

MAPES ROAD CULTIVATION & DISTRIBUTION FACILITY TRAFFIC IMPACT ANALYSIS

City of Perris

August 30, 2019

gandbñ

Traffic Engineering • Transportation Planning • Parking • Noise & Vibration
Air Quality • Global Climate Change • Health Risk Assessment

MAPES ROAD CULTIVATION & DISTRIBUTION FACILITY TRAFFIC IMPACT ANALYSIS

City of Perris

August 30, 2019

prepared by
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19-0024

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EXECUTIVE SUMMARY

The purpose of this Traffic Impact Analysis is to provide an assessment of traffic operations resulting from development of the proposed Mapes Road Cultivation & Distribution Facility project and to identify measures necessary to mitigate potentially significant transportation impacts. This report analyzes transportation impacts for the anticipated project opening year in Year 2021.

Although this is a technical report, effort has been made to write the report clearly and concisely. A glossary is provided in Appendix A to assist the reader with technical terms related to transportation engineering.

PROJECT DESCRIPTION

The 5.94 acre project site is located on the north side of Mapes Road, between A Street and Goetz Road. The project site is currently vacant.

The proposed project involves construction of a 9,900 square foot office and warehouse building and four (4) 18,900 square foot greenhouse cultivation buildings. A full access driveway is proposed at Mapes Road. The proposed project is anticipated to be constructed and fully operational by year 2021.

EXISTING TRAFFIC OPERATIONS

The following study intersections currently operate at an unacceptable Level of Service (E or F) during the peak hours for Existing traffic conditions (see Table 1):

- A Street/River Road at Mapes Road (#1) [LOS E - AM peak hour]
- Goetz Road at Mapes Road (#3) [LOS F - AM peak hour, LOS E - PM peak hour]

A traffic signal appears to currently be warranted at the following study intersections based upon the California Manual on Uniform Traffic Control Devices (2014):

- Goetz Road at Mapes Road (#3)

PROJECT TRIPS

The proposed project is forecast to generate a total of approximately 424 daily vehicle trips, including 60 vehicle trips during the morning peak hour and 54 vehicle trips during the evening peak hour. The proposed project is forecast to generate a total of approximately 545 daily trips in passenger car equivalents, including 92 passenger car equivalent trips during the morning peak hour and 71 passenger car equivalent trips during the evening peak hour (see Table 2).

FORECAST TRAFFIC OPERATIONS

Existing Plus Project Conditions: The following study intersections are forecast to operate at an unacceptable Level of Service (E or F) during the peak hours for Existing Plus Project traffic conditions (see Table 4):

- A Street/River Road at Mapes Road (#1) [LOS E - AM peak hour]
- Goetz Road at Mapes Road (#3) [LOS F - AM peak hour, LOS E - PM peak hour]

The proposed project is forecast to result in a significant traffic impact at the intersection of Goetz Road and Mapes Road for Existing Plus Project conditions (50 or more project generated trips at an intersection performing at an LOS of E or F in the baseline condition and an LOS increase of over 2 seconds).

With the implementation of the traffic signal currently warranted under Existing traffic conditions, Goetz Road and Mapes Road is forecast to operate at acceptable Levels of Service during the peak hours for Existing Plus Project traffic conditions (see Table 4).

Existing Plus Ambient Growth Plus Project (EAP): The following study intersections are forecast to operate at an unacceptable Level of Service (E or F) during the peak hours for EAP traffic conditions (see Table 5):

- A Street/River Road at Mapes Road (#1) [LOS F - AM peak hour]
- Goetz Road at Mapes Road (#3) [LOS F - AM/PM peak hour]

The proposed project is forecast to result in a significant traffic impact at the intersection of Goetz Road and Mapes Road for EAP conditions (50 or more project generated trips at an intersection performing at an LOS of E or F in the baseline condition and an LOS increase of over 2 seconds).

With the implementation of the traffic signal currently warranted under Existing traffic conditions, Goetz Road and Mapes Road is forecast to operate at acceptable Levels of Service during the peak hours for EAP traffic conditions (see Table 5).

Existing Plus Ambient Growth Plus Cumulative (EAPC): The following study intersections are forecast to operate at an unacceptable Level of Service (E or F) during the peak hours for EAPC traffic conditions (see Table 6):

- A Street/River Road at Mapes Road (#1) [LOS F - AM peak hour]
- Goetz Road at Mapes Road (#3) [LOS F - AM/PM peak hour]

The proposed project is forecast to result in a significant traffic impact at the intersection of Goetz Road and Mapes Road for EAPC conditions (50 or more project generated trips at an intersection performing at an LOS of E or F in the baseline condition and an LOS increase of over 2 seconds).

With the implementation of the traffic signal currently warranted under Existing traffic conditions, Goetz Road and Mapes Road is forecast to operate at acceptable Levels of Service during the peak hours for EAPC traffic conditions (see Table 6).

PARKING ANALYSIS

A total of 53 parking spaces are required for the proposed project. The proposed site plan provides a total of 48 parking spaces. Therefore, full occupancy of the proposed project will require 5 parking spaces in addition to the spaces shown on the proposed project site plan.

MITIGATION MEASURES

Under existing traffic conditions a traffic signal is warranted at the intersection of Goetz Road/Mapes Road. Prior to issuance of any occupancy permit, the applicant shall install the said traffic signal, at ultimate design, and the applicant will be eligible for Development Impact Fee (DIF) credit. However, at this time, if the City has already awarded the contract for installation of the said traffic signal, the applicant will only be subject to pay the DIF.

Five (5) parking spaces in addition to the 48 proposed in the project site plan should be implemented in order to meet the criteria for off-site parking in the City of Perris.

1. INTRODUCTION

This section describes the purpose of this traffic impact analysis, project location, proposed development, and study area. Figure 1 shows the project location map and Figure 2 illustrates the project site plan.

PURPOSE AND OBJECTIVES

The purpose of this traffic impact analysis is to provide an assessment of traffic operations resulting from development of the proposed Mapes Road Cultivation & Distribution Facility project and to identify measures necessary to mitigate potentially significant transportation impacts. This report analyzes transportation impacts for the anticipated project opening year in 2021.

Although this is a technical report, effort has been made to write the report clearly and concisely. A glossary is provided in Appendix A to assist the reader with technical terms related to transportation engineering.

PROJECT DESCRIPTION

The 5.94 acre project site is located on the north side of Mapes Road, between A Street and Goetz Road. The project site is currently vacant.

The proposed project involves construction of a 9,900 square foot office and warehouse building and four (4) 18,900 square foot greenhouse cultivation buildings. A full access driveway is proposed at Mapes Road. The proposed project is anticipated to be constructed and fully operational by year 2021.

STUDY AREA

Based on the study intersections identified in the approved scoping agreement (Appendix B), the study area consists of the following study intersections within the City of Perris:

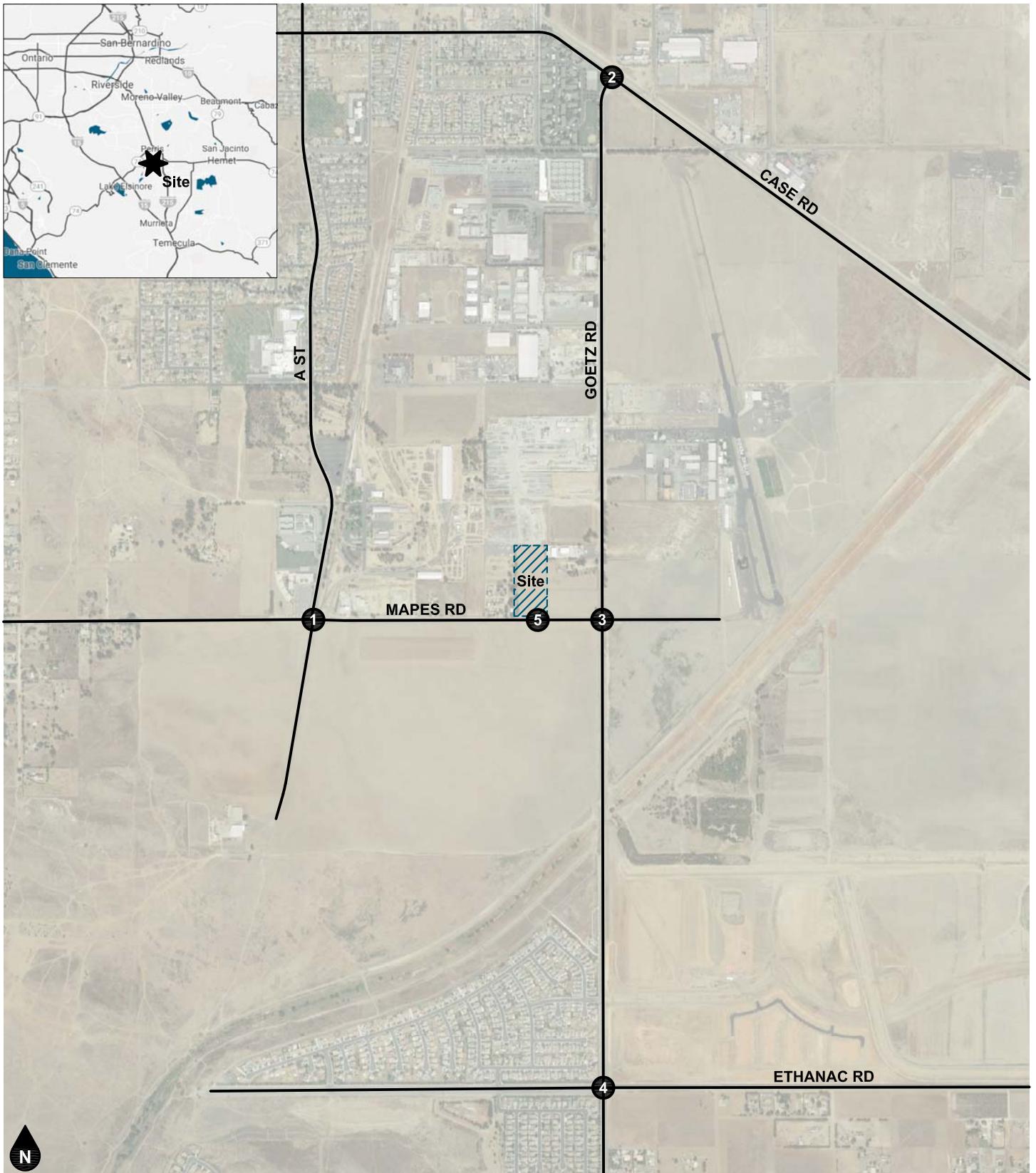
Study Intersections ¹	Jurisdiction
1. South A Street/River Road (NS) at Mapes Road (EW)	Perris
2. Goetz Road (NS) at Case Road (EW)	Perris
3. Goetz Road (NS) at Mapes Road (EW)	Perris
4. Goetz Road (NS) at Ethanac Road (EW)	Perris
5. Project Driveway (NS) at Mapes Road (EW)	Perris

ANALYSIS SCENARIOS

The following scenarios are analyzed during typical weekday AM and PM peak hour conditions:

- Existing Conditions
- Existing Plus Project Conditions
- Existing Plus Ambient Growth Plus Project
- Existing Plus Ambient Growth Plus Project Plus Cumulative

¹ (NS) = north-south roadway; (EW) = east-west roadway



Legend

Study Intersection

Figure 1
Project Location Map

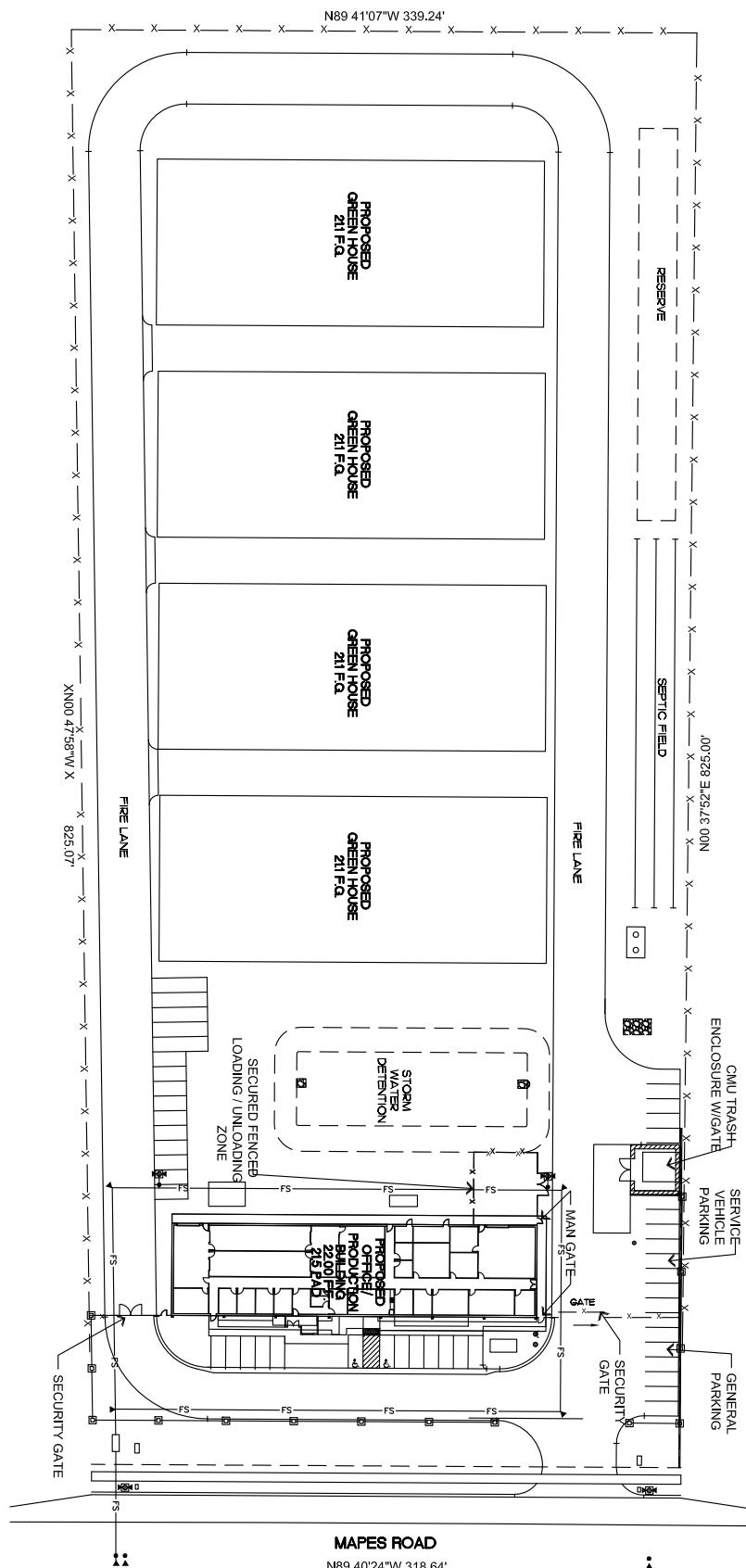


Figure 2 Site Plan

Mapes Road Cultivation & Distribution Facility Traffic Impact Analysis 19-0024

2. METHODOLOGY

This section describes the analysis methodologies used to assess transportation facility performance as adopted by the respective jurisdictional agencies.

INTERSECTION DELAY METHODOLOGY

The technique used to assess the performance of unsignalized intersections and intersections within the California Department of Transportation jurisdiction is known as the intersection delay methodology based on the procedures contained in the [Highway Capacity Manual](#) (Transportation Research Board, 6th Edition). The methodology considers the traffic volume and distribution of movements, traffic composition, geometric characteristics, and signalization details to calculate the average control delay per vehicle and corresponding Level of Service. Control delay is defined as the portion of delay attributed to the intersection traffic control (such as a traffic signal or stop sign) and includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay. The intersection control delay is then correlated to Level of Service based on the following thresholds:

Level of Service	Intersection Control Delay (Seconds / Vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10.0	≤ 10.0
B	$> 10.0 \text{ to } \leq 20.0$	$> 10.0 \text{ to } \leq 15.0$
C	$> 20.0 \text{ to } \leq 35.0$	$> 15.0 \text{ to } \leq 25.0$
D	$> 35.0 \text{ to } \leq 55.0$	$> 25.0 \text{ to } \leq 35.0$
E	$> 55.0 \text{ to } \leq 80.0$	$> 35.0 \text{ to } \leq 50.0$
F	> 80.0	> 50.0

Source: Transportation Research Board, [Highway Capacity Manual](#) (6th Edition).

Level of Service is used to qualitatively describe the performance of a roadway facility, ranging from Level of Service A (free-flow conditions) to Level of Service F (extreme congestion and system failure). At intersections with traffic signal or all way stop control, Level of Service is determined by the average control delay for the overall intersection. At intersections with cross street stop control (i.e., one- or two-way stop control), Level of Service is determined by the average control delay for the worst individual movement (or movements sharing a single lane).

Intersection delay analysis was performed using the Vistro (Version 6.00-00) software. Intersection delay analysis was performed using the Vistro (Version 6.00-00) software. The Level of Service analysis has been performed in accordance with the input parameters identified in Exhibit C of the Riverside County Guidelines. Default values recommended in the Highway Capacity Manual were used for any values not specifically identified in the Riverside County Guidelines.

PERFORMANCE STANDARDS

The City of Perris has established Level of Service D as the minimum acceptable Level of Service at all study intersections.

THRESHOLDS OF SIGNIFICANCE

For study intersections within the City of Perris jurisdiction, a project traffic impact is considered significant if:

- The addition of 50 or more peak hour project generated trips is forecast to cause an intersection to deteriorate from acceptable Level of Service (D or better) to unacceptable Level of Service (E or F); or,
- The addition of 50 or more peak hour project generated trips worsens the delay at an intersection operating at an unacceptable Level of Service (E or F) in the baseline condition by 2 seconds or more.
- A cumulative impact is considered significant when a study intersection is forecast to operate at an unacceptable Level of Service with the addition of cumulative/background traffic and 50 or more peak hour project trips.

If a project is forecast to cause a significant traffic impact, feasible mitigation measures that will reduce the impact to a less than significant level are identified. Mitigation measures can be in many forms, including the addition of lanes, traffic control modification, or demand management measures. If no feasible mitigation measures can be identified for a significantly impacted facility, the impact will remain significant and unavoidable and a statement of overriding considerations is required.

3. EXISTING CONDITIONS

EXISTING ROADWAY SYSTEM

Figure 3 identifies the lane geometry and intersection traffic controls for Existing conditions based on a field survey of the study area. Regional access to the project area is provided by the Interstate 215 Freeway approximately 2 miles north and east of the project site. Key north-south roadways providing local circulation include A Street/River Road and Goetz Road. Key east-west roadways providing local circulation include 11th Street/Case Road, Mapes Road, and Ethanac Road.

