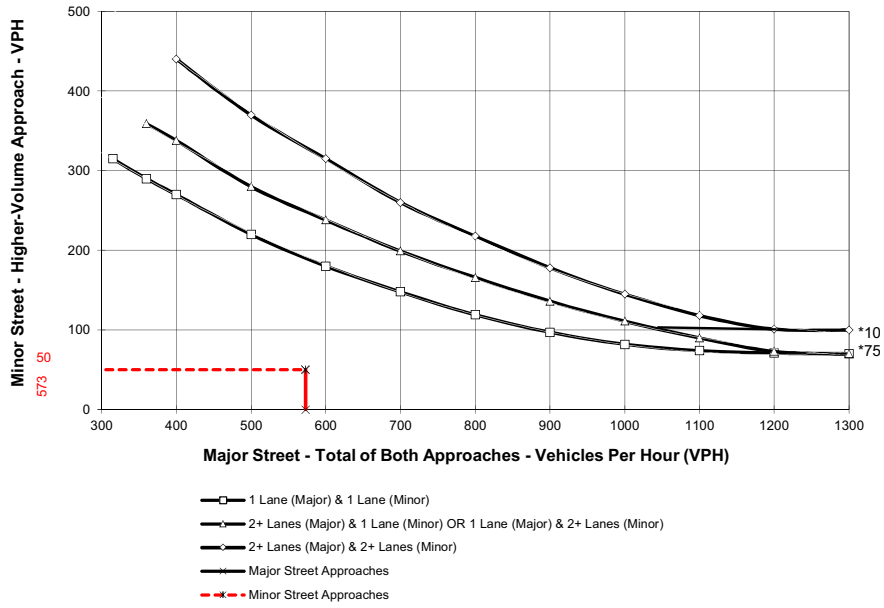
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**

High Volume Approach (VPH) = **50**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing + Project Conditions - Mid-Day Peak Hour**

Major Street Name = **Highway 395**

Total of Both Approaches (VPH) = **721**

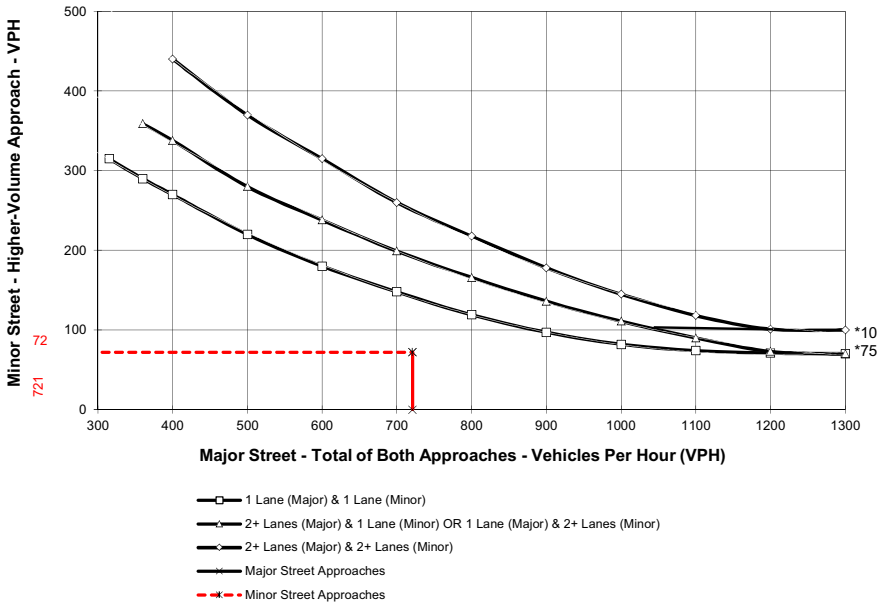
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**

High Volume Approach (VPH) = **72**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing + Project Conditions - PM Peak Hour**

Major Street Name = **Highway 395**

Total of Both Approaches (VPH) = **622**

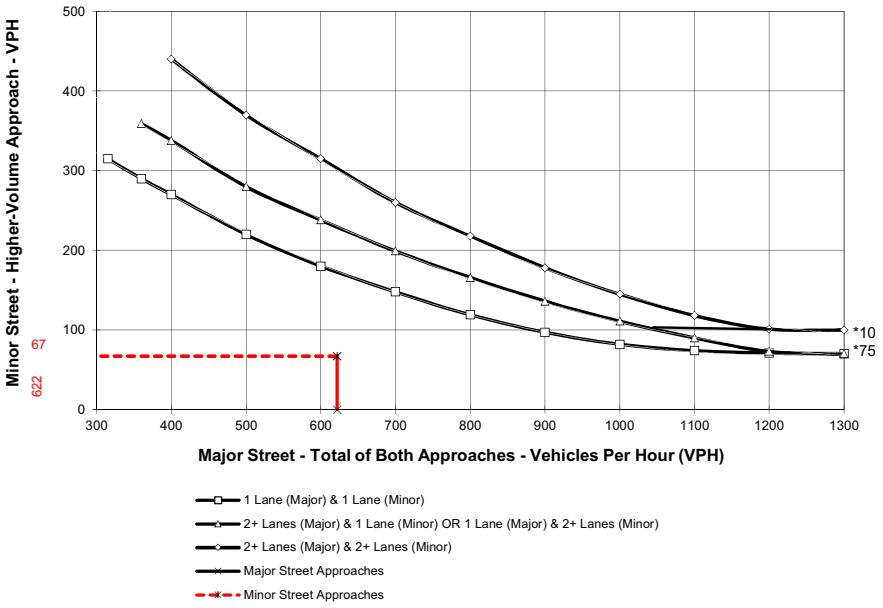
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**

High Volume Approach (VPH) = **67**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

Urban/Rural (1/2) = **2**

SCENARIO: **Opening Year Without Project Conditions**

MAJOR STREET: **Highway 395** ADT = **5,671** Lanes= **2**

MINOR STREET: **Tioga Rd (SR-120)** ADT = **1,281** Lanes= **1**

(Based on Estimated Average Daily Traffic-See Note)

URBAN RURAL **XX**

				Minimum Requirements EADT			
1A - Minimum Vehicular Traffic				Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied		Not Satisfied **XX**					
Number of lanes for moving traffic on each approach.							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1		1		8,000	5,600	2,400	1,680
2 or More	5,671	1	1,281	9,600	6,720	2,400	1,680
2 or More		2 or More		9,600	6,720	3,200	2,240
1		2 or More		8,000	5,600	3,200	2,240
1B - Interruption of Continuous Traffic				Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied		Not Satisfied **XX**					
Number of lanes for moving traffic on each approach.							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1		1		12,000	8,400	1,200	850
2 or More	5,671	1	1,281	14,400	10,080	1,200	850 *
2 or More		2 or More		14,400	10,080	1,600	1,120
1		2 or More		12,000	8,400	1,600	1,120
1A&B - Combinations							
Satisfied		Not Satisfied **XX**					
No one warrant satisfied, but following warrants fulfilled 80% or more…				2 Warrants		2 Warrants	
76% 1A		56% 1B					

Note: Use only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

10/4/2018

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Opening Year Without Project Conditions - AM Peak**

Major Street Name = **Highway 395**

Total of Both Approaches (VPH) = **665**

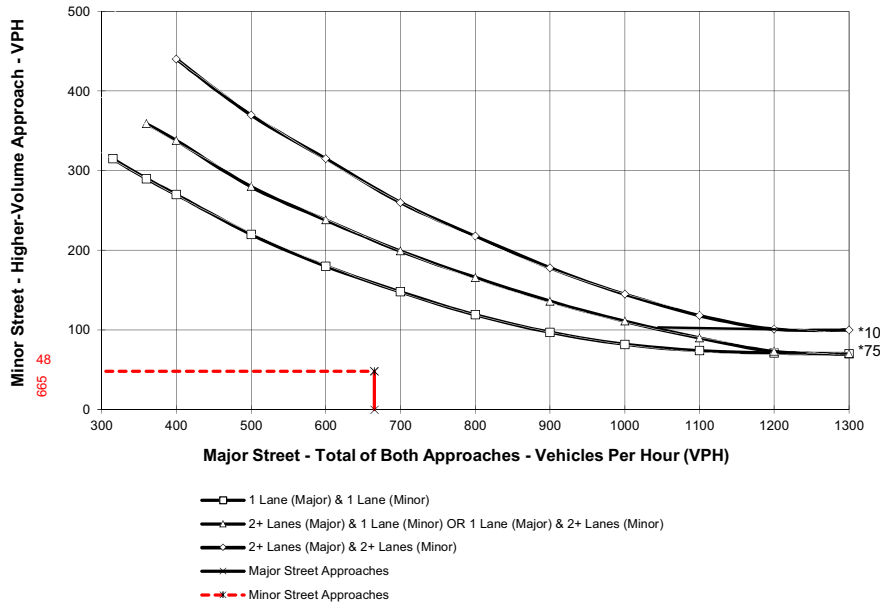
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**

High Volume Approach (VPH) = **48**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

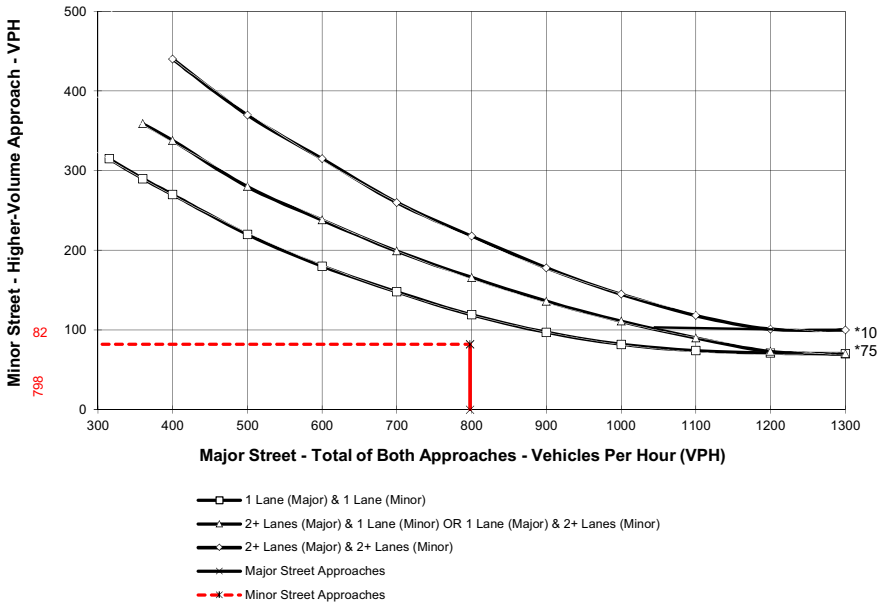
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Opening Year Without Project Conditions - Mid-Day Peak**

Major Street Name = **Highway 395**
Total of Both Approaches (VPH) = **798**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**
High Volume Approach (VPH) = **82**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

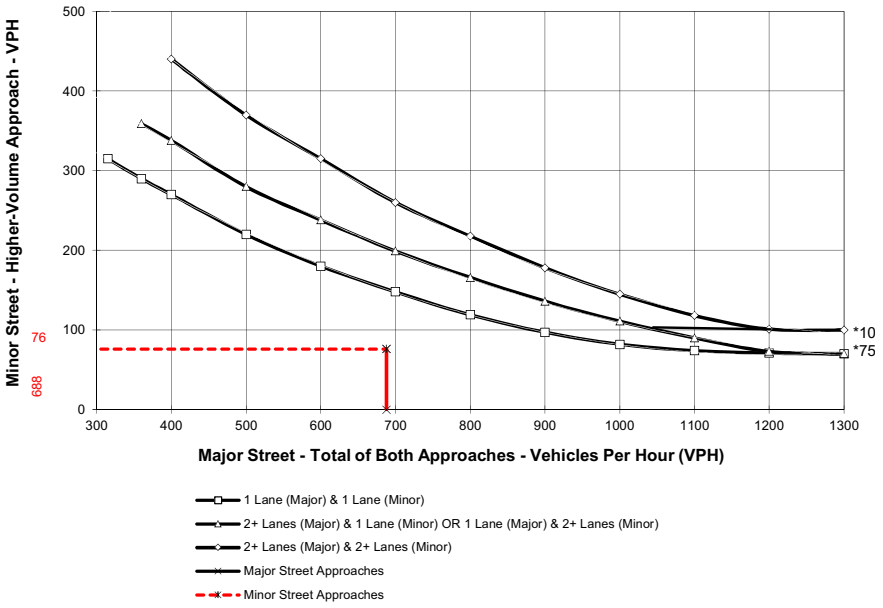
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Opening Year Without Project Conditions - PM Peak**

Major Street Name = **Highway 395**
Total of Both Approaches (VPH) = **688**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**
High Volume Approach (VPH) = **76**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

Urban/Rural (1/2) = **2**

SCENARIO: **Opening Year With Project Conditions**

MAJOR STREET: **Highway 395** ADT = **5,978** Lanes= **2**

MINOR STREET: **Tioga Rd (SR-120)** ADT = **1,588** Lanes= **1**

(Based on Estimated Average Daily Traffic-See Note)

URBAN RURAL **XX**

				Minimum Requirements EADT			
1A - Minimum Vehicular Traffic				Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied		Not Satisfied **XX**					
Number of lanes for moving traffic on each approach.							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1		1		8,000	5,600	2,400	1,680
2 or More	5,978	1	1,588	9,600	6,720	2,400	1,680
2 or More		2 or More		9,600	6,720	3,200	2,240
1		2 or More		8,000	5,600	3,200	2,240
1B - Interruption of Continuous Traffic				Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied		Not Satisfied **XX**					
Number of lanes for moving traffic on each approach.							
Major Street		Minor Street		Urban	Rural	Urban	Rural
1		1		12,000	8,400	1,200	850
2 or More	5,978	1	1,588	14,400	10,080	1,200	850 *
2 or More		2 or More		14,400	10,080	1,600	1,120
1		2 or More		12,000	8,400	1,600	1,120
1A&B - Combinations							
Satisfied		Not Satisfied **XX**					
No one warrant satisfied, but following warrants fulfilled 80% or more…				2 Warrants		2 Warrants	
89% 1A		59% 1B					

Note: Use only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

10/4/2018

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Opening Year With Project Conditions - AM Peak Hour**

Major Street Name = **Highway 395**

Total of Both Approaches (VPH) = **686**

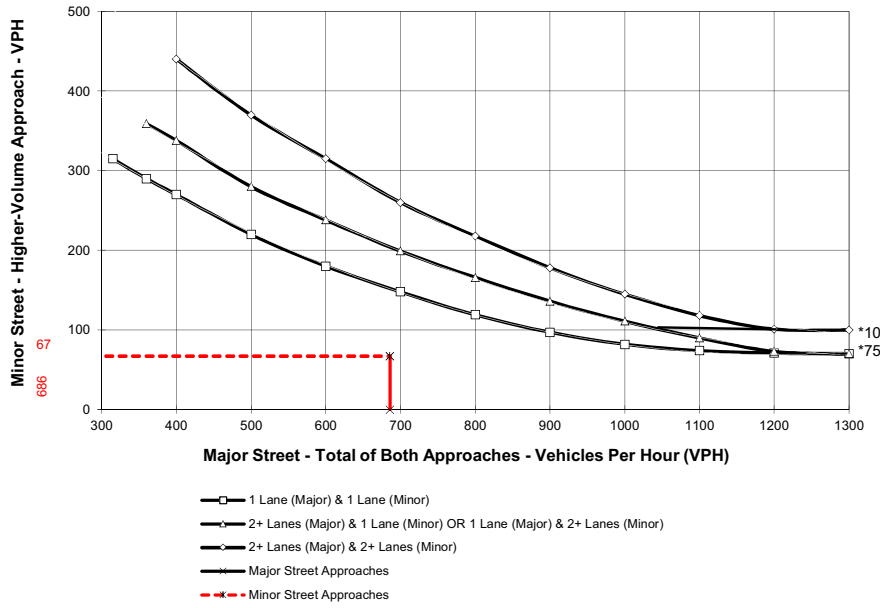
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**

High Volume Approach (VPH) = **67**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Opening Year With Project Conditions - Mid-Day Peak**

Major Street Name = **Highway 395**

Total of Both Approaches (VPH) = **854**

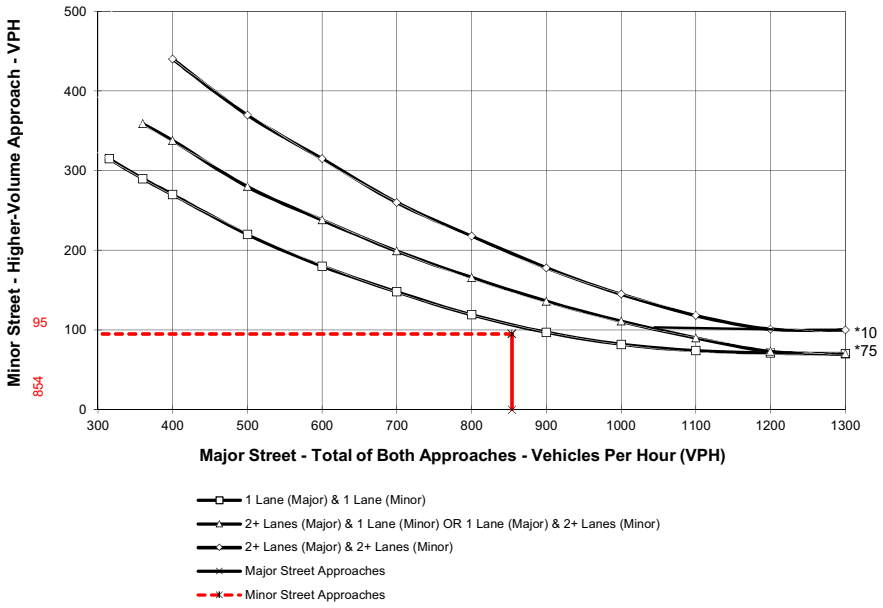
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**

High Volume Approach (VPH) = **95**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

2014 Edition

WARRANT 3, PEAK HOUR (70% FACTOR)
(Rural Areas)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Opening Year With Project Conditions - PM Peak Hour**

Major Street Name = **Highway 395**

Total of Both Approaches (VPH) = **744**

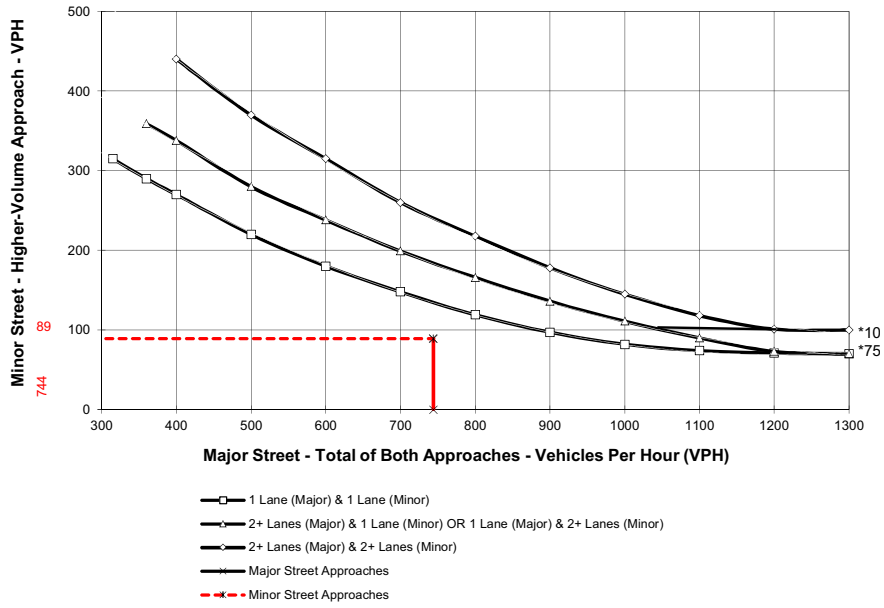
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Tioga Rd (SR-120)**

High Volume Approach (VPH) = **89**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

November 2014

APPENDIX C
Existing Conditions LOS Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.999				0.850		0.865	
Flt Protected	0.950			0.950				0.950				
Satd. Flow (prot)	1583	3034	1417	1583	3032	0	0	1583	1417	0	1442	0
Flt Permitted	0.950			0.950				0.950				
Satd. Flow (perm)	1583	3034	1417	1583	3032	0	0	1583	1417	0	1442	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1	156	66	92	235	2	31	0	27	0	0	3
Future Volume (vph)	1	156	66	92	235	2	31	0	27	0	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1	177	75	105	267	2	35	0	31	0	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	177	75	105	269	0	0	35	31	0	3	0

Intersection Summary

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	156	66	92	235	2	31	0	27	0	0	3
Future Vol, veh/h	1	156	66	92	235	2	31	0	27	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	1	177	75	105	267	2	35	0	31	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	269	0	0	177	0	0	523	658	-	569	657	135
Stage 1	-	-	-	-	-	-	179	179	-	478	478	-
Stage 2	-	-	-	-	-	-	344	479	-	91	179	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1209	-	-	1313	-	-	411	359	0	380	360	852
Stage 1	-	-	-	-	-	-	772	722	0	507	525	-
Stage 2	-	-	-	-	-	-	613	524	0	872	722	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1209	-	-	1313	-	-	384	330	-	356	331	852
Mov Cap-2 Maneuver	-	-	-	-	-	-	384	330	-	356	331	-
Stage 1	-	-	-	-	-	-	771	721	-	506	483	-
Stage 2	-	-	-	-	-	-	562	482	-	871	721	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.2	15.3	9.2
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	384	-	1209	-	-	1313	-	-	852
HCM Lane V/C Ratio	0.092	-	0.001	-	-	0.08	-	-	0.004
HCM Control Delay (s)	15.3	0	8	-	-	8	-	-	9.2
HCM Lane LOS	C	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	-	0	-	-	0.3	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	46	52	57	33	70	186
Future Volume (vph)	46	52	57	33	70	186
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	51	58	63	37	78	207
Shared Lane Traffic (%)						
Lane Group Flow (vph)	51	58	63	37	78	207

Intersection Summary

Intersection	
Int Delay, s/veh	3.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	52	57	33	70	186
Future Vol, veh/h	46	52	57	33	70	186
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	51	58	63	37	78	207