A Street/River Road is a two-lane divided roadway. A Street/River Road is classified as a Major Collector (78 foot right-of-way) in the City of Perris General Plan. On-street parking is generally prohibited. Dedicated Class II (marked/on-street) bicycle lanes are proposed but not yet provided. Sidewalks are provided on the west side of the roadway between Alpine Drive and Mapes Road.

Goetz Road is a two-lane undivided roadway. Goetz Road is classified as a Primary Arterial (128 foot right-of-way) in the City of Perris General Plan. On-street parking is generally prohibited. Dedicated Class II (marked/on-street) bicycle lanes are proposed but not yet provided. Sidewalks are generally provided on the west side of the roadway.

11th Street/Case Road is a two-lane undivided roadway. 11th Street/Case Road is classified as a Primary Arterial (128 foot right-of-way) west of Goetz Road and a Secondary Arterial (94 foot right-of-way) east of Goetz Road in the City of Perris General Plan. On-street parking is generally prohibited. Dedicated Class II (marked/on-street) bicycle lanes are proposed but not yet provided.

Mapes Road is a two-lane undivided roadway. Mapes Road is classified as a Secondary Arterial (94 foot right-of-way) in the City of Perris General Plan. On-street parking is generally prohibited. Dedicated Class II (marked/on-street) bicycle lanes are proposed but not yet provided.

Ethanac Road is a four-lane divided roadway west of Goetz Road and a two-lane undivided roadway east of Goetz Road. Ethanac Road is classified as an Expressway (184 foot right-of-way) in the City of Perris General Plan. On-street parking is generally prohibited. Dedicated Class II (marked/on-street) bicycle lanes are proposed but not yet provided. Sidewalks are generally provided on both sides of the roadway west of Goetz Road.

PEDESTRIAN FACILITIES

There are currently no pedestrian sidewalks provided along the roadways adjacent to the project site,

BICYCLE ROUTES

There are currently no bicycle paths adjacent to the project site boundary. The City of Perris Proposed Bikeways and Trail Improvements is depicted on Figure 4.

TRANSIT FACILITIES

Figure 5 shows the existing transit routes available in the project vicinity. As shown on Figure 5, Transit Routes 30, 61, and 74 run along 11th Street/Case Road.

TRUCK ROUTES

Figure 6 shows the designated truck routes as identified in the City of Perris General Plan.

GENERAL PLAN CONTEXT

Figure 7 shows the City of Perris General Plan Circulation Element roadway classifications map. This figure shows the nature and extent of arterial and collector highways that are needed to adequately serve the ultimate development depicted by the Land Use Element of the General Plan. The City of Perris standard roadway cross-sections are illustrated on Figure 8.

EXISTING ROADWAY VOLUMES

Figure 9 shows the Existing average daily traffic volumes. The Existing average daily traffic volumes have been factored from peak hour intersection turning movement volumes using the following formula for each intersection leg:

$$\text{Evening Peak Hour (Approach Volume} + \text{Exit Volume}) \times 12 = \text{Leg Volume.}$$

Existing peak hour volumes are based upon morning peak period and evening peak period intersection turning movement counts obtained in May 2019 during typical weekday conditions when local schools were in session. The morning peak period was counted between 7:00 AM and 9:00 AM and the evening peak period was counted between 4:00 PM and 6:00 PM. The actual peak hour within the peak period is the four consecutive 15 minute periods with the highest total volume when all movements are added together. Thus, the weekday evening peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15 minute periods have the highest combined volume. Intersection turning movement count worksheets are provided in Appendix C.

Figure 10 and Figure 11 show the Existing AM peak hour and PM peak hour intersection turning movement volumes.

EXISTING INTERSECTION LEVEL OF SERVICE

The intersection Levels of Service for Existing conditions have been calculated and are shown in Table 1. Existing intersection Level of Service worksheets are provided in Appendix D.

As shown in Table 1, the following study intersections currently operate at an unacceptable Level of Service (E or F) during the peak hours for Existing conditions:

- A Street/River Road at Mapes Road (#1) [LOS E - AM peak hour]
- Goetz Road at Mapes Road (#3) [LOS F - AM peak hour, LOS E - PM peak hour]

EXISTING TRAFFIC SIGNAL WARRANT ANALYSIS

A traffic signal appears to currently be warranted at the following study intersection based upon the California Manual on Uniform Traffic Control Devices (2014) peak hour volume warrant (Warrant 3):

- Goetz Road at Mapes Road (#3)

Traffic signal warrant worksheets are provided in Appendix E.

Table 1
Existing Intersection Levels of Service

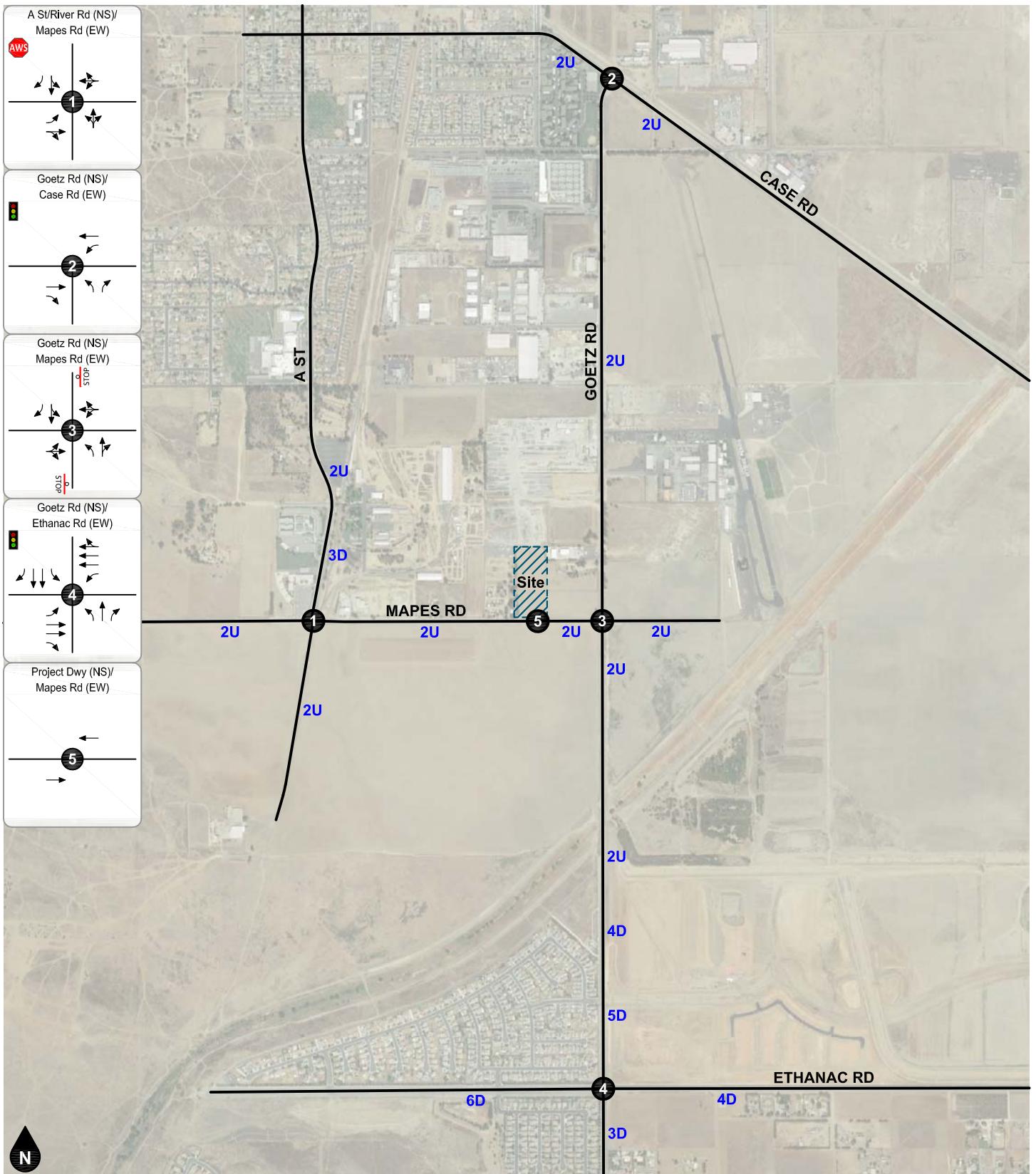
ID	Study Intersection	Traffic Control ¹	AM Peak Hour		PM Peak Hour	
			Delay ²	LOS ³	Delay ²	LOS ³
1. A Street/River Road at Mapes Road		AWS	48.9	E	10.1	B
2. Goetz Road at Case Road		TS	19.3	B	17.9	B
3. Goetz Road at Mapes Road		CSS	171.6	F	38.1	E
4. Goetz Road at Ethanac Road		TS	26.8	C	27.9	C

Notes:

(1) AWS = All Way Stop; TS = Traffic Signal; CSS = Cross Street Stop

(2) Delay is shown in seconds/vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst individual lane (or movements sharing a lane).

(3) LOS = Level of Service



Legend

- Traffic Signal
- AWS All Way Stop
- STOP Stop Sign
- #D #Lane Divided Roadway
- #U #Lane Undivided Roadway

Existing Lane

Figure 3
Existing Lane Geometry and Intersection Traffic Controls

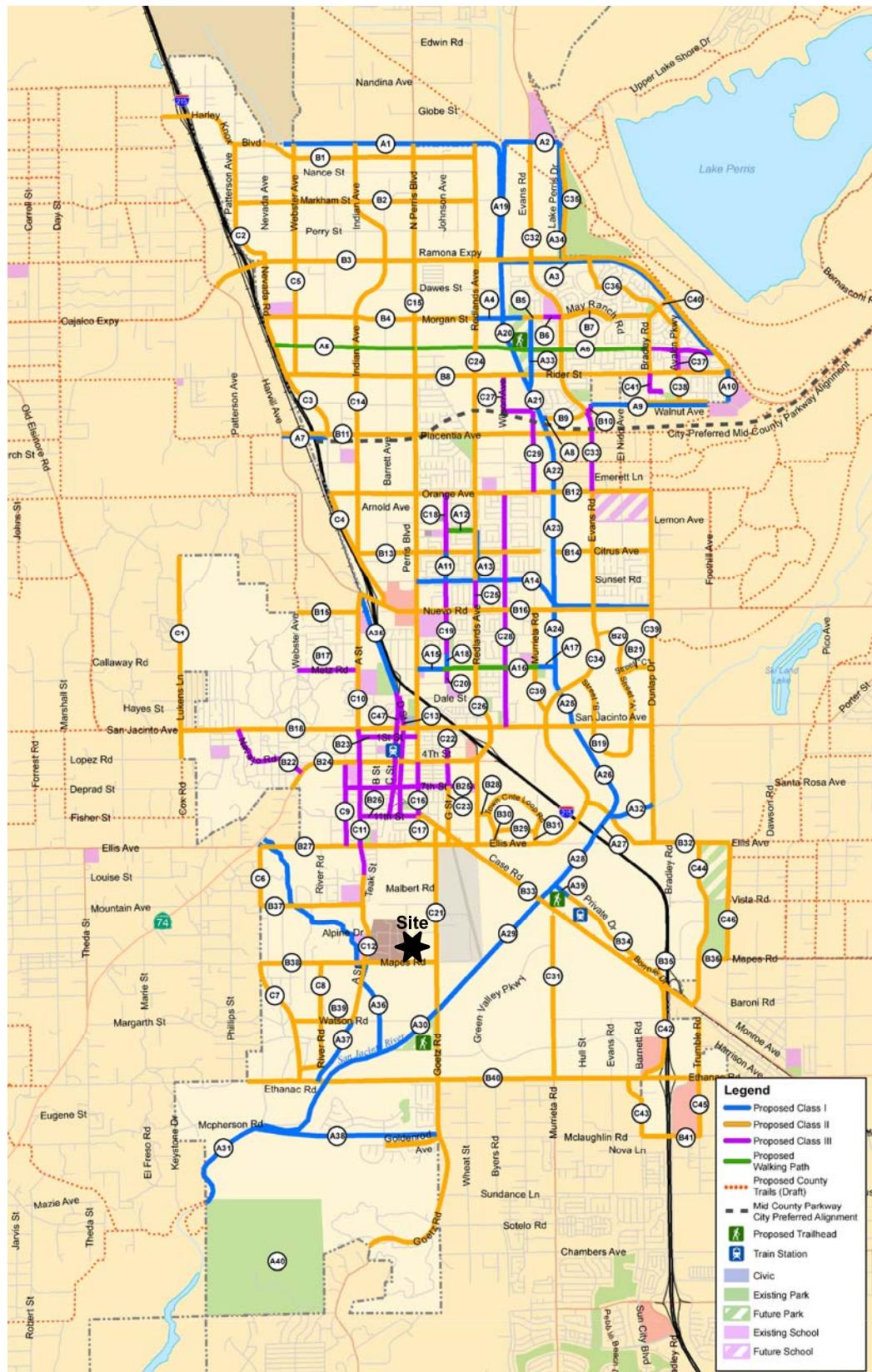
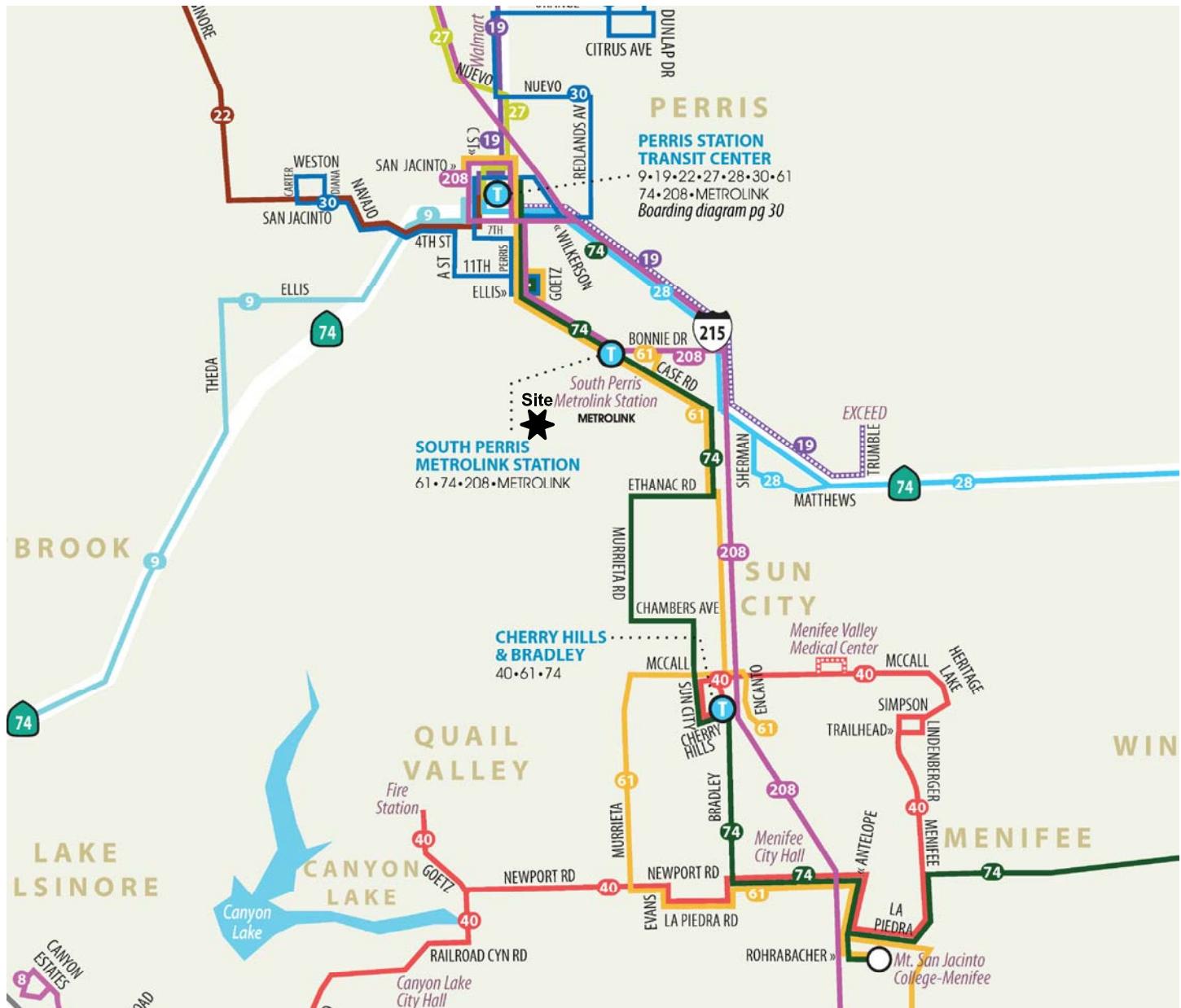


Figure 4
City of Perris Proposed Bikeway Master Plan

Source: City of Perris

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Mapes Road Cultivation & Distribution Facility
Traffic Impact Analysis
19-0004



- This legend provides key symbols and descriptions for various map elements:

 - Route Number**: Represented by a black circle with the number "41".
 - Alternate Routing**: Represented by a dashed line.
 - Transfer Point**: Represented by a circle containing a stylized "T".
 - State Highway**: Represented by a teal diamond shape.
 - Route Path**: Represented by a thick black line.
 - Point of Interest**: Represented by a white circle with a black outline.
 - Metrolink Station**: Represented by a blue circle with a train icon.
 - Main Road**: Represented by a grey line.
 - Commuter Routing**: Represented by a dashed line.
 - Medical Facility**: Represented by a red circle with a white cross.
 - Interstate**: Represented by a white circle with a black outline.
 - Water**: Represented by a light blue line.

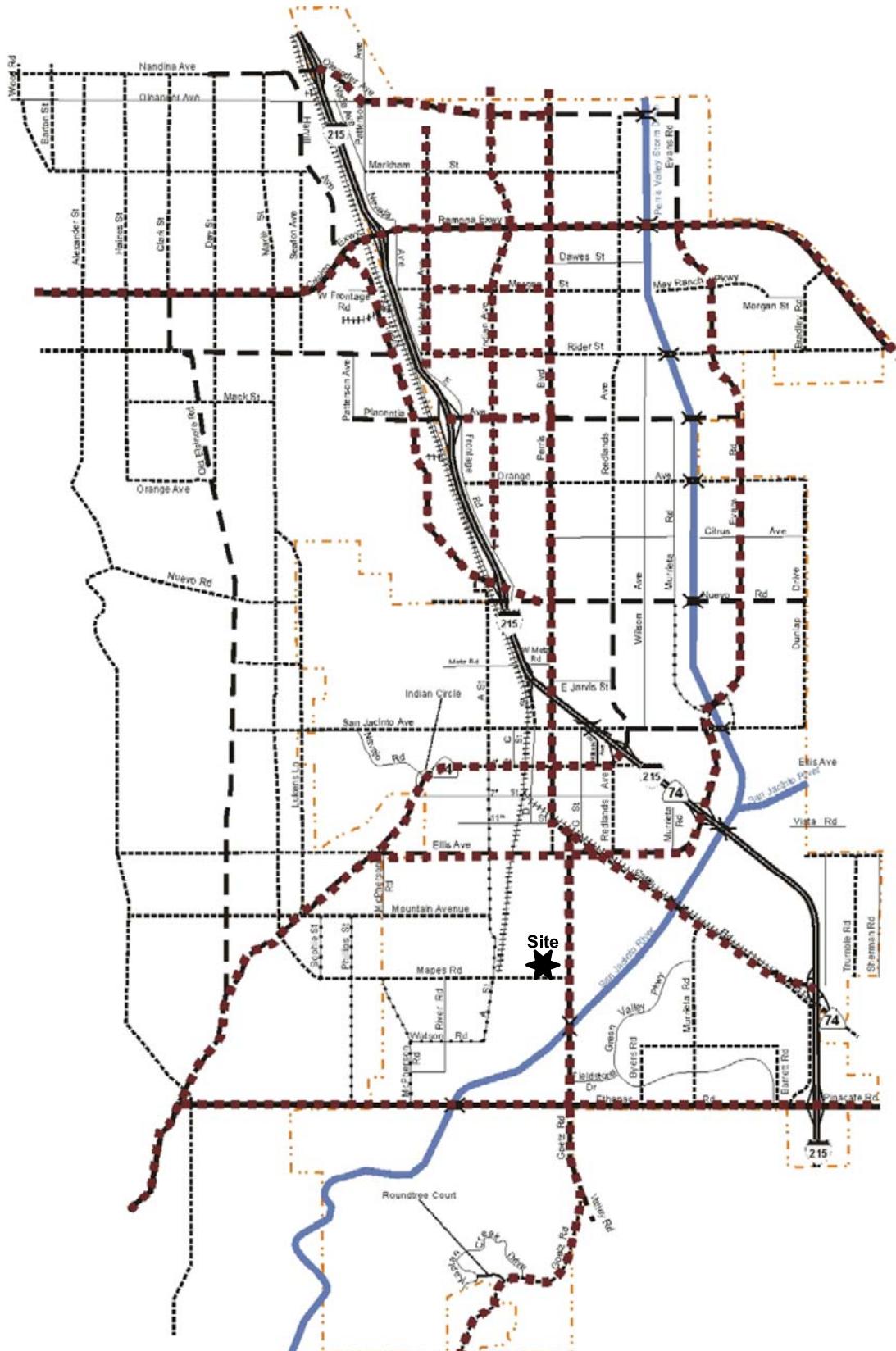


Figure 5
City of Perris Transit Routes

Source: Riverside Transit Agency

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Mapes Road Cultivation & Distribution Facility
Traffic Impact Analysis
19-0024



Legend:

Freeway	Collector (66' ROW)
Expressway (184' ROW)	Railroad
Arterial (128' ROW)	Bridge
Secondary Arterial (94' ROW)	Truck Route
Major Collector (78' ROW)	Water
	City Boundary

Source: City of Perris

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Figure 7
City of Perris Truck Route Map

Mapes Road Cultivation & Distribution Facility
Traffic Impact Analysis
19-0024

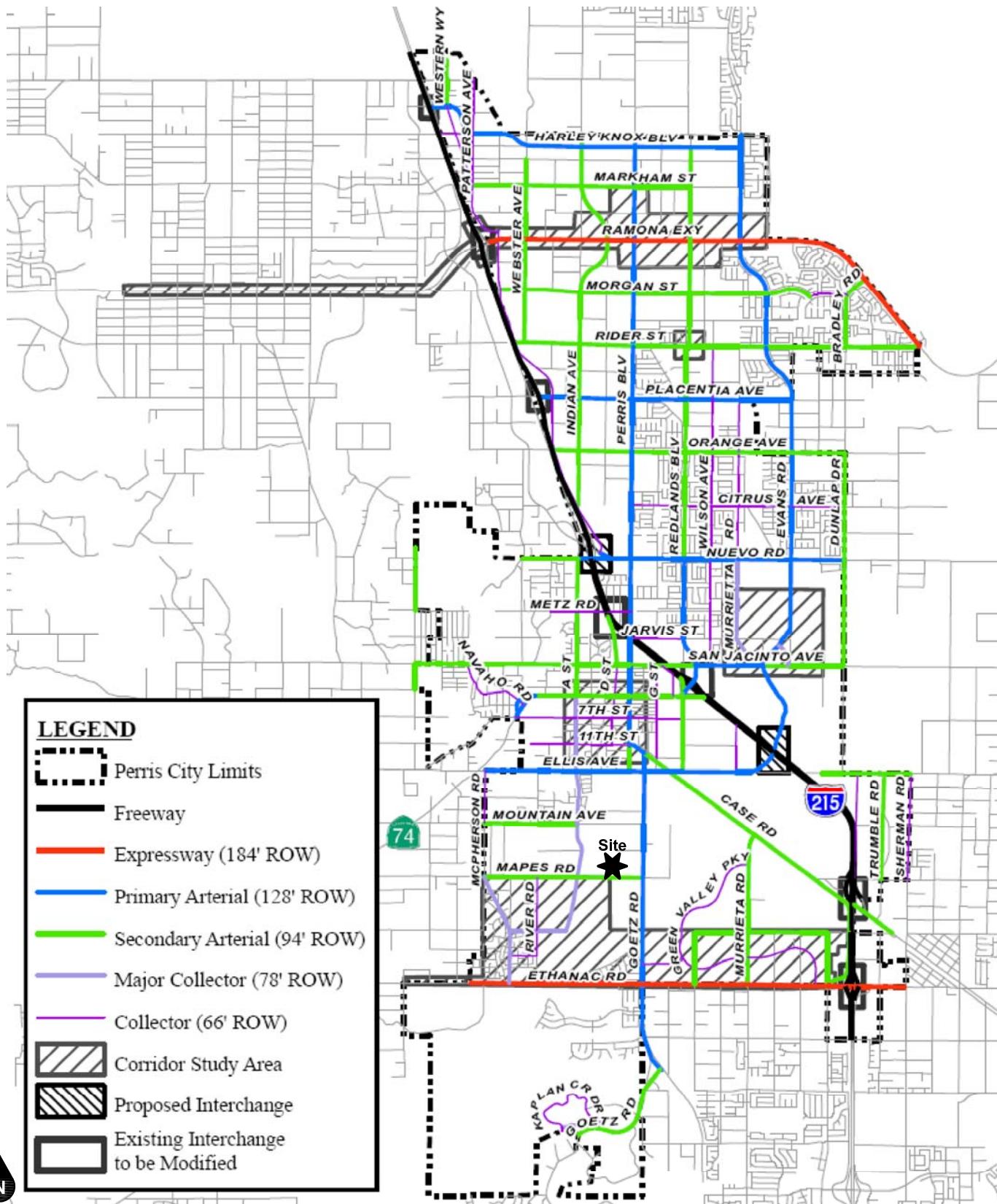
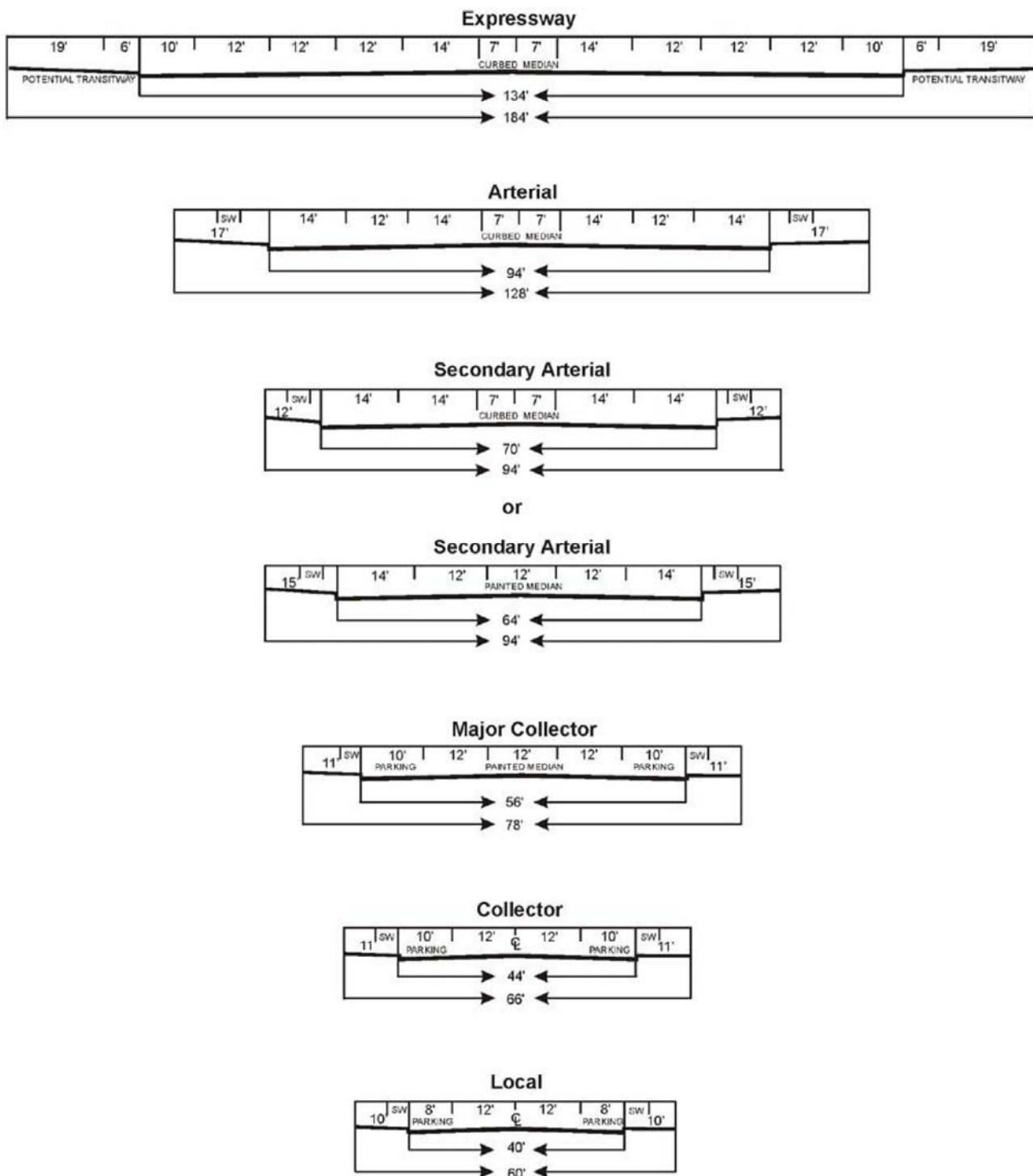


Figure 7
City of Perris General Plan Circulation Element

Source: City of Perris

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Mapes Road Cultivation & Distribution Facility
Traffic Impact Analysis
19-0004



Specific details for each cross-section follow in Figures 4.1 A - 4.1 F

Legend

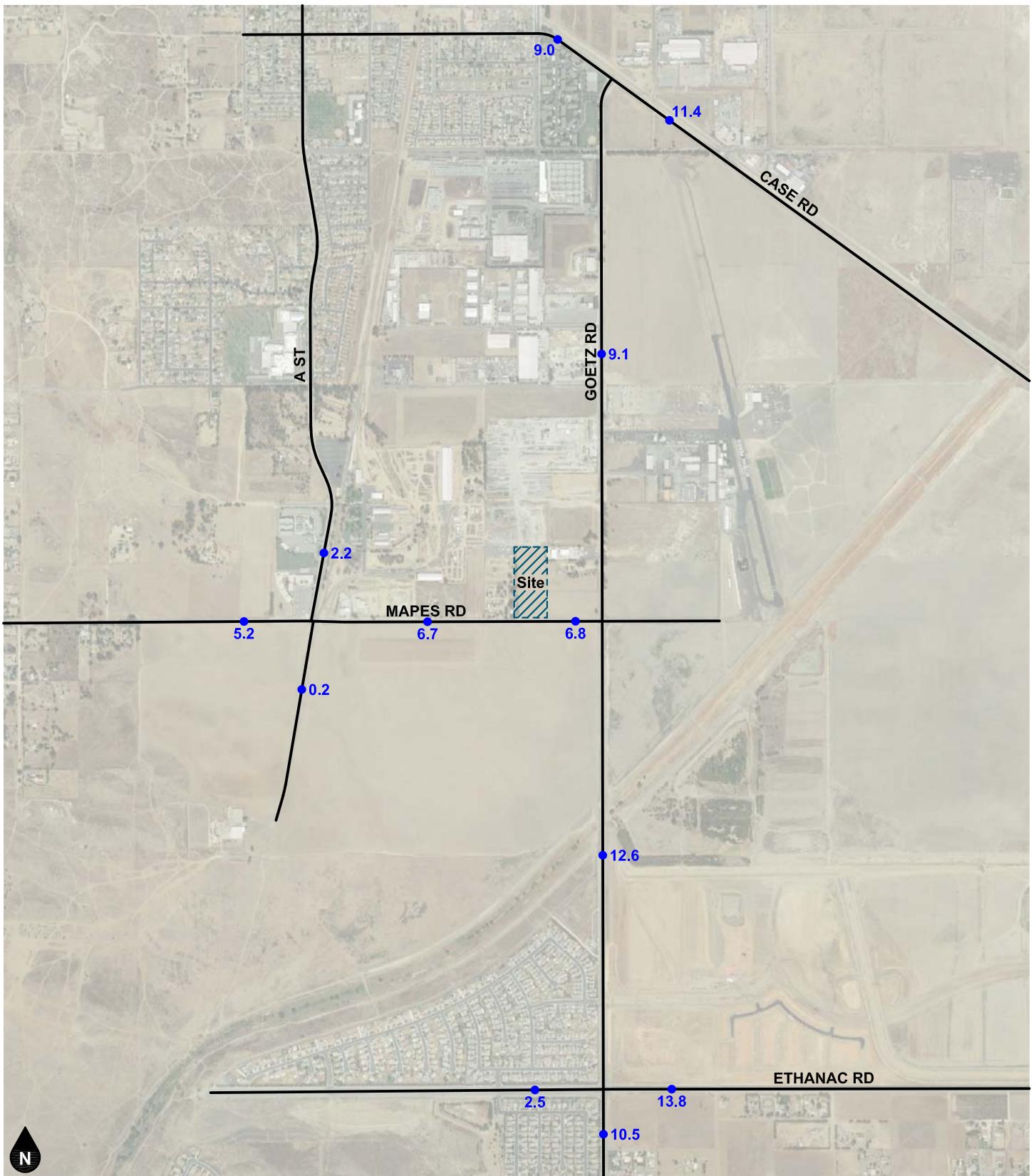
SW	Sidewalk or Trail (at least 4 feet)	CURBED MEDIAN	Landscaped Center Median
PARKING	Parking or Bike Lane		
PAINTED MEDIAN	Center Median and/or Continuous Left Turning Lane		

Figure 8
City of Perris General Plan Roadway Cross-Sections

Source: City of Perris

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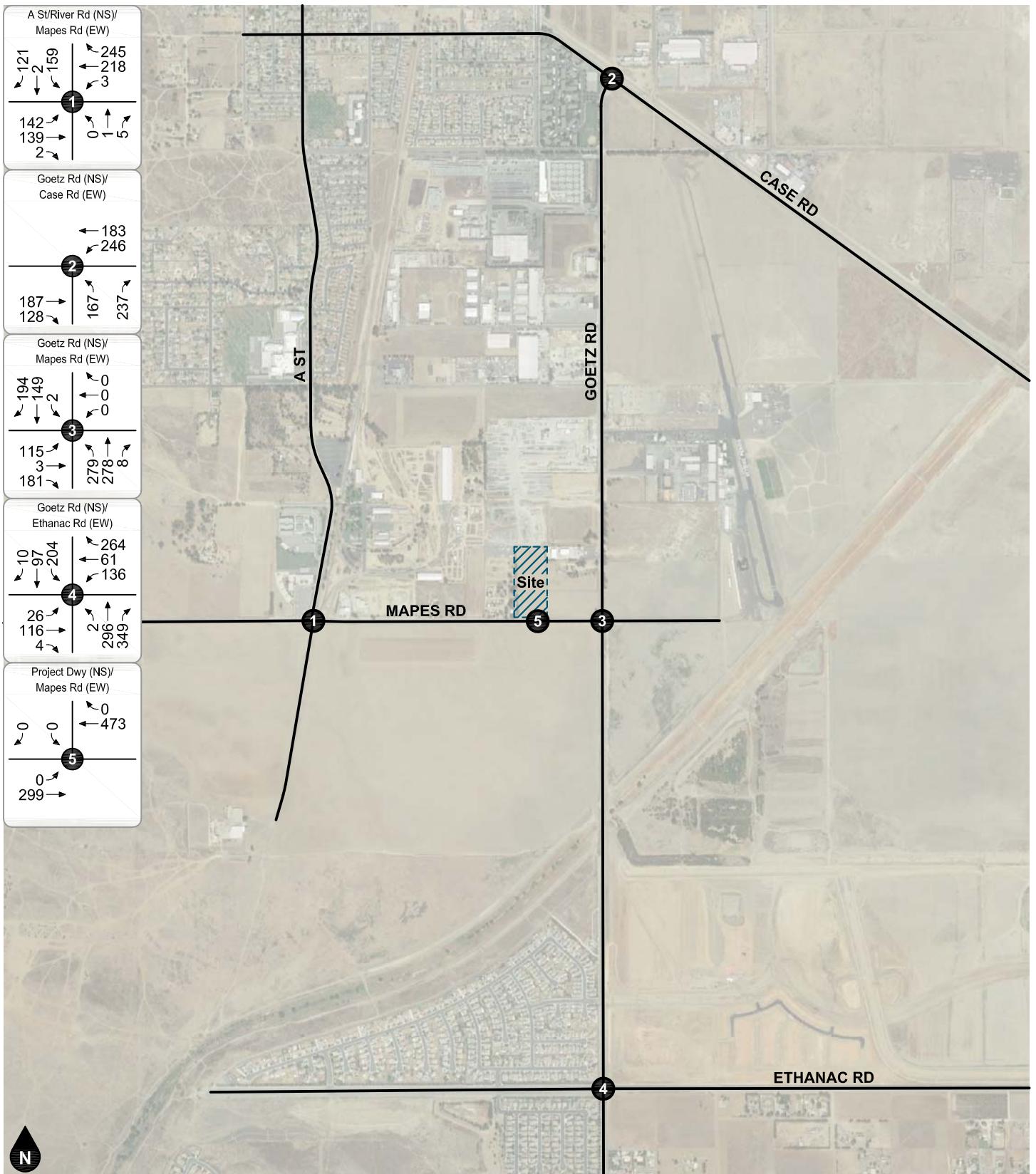
Mapes Road Cultivation & Distribution Facility
Traffic Impact Analysis
19-00024



Legend

●## Vehicles Per Day (1,000's)