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	426	63	0	0	100	0
Stage 1	63	-	-	-	-	-
Stage 2	363	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	563	969	-	-	1421	-
Stage 1	930	-	-	-	-	-
Stage 2	678	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	532	969	-	-	1421	-
Mov Cap-2 Maneuver	532	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	678	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	2.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	532	969	1421	-
HCM Lane V/C Ratio	-	-	0.096	0.06	0.055	-
HCM Control Delay (s)	-	-	12.5	9	7.7	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.2	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850						0.850		0.902	
Flt Protected	0.950			0.950				0.950			0.987	
Satd. Flow (prot)	1583	3034	1417	1583	3034	0	0	1583	1417	0	1484	0
Flt Permitted	0.950			0.950				0.950			0.987	
Satd. Flow (perm)	1583	3034	1417	1583	3034	0	0	1583	1417	0	1484	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	5	273	51	87	249	0	58	0	41	2	0	6
Future Volume (vph)	5	273	51	87	249	0	58	0	41	2	0	6
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	6	341	64	109	311	0	73	0	51	3	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	341	64	109	311	0	0	73	51	0	11	0

Intersection Summary

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	273	51	87	249	0	58	0	41	2	0	6
Future Vol, veh/h	5	273	51	87	249	0	58	0	41	2	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	6	341	64	109	311	0	73	0	51	3	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	311	0	0	341	0	0	727	882	-	712	882	156
Stage 1	-	-	-	-	-	-	353	353	-	529	529	-
Stage 2	-	-	-	-	-	-	374	529	-	183	353	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1164	-	-	1133	-	-	290	263	0	298	263	825
Stage 1	-	-	-	-	-	-	605	600	0	472	496	-
Stage 2	-	-	-	-	-	-	587	496	0	768	600	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1164	-	-	1133	-	-	265	236	-	275	236	825
Mov Cap-2 Maneuver	-	-	-	-	-	-	265	236	-	275	236	-
Stage 1	-	-	-	-	-	-	602	597	-	470	448	-
Stage 2	-	-	-	-	-	-	526	448	-	764	597	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	2.2	23.6	11.7
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	265	-	1164	-	-	1133	-	-	550
HCM Lane V/C Ratio	0.274	-	0.005	-	-	0.096	-	-	0.018
HCM Control Delay (s)	23.6	0	8.1	-	-	8.5	-	-	11.7
HCM Lane LOS	C	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.1	-	0	-	-	0.3	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	53	72	97	64	95	91
Future Volume (vph)	53	72	97	64	95	91
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	66	90	121	80	119	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	66	90	121	80	119	114

Intersection Summary

Intersection	
Int Delay, s/veh	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	53	72	97	64	95	91
Future Vol, veh/h	53	72	97	64	95	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	66	90	121	80	119	114

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	473	121	0	0	201	0
Stage 1	121	-	-	-	-	-
Stage 2	352	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	529	899	-	-	1302	-
Stage 1	875	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	481	899	-	-	1302	-
Mov Cap-2 Maneuver	481	-	-	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	686	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	4.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	481	899	1302	-
HCM Lane V/C Ratio	-	-	0.138	0.1	0.091	-
HCM Control Delay (s)	-	-	13.7	9.4	8	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0.3	0.3	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.998				0.850		0.955	
Flt Protected	0.950			0.950				0.953			0.976	
Satd. Flow (prot)	1583	3034	1417	1583	3029	0	0	1588	1417	0	1553	0
Flt Permitted	0.950			0.950				0.953			0.976	
Satd. Flow (perm)	1583	3034	1417	1583	3029	0	0	1588	1417	0	1553	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	272	47	53	187	3	53	1	105	3	1	2
Future Volume (vph)	4	272	47	53	187	3	53	1	105	3	1	2
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	299	52	58	205	3	58	1	115	3	1	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	299	52	58	208	0	0	59	115	0	6	0

Intersection Summary

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	272	47	53	187	3	53	1	105	3	1	2
Future Vol, veh/h	4	272	47	53	187	3	53	1	105	3	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	4	299	52	58	205	3	58	1	115	3	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	208	0	0	299	0	0	526	631	-	481	630	104
Stage 1	-	-	-	-	-	-	307	307	-	323	323	-
Stage 2	-	-	-	-	-	-	219	324	-	158	307	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1277	-	-	1177	-	-	409	373	0	442	373	893
Stage 1	-	-	-	-	-	-	645	630	0	631	620	-
Stage 2	-	-	-	-	-	-	730	619	0	795	630	-
Platoon blocked, %			-			-						
Mov Cap-1 Maneuver	1277	-	-	1177	-	-	391	354	-	423	354	893
Mov Cap-2 Maneuver	-	-	-	-	-	-	391	354	-	423	354	-
Stage 1	-	-	-	-	-	-	643	628	-	629	590	-
Stage 2	-	-	-	-	-	-	691	589	-	791	628	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.8	15.9	12.4
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	390	-	1277	-	-	1177	-	-	494
HCM Lane V/C Ratio	0.152	-	0.003	-	-	0.049	-	-	0.013
HCM Control Delay (s)	15.9	0	7.8	-	-	8.2	-	-	12.4
HCM Lane LOS	C	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.5	-	0	-	-	0.2	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	32	63	149	75	64	68
Future Volume (vph)	32	63	149	75	64	68
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	38	75	177	89	76	81
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	75	177	89	76	81

Intersection Summary

Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	63	149	75	64	68
Future Vol, veh/h	32	63	149	75	64	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	38	75	177	89	76	81

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	410	177	0	0	266	0
Stage 1	177	-	-	-	-	-
Stage 2	233	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	575	836	-	-	1231	-
Stage 1	826	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	539	836	-	-	1231	-
Mov Cap-2 Maneuver	539	-	-	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	778	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	3.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	539	836	1231	-
HCM Lane V/C Ratio	-	-	0.071	0.09	0.062	-
HCM Control Delay (s)	-	-	12.2	9.7	8.1	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.3	0.2	-

APPENDIX D
Existing Plus Project Conditions LOS Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.999				0.850		0.865	
Flt Protected	0.950			0.950				0.950				
Satd. Flow (prot)	1583	3034	1417	1583	3032	0	0	1583	1417	0	1442	0
Flt Permitted	0.950			0.950				0.950				
Satd. Flow (perm)	1583	3034	1417	1583	3032	0	0	1583	1417	0	1442	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1	156	73	106	235	2	50	0	67	0	0	3
Future Volume (vph)	1	156	73	106	235	2	50	0	67	0	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1	177	83	120	267	2	57	0	76	0	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	177	83	120	269	0	0	57	76	0	3	0

Intersection Summary

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	156	73	106	235	2	50	0	67	0	0	3
Future Vol, veh/h	1	156	73	106	235	2	50	0	67	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	1	177	83	120	267	2	57	0	76	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	269	0	0	177	0	0	553	688	-	599	687	135
Stage 1	-	-	-	-	-	-	179	179	-	508	508	-
Stage 2	-	-	-	-	-	-	374	509	-	91	179	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1209	-	-	1313	-	-	391	344	0	361	345	852
Stage 1	-	-	-	-	-	-	772	722	0	486	508	-
Stage 2	-	-	-	-	-	-	587	507	0	872	722	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1209	-	-	1313	-	-	362	312	-	335	313	852
Mov Cap-2 Maneuver	-	-	-	-	-	-	362	312	-	335	313	-
Stage 1	-	-	-	-	-	-	771	721	-	486	462	-
Stage 2	-	-	-	-	-	-	531	461	-	871	721	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.5	16.8	9.2
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	362	-	1209	-	-	1313	-	-	852
HCM Lane V/C Ratio	0.157	-	0.001	-	-	0.092	-	-	0.004
HCM Control Delay (s)	16.8	0	8	-	-	8	-	-	9.2
HCM Lane LOS	C	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.6	-	0	-	-	0.3	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	55	111	57	40	90	186
Future Volume (vph)	55	111	57	40	90	186
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	61	123	63	44	100	207
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	123	63	44	100	207

Intersection Summary

Intersection

Int Delay, s/veh	4.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	55	111	57	40	90	186
Future Vol, veh/h	55	111	57	40	90	186
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	61	123	63	44	100	207

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	470	63	0	0	107	0
Stage 1	63	-	-	-	-	-
Stage 2	407	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	531	969	-	-	1412	-
Stage 1	930	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	493	969	-	-	1412	-
Mov Cap-2 Maneuver	493	-	-	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	647	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	493	969	1412	-
HCM Lane V/C Ratio	-	-	0.124	0.127	0.071	-
HCM Control Delay (s)	-	-	13.3	9.3	7.7	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.4	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850						0.850		0.902	
Flt Protected	0.950			0.950				0.950			0.987	
Satd. Flow (prot)	1583	3034	1417	1583	3034	0	0	1583	1417	0	1484	0
Flt Permitted	0.950			0.950				0.950			0.987	
Satd. Flow (perm)	1583	3034	1417	1583	3034	0	0	1583	1417	0	1484	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	5	273	69	125	249	0	71	0	67	2	0	6
Future Volume (vph)	5	273	69	125	249	0	71	0	67	2	0	6
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	6	341	86	156	311	0	89	0	84	3	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	341	86	156	311	0	0	89	84	0	11	0

Intersection Summary

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	273	69	125	249	0	71	0	67	2	0	6
Future Vol, veh/h	5	273	69	125	249	0	71	0	67	2	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	6	341	86	156	311	0	89	0	84	3	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	311	0	0	341	0	0	821	976	-	806	976	156
Stage 1	-	-	-	-	-	-	353	353	-	623	623	-
Stage 2	-	-	-	-	-	-	468	623	-	183	353	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1164	-	-	1133	-	-	247	230	0	253	230	825
Stage 1	-	-	-	-	-	-	605	600	0	412	448	-
Stage 2	-	-	-	-	-	-	514	448	0	768	600	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1164	-	-	1133	-	-	218	197	-	225	197	825
Mov Cap-2 Maneuver	-	-	-	-	-	-	218	197	-	225	197	-
Stage 1	-	-	-	-	-	-	602	597	-	410	386	-
Stage 2	-	-	-	-	-	-	439	386	-	764	597	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	2.9	32.4	12.4
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	218	-	1164	-	-	1133	-	-	495
HCM Lane V/C Ratio	0.407	-	0.005	-	-	0.138	-	-	0.02
HCM Control Delay (s)	32.4	0	8.1	-	-	8.7	-	-	12.4
HCM Lane LOS	D	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.8	-	0	-	-	0.5	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	63	111	97	75	151	91
Future Volume (vph)	63	111	97	75	151	91
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	79	139	121	94	189	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	79	139	121	94	189	114

Intersection Summary

Intersection	
Int Delay, s/veh	5.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	63	111	97	75	151	91
Future Vol, veh/h	63	111	97	75	151	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	79	139	121	94	189	114

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	613	121	0	0	215	0
Stage 1	121	-	-	-	-	-
Stage 2	492	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	437	899	-	-	1287	-
Stage 1	875	-	-	-	-	-
Stage 2	591	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	373	899	-	-	1287	-
Mov Cap-2 Maneuver	373	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	591	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	5.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	373	899	1287	-
HCM Lane V/C Ratio	-	-	0.211	0.154	0.147	-
HCM Control Delay (s)	-	-	17.2	9.7	8.3	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.8	0.5	0.5	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.998				0.850		0.955	
Flt Protected	0.950			0.950				0.953			0.976	
Satd. Flow (prot)	1583	3034	1417	1583	3029	0	0	1588	1417	0	1553	0
Flt Permitted	0.950			0.950				0.953			0.976	
Satd. Flow (perm)	1583	3034	1417	1583	3029	0	0	1588	1417	0	1553	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	272	65	91	187	3	66	1	131	3	1	2
Future Volume (vph)	4	272	65	91	187	3	66	1	131	3	1	2
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	299	71	100	205	3	73	1	144	3	1	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	299	71	100	208	0	0	74	144	0	6	0

Intersection Summary

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	272	65	91	187	3	66	1	131	3	1	2
Future Vol, veh/h	4	272	65	91	187	3	66	1	131	3	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	4	299	71	100	205	3	73	1	144	3	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	208	0	0	299	0	0	610	715	-	565	714	104
Stage 1	-	-	-	-	-	-	307	307	-	407	407	-
Stage 2	-	-	-	-	-	-	303	408	-	158	307	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1277	-	-	1177	-	-	355	332	0	383	332	893
Stage 1	-	-	-	-	-	-	645	630	0	561	566	-
Stage 2	-	-	-	-	-	-	649	566	0	795	630	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1277	-	-	1177	-	-	329	303	-	356	303	893
Mov Cap-2 Maneuver	-	-	-	-	-	-	329	303	-	356	303	-
Stage 1	-	-	-	-	-	-	643	628	-	559	518	-
Stage 2	-	-	-	-	-	-	591	518	-	791	628	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	2.7	19.1	13.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	329	-	1277	-	-	1177	-	-	430
HCM Lane V/C Ratio	0.224	-	0.003	-	-	0.085	-	-	0.015
HCM Control Delay (s)	19.1	0	7.8	-	-	8.3	-	-	13.5
HCM Lane LOS	C	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.8	-	0	-	-	0.3	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	42	102	149	86	120	68
Future Volume (vph)	42	102	149	86	120	68
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	50	121	177	102	143	81
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	121	177	102	143	81

Intersection Summary

Intersection	
Int Delay, s/veh	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	42	102	149	86	120	68
Future Vol, veh/h	42	102	149	86	120	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	50	121	177	102	143	81

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	544	177	0	0	279	0
Stage 1	177	-	-	-	-	-
Stage 2	367	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	480	836	-	-	1218	-
Stage 1	826	-	-	-	-	-
Stage 2	675	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	424	836	-	-	1218	-
Mov Cap-2 Maneuver	424	-	-	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	675	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	5.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	424	836	1218	-
HCM Lane V/C Ratio	-	-	0.118	0.145	0.117	-
HCM Control Delay (s)	-	-	14.6	10	8.3	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.5	0.4	-

APPENDIX E
Forecast Opening Year (2023) Without Project Conditions
LOS Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.999				0.850		0.865	
Flt Protected	0.950			0.950				0.950				
Satd. Flow (prot)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1442	0
Flt Permitted	0.950			0.950				0.950				
Satd. Flow (perm)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1442	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1	172	90	141	259	2	48	0	62	0	0	3
Future Volume (vph)	1	172	90	141	259	2	48	0	62	0	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1	195	102	160	294	2	55	0	70	0	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	195	102	160	296	0	0	55	70	0	3	0

Intersection Summary

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	1	172	90	141	259	2	48	0	62	0	0	3
Future Vol, veh/h	1	172	90	141	259	2	48	0	62	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	1	195	102	160	294	2	55	0	70	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	296	0	0	195	0	0	664	813	-	715	812	148
Stage 1	-	-	-	-	-	-	197	197	-	615	615	-
Stage 2	-	-	-	-	-	-	467	616	-	100	197	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1180	-	-	1292	-	-	323	290	0	296	290	835
Stage 1	-	-	-	-	-	-	753	708	0	417	452	-
Stage 2	-	-	-	-	-	-	515	451	0	861	708	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1180	-	-	1292	-	-	291	254	-	268	254	835
Mov Cap-2 Maneuver	-	-	-	-	-	-	291	254	-	268	254	-
Stage 1	-	-	-	-	-	-	752	707	-	417	396	-
Stage 2	-	-	-	-	-	-	449	395	-	860	707	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.9	20.2	9.3
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	291	-	1180	-	-	1292	-	-	835
HCM Lane V/C Ratio	0.187	-	0.001	-	-	0.124	-	-	0.004
HCM Control Delay (s)	20.2	0	8.1	-	-	8.2	-	-	9.3
HCM Lane LOS	C	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.7	-	0	-	-	0.4	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	74	102	63	64	135	205
Future Volume (vph)	74	102	63	64	135	205
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	82	113	70	71	150	228
Shared Lane Traffic (%)						
Lane Group Flow (vph)	82	113	70	71	150	228

Intersection Summary

Intersection

Int Delay, s/veh	5.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	74	102	63	64	135	205
Future Vol, veh/h	74	102	63	64	135	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	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	82	113	70	71	150	228

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	598	70	0	0	141	0
Stage 1	70	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	446	960	-	-	1372	-
Stage 1	923	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	397	960	-	-	1372	-
Mov Cap-2 Maneuver	397	-	-	-	-	-
Stage 1	822	-	-	-	-	-
Stage 2	568	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	3.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	397	960	1372	-
HCM Lane V/C Ratio	-	-	0.207	0.118	0.109	-
HCM Control Delay (s)	-	-	16.4	9.3	7.9	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.8	0.4	0.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850						0.850		0.899	
Flt Protected	0.950			0.950				0.950			0.988	
Satd. Flow (prot)	1583	3034	1417	1583	3034	0	0	1583	1417	0	1480	0
Flt Permitted	0.950			0.950				0.950			0.988	
Satd. Flow (perm)	1583	3034	1417	1583	3034	0	0	1583	1417	0	1480	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	6	300	76	142	274	0	81	0	86	2	0	7
Future Volume (vph)	6	300	76	142	274	0	81	0	86	2	0	7
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	8	375	95	178	343	0	101	0	108	3	0	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	375	95	178	343	0	0	101	108	0	12	0

Intersection Summary

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	300	76	142	274	0	81	0	86	2	0	7
Future Vol, veh/h	6	300	76	142	274	0	81	0	86	2	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	8	375	95	178	343	0	101	0	108	3	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	343	0	0	375	0	0	919	1090	-	903	1090	172
Stage 1	-	-	-	-	-	-	391	391	-	699	699	-
Stage 2	-	-	-	-	-	-	528	699	-	204	391	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1131	-	-	1098	-	-	208	196	0	214	196	805
Stage 1	-	-	-	-	-	-	573	576	0	370	412	-
Stage 2	-	-	-	-	-	-	472	412	0	745	576	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1131	-	-	1098	-	-	179	163	-	186	163	805
Mov Cap-2 Maneuver	-	-	-	-	-	-	179	163	-	186	163	-
Stage 1	-	-	-	-	-	-	569	572	-	367	345	-
Stage 2	-	-	-	-	-	-	391	345	-	740	572	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	3	48.5	13
HCM LOS			E	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	179	-	1131	-	-	1098	-	-	463
HCM Lane V/C Ratio	0.566	-	0.007	-	-	0.162	-	-	0.024
HCM Control Delay (s)	48.5	0	8.2	-	-	8.9	-	-	13
HCM Lane LOS	E	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	3	-	0	-	-	0.6	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	86	137	107	103	171	100
Future Volume (vph)	86	137	107	103	171	100
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	108	171	134	129	214	125
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	171	134	129	214	125

Intersection Summary

Intersection	
Int Delay, s/veh	6.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	86	137	107	103	171	100
Future Vol, veh/h	86	137	107	103	171	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	108	171	134	129	214	125

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	687	134	0	0	263	0
Stage 1	134	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	395	884	-	-	1235	-
Stage 1	864	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	327	884	-	-	1235	-
Mov Cap-2 Maneuver	327	-	-	-	-	-
Stage 1	715	-	-	-	-	-
Stage 2	553	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.4	0	5.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	327	884	1235	-
HCM Lane V/C Ratio	-	-	0.329	0.194	0.173	-
HCM Control Delay (s)	-	-	21.3	10	8.5	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	1.4	0.7	0.6	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.998				0.850		0.955	
Flt Protected	0.950			0.950				0.953			0.976	
Satd. Flow (prot)	1583	3034	1417	1583	3029	0	0	1588	1417	0	1553	0
Flt Permitted	0.950			0.950				0.953			0.976	
Satd. Flow (perm)	1583	3034	1417	1583	3029	0	0	1588	1417	0	1553	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	299	72	104	206	3	75	1	157	3	1	2
Future Volume (vph)	4	299	72	104	206	3	75	1	157	3	1	2
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	329	79	114	226	3	82	1	173	3	1	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	329	79	114	229	0	0	83	173	0	6	0

Intersection Summary

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	299	72	104	206	3	75	1	157	3	1	2
Future Vol, veh/h	4	299	72	104	206	3	75	1	157	3	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	4	329	79	114	226	3	82	1	173	3	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	229	0	0	329	0	0	679	794	-	629	793	115
Stage 1	-	-	-	-	-	-	337	337	-	456	456	-
Stage 2	-	-	-	-	-	-	342	457	-	173	337	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1253	-	-	1145	-	-	315	297	0	343	298	879
Stage 1	-	-	-	-	-	-	619	611	0	523	537	-
Stage 2	-	-	-	-	-	-	614	537	0	778	611	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1253	-	-	1145	-	-	289	266	-	315	267	879
Mov Cap-2 Maneuver	-	-	-	-	-	-	289	266	-	315	267	-
Stage 1	-	-	-	-	-	-	617	609	-	521	483	-
Stage 2	-	-	-	-	-	-	550	483	-	774	609	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	2.8	22.4	14.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	289	-	1253	-	-	1145	-	-	386
HCM Lane V/C Ratio	0.289	-	0.004	-	-	0.1	-	-	0.017
HCM Control Delay (s)	22.4	0	7.9	-	-	8.5	-	-	14.5
HCM Lane LOS	C	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.2	-	0	-	-	0.3	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	63	127	164	116	136	75
Future Volume (vph)	63	127	164	116	136	75
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	75	151	195	138	162	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	75	151	195	138	162	89

Intersection Summary

Intersection

Int Delay, s/veh	5.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	63	127	164	116	136	75
Future Vol, veh/h	63	127	164	116	136	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	75	151	195	138	162	89

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	608	195	0	0	333	0
Stage 1	195	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	440	817	-	-	1162	-
Stage 1	810	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	379	817	-	-	1162	-
Mov Cap-2 Maneuver	379	-	-	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	643	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	5.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	379	817	1162	-
HCM Lane V/C Ratio	-	-	0.198	0.185	0.139	-
HCM Control Delay (s)	-	-	16.8	10.4	8.6	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0.7	0.5	-

APPENDIX F
Forecast Opening Year (2023) With Project Conditions LOS Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.999				0.850		0.865	
Flt Protected	0.950			0.950				0.950				
Satd. Flow (prot)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1442	0
Flt Permitted	0.950			0.950				0.950				
Satd. Flow (perm)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1442	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1	172	97	155	259	2	67	0	102	0	0	3
Future Volume (vph)	1	172	97	155	259	2	67	0	102	0	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1	195	110	176	294	2	76	0	116	0	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	195	110	176	296	0	0	76	116	0	3	0