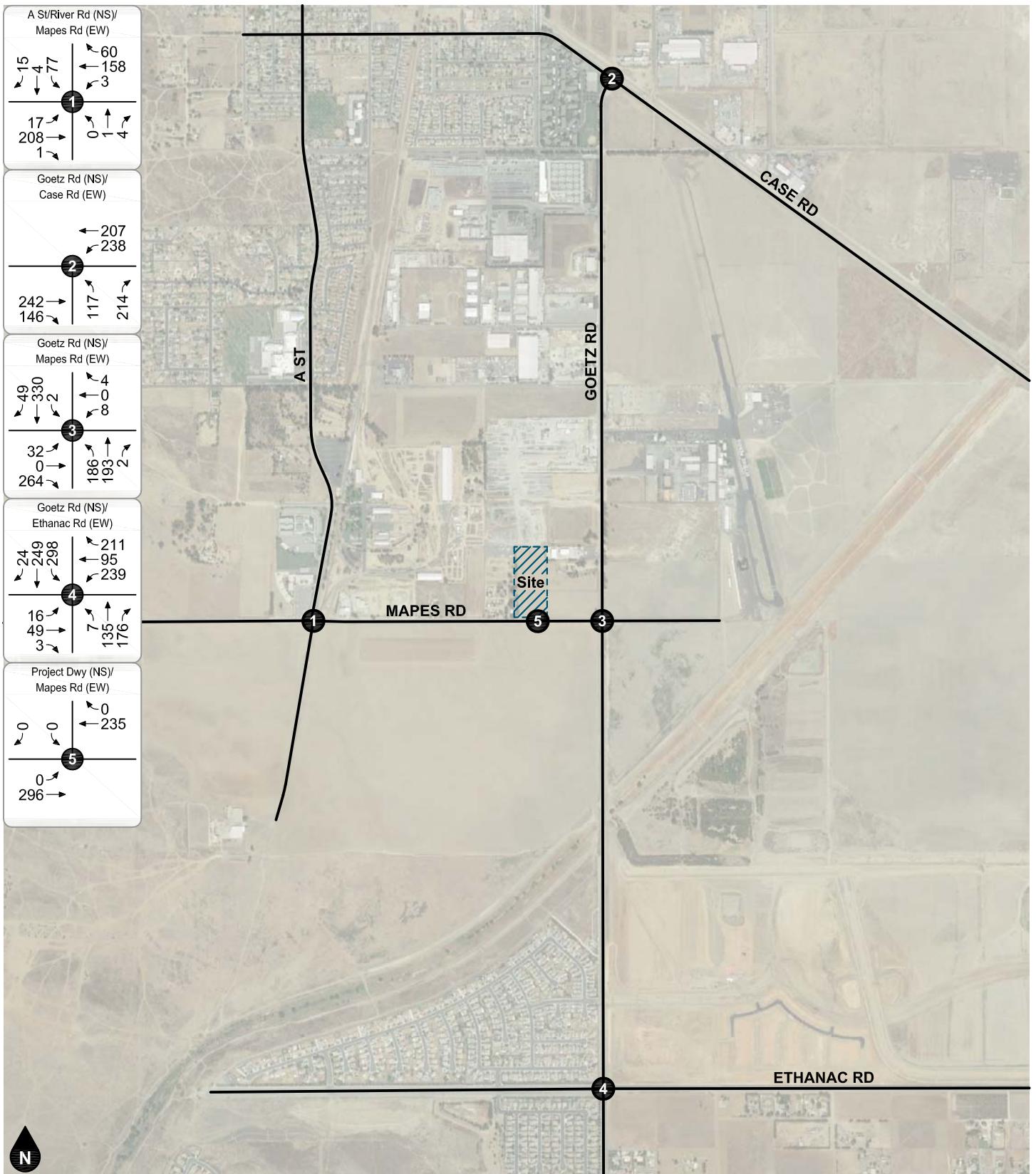
Figure 9
Existing Average Daily Traffic Volumes



Legend

Study Intersection

Figure 10
Existing AM Peak Hour Intersection Turning Movement Volumes



Legend

Study Intersection

Figure 11
Existing PM Peak Hour Intersection Turning Movement Volumes

4. PROJECT TRIP FORECASTS

This section describes how project trip generation, trip distribution, and trip assignment forecasts were developed. The forecast project volumes are illustrated on figures contained in this section.

PROJECT DESCRIPTION

The 5.94 acre project site is proposed to consist of 85,500 square feet of gross floor area. The proposed project involves construction of a 9,900 square foot office and warehouse building and four (4) 18,900 square foot greenhouse cultivation buildings. A full access driveway is proposed at Mapes Road. The proposed project is anticipated to be constructed and fully operational by year 2021.

PROJECT TRIP GENERATION

Table 2 shows the project trip generation based upon trip generation rates obtained from the Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017. Trip generation rates were determined for daily trips, AM peak hour trips, and PM peak hour trips for the proposed land use. Trip generation rates for Land Use Code 110 – Light Industrial were used for the proposed project. The number of trips forecast to be generated by the proposed use are determined by multiplying the trip generation rates by the land use quantity.

The project trip generation was converted to Passenger Car Equivalent (PCE) trips based on vehicle mix data from the City of Fontana, Truck Trip Generation Study, August 2003 and PCE factors recommended by the County of San Bernardino Congestion Management Program.

As shown in Table 2, the proposed project is forecast to generate a total of approximately 424 daily vehicle trips, including 60 vehicle trips during the AM peak hour and 54 vehicle trips during the PM peak hour. The proposed project is forecast to generate a total of approximately 545 daily PCE trips, including 92 PCE trips during the AM peak hour and 71 PCE trips during the PM peak hour.

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Figure 12 shows the forecast directional distribution patterns for the project generated trips. The project trip distribution patterns are based on review of existing volume data, surrounding land uses, designated truck routes, and the local and regional roadway facilities in the project vicinity.

Based on the identified project trip generation and distributions, project average daily traffic volumes have been calculated and shown on Figure 13. AM and PM peak hour intersection turning movement volumes (in PCE trips) expected from the project are depicted on Figure 14 and Figure 15, respectively.

Table 2
Project Trip Generation

Land Use/Vehicle Type	Source ¹	Trip Generation Rates per TSF ²						
		AM Peak Hour			PM Peak Hour			Daily
		% In	% Out	Total	% In	% Out	Total	
General Light Industrial	[a]	88%	12%	0.70	13%	87%	0.63	4.96
Percent Cars	[b]	--	--	60.53%	--	--	76.83%	78.60%
Percent Trucks	[b]	--	--	39.47%	--	--	23.17%	21.40%
Car Trips per TSF		0.373	0.051	0.424	0.063	0.421	0.484	3.899
Truck Trips per TSF		0.243	0.033	0.276	0.019	0.127	0.146	1.061
<u>Truck Breakdown by Axle</u>	<u>Percent³</u>							
2-Axle Trucks	32.70%	0.079	0.011	0.090	0.006	0.042	0.048	0.347
3-Axle Trucks	17.90%	0.043	0.006	0.049	0.003	0.023	0.026	0.190
4+ Axle Trucks	49.40%	0.120	0.016	0.136	0.009	0.063	0.072	0.524

Vehicle Trips Generated								
Land Use/Vehicle Type	Quantity (TSF) ²	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
General Light Industrial	85.500							
Cars		32	4	36	5	36	41	333
Trucks								
2-Axle Trucks		7	1	8	1	4	5	30
3-Axle Trucks		4	1	5	0	2	2	16
4+ Axle Trucks		10	1	11	1	5	6	45
Subtotal Trucks		21	3	24	2	11	13	91
TOTAL VEHICLE TRIPS GENERATED		53	7	60	7	47	54	424

Passenger Car Equivalent (PCE) Trips Generated								
Land Use/Vehicle Type	Quantity (TSF) ²	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
General Light Industrial	85.500							
Cars		32	4	36	5	36	41	333
Trucks								
PCE Factor ⁴								
2-Axle Trucks	1.5	11	2	13	2	6	8	45
3-Axle Trucks	2.0	8	2	10	0	4	4	32
4+ Axle Trucks	3.0	30	3	33	3	15	18	135
Subtotal Trucks	--	49	7	56	5	25	30	212
TOTAL PCE TRIPS GENERATED		81	11	92	10	61	71	545

Notes:

(1) Source:

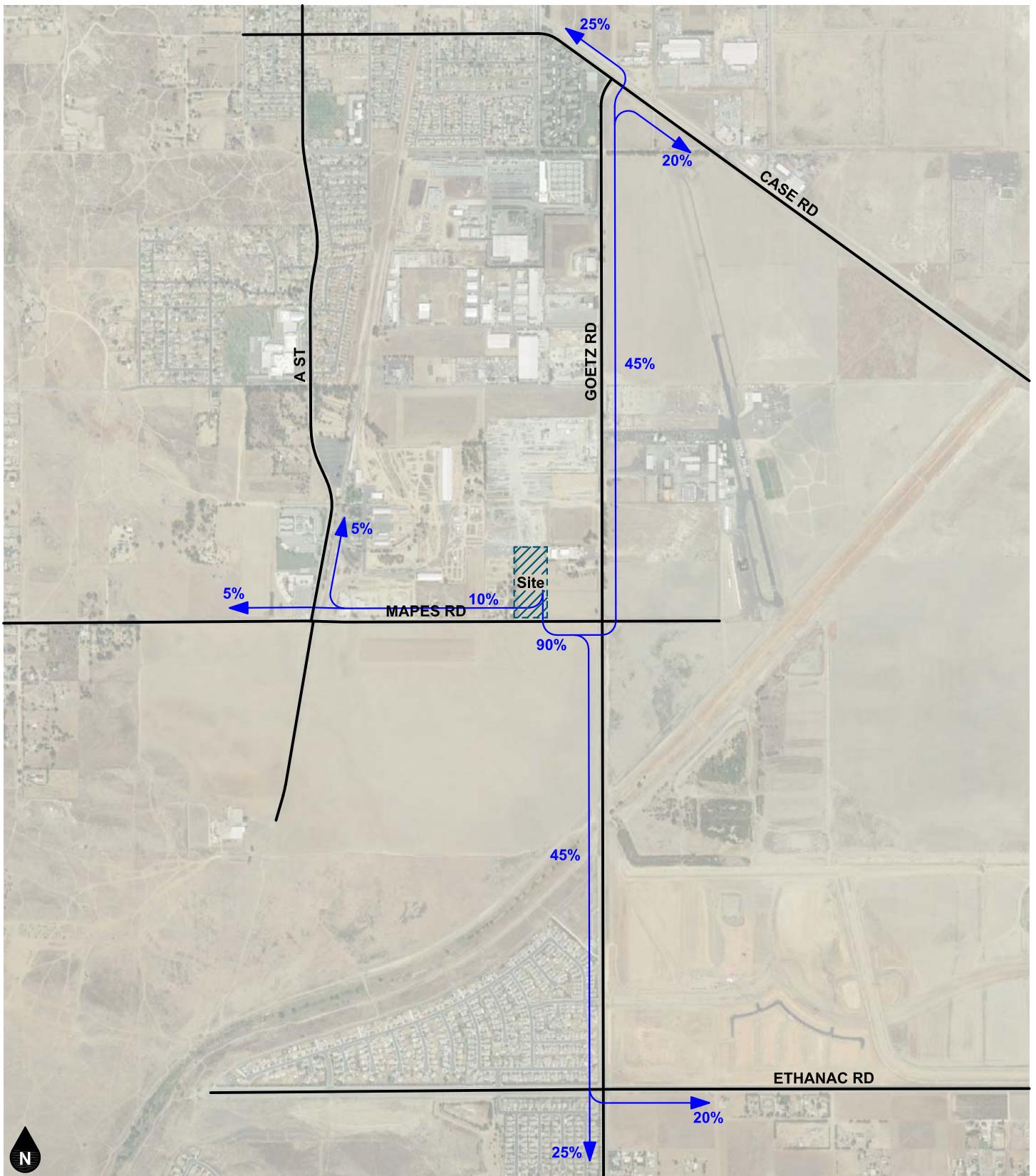
[a] Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017, Land Use Code 110.

[b] City of Fontana, Truck Trip Generation Study, August 2003.

(2) TSF = Thousand Square Feet

(3) Truck by axle percentages obtained from City of Fontana, Truck Trip Generation Study, August 2003.

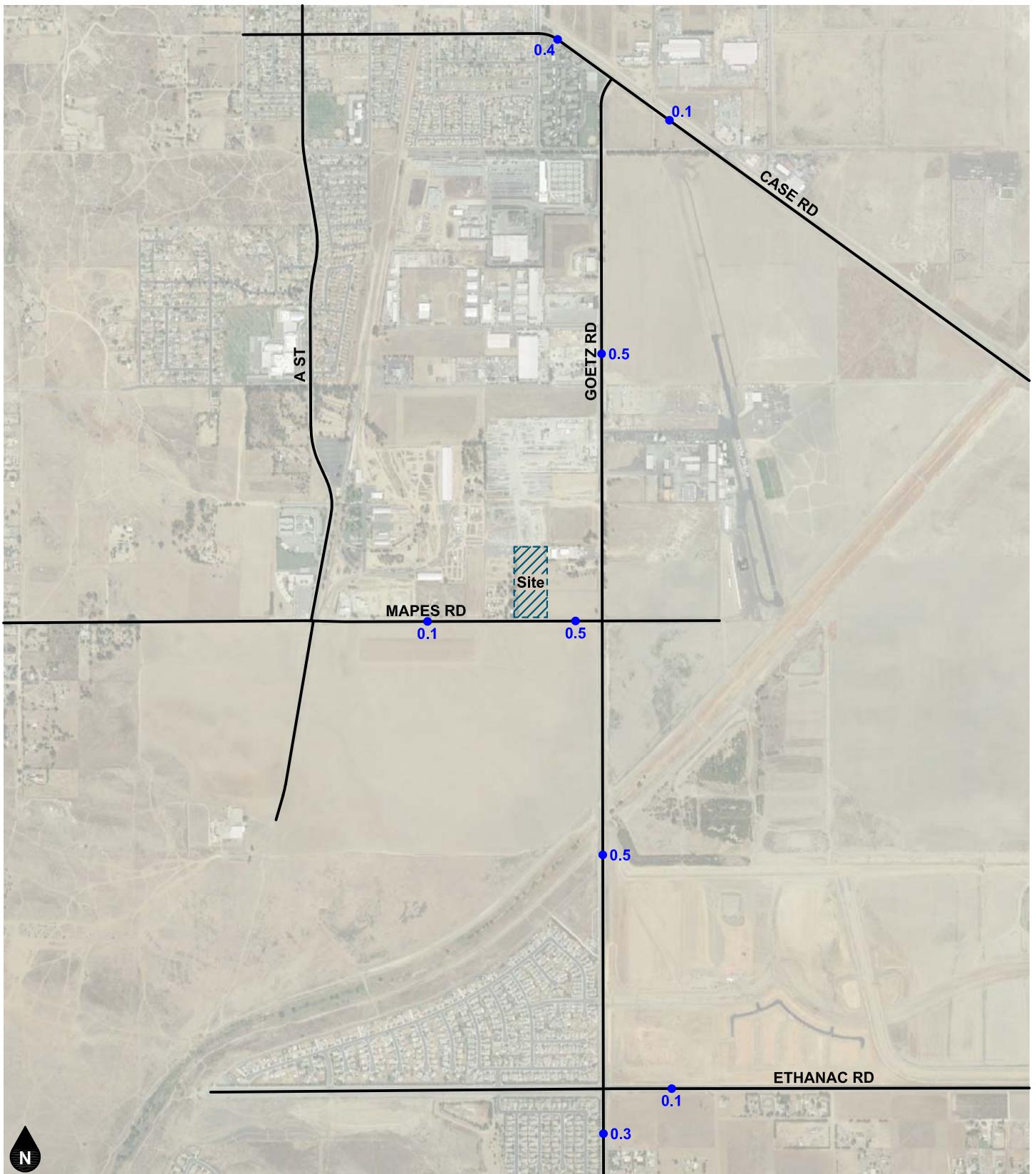
(4) PCE factors recommended by County of San Bernardino Congestion Management Program.



Legend

← 10% Percent To/From Project

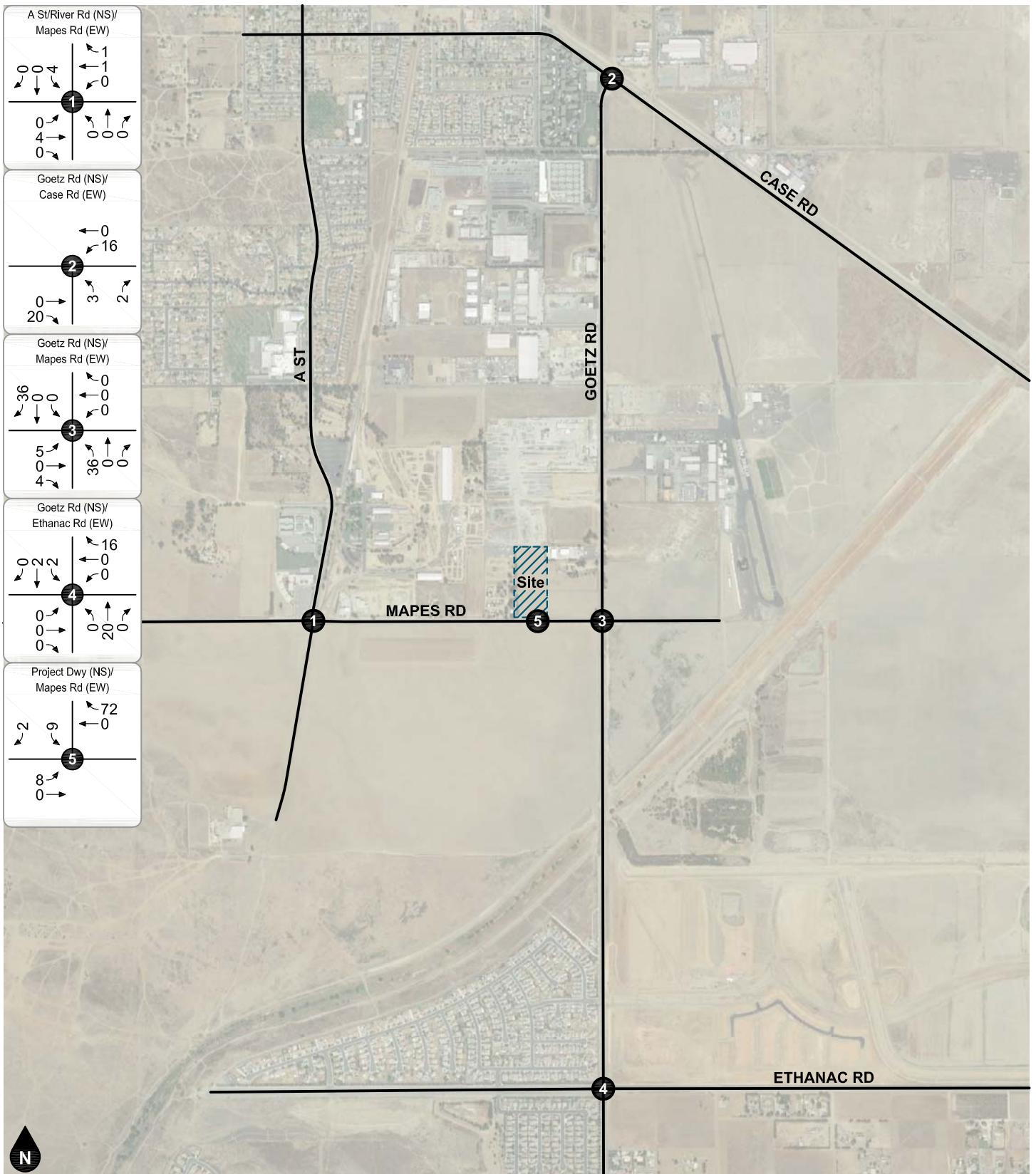
Figure 12
Trip Distribution Map



Legend

●## Vehicles Per Day (1,000's)