Intersection Summary

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	172	97	155	259	2	67	0	102	0	0	3
Future Vol, veh/h	1	172	97	155	259	2	67	0	102	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	1	195	110	176	294	2	76	0	116	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	296	0	0	195	0	0	696	845	-	747	844	148
Stage 1	-	-	-	-	-	-	197	197	-	647	647	-
Stage 2	-	-	-	-	-	-	499	648	-	100	197	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1180	-	-	1292	-	-	306	277	0	280	277	835
Stage 1	-	-	-	-	-	-	753	708	0	398	436	-
Stage 2	-	-	-	-	-	-	492	436	0	861	708	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1180	-	-	1292	-	-	273	239	-	251	239	835
Mov Cap-2 Maneuver	-	-	-	-	-	-	273	239	-	251	239	-
Stage 1	-	-	-	-	-	-	752	707	-	398	377	-
Stage 2	-	-	-	-	-	-	423	377	-	860	707	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.1	23.2	9.3
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	273	-	1180	-	-	1292	-	-	835
HCM Lane V/C Ratio	0.279	-	0.001	-	-	0.136	-	-	0.004
HCM Control Delay (s)	23.2	0	8.1	-	-	8.2	-	-	9.3
HCM Lane LOS	C	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	1.1	-	0	-	-	0.5	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	83	161	63	71	155	205
Future Volume (vph)	83	161	63	71	155	205
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	92	179	70	79	172	228
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	179	70	79	172	228

Intersection Summary

Intersection	
Int Delay, s/veh	5.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	83	161	63	71	155	205
Future Vol, veh/h	83	161	63	71	155	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	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	92	179	70	79	172	228

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	642	70	0	0	149	0
Stage 1	70	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	420	960	-	-	1362	-
Stage 1	923	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	367	960	-	-	1362	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	542	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	3.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	367	960	1362	-
HCM Lane V/C Ratio	-	-	0.251	0.186	0.126	-
HCM Control Delay (s)	-	-	18.1	9.6	8	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	1	0.7	0.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850						0.850		0.899	
Flt Protected	0.950			0.950				0.950			0.988	
Satd. Flow (prot)	1583	3034	1417	1583	3034	0	0	1583	1417	0	1480	0
Flt Permitted	0.950			0.950				0.950			0.988	
Satd. Flow (perm)	1583	3034	1417	1583	3034	0	0	1583	1417	0	1480	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	6	300	94	180	274	0	94	0	112	2	0	7
Future Volume (vph)	6	300	94	180	274	0	94	0	112	2	0	7
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	8	375	118	225	343	0	118	0	140	3	0	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	375	118	225	343	0	0	118	140	0	12	0

Intersection Summary

Intersection	
Int Delay, s/veh	10.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	300	94	180	274	0	94	0	112	2	0	7
Future Vol, veh/h	6	300	94	180	274	0	94	0	112	2	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	8	375	118	225	343	0	118	0	140	3	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	343	0	0	375	0	0	1013	1184	-	997	1184	172
Stage 1	-	-	-	-	-	-	391	391	-	793	793	-
Stage 2	-	-	-	-	-	-	622	793	-	204	391	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1131	-	-	1098	-	-	177	171	0	182	171	805
Stage 1	-	-	-	-	-	-	573	576	0	323	371	-
Stage 2	-	-	-	-	-	-	413	371	0	745	576	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1131	-	-	1098	-	-	147	135	-	153	135	805
Mov Cap-2 Maneuver	-	-	-	-	-	-	147	135	-	153	135	-
Stage 1	-	-	-	-	-	-	569	572	-	321	295	-
Stage 2	-	-	-	-	-	-	325	295	-	740	572	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	3.6	88.5	14
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	147	-	1131	-	-	1098	-	-	413
HCM Lane V/C Ratio	0.799	-	0.007	-	-	0.205	-	-	0.027
HCM Control Delay (s)	88.5	0	8.2	-	-	9.1	-	-	14
HCM Lane LOS	F	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	5	-	0	-	-	0.8	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	96	176	107	114	227	100
Future Volume (vph)	96	176	107	114	227	100
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	120	220	134	143	284	125
Shared Lane Traffic (%)						
Lane Group Flow (vph)	120	220	134	143	284	125

Intersection Summary

Intersection

Int Delay, s/veh	8.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	96	176	107	114	227	100
Future Vol, veh/h	96	176	107	114	227	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	120	220	134	143	284	125

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	827	134	0	0	277	0
Stage 1	134	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	326	884	-	-	1220	-
Stage 1	864	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	250	884	-	-	1220	-
Mov Cap-2 Maneuver	250	-	-	-	-	-
Stage 1	663	-	-	-	-	-
Stage 2	475	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18	0	6.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	250	884	1220	-
HCM Lane V/C Ratio	-	-	0.48	0.249	0.233	-
HCM Control Delay (s)	-	-	32	10.4	8.8	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	2.4	1	0.9	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.998				0.850		0.955	
Flt Protected	0.950			0.950				0.953			0.976	
Satd. Flow (prot)	1583	3034	1417	1583	3029	0	0	1588	1417	0	1553	0
Flt Permitted	0.950			0.950				0.953			0.976	
Satd. Flow (perm)	1583	3034	1417	1583	3029	0	0	1588	1417	0	1553	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	299	90	142	206	3	88	1	183	3	1	2
Future Volume (vph)	4	299	90	142	206	3	88	1	183	3	1	2
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	329	99	156	226	3	97	1	201	3	1	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	329	99	156	229	0	0	98	201	0	6	0

Intersection Summary

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	299	90	142	206	3	88	1	183	3	1	2
Future Vol, veh/h	4	299	90	142	206	3	88	1	183	3	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	4	329	99	156	226	3	97	1	201	3	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	229	0	0	329	0	0	763	878	-	713	877	115
Stage 1	-	-	-	-	-	-	337	337	-	540	540	-
Stage 2	-	-	-	-	-	-	426	541	-	173	337	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1253	-	-	1145	-	-	273	264	0	297	265	879
Stage 1	-	-	-	-	-	-	619	611	0	464	491	-
Stage 2	-	-	-	-	-	-	546	490	0	778	611	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1253	-	-	1145	-	-	242	227	-	264	228	879
Mov Cap-2 Maneuver	-	-	-	-	-	-	242	227	-	264	228	-
Stage 1	-	-	-	-	-	-	617	609	-	463	424	-
Stage 2	-	-	-	-	-	-	469	423	-	774	609	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	3.5	29.6	16
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	242	-	1253	-	-	1145	-	-	333
HCM Lane V/C Ratio	0.404	-	0.004	-	-	0.136	-	-	0.02
HCM Control Delay (s)	29.6	0	7.9	-	-	8.6	-	-	16
HCM Lane LOS	D	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.8	-	0	-	-	0.5	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		275	75	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1667	1417	1583	1667
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1667	1417	1583	1667
Link Speed (mph)	30		30			30
Link Distance (ft)	624		1463			921
Travel Time (s)	14.2		33.3			20.9

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	73	166	164	127	192	75
Future Volume (vph)	73	166	164	127	192	75
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	87	198	195	151	229	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	198	195	151	229	89

Intersection Summary

Intersection	
Int Delay, s/veh	6.4

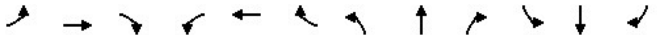
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	73	166	164	127	192	75
Future Vol, veh/h	73	166	164	127	192	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	275	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	14	14	14	14	14	14
Mvmt Flow	87	198	195	151	229	89

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	742	195	0	0	346	0
Stage 1	195	-	-	-	-	-
Stage 2	547	-	-	-	-	-
Critical Hdwy	6.54	6.34	-	-	4.24	-
Critical Hdwy Stg 1	5.54	-	-	-	-	-
Critical Hdwy Stg 2	5.54	-	-	-	-	-
Follow-up Hdwy	3.626	3.426	-	-	2.326	-
Pot Cap-1 Maneuver	366	817	-	-	1149	-
Stage 1	810	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	293	817	-	-	1149	-
Mov Cap-2 Maneuver	293	-	-	-	-	-
Stage 1	649	-	-	-	-	-
Stage 2	556	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	6.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	293	817	1149	-
HCM Lane V/C Ratio	-	-	0.297	0.242	0.199	-
HCM Control Delay (s)	-	-	22.4	10.8	8.9	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	1.2	0.9	0.7	-

APPENDIX G
Forecast Opening Year (2023) With Project Conditions With Traffic Signal LOS Analysis Worksheets



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.999				0.850		0.865	
Flt Protected	0.950			0.950				0.950				
Satd. Flow (prot)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1442	0
Flt Permitted	0.950			0.950				0.756				
Satd. Flow (perm)	1583	3034	1417	1583	3031	0	0	1260	1417	0	1442	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191		1				191		555	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1	172	97	155	259	2	67	0	102	0	0	3
Future Volume (vph)	1	172	97	155	259	2	67	0	102	0	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1	195	110	176	294	2	76	0	116	0	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	195	110	176	296	0	0	76	116	0	3	0

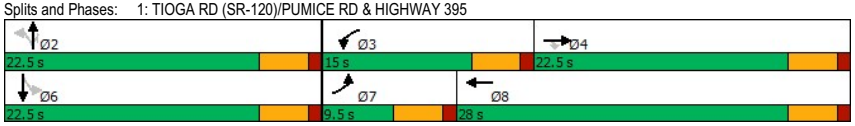
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	1	172	97	155	259	67	0	102	0
Future Volume (vph)	1	172	97	155	259	67	0	102	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4		3	8		2		6
Permitted Phases			4			2		2	
Detector Phase	7	4	4	3	8	2	2	2	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.5	22.5	22.5	15.0	28.0	22.5	22.5	22.5	22.5
Total Split (%)	15.8%	37.5%	37.5%	25.0%	46.7%	37.5%	37.5%	37.5%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	6.1	9.0	9.0	10.1	17.7		13.0	13.0	13.0
Actuated g/C Ratio	0.17	0.26	0.26	0.29	0.50		0.37	0.37	0.37
v/c Ratio	0.00	0.25	0.22	0.39	0.19		0.16	0.18	0.00
Control Delay	18.0	14.5	1.9	16.7	6.7		15.2	1.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	18.0	14.5	1.9	16.7	6.7		15.2	1.7	0.0
LOS	B	B	A	B	A		B	A	A
Approach Delay		10.0			10.4		7.1		
Approach LOS		A			B		A		

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 35.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 9.6 — Intersection LOS: A
Intersection Capacity Utilization 35.0% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: TIOGA RD (SR-120)/PUMICE RD & HIGHWAY 395



Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	195	110	176	296	76	116	3
v/c Ratio	0.00	0.25	0.22	0.39	0.19	0.16	0.18	0.00
Control Delay	18.0	14.5	1.9	16.7	6.7	15.2	1.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	14.5	1.9	16.7	6.7	15.2	1.7	0.0
Queue Length 50th (ft)	0	18	0	32	12	14	0	0
Queue Length 95th (ft)	3	42	8	85	49	42	10	0
Internal Link Dist (ft)		1473			1541	841		216
Turn Bay Length (ft)	400		400	270			50	
Base Capacity (vph)	272	1693	875	571	2027	703	875	1050
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.12	0.13	0.31	0.15	0.11	0.13	0.00

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	172	97	155	259	2	67	0	102	0	0	3
Future Volume (veh/h)	1	172	97	155	259	2	67	0	102	0	0	3
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1667	1597	1667	1667	1597	1900	1900	1667	1667	1900	1667	1900
Adj Flow Rate, veh/h	1	195	0	176	294	2	76	0	0	0	0	3
Adj No. of Lanes	1	2	1	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	19	14	14	19	19	14	14	14	14	14	14
Cap, veh/h	6	545	255	221	980	7	495	0	261	0	0	261
Arrive On Green	0.00	0.18	0.00	0.14	0.32	0.32	0.18	0.00	0.00	0.00	0.00	0.18
Sat Flow, veh/h	1587	3034	1417	1587	3090	21	1248	0	1417	0	0	1417
Grp Volume(v), veh/h	1	195	0	176	144	152	76	0	0	0	0	3
Grp Sat Flow(s),veh/h/ln	1587	1517	1417	1587	1517	1593	1248	0	1417	0	0	1417
Q Serve(g_s), s	0.0	1.5	0.0	2.9	1.9	2.0	1.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.5	0.0	2.9	1.9	2.0	1.5	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	6	545	255	221	481	505	495	0	261	0	0	261
V/C Ratio(X)	0.17	0.36	0.00	0.80	0.30	0.30	0.15	0.00	0.00	0.00	0.00	0.01
Avail Cap(c_a), veh/h	292	2011	939	614	1313	1379	1098	0	939	0	0	939
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	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	9.8	0.0	11.3	7.0	7.0	9.7	0.0	0.0	0.0	0.0	9.1
Incr Delay (d2), s/veh	13.3	0.4	0.0	6.5	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.7	0.0	1.7	0.8	0.9	0.5	0.0	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	26.8	10.2	0.0	17.8	7.3	7.3	9.8	0.0	0.0	0.0	0.0	9.1
LnGrp LOS	C	B		B	A	A	A					A
Approach Vol, veh/h		196			472			76			3	
Approach Delay, s/veh		10.2			11.2			9.8			9.1	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		9.5	8.3	9.4		9.5	4.5	13.1
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	10.5	18.0		18.0	5.0	23.5
Max Q Clear Time (g_c+I1), s		3.5	4.9	3.5		2.0	2.0	4.0
Green Ext Time (p_c), s		0.2	0.2	1.0		0.0	0.0	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	10.8
HCM 2010 LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850						0.850		0.899	
Flt Protected	0.950			0.950				0.950			0.988	
Satd. Flow (prot)	1583	3034	1417	1583	3034	0	0	1583	1417	0	1480	0
Flt Permitted	0.950			0.950				0.750			0.930	
Satd. Flow (perm)	1583	3034	1417	1583	3034	0	0	1250	1417	0	1393	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191						191		191	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	6	300	94	180	274	0	94	0	112	2	0	7
Future Volume (vph)	6	300	94	180	274	0	94	0	112	2	0	7
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	8	375	118	225	343	0	118	0	140	3	0	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	375	118	225	343	0	0	118	140	0	12	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	6	300	94	180	274	94	0	112	2	0
Future Volume (vph)	6	300	94	180	274	94	0	112	2	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4		3	8		2			6
Permitted Phases			4			2		2	6	
Detector Phase	7	4	4	3	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.5	22.5	22.5	15.0	28.0	22.5	22.5	22.5	22.5	22.5
Total Split (%)	15.8%	37.5%	37.5%	25.0%	46.7%	37.5%	37.5%	37.5%	37.5%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.1	11.6	11.6	10.3	25.0		9.8	9.8		9.8
Actuated g/C Ratio	0.11	0.25	0.25	0.23	0.55		0.21	0.21		0.21
v/c Ratio	0.04	0.49	0.23	0.63	0.21		0.44	0.31		0.03
Control Delay	22.8	17.2	2.0	29.9	7.2		21.9	3.4		0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	22.8	17.2	2.0	29.9	7.2		21.9	3.4		0.1
LOS	C	B	A	C	A		C	A		A
Approach Delay		13.7			16.2		11.9			0.1
Approach LOS		B			B		B			A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 45.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 41.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: TIOGA RD (SR-120)/PUMICE RD & HIGHWAY 395

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	8	375	118	225	343	118	140	12
v/c Ratio	0.04	0.49	0.23	0.63	0.21	0.44	0.31	0.03
Control Delay	22.8	17.2	2.0	29.9	7.2	21.9	3.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.8	17.2	2.0	29.9	7.2	21.9	3.4	0.1
Queue Length 50th (ft)	2	43	0	52	17	27	0	0
Queue Length 95th (ft)	12	75	4	#145	57	62	11	0
Internal Link Dist (ft)		1473			1541	841		216
Turn Bay Length (ft)	400		400	270			50	
Base Capacity (vph)	178	1231	688	374	1718	507	688	678
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.30	0.17	0.60	0.20	0.23	0.20	0.02

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)	6	300	94	180	274	0	94	0	112	2	0	7
Future Volume (veh/h)	6	300	94	180	274	0	94	0	112	2	0	7
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1667	1597	1667	1667	1597	1900	1900	1667	1667	1900	1667	1900
Adj Flow Rate, veh/h	8	375	0	225	342	0	118	0	0	2	0	9
Adj No. of Lanes	1	2	1	1	2	0	0	1	1	0	1	0
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	14	19	14	14	19	19	14	14	14	14	14	14
Cap, veh/h	17	707	330	283	1215	0	433	0	230	153	23	189
Arrive On Green	0.01	0.23	0.00	0.18	0.40	0.00	0.16	0.00	0.00	0.16	0.00	0.16
Sat Flow, veh/h	1587	3034	1417	1587	3113	0	1266	0	1417	115	144	1165
Grp Volume(v), veh/h	8	375	0	225	342	0	118	0	0	11	0	0
Grp Sat Flow(s),veh/h/ln	1587	1517	1417	1587	1517	0	1266	0	1417	1424	0	0
Q Serve(g_s), s	0.2	3.4	0.0	4.3	2.4	0.0	2.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	3.4	0.0	4.3	2.4	0.0	2.7	0.0	0.0	0.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	0.18		0.82
Lane Grp Cap(c), veh/h	17	707	330	283	1215	0	433	0	230	365	0	0
V/C Ratio(X)	0.47	0.53	0.00	0.80	0.28	0.00	0.27	0.00	0.00	0.03	0.00	0.00
Avail Cap(c_a), veh/h	251	1726	806	527	2254	0	943	0	806	929	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.6	10.6	0.0	12.4	6.4	0.0	12.2	0.0	0.0	11.2	0.0	0.0
Incr Delay (d2), s/veh	18.8	0.6	0.0	5.1	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.5	0.0	2.3	1.0	0.0	1.0	0.0	0.0	0.1	0.0	0.0
LnGrp Delay(d),s/veh	34.3	11.2	0.0	17.5	6.5	0.0	12.5	0.0	0.0	11.2	0.0	0.0
LnGrp LOS	C	B		B	A		B			B		
Approach Vol, veh/h		383			567			118			11	
Approach Delay, s/veh		11.7			10.9			12.5			11.2	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		9.6	10.1	11.9		9.6	4.8	17.2
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	10.5	18.0		18.0	5.0	23.5
Max Q Clear Time (g_c+I1), s		4.7	6.3	5.4		2.2	2.2	4.4
Green Ext Time (p_c), s		0.4	0.3	2.0		0.0	0.0	2.1

Intersection Summary

HCM 2010 Ctrl Delay	11.4
HCM 2010 LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.998				0.850		0.955	
Flt Protected	0.950			0.950				0.953			0.976	
Satd. Flow (prot)	1583	3034	1417	1583	3029	0	0	1588	1417	0	1553	0
Flt Permitted	0.950			0.950				0.725			0.878	
Satd. Flow (perm)	1583	3034	1417	1583	3029	0	0	1208	1417	0	1397	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191		3				201		2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	299	90	142	206	3	88	1	183	3	1	2
Future Volume (vph)	4	299	90	142	206	3	88	1	183	3	1	2
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	329	99	156	226	3	97	1	201	3	1	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	329	99	156	229	0	0	98	201	0	6	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	4	299	90	142	206	88	1	183	3	1
Future Volume (vph)	4	299	90	142	206	88	1	183	3	1
Turn Type	Prot	NA	Perm	Prot	NA	Perm	NA	Perm	Perm	NA
Protected Phases	7	4		3	8		2			6
Permitted Phases			4			2		2	6	
Detector Phase	7	4	4	3	8	2	2	2	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.5	22.5	22.5	15.0	28.0	22.5	22.5	22.5	22.5	22.5
Total Split (%)	15.8%	37.5%	37.5%	25.0%	46.7%	37.5%	37.5%	37.5%	37.5%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.6	10.6	10.6	9.1	19.3		9.3	9.3		9.3
Actuated g/C Ratio	0.14	0.26	0.26	0.23	0.48		0.23	0.23		0.23
v/c Ratio	0.02	0.41	0.19	0.43	0.16		0.35	0.42		0.02
Control Delay	21.0	15.5	1.2	20.9	6.9		19.3	6.1		13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	21.0	15.5	1.2	20.9	6.9		19.3	6.1		13.0
LOS	C	B	A	C	A		B	A		B
Approach Delay		12.3			12.6		10.4			13.0
Approach LOS		B			B		B			B

Intersection Summary			
Cycle Length: 60			
Actuated Cycle Length: 40			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 11.9		Intersection LOS: B	
Intersection Capacity Utilization 36.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: TIOGA RD (SR-120)/PUMICE RD & HIGHWAY 395

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	4	329	99	156	229	98	201	6
v/c Ratio	0.02	0.41	0.19	0.43	0.16	0.35	0.42	0.02
Control Delay	21.0	15.5	1.2	20.9	6.9	19.3	6.1	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	15.5	1.2	20.9	6.9	19.3	6.1	13.0
Queue Length 50th (ft)	1	34	0	31	10	20	0	1
Queue Length 95th (ft)	9	73	4	94	43	59	40	8
Internal Link Dist (ft)		1473			1541	841		216
Turn Bay Length (ft)	400		400	270			50	
Base Capacity (vph)	220	1519	805	462	1954	605	810	700
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.22	0.12	0.34	0.12	0.16	0.25	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	299	90	142	206	3	88	1	183	3	1	2
Future Volume (veh/h)	4	299	90	142	206	3	88	1	183	3	1	2
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	1693	1618	1693	1693	1618	1618	1693	1693	1693	1693	1693	1693
Adj Flow Rate, veh/h	4	329	0	156	226	3	97	1	0	3	1	2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	14	19	14	14	19	19	14	14	14	14	14	14
Cap, veh/h	9	683		201	1061	14	477	4		274	90	86
Arrive On Green	0.01	0.22	0.00	0.12	0.34	0.34	0.18	0.18	0.00	0.18	0.18	0.18
Sat Flow, veh/h	1612	3075	1434	1612	3107	41	1269	20	1434	472	508	490
Grp Volume(v), veh/h	4	329	0	156	112	117	98	0	0	6	0	0
Grp Sat Flow(s),veh/h/ln	1612	1537	1434	1612	1537	1611	1289	0	1434	1470	0	0
Q Serve(g_s), s	0.1	2.6	0.0	2.7	1.5	1.5	1.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	2.6	0.0	2.7	1.5	1.5	1.9	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.03	0.99		1.00	0.50		0.33
Lane Grp Cap(c), veh/h	9	683		201	525	550	480	0		450	0	0
V/C Ratio(X)	0.45	0.48		0.78	0.21	0.21	0.20	0.00		0.01	0.00	0.00
Avail Cap(c_a), veh/h	284	1954		597	1275	1336	1069	0		1086	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.0	9.6	0.0	12.0	6.6	6.6	10.4	0.0	0.0	9.6	0.0	0.0
Incr Delay (d2), s/veh	32.4	0.5	0.0	6.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.6	0.0	1.0	0.3	0.3	0.4	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	10.1	0.0	18.3	6.8	6.8	10.6	0.0	0.0	9.7	0.0	0.0
LnGrp LOS	D	B		B	A	A	B	A		A	A	A
Approach Vol, veh/h		333	A		385			98	A		6	
Approach Delay, s/veh		10.6			11.5			10.6			9.7	
Approach LOS		B			B			B			A	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	9.5	8.0	10.8	9.5	4.7	14.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.0	10.5	18.0	18.0	5.0	23.5
Max Q Clear Time (g_c+I1), s	3.9	4.7	4.6	2.1	2.1	3.5
Green Ext Time (p_c), s	0.3	0.2	1.7	0.0	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	11.0
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX H
Forecast Opening Year (2023) With Project Conditions With Single-Lane Roundabout LOS Analysis Worksheets