Figure 13
Project Average Daily Traffic Volumes



Legend

Study Intersection

Figure 14
Project AM Peak Hour Intersection Turning Movement Volumes

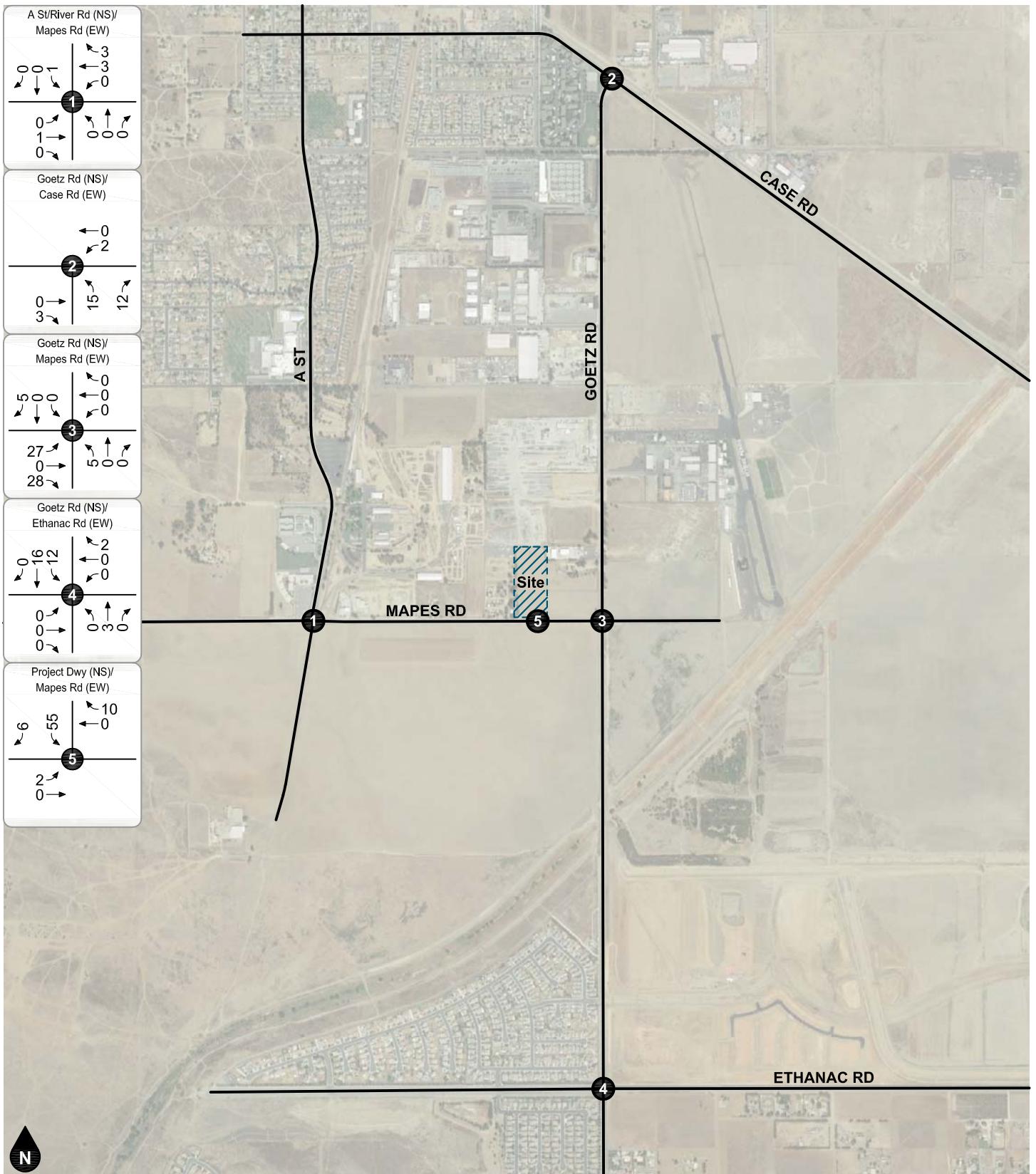


Figure 15
Project PM Peak Hour Intersection Turning Movement Volumes

5. FUTURE VOLUME FORECASTS

This section describes how future volume forecasts for each analysis scenario were developed. Forecast study area volumes are illustrated on figures contained in this section.

CUMULATIVE TRIPS

Ambient Growth Rate

To account for ambient growth on roadways, existing traffic volumes were increased by a growth rate of three percent (3%) per year over two years for Opening Year conditions. This equates to a total growth factor of approximately 1.06 for Opening Year conditions. The ambient growth rate was conservatively applied to all movements at the study intersections.

Other Development

To account for trips generated by future development, trips generated by pending or approved other development projects in the City of Perris were added to the study area. Table 3 shows the trip generation summary for other development projects. Figure 16 shows the other development location map. The previously discussed ambient growth accounts for any additional trips generated by other development projects located outside the project vicinity and not specifically listed in this report.

Figure 17 shows the forecast average daily traffic volumes for the other development. Figure 18 and Figure 19 show the forecast morning and evening peak hour intersection turning movement volumes for trips generated by other developments.

ANALYSIS SCENARIO VOLUME FORECASTS

Existing Plus Project

Existing Plus Project volume forecasts were derived by adding the project generated trips to Existing volumes. Existing Plus Project average daily traffic volumes are shown on Figure 20. Existing Plus Project AM and PM peak hour intersection turning movement volumes are shown on Figure 21 and Figure 22.

Existing Plus Ambient Growth Plus Project (EAP)

To develop EAP volume forecasts, Existing volumes were combined with ambient growth and project generated trips. EAP average daily traffic volumes are shown on Figure 23. AM and PM peak hour intersection turning movement volumes for EAP conditions are shown Figure 24 and Figure 25.

Existing Plus Ambient Growth Plus Project Plus Cumulative (EAPC)

EAPC volume forecasts were developed by adding trips generated by other developments to the EAP forecast. EAPC average daily traffic volumes are shown on Figure 26. AM and PM peak hour intersection turning movement volumes for EAPC conditions are shown on Figure 27 and Figure 28.

Table 3
Other Development Trip Generation

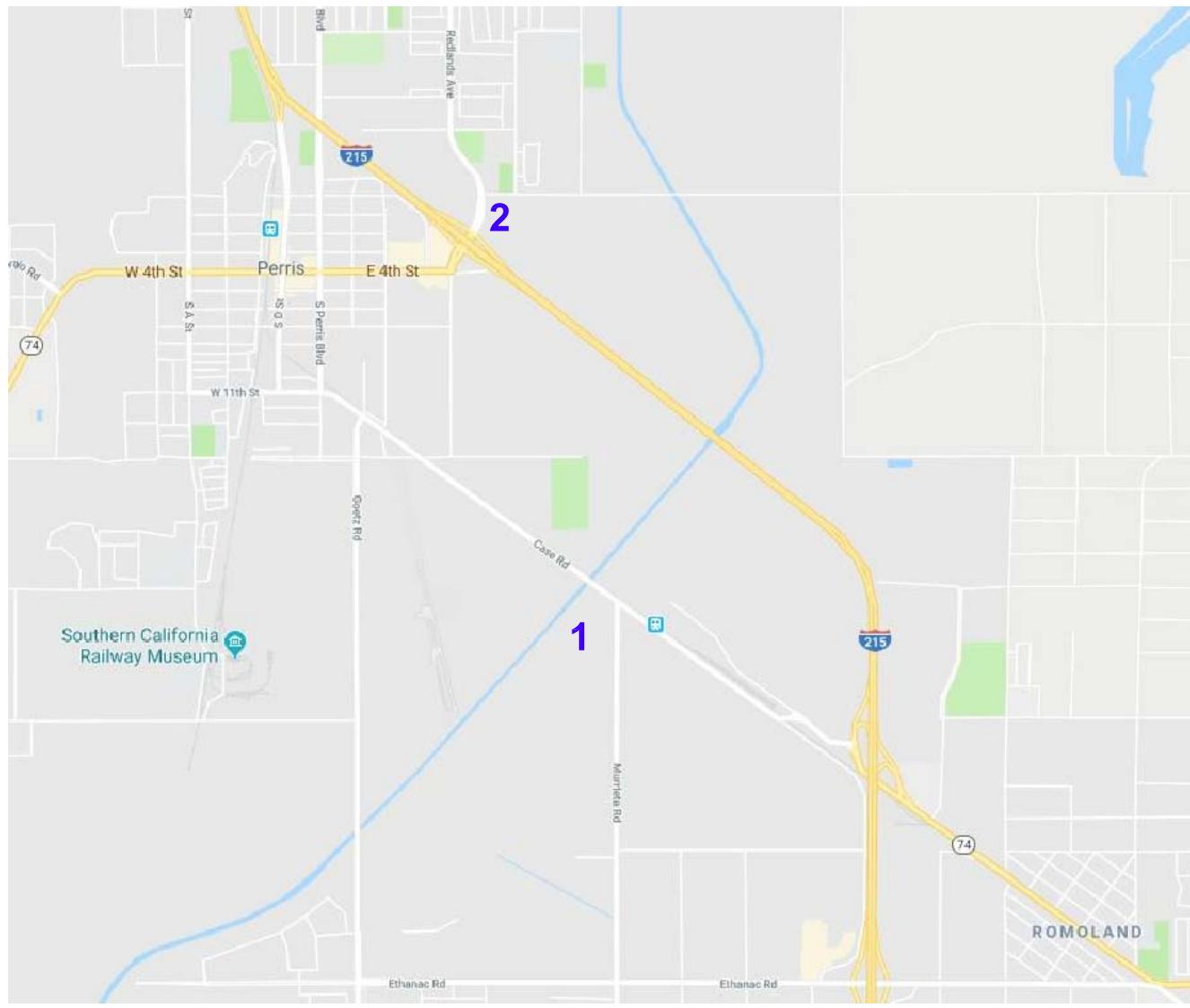
ID	Project Name	Quantity	Units ¹	Source ²	AM Peak Hour			PM Peak Hour			Daily
					In	Out	Total	In	Out	Total	
1	Green Valley	317	DU	[1]	60	178	238	200	117	317	3,018
2	Lewis Retail Center	643.000	TSF	ITE 820	374	230	604	1,176	1,274	2,450	24,273
Total Other Development Trips Generated					434	408	842	1,376	1,391	2,767	27,291

Notes:

(1) DU = Dwelling Units; TSF = Thousand Square Feet

(2) ITE = Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017; ### = Land Use Code

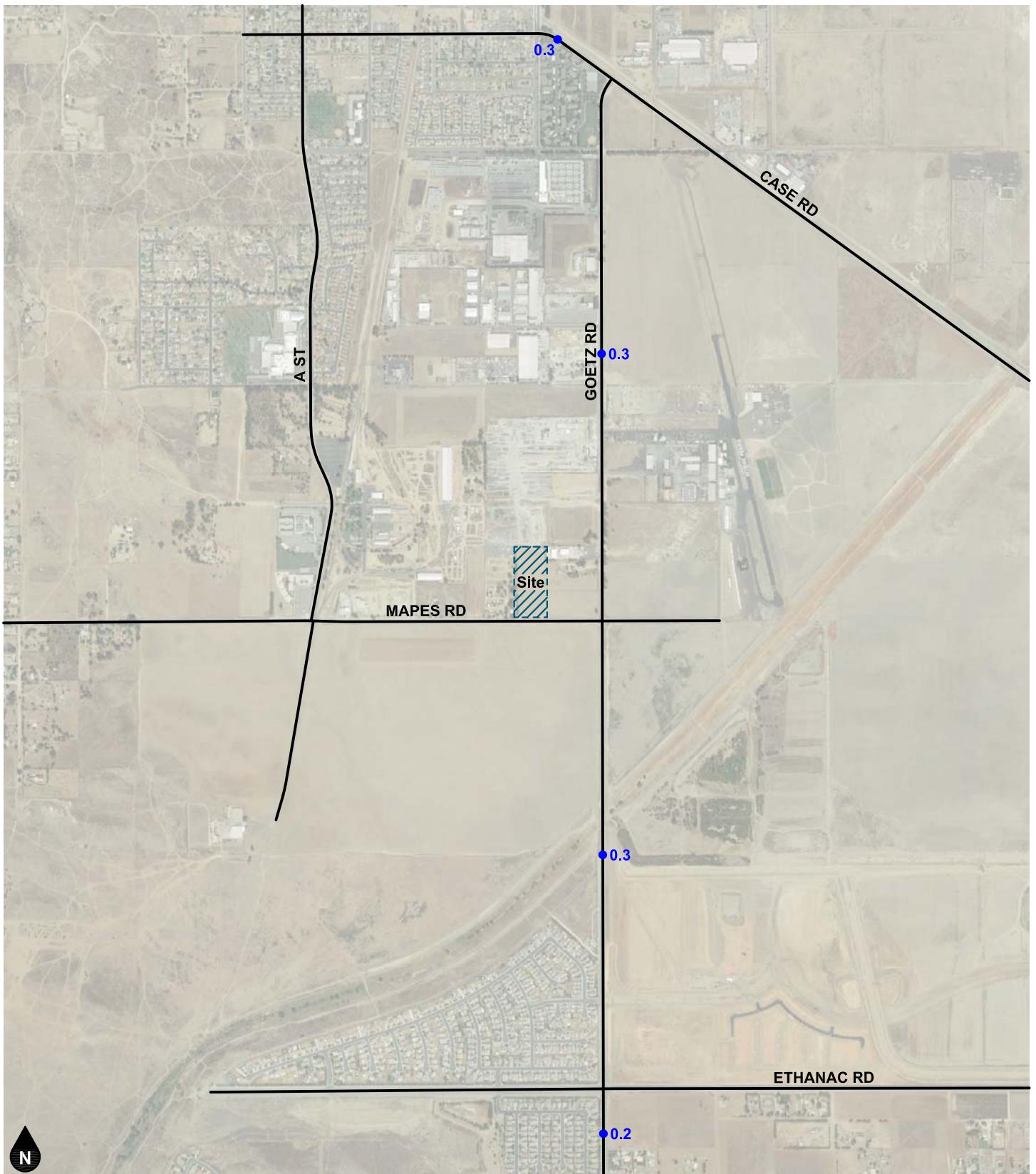
[1] Source: Albert A. Webb Associates, Green Valley Traffic Impact Analysis, January 2016.



Legend

- 1** Green Valley Specific Plan
- 2** Lewis Retail Center

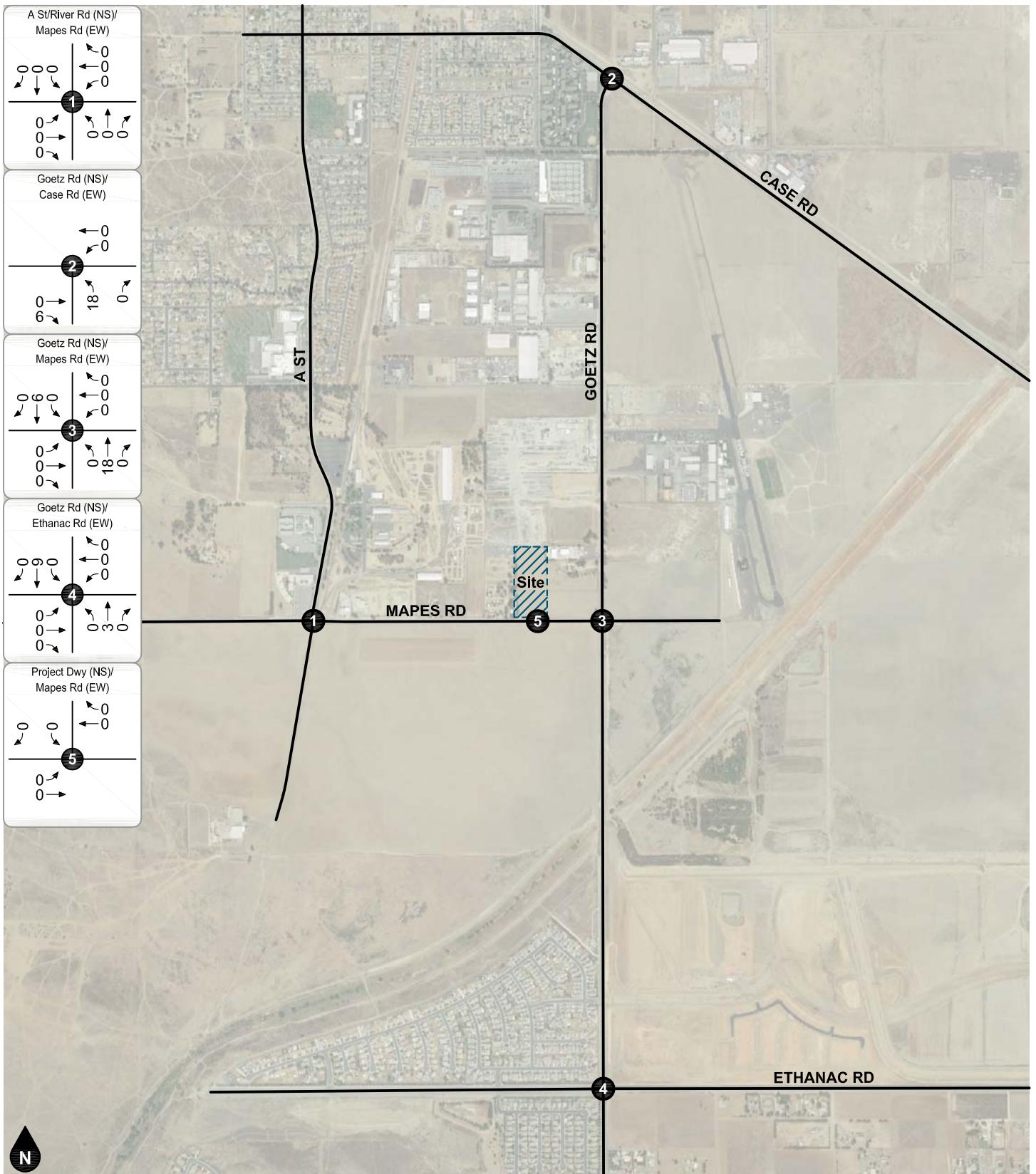
Figure 16
Other Development Location Map



Legend

●## Vehicles Per Day (1,000's)

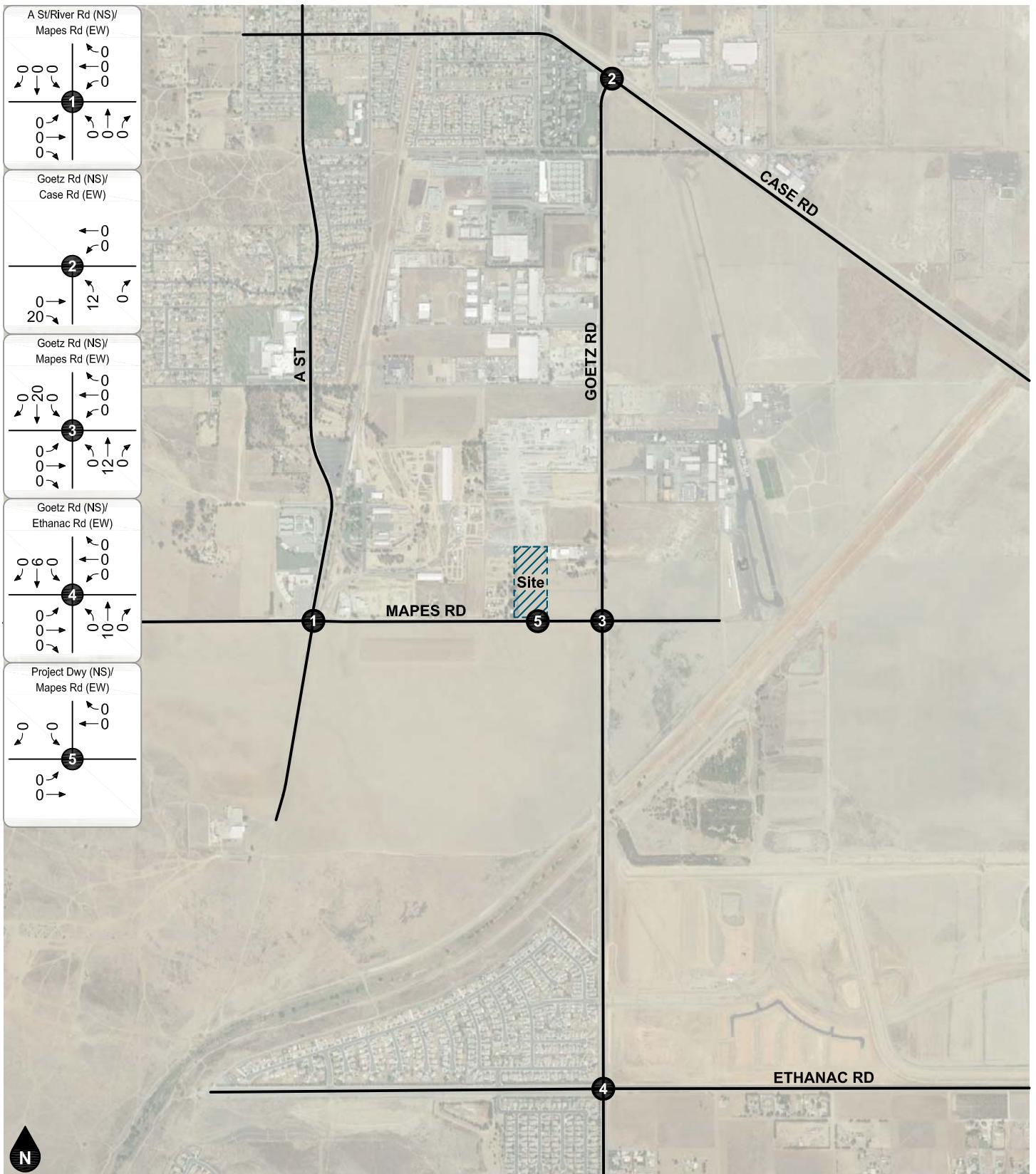
Figure 17
Other Development Average Daily Traffic Volumes



Legend

Study Intersection

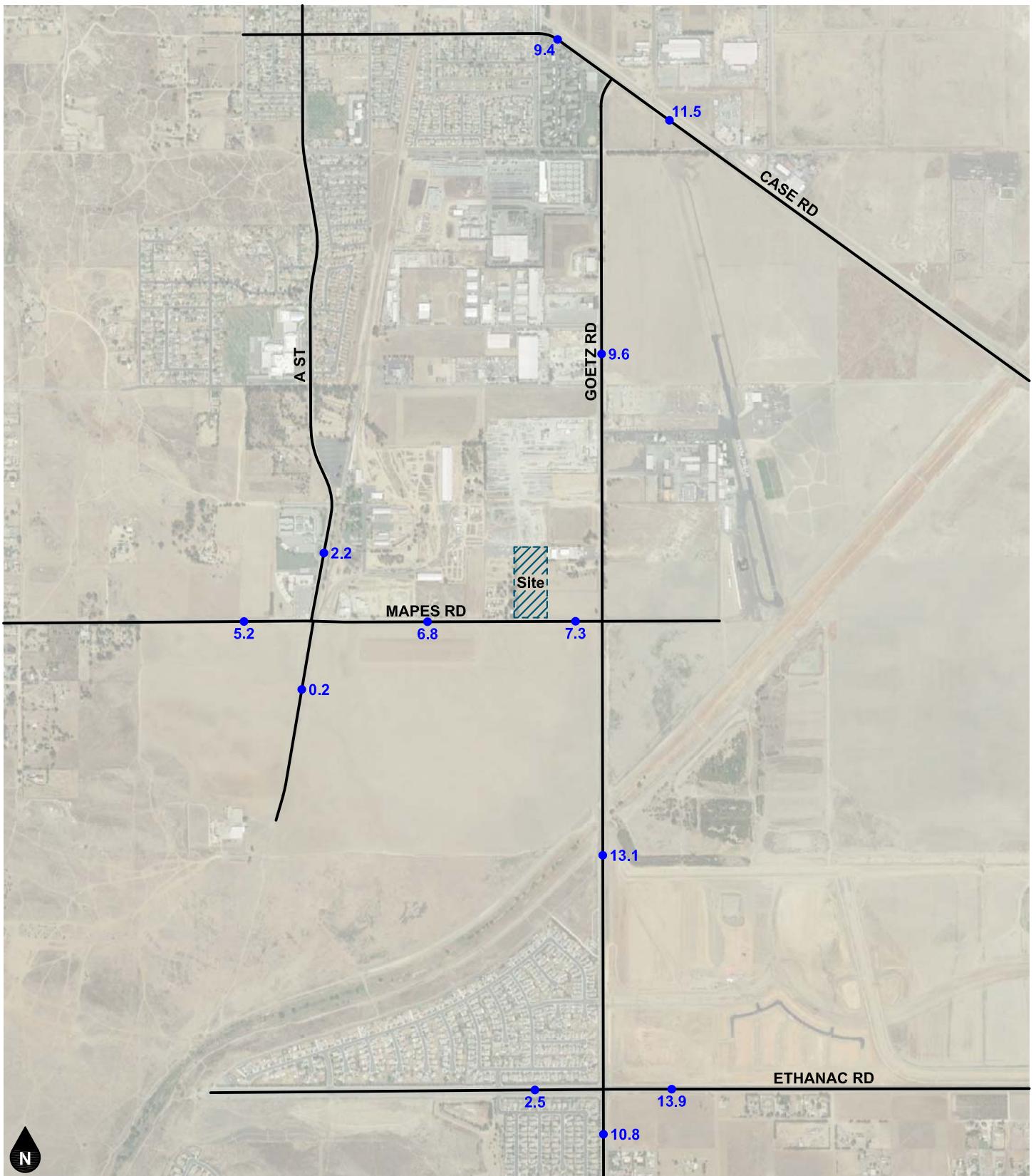
Figure 18
Other Development
AM Peak Hour Intersection Turning Movement Volumes



Legend

Study Intersection

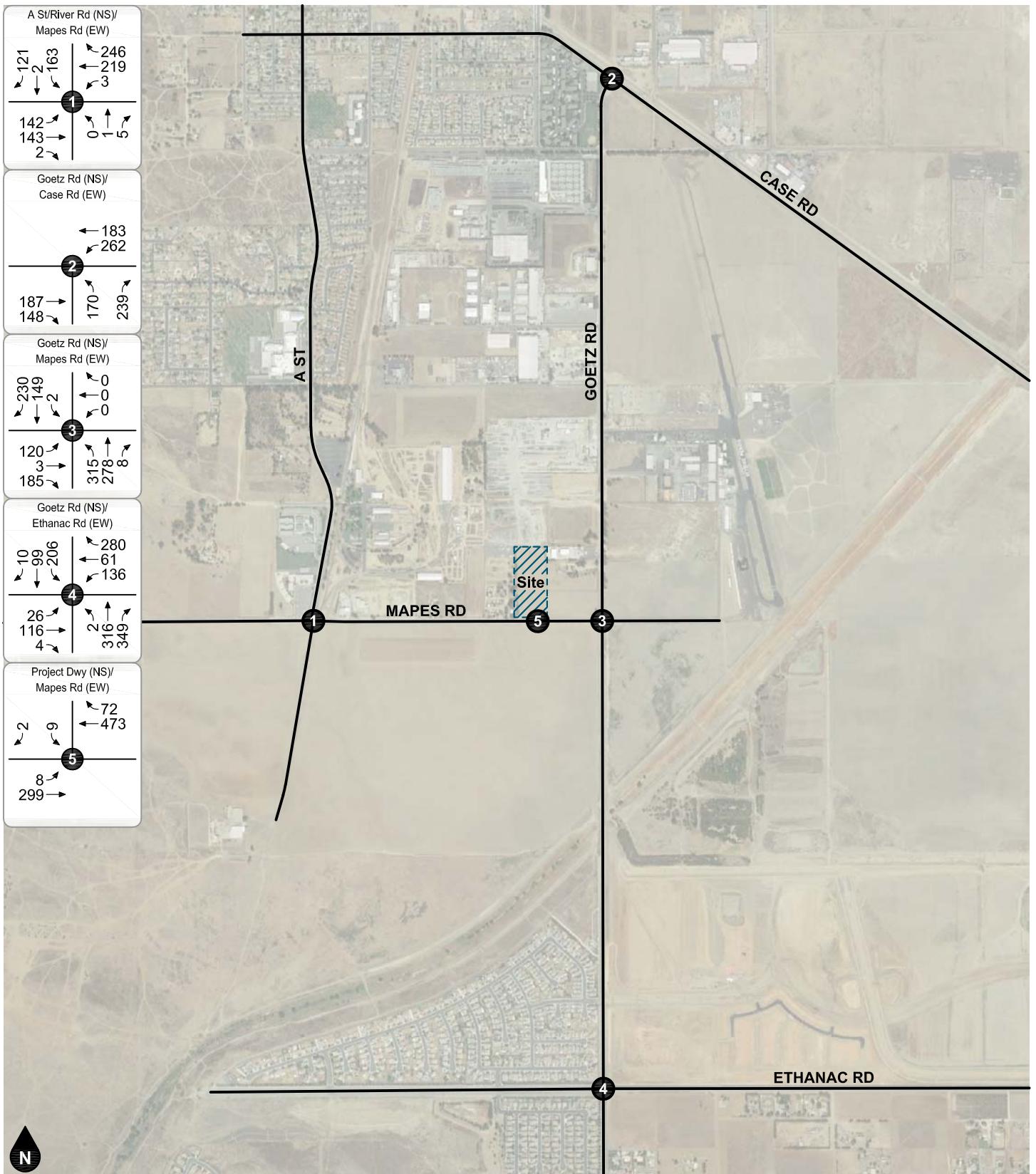
Figure 19
Other Development
PM Peak Hour Intersection Turning Movement Volumes



Legend

●## Vehicles Per Day (1,000's)

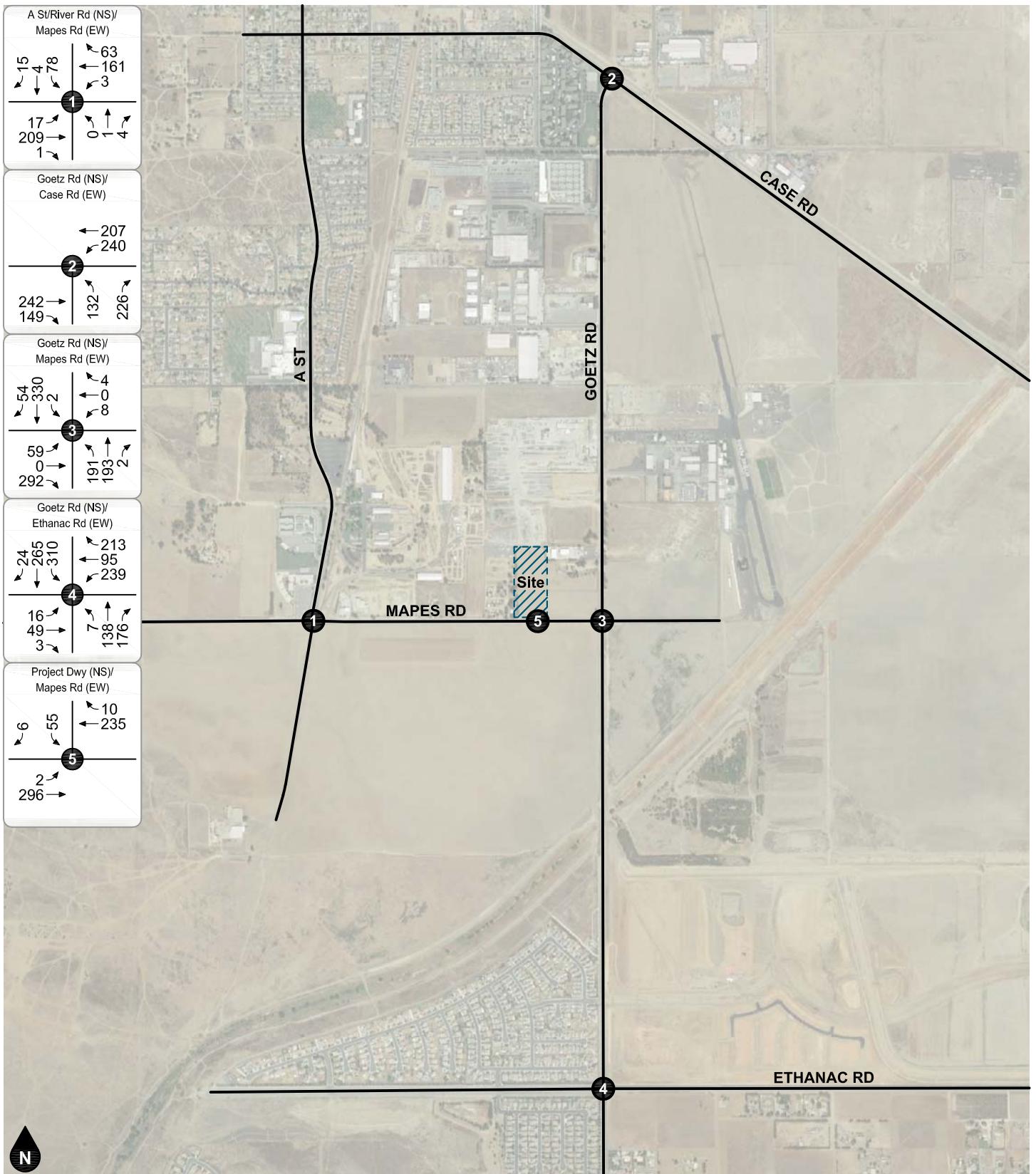
Figure 20
Existing Plus Project Average Daily Traffic Volumes



Legend

Study Intersection

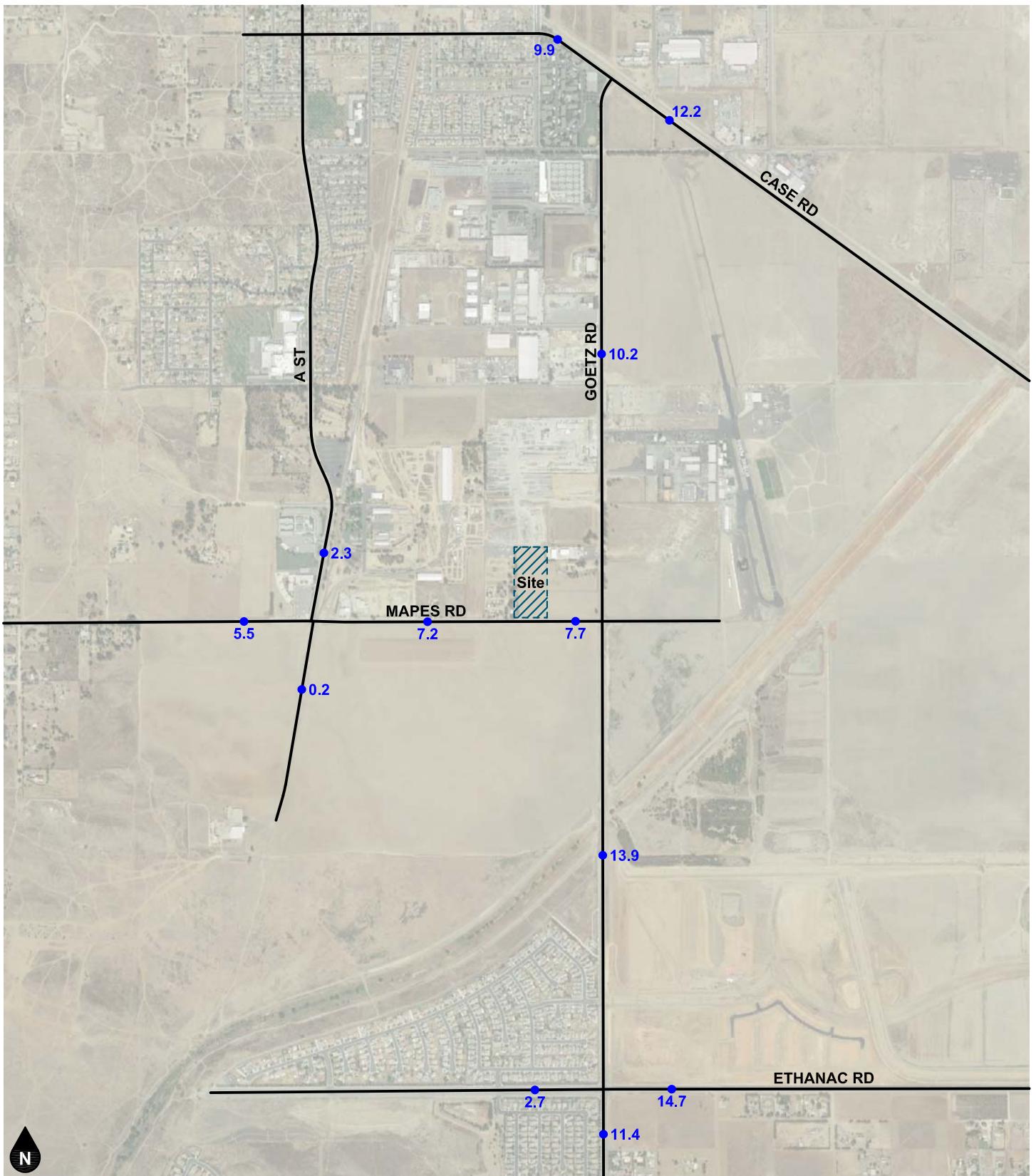
Figure 21
Existing Plus Project
AM Peak Hour Intersection Turning Movement Volumes