INTERSECTION SUMMARY

Site: OY+P (AM)

HIGHWAY 395 (NS) at TIOGA ROAD (SR-120) (EW)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	30.7	mph	30.7	mph
Travel Distance (Total)	612.0	veh-mi/h	734.4	pers-mi/h
Travel Time (Total)	19.9	veh-h/h	23.9	pers-h/h
Demand Flows (Total)	978	veh/h	1174	pers/h
Percent Heavy Vehicles (Demand)	16.5	%		
Degree of Saturation	0.536			
Practical Spare Capacity	58.7	%		
Effective Intersection Capacity	1826	veh/h		
Control Delay (Total)	2.70	veh-h/h	3.24	pers-h/h
Control Delay (Average)	9.9	sec	9.9	sec
Control Delay (Worst Lane)	11.4	sec		
Control Delay (Worst Movement)	11.4	sec	11.4	sec
Geometric Delay (Average)	0.0	sec		
Stop-Line Delay (Average)	9.9	sec		
Idling Time (Average)	8.2	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	2.6	veh		
95% Back of Queue - Distance (Worst Lane)	74.9	ft		
Queue Storage Ratio (Worst Lane)	0.06			
Total Effective Stops	241	veh/h	290	pers/h
Effective Stop Rate	0.25	per veh	0.25	per pers
Proportion Queued	0.36		0.36	
Performance Index	31.5		31.5	
Cost (Total)	411.60	$/h	411.60	$/h
Fuel Consumption (Total)	41.2	gal/h		
Carbon Dioxide (Total)	377.7	kg/h		
Hydrocarbons (Total)	0.029	kg/h		
Carbon Monoxide (Total)	0.372	kg/h		
NOx (Total)	1.670	kg/h		

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	469,636	veh/y	563,564	pers/y
Delay	1,296	veh-h/y	1,555	pers-h/y
Effective Stops	115,916	veh/y	139,099	pers/y
Travel Distance	293,769	veh-mi/y	352,523	pers-mi/y
Travel Time	9,557	veh-h/y	11,468	pers-h/y
Cost	197,568	$/y	197,568	$/y
Fuel Consumption	19,757	gal/y		
Carbon Dioxide	181,293	kg/y		
Hydrocarbons	14	kg/y		
Carbon Monoxide	179	kg/y		
NOx	801	kg/y		

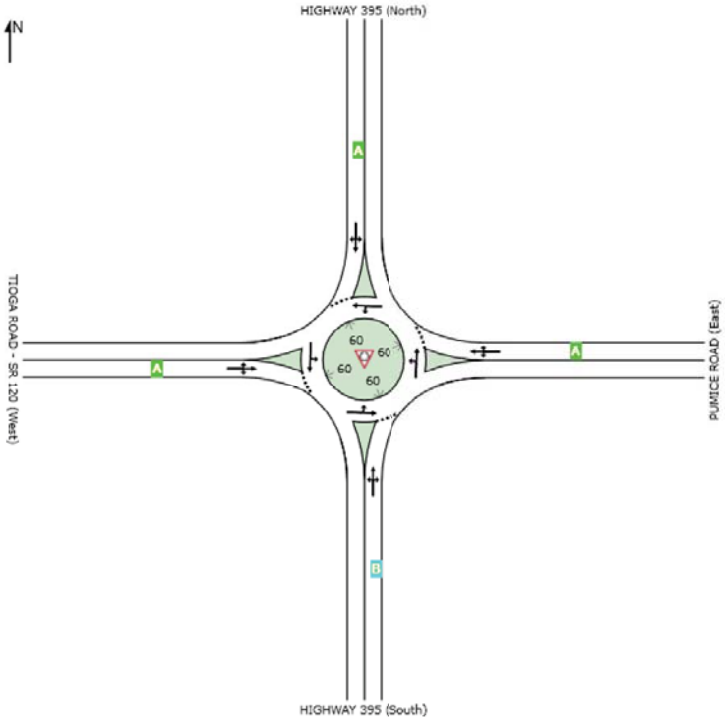
LEVEL OF SERVICE

Site: OY+P (AM)

HIGHWAY 395 (NS) at TIOGA ROAD (SR-120) (EW)
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	B	A	A	A	A



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

INTERSECTION SUMMARY

Site: OY+P (MD)

HIGHWAY 395 (NS) at TIOGA ROAD (SR-120) (EW)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	28.4	mph	28.4	mph
Travel Distance (Total)	838.8	veh-mi/h	1006.6	pers-mi/h
Travel Time (Total)	29.5	veh-h/h	35.4	pers-h/h
Demand Flows (Total)	1340	veh/h	1608	pers/h
Percent Heavy Vehicles (Demand)	16.7	%		
Degree of Saturation	0.680			
Practical Spare Capacity	25.0	%		
Effective Intersection Capacity	1970	veh/h		
Control Delay (Total)	5.93	veh-h/h	7.11	pers-h/h
Control Delay (Average)	15.9	sec	15.9	sec
Control Delay (Worst Lane)	17.8	sec		
Control Delay (Worst Movement)	17.8	sec	17.8	sec
Geometric Delay (Average)	0.0	sec		
Stop-Line Delay (Average)	15.9	sec		
Idling Time (Average)	12.9	sec		
Intersection Level of Service (LOS)	LOS C			
95% Back of Queue - Vehicles (Worst Lane)	4.3	veh		
95% Back of Queue - Distance (Worst Lane)	121.8	ft		
Queue Storage Ratio (Worst Lane)	0.10			
Total Effective Stops	654	veh/h	785	pers/h
Effective Stop Rate	0.49	per veh	0.49	per pers
Proportion Queued	0.55		0.55	
Performance Index	54.9		54.9	
Cost (Total)	608.37	$/h	608.37	$/h
Fuel Consumption (Total)	58.4	gal/h		
Carbon Dioxide (Total)	536.1	kg/h		
Hydrocarbons (Total)	0.043	kg/h		
Carbon Monoxide (Total)	0.531	kg/h		
NOx (Total)	2.380	kg/h		

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	643,200	veh/y	771,840	pers/y
Delay	2,846	veh-h/y	3,415	pers-h/y
Effective Stops	314,125	veh/y	376,950	pers/y
Travel Distance	402,629	veh-mi/y	483,155	pers-mi/y
Travel Time	14,162	veh-h/y	16,995	pers-h/y
Cost	292,019	$/y	292,019	$/y
Fuel Consumption	28,048	gal/y		
Carbon Dioxide	257,348	kg/y		
Hydrocarbons	21	kg/y		
Carbon Monoxide	255	kg/y		
NOx	1,142	kg/y		

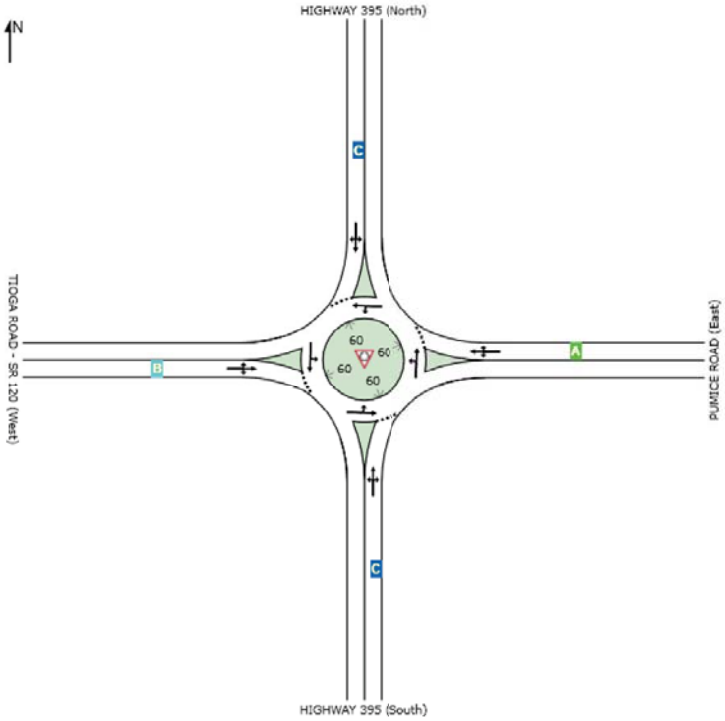
LEVEL OF SERVICE

Site: OY+P (MD)

HIGHWAY 395 (NS) at TIOGA ROAD (SR-120) (EW)
Roundabout

All Movement Classes

	South	East	North	West	Intersection
LOS	C	A	C	B	C



Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

INTERSECTION SUMMARY

Site: OY+P (PM)

HIGHWAY 395 (NS) at TIOGA ROAD (SR-120) (EW)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	30.2	mph	30.2	mph
Travel Distance (Total)	701.7	veh-mi/h	842.1	pers-mi/h
Travel Time (Total)	23.2	veh-h/h	27.9	pers-h/h
Demand Flows (Total)	1123	veh/h	1348	pers/h
Percent Heavy Vehicles (Demand)	16.5	%		
Degree of Saturation	0.541			
Practical Spare Capacity	57.2	%		
Effective Intersection Capacity	2078	veh/h		
Control Delay (Total)	3.54	veh-h/h	4.25	pers-h/h
Control Delay (Average)	11.4	sec	11.4	sec
Control Delay (Worst Lane)	12.4	sec		
Control Delay (Worst Movement)	12.4	sec	12.4	sec
Geometric Delay (Average)	0.0	sec		
Stop-Line Delay (Average)	11.4	sec		
Idling Time (Average)	9.2	sec		
Intersection Level of Service (LOS)	LOS B			
95% Back of Queue - Vehicles (Worst Lane)	2.5	veh		
95% Back of Queue - Distance (Worst Lane)	70.6	ft		
Queue Storage Ratio (Worst Lane)	0.06			
Total Effective Stops	402	veh/h	482	pers/h
Effective Stop Rate	0.36	per veh	0.36	per pers
Proportion Queued	0.44		0.44	
Performance Index	38.6		38.6	
Cost (Total)	480.15	$/h	480.15	$/h
Fuel Consumption (Total)	47.6	gal/h		
Carbon Dioxide (Total)	436.3	kg/h		
Hydrocarbons (Total)	0.034	kg/h		
Carbon Monoxide (Total)	0.431	kg/h		
NOx (Total)	1.929	kg/h		

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	539,077	veh/y	646,892	pers/y
Delay	1,701	veh-h/y	2,041	pers-h/y
Effective Stops	192,747	veh/y	231,296	pers/y
Travel Distance	336,826	veh-mi/y	404,191	pers-mi/y
Travel Time	11,159	veh-h/y	13,390	pers-h/y
Cost	230,473	$/y	230,473	$/y
Fuel Consumption	22,828	gal/y		
Carbon Dioxide	209,444	kg/y		
Hydrocarbons	16	kg/y		
Carbon Monoxide	207	kg/y		
NOx	926	kg/y		

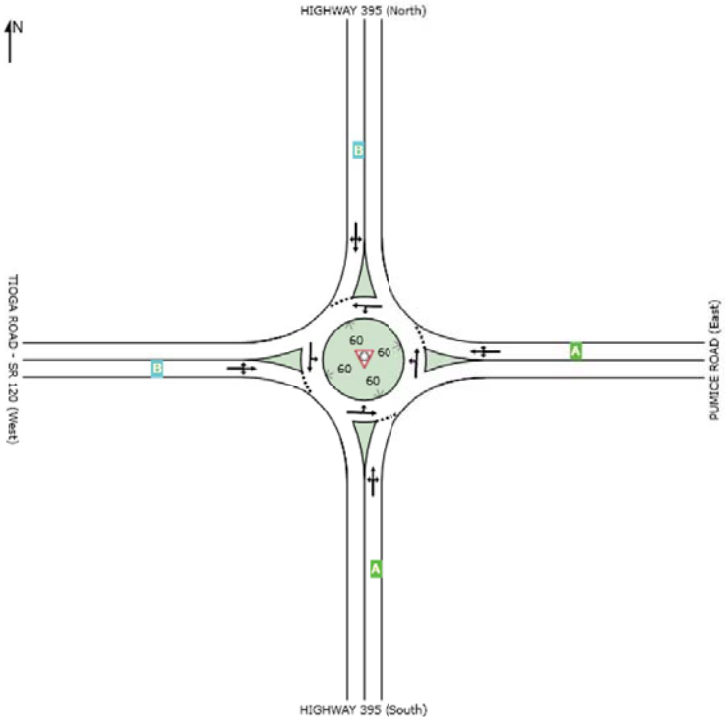
LEVEL OF SERVICE

Site: OY+P (PM)

HIGHWAY 395 (NS) at TIOGA ROAD (SR-120) (EW)
Roundabout

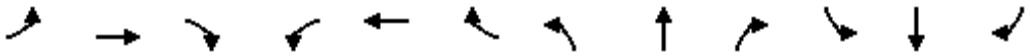
All Movement Classes

	South	East	North	West	Intersection
LOS	A	A	B	B	B



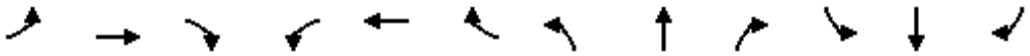
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

APPENDIX I
Non-Peak Season Mid-Day Conditions at the Highway 395 / Tioga Road (SR-120) LOS Analysis Worksheets



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.999				0.850		0.902	
Flt Protected	0.950			0.950				0.950			0.987	
Satd. Flow (prot)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1484	0
Flt Permitted	0.950			0.950				0.950			0.987	
Satd. Flow (perm)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1484	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	2	157	45	42	120	1	27	0	46	2	0	6
Future Volume (vph)	2	157	45	42	120	1	27	0	46	2	0	6
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	3	196	56	53	150	1	34	0	58	3	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	196	56	53	151	0	0	34	58	0	11	0

Intersection Summary

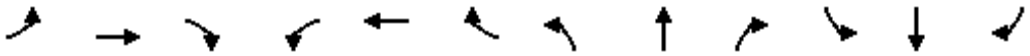
Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	157	45	42	120	1	27	0	46	2	0	6
Future Vol, veh/h	2	157	45	42	120	1	27	0	46	2	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	3	196	56	53	150	1	34	0	58	3	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	151	0	0	196	0	0	383	459	-	361	459	76
Stage 1	-	-	-	-	-	-	202	202	-	257	257	-
Stage 2	-	-	-	-	-	-	181	257	-	104	202	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1344	-	-	1291	-	-	521	471	0	541	471	932
Stage 1	-	-	-	-	-	-	747	705	0	692	665	-
Stage 2	-	-	-	-	-	-	770	665	0	857	705	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1344	-	-	1291	-	-	500	451	-	523	451	932
Mov Cap-2 Maneuver	-	-	-	-	-	-	500	451	-	523	451	-
Stage 1	-	-	-	-	-	-	746	704	-	691	638	-
Stage 2	-	-	-	-	-	-	732	638	-	855	704	-

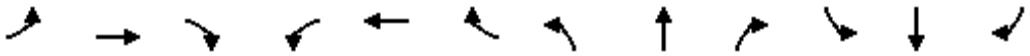
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	2	12.7	9.7
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	500	-	1344	-	-	1291	-	-	780
HCM Lane V/C Ratio	0.068	-	0.002	-	-	0.041	-	-	0.013
HCM Control Delay (s)	12.7	0	7.7	-	-	7.9	-	-	9.7
HCM Lane LOS	B	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	0	-	-	0.1	-	-	0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.999				0.850		0.902	
Flt Protected	0.950			0.950				0.950			0.987	
Satd. Flow (prot)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1484	0
Flt Permitted	0.950			0.950				0.950			0.987	
Satd. Flow (perm)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1484	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	2	157	63	80	120	1	40	0	72	2	0	6
Future Volume (vph)	2	157	63	80	120	1	40	0	72	2	0	6
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	3	196	79	100	150	1	50	0	90	3	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	196	79	100	151	0	0	50	90	0	11	0

Intersection Summary

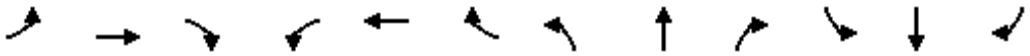
Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	157	63	80	120	1	40	0	72	2	0	6
Future Vol, veh/h	2	157	63	80	120	1	40	0	72	2	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	3	196	79	100	150	1	50	0	90	3	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	151	0	0	196	0	0	477	553	-	455	553	76
Stage 1	-	-	-	-	-	-	202	202	-	351	351	-
Stage 2	-	-	-	-	-	-	275	351	-	104	202	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1344	-	-	1291	-	-	445	415	0	462	415	932
Stage 1	-	-	-	-	-	-	747	705	0	607	602	-
Stage 2	-	-	-	-	-	-	675	602	0	857	705	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1344	-	-	1291	-	-	415	382	-	434	382	932
Mov Cap-2 Maneuver	-	-	-	-	-	-	415	382	-	434	382	-
Stage 1	-	-	-	-	-	-	746	704	-	606	556	-
Stage 2	-	-	-	-	-	-	618	556	-	855	704	-

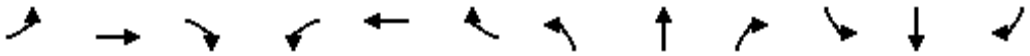
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	3.2	14.9	10
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	415	-	1344	-	-	1291	-	-	724
HCM Lane V/C Ratio	0.12	-	0.002	-	-	0.077	-	-	0.014
HCM Control Delay (s)	14.9	0	7.7	-	-	8	-	-	10
HCM Lane LOS	B	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.4	-	0	-	-	0.3	-	-	0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.999				0.850		0.899	
Flt Protected	0.950			0.950				0.950			0.988	
Satd. Flow (prot)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1480	0
Flt Permitted	0.950			0.950				0.950			0.988	
Satd. Flow (perm)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1480	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	2	173	70	92	132	1	47	0	92	2	0	7
Future Volume (vph)	2	173	70	92	132	1	47	0	92	2	0	7
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	3	216	88	115	165	1	59	0	115	3	0	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	216	88	115	166	0	0	59	115	0	12	0

Intersection Summary

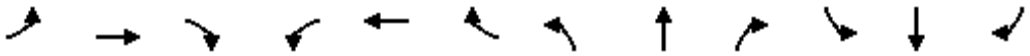
Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	173	70	92	132	1	47	0	92	2	0	7
Future Vol, veh/h	2	173	70	92	132	1	47	0	92	2	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	3	216	88	115	165	1	59	0	115	3	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	166	0	0	216	0	0	535	618	-	510	618	83
Stage 1	-	-	-	-	-	-	222	222	-	396	396	-
Stage 2	-	-	-	-	-	-	313	396	-	114	222	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1326	-	-	1268	-	-	403	379	0	420	379	922
Stage 1	-	-	-	-	-	-	727	690	0	569	573	-
Stage 2	-	-	-	-	-	-	640	573	0	845	690	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1326	-	-	1268	-	-	371	344	-	390	344	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	371	344	-	390	344	-
Stage 1	-	-	-	-	-	-	726	689	-	568	521	-
Stage 2	-	-	-	-	-	-	576	521	-	843	689	-

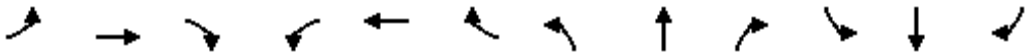
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	3.3	16.5	10.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	371	-	1326	-	-	1268	-	-	708
HCM Lane V/C Ratio	0.158	-	0.002	-	-	0.091	-	-	0.016
HCM Control Delay (s)	16.5	0	7.7	-	-	8.1	-	-	10.2
HCM Lane LOS	C	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.6	-	0	-	-	0.3	-	-	0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	400		400	270		0	0		50	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.999				0.850		0.899	
Flt Protected	0.950			0.950				0.950			0.988	
Satd. Flow (prot)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1480	0
Flt Permitted	0.950			0.950				0.950			0.988	
Satd. Flow (perm)	1583	3034	1417	1583	3031	0	0	1583	1417	0	1480	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1553			1621			921			296	
Travel Time (s)		35.3			36.8			20.9			6.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	2	173	88	130	132	1	60	0	118	2	0	7
Future Volume (vph)	2	173	88	130	132	1	60	0	118	2	0	7
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	14%	19%	14%	14%	19%	14%	14%	14%	14%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	3	216	110	163	165	1	75	0	148	3	0	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	216	110	163	166	0	0	75	148	0	12	0

Intersection Summary

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	173	88	130	132	1	60	0	118	2	0	7
Future Vol, veh/h	2	173	88	130	132	1	60	0	118	2	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	Free	-	-	None
Storage Length	400	-	400	270	-	-	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	14	19	14	14	19	14	14	14	14	14	14	14
Mvmt Flow	3	216	110	163	165	1	75	0	148	3	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	166	0	0	216	0	0	631	714	-	606	714	83
Stage 1	-	-	-	-	-	-	222	222	-	492	492	-
Stage 2	-	-	-	-	-	-	409	492	-	114	222	-
Critical Hdwy	4.38	-	-	4.38	-	-	7.78	6.78	-	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.78	5.78	-	6.78	5.78	-
Follow-up Hdwy	2.34	-	-	2.34	-	-	3.64	4.14	-	3.64	4.14	3.44
Pot Cap-1 Maneuver	1326	-	-	1268	-	-	342	332	0	357	332	922
Stage 1	-	-	-	-	-	-	727	690	0	497	517	-
Stage 2	-	-	-	-	-	-	559	517	0	845	690	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1326	-	-	1268	-	-	305	289	-	321	289	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	305	289	-	321	289	-
Stage 1	-	-	-	-	-	-	726	689	-	496	450	-
Stage 2	-	-	-	-	-	-	483	450	-	843	689	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	4.1	20.6	10.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	305	-	1326	-	-	1268	-	-	651
HCM Lane V/C Ratio	0.246	-	0.002	-	-	0.128	-	-	0.017
HCM Control Delay (s)	20.6	0	7.7	-	-	8.3	-	-	10.6
HCM Lane LOS	C	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.9	-	0	-	-	0.4	-	-	0.1