Legend

Study Intersection

Figure 22
Existing Plus Project
PM Peak Hour Intersection Turning Movement Volumes



Legend

●## Vehicles Per Day (1,000's)

Figure 23
Existing Plus Ambient Growth Plus Project
Average Daily Traffic Volumes

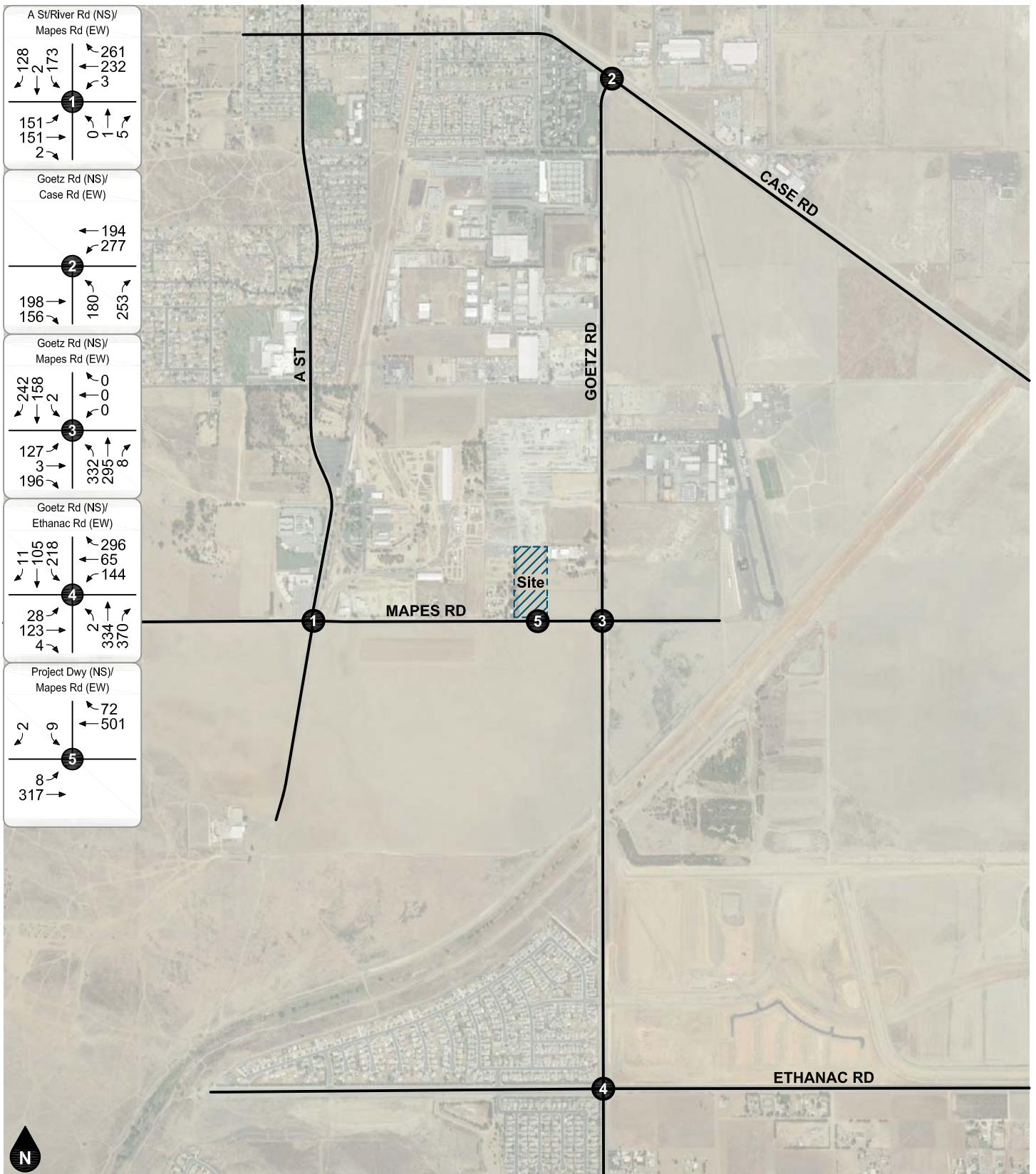


Figure 24
Existing Plus Ambient Growth Plus Project
AM Peak Hour Intersection Turning Movement Volumes

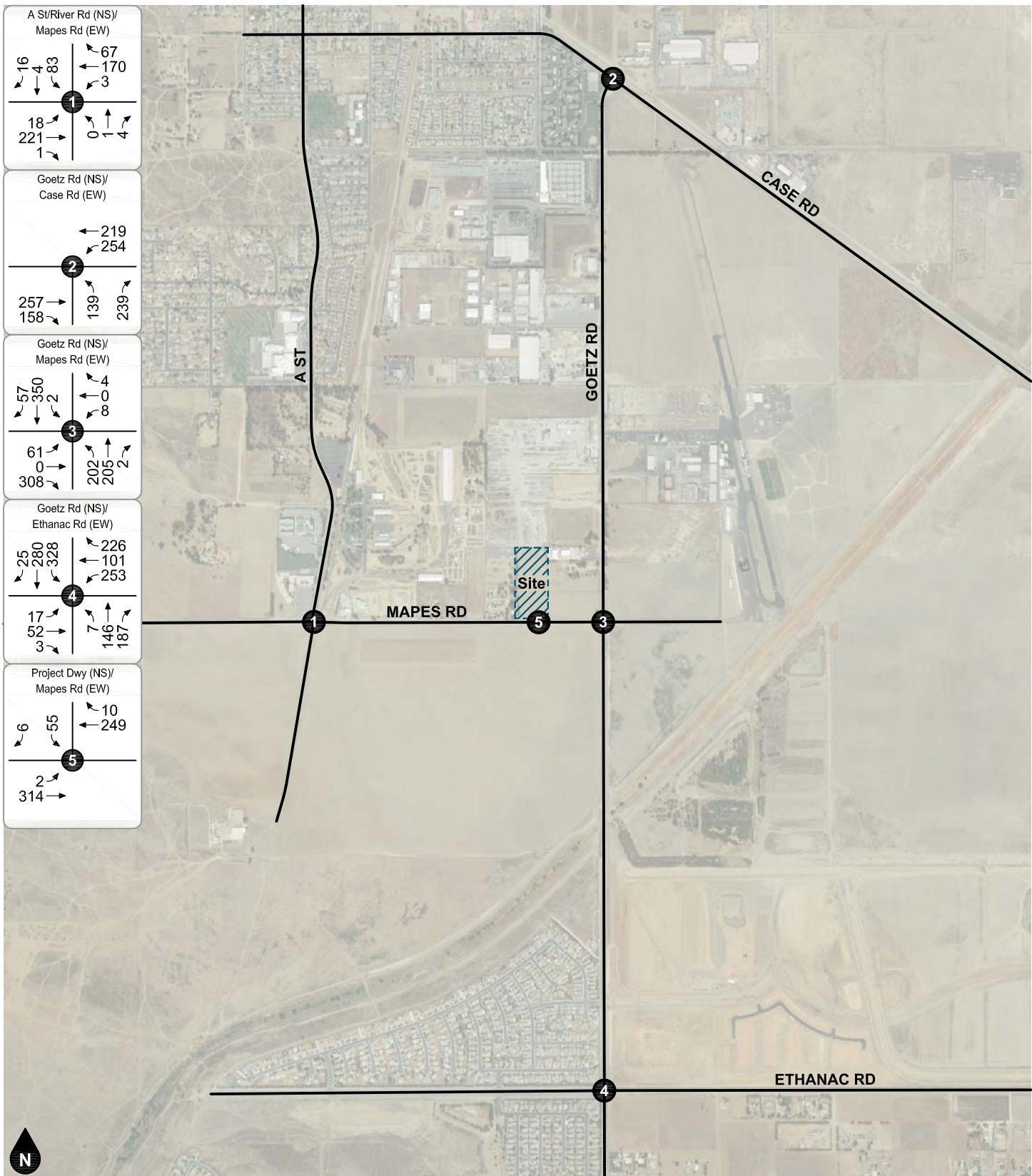
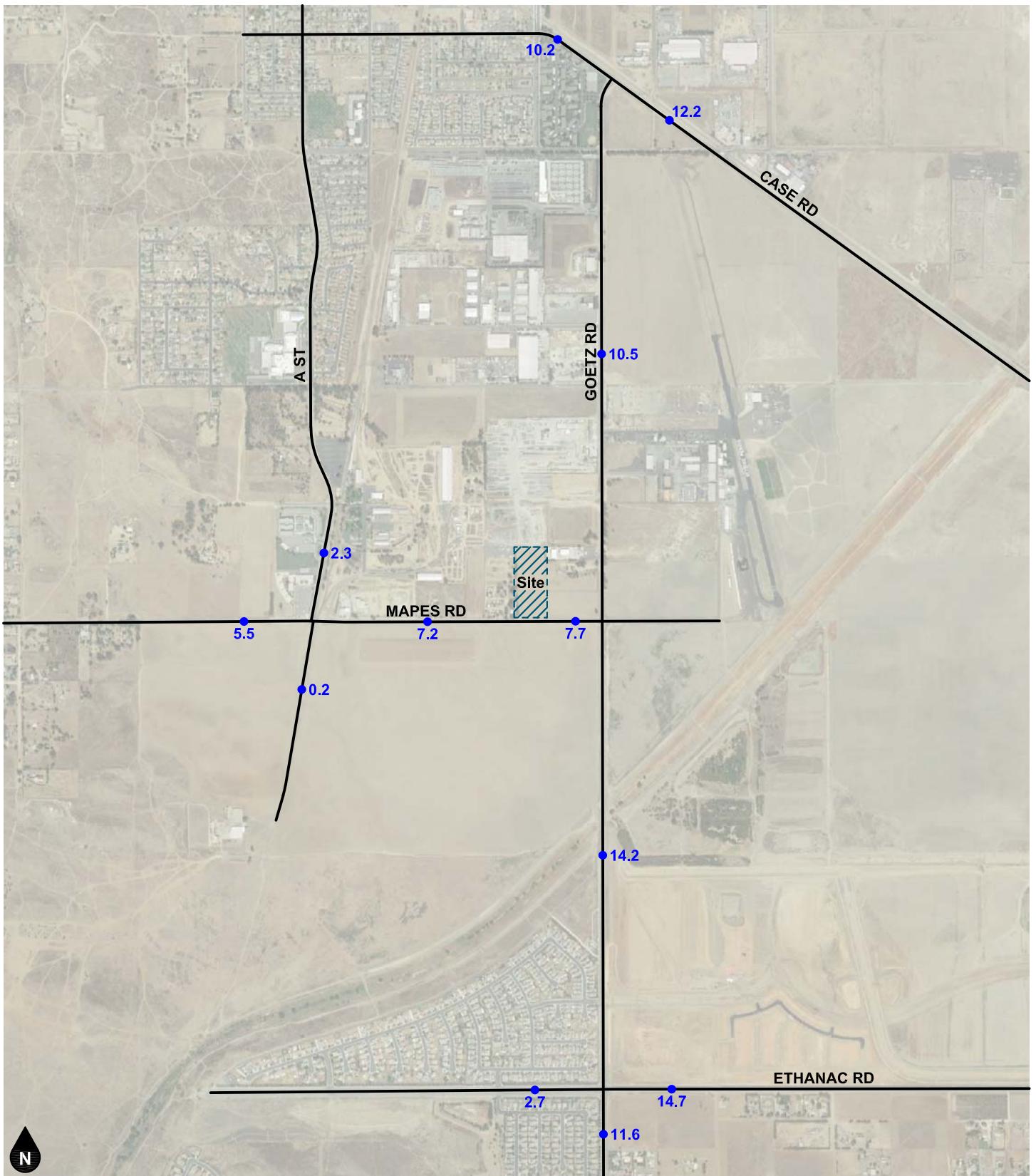


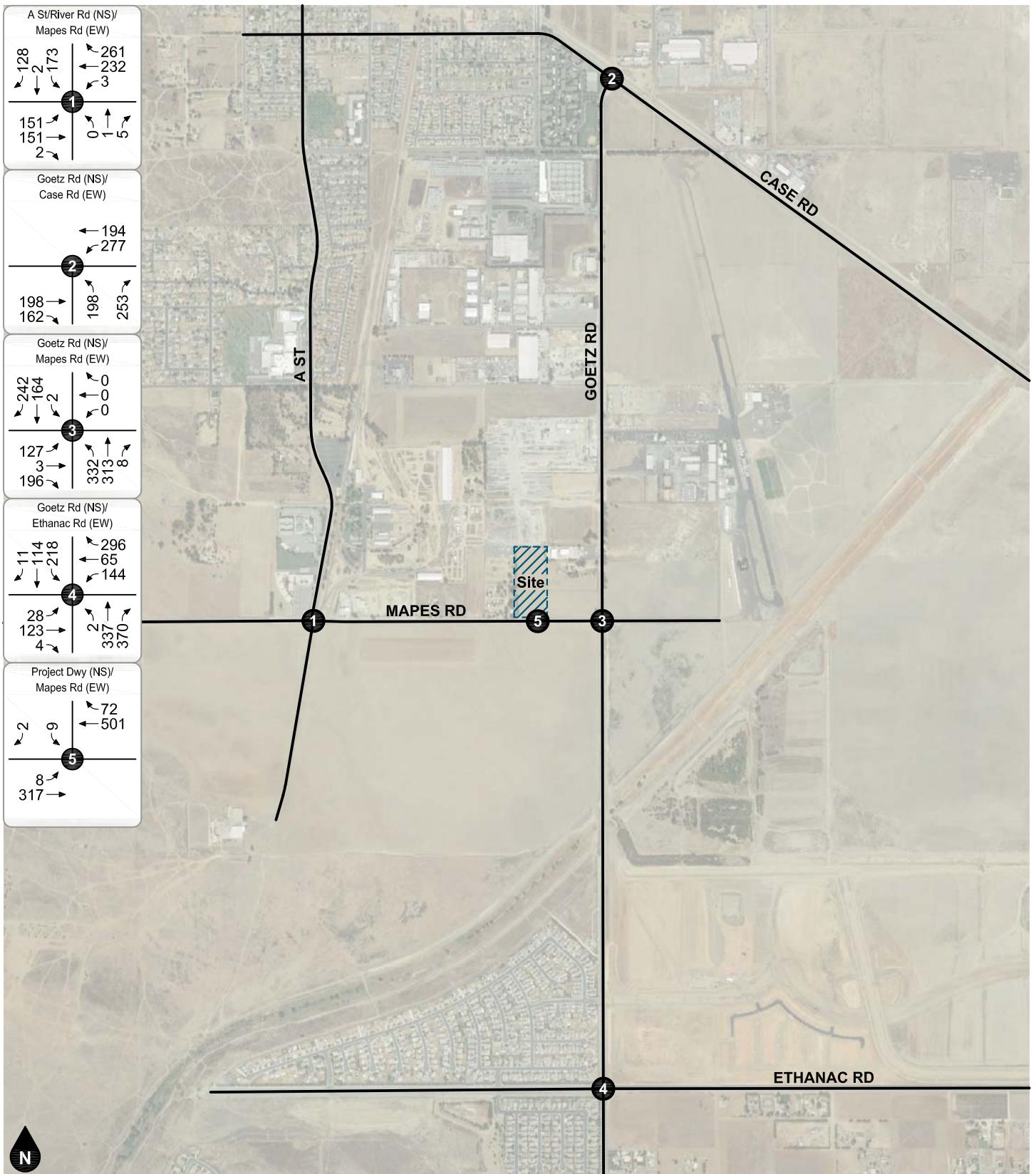
Figure 25
Existing Plus Ambient Growth Plus Project
PM Peak Hour Intersection Turning Movement Volumes



Legend

•## Vehicles Per Day (1,000's)

Figure 26
**Existing Plus Ambient Growth Plus Project Plus Cumulative
 Average Daily Traffic Volumes**



Legend

Study Intersection

Figure 27
Existing Plus Ambient Growth Plus Project Plus Cumulative AM Peak Hour Intersection Turning Movement Volumes

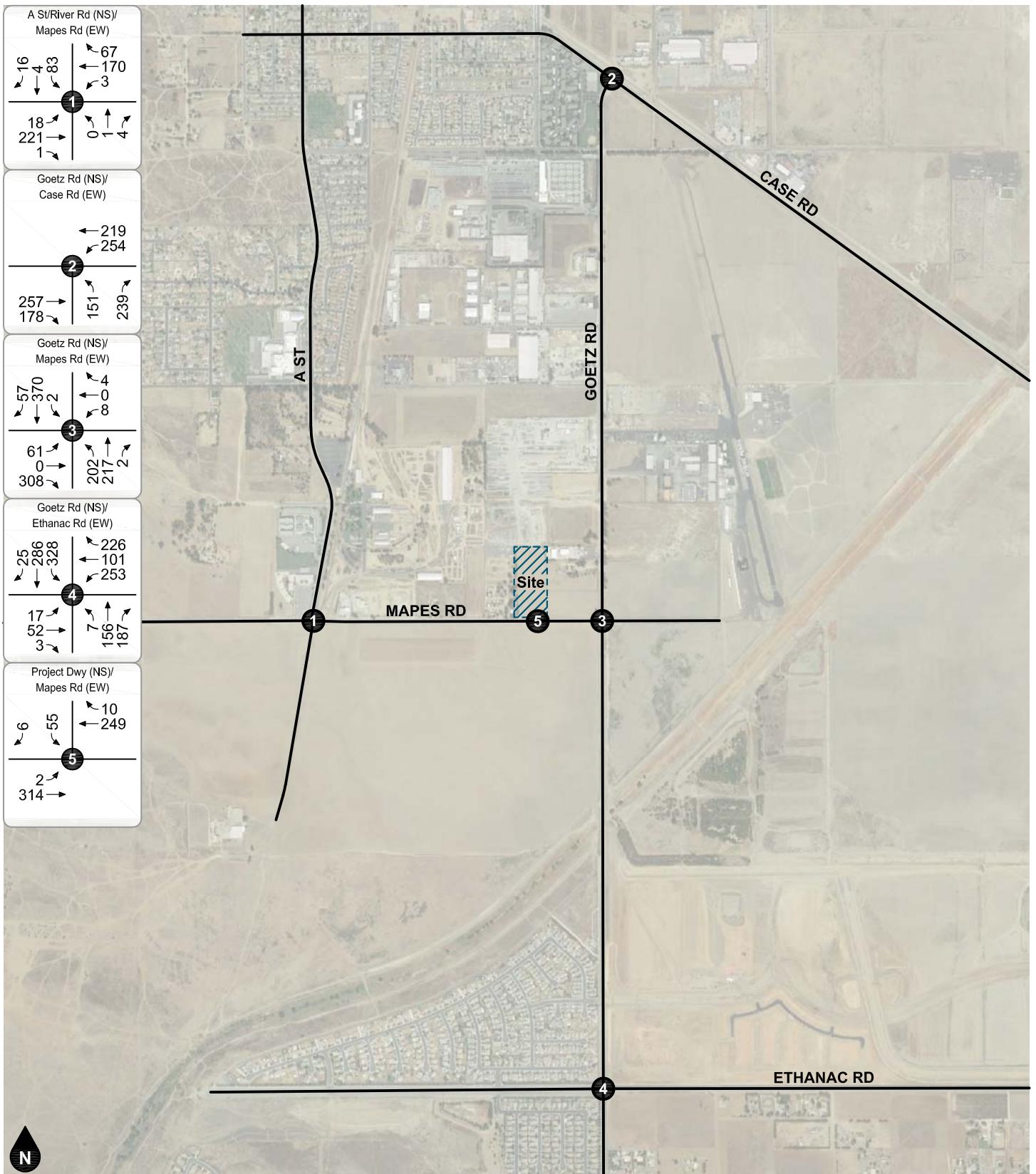


Figure 28
**Existing Plus Ambient Growth Plus Project Plus Cumulative
 PM Peak Hour Intersection Turning Movement Volumes**

6. FUTURE OPERATIONAL ANALYSIS

Detailed intersection Level of Service calculation worksheets for each of the following analysis scenarios are provided in Appendix D.

EXISTING PLUS PROJECT

Intersection Levels of Service

The intersection Levels of Service for Existing Plus Project conditions are shown in Table 4. As shown in Table 4, the following study intersections are forecast to continue to operate at an unacceptable Level of Service (E or F) during the peak hours for Existing Plus Project conditions:

- A Street/River Road at Mapes Road (#1) [LOS E - AM peak hour]
- Goetz Road at Mapes Road (#3) [LOS F - AM peak hour, LOS E - PM peak hour]

Significant Impact Evaluation

The proposed project does not result in a significant traffic impact at the intersection of A Street/River Road at Mapes Road (#1) for Existing Plus Project conditions since the project is not forecast to contribute 50 or more peak hour trips to the intersection. The proposed project is forecast to result in a significant traffic impact at the intersection of Goetz Road/Mapes Road (#3) for Existing Plus Project conditions (50 or more project generated trips at an intersection performing at an LOS of E or F in the baseline condition and an LOS increase of over 2 seconds).

With the implementation of the traffic signal currently warranted under Existing conditions, Goetz Road and Mapes Road is forecast to operate at acceptable Levels of Service during the peak hours for Existing Plus Project traffic conditions (see Table 4).

EXISTING PLUS AMBIENT GROWTH PLUS PROJECT (EAP)

Intersection Levels of Service

The intersection Levels of Service for EAP conditions are shown in Table 5. As shown in Table 5, the following study intersections are forecast to operate at an unacceptable Level of Service (E or F) during the peak hours for EAP conditions:

- A Street/River Road at Mapes Road (#1) [LOS F - AM peak hour]
- Goetz Road at Mapes Road (#3) [LOS F - AM/PM peak hour]

Significant Impact Evaluation

The proposed project does not result in a significant traffic impact at the intersection of A Street/River Road at Mapes Road (#1) for EAP conditions since the project is not forecast to contribute 50 or more peak hour trips to the intersection. The proposed project is forecast to result in a significant traffic impact at the intersection of Goetz Road and Mapes Road for EAP conditions (50 or more project generated trips at an intersection performing at an LOS of E or F in the baseline condition and an LOS increase of over 2 seconds).

With the implementation of the traffic signal currently warranted under Existing conditions, Goetz Road and Mapes Road is forecast to operate at acceptable Levels of Service during the peak hours for EAP conditions (see Table 5).

EXISTING PLUS AMBIENT GROWTH PLUS PROJECT PLUS CUMULATIVE (EAPC)

Intersection Levels of Service

The intersection Levels of Service for EAPC conditions are shown in Table 6. As shown in Table 6, the following study intersections are forecast to operate at an unacceptable Level of Service (E or F) during the peak hours for EAPC conditions:

- A Street/River Road at Mapes Road (#1) [LOS F - AM peak hour]
- Goetz Road at Mapes Road (#3) [LOS F - AM/PM peak hour]

Significant Impact Evaluation

The proposed project does not result in a significant traffic impact at the intersection of A Street/River Road at Mapes Road (#1) for EAPC conditions since the project is not forecast to contribute 50 or more peak hour trips to the intersection. The proposed project is forecast to result in a significant traffic impact at the intersection of Goetz Road and Mapes Road for EAPC conditions (50 or more project generated trips at an intersection performing at an LOS of E or F in the baseline condition and an LOS increase of over 2 seconds).

With the implementation of the traffic signal currently warranted under Existing conditions, Goetz Road and Mapes Road is forecast to operate at acceptable Levels of Service during the peak hours for EAPC conditions (see Table 6).

Table 4
Existing Plus Project Intersection Levels of Service

ID	Study Intersection	Traffic Control ¹	AM Peak Hour		PM Peak Hour	
			Delay ²	LOS ³	Delay ²	LOS ³
1. A Street/River Road at Mapes Road		AWS	50.4	F	10.2	B
2. Goetz Road at Case Road		TS	19.5	B	18.1	B
3. Goetz Road at Mapes Road -With Improvements		CSS	277.8	F	43.7	E
		TS	14.1	B	14.2	B
4. Goetz Road at Ethanac Road		TS	27.3	C	28.5	C
5. Project Driveway at Mapes Road		CSS	16.6	C	13.5	B

Notes:

(1) AWS = All Way Stop; TS = Traffic Signal; CSS = Cross Street Stop

(2) Delay is shown in seconds/vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst individual lane (or movements sharing a lane).

(3) LOS = Level of Service

Table 5
Existing Plus Ambient Growth Plus Project Intersection Levels of Service

ID	Study Intersection	Traffic Control ¹	AM Peak Hour		PM Peak Hour	
			Delay ²	LOS ³	Delay ²	LOS ³
1. A Street/River Road at Mapes Road		AWS	65.3	F	10.5	B
2. Goetz Road at Case Road		TS	19.7	B	18.4	B
3. Goetz Road at Mapes Road -With Improvements	CSS	401.9	F	56.0	F	
	TS	14.7	B	14.7	B	
4. Goetz Road at Ethanac Road	TS	28.8	C	28.6	C	
5. Project Driveway at Mapes Road	CSS	17.4	C	14.0	B	

Notes:

(1) AWS = All Way Stop; TS = Traffic Signal; CSS = Cross Street Stop

(2) Delay is shown in seconds/vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst individual lane (or movements sharing a lane).

(3) LOS = Level of Service

Table 6
Existing Plus Ambient Growth Plus Project Plus Cumulative Intersection Levels of Service

ID	Study Intersection	Traffic Control ¹	AM Peak Hour		PM Peak Hour	
			Delay ²	LOS ³	Delay ²	LOS ³
1. A Street/River Road at Mapes Road		AWS	65.3	F	10.5	B
2. Goetz Road at Case Road		TS	44.7	D	31.6	C
3. Goetz Road at Mapes Road -With Improvements		CSS	436.0	F	63.6	F
		TS	14.7	B	14.8	B
4. Goetz Road at Ethanac Road		TS	45.3	D	29.7	C
5. Project Driveway at Mapes Road		CSS	17.4	C	14.0	B

Notes:

(1) AWS = All Way Stop; TS = Traffic Signal; CSS = Cross Street Stop

(2) Delay is shown in seconds/vehicle. For intersections with traffic signal or all way stop control, overall average intersection delay and LOS are shown. For intersections with cross street stop control, LOS is based on average delay of the worst individual lane (or movements sharing a lane).

(3) LOS = Level of Service

7. PARKING ANALYSIS

CITY OF PERRIS PARKING CODE

The number of off-street parking spaces for the proposed project has been determined based on the City of Perris Municipal Code off-street parking requirements, which are provided in Appendix F.

Table 7 calculates the number of parking spaces required for the proposed project. Based upon the City off-street parking rate, a total of 53 parking spaces are required for the proposed project ("warehousing" land use). The proposed site plan provides a total of 48 parking spaces. Therefore, full occupancy of the proposed project will require 5 parking spaces in addition to the spaces shown on the proposed project site plan.

At full occupancy, 50 employees will work at the proposed project site. All employees will begin their shifts at 8:00 AM and end their shifts at 5:00 PM. With the 53 parking spaces required by the City of Perris off-street parking requirements, every employee should be able to park their own car at the project site during their shift.

As also shown on Table 7, the nearby jurisdictions of City of Menifee and County of Riverside would require a total of 43 spaces for the proposed project per the County of Riverside Code of Ordinances. However, since this is lower than the requirement of the City of Perris and would not provide enough spaces for the 50 employees, 53 parking spaces is the recommended minimum for the proposed project.

Table 7
Off-Street Parking Spaces Required by City of Perris, City of Menifee and County of Riverside Municipal Code

City of Perris					
Tenants	Quantity	Units ¹	Land Use	Municipal Code Requirement ²	Number of Parking Spaces Required
Proposed Project (Rate for First 20,000 SF)	20.000	TSF	Warehousing	1.0 parking space : 1,000 SF	20
Proposed Project (Rate for Remaining SF)	65.500	TSF	Warehousing	1.0 parking space : 2,000 SF	33
Required Spaces					53
Proposed Spaces					48
Additional Spaces Needed					5

City of Menifee/County of Riverside					
Tenants	Quantity	Units ¹	Land Use	Municipal Code Requirement ³	Number of Parking Spaces Required
Proposed Project	85.500	TSF	Warehousing	1.0 parking space : 2,000 SF	43
Proposed Spaces					48
Additional Spaces Needed					-5

Notes:

(1) TSF = Thousand Square Feet; SF = Square Feet

(2) Source = City of Perris Code of Ordinances, Section 19.69.030.(b).d.2.

(3) Source = County of Riverside Code of Ordinances, Section 17.188.030.

8. CONCLUSIONS

MITIGATION MEASURES

Under existing traffic conditions a traffic signal is warranted at the intersection of Goetz Road/Mapes Road. Prior to issuance of any occupancy permit, the applicant shall install the said traffic signal, at ultimate design, and the applicant will be eligible for Development Impact Fee (DIF) credit. However, at this time, if the City has already awarded the contract for installation of the said traffic signal, the applicant will only be subject to pay the DIF.

GENERAL RECOMMENDATIONS

All roadway design, traffic signing and striping, and traffic control improvements relating to the proposed project should be constructed in accordance with applicable engineering standards and to the satisfaction of the City of Perris Public Works Department.

Site-adjacent roadways should be constructed or repaired at their ultimate half-section width, including landscaping and parkway improvements in conjunction with development, or as otherwise required by the City of Perris Public Works Department.

On-site traffic signing and striping plans should be submitted for City of Perris approval in conjunction with detailed construction plans for the project.

Off-street parking should be provided to meet City of Perris Municipal Code requirements. Five (5) additional off-street parking spaces (in addition to the 48 proposed in the project site plan) should be provided in order to meet the criteria for off-site parking in the City of Perris.

The final grading, landscaping, and street improvement plans should demonstrate that sight distance standards are met in accordance with applicable City of Perris/California Department of Transportation sight distance standards.

As is the case for any roadway design, the City of Perris should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

APPENDICES

- Appendix A Glossary
- Appendix B Scoping Agreement
- Appendix C Volume Count Worksheets
- Appendix D Level of Service Worksheets
- Appendix E Traffic Signal Warrant Worksheets
- Appendix F City of Perris Zoning Code Parking Ordinance

APPENDIX A

GLOSSARY

GLOSSARY OF TERMS

ACRONYMS

AC	Acres
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
DU	Dwelling Unit
ICU	Intersection Capacity Utilization
LOS	Level of Service
TSF	Thousand Square Feet
V/C	Volume/Capacity
VMT	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The average 24-hour volume for a stated period divided by the number of days in that period. For example, Annual Average Daily Traffic is the total volume during a year divided by 365 days.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A point of constriction along a roadway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CONTROL DELAY: The component of delay, typically expressed in seconds per vehicle, resulting from the type of traffic control at an intersection. Control delay is measured by comparison with the uncontrolled condition; it includes delay incurred by slowing down, stopping/waiting, and speeding up.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CORNER SIGHT DISTANCE: The minimum sight distance required by the driver of a vehicle to cross or enter the lanes of the major roadway without requiring approaching traffic travelling at a given speed to radically alter their speed or trajectory. Corner sight distance is measured from the driver's eye at 42 inches above the pavement to an object height of 36 inches above the pavement in the center of the nearest approach lane.

CYCLE LENGTH: The time period in seconds required for a traffic signal to complete one full cycle of indications.

CUL-DE-SAC: A local street open at one end only and with special provisions for turning around.

DAILY CAPACITY: A theoretical value representing the daily traffic volume that will typically result in a peak hour volume equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

PASSENGER CAR EQUIVALENT (PCE): A metric used to assess the impact of larger vehicles, such as trucks, recreational vehicles, and buses, by converting the traffic volume of larger vehicles to an equivalent number of passenger cars.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

QUEUE: The number of vehicles waiting at a service area such as a traffic signal, stop sign, or access gate.

QUEUE LENGTH: The length of vehicle queue, typically expressed in feet, waiting at a service area such as a traffic signal, stop sign, or access gate.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SHARED/RECIPROCAL PARKING AGREEMENT: A written binding document executed between property owners to provide a designated number of off-street parking stalls within a designated area to be available for specified businesses or land uses.

SIGHT DISTANCE: The continuous length of roadway visible to a driver or roadway user.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STACKING DISTANCE: The length of area available behind a service area, such as a traffic signal or gate, for vehicle queueing to occur.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through an intersection.

STOPPING SIGHT DISTANCE: The minimum distance required by the driver of a vehicle on the major roadway travelling at a given speed to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eye at 42 inches above the pavement to an object height of 6 inches above the pavement.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination (i.e., each trip has two trip-ends). A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quantity of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

TURNING RADIUS: The circular arc formed by the smallest turning path radius of the front outside tire of a vehicle, such as that performed by a U-turn maneuver. This is based on the length and width of the wheel base as well as the steering mechanism of the vehicle.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

APPENDIX B

SCOPING AGREEMENT

May 30, 2019

Ms. Mary Blias
CITY OF PERRIS
135 North "D" Street
Perris, CA 92570

Subject: Mapes Road Cultivation & Processing Facility (DPR 18-00010) Scoping Agreement Review #3

Dear Ms. Blias:

Introduction

RK ENGINEERING GROUP, INC. (RK) has reviewed the May 23rd, 2019 Scoping Agreement for the Mapes Road Cultivation & Processing Facility (DPR 18-00010) prepared by Ganddini Group, Inc. RK has reviewed the Scoping Agreement with respect to the requirements to the City of Perris and General Traffic Engineering practice.

RK has reviewed the Scoping Agreement as revised and has founded it to be acceptable from a technical standpoint. Attached please find a signed copy of the Scoping Agreement. The traffic consultant can now proceed with preparation of the traffic study.

Conclusions

RK Engineering Group, Inc. has reviewed the Scoping Agreement #3 for the Mapes Road Cultivation & Processing Facility (DPR 18-00010) located north of Mapes Road and west of Geotz Road in the City of Perris. The revised Scoping Agreement dated May 23, 2019 is acceptable from a technical standpoint. The traffic consultant now can perform the traffic impact study for the project.

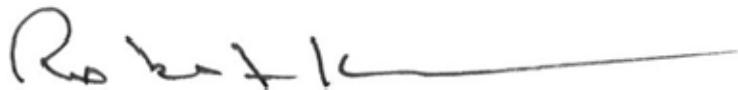
RK appreciates this opportunity to work with the City of Perris. If you have any questions, please call me at (949) 474-0809.

CITY OF PERRIS

RK 15336

Page 2

Respectfully submitted,
RK ENGINEERING GROUP, INC.



Robert Kahn, P.E.
Principal

Registered Civil Engineer 20285
Registered Traffic Engineer 0555

Attachment

RK:sl/rk15336.doc

JN:2126-2019-02

SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY

This letter acknowledges the City of Perris Engineering Department requirements for the traffic impact analysis of the following project.

Case No. Preliminary Plan Review DPR #18-00010

Related Cases _____

SP No. _____

EIR No. _____

GPA No. _____

CZ No. _____

Project Name: Mapes Road Cultivation & Processing Facility

Project Address: North side of Mapes Road, south of Alpine Drive, between Goetz Road and "A" Street

Project Description: 9,900 sq. ft. marijuana processing and manufacturing/office building, and four (4) 18,900 sq. ft. greenhouse cultivation buildings totaling 75,600 sq. ft.

Consultant

Name: GANDDINI GROUP, INC.

Address: 550 Parkcenter Drive, Suite 202

Santa Ana, CA 92705

Telephone: (714) 795-3100 x 106

Contact: Brandon Alvarado, EIT

Developer

SUNSET BME SUPPLIES, INC.

6088 Bounty Street

San Diego, CA 92120

(619) 694-6389

Kameron Abraham

A. Trip Generation Source: Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017 (see Table 1).

Land Use	Existing			Proposed		
	GI - General Industrial			GI - General Industrial		
Zoning	GI - General Industrial			GI - General Industrial		
Trip Generation (PCE)	IN	OUT	TOTAL	IN	OUT	TOTAL
AM Trips	0	0	0	81	11	92
PM Trips	0	0	0	10	61	71
Daily Trips	-	-	0	272	273	545

Internal Trip Allowance Yes No (% Trip Discount)

Pass-By Trip Allowance Yes No (% Trip Discount)

B. Trip Geographic Distribution: (See attached exhibit for detailed assignment)

Cars: N 30 % S 25 % E 40 % W 5 %

Trucks: N NA % S NA % E NA % W NA %

C. Background Traffic

Project Build-out Year 2021 Annual Ambient Growth Rate: 3.0 %

Phase Year(s): NA

Other area projects to be analyzed: Please provide (the most recently available data).

Model/Forecast methodology: Manual build-up methodology (i.e., Existing Plus Ambient Growth Plus Other Developments)

D. **Build-Out Studies:** Does this project require a Build-out Study? Scenarios to be studied:

- Existing
- Existing Plus Ambient Growth Plus Project
- Existing Plus Project
- Existing Plus Ambient Growth Plus Project Plus Cumulative

E. **Study intersections:** (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)

1.	South A Street/River Road (NS) at Mapes Road (EW)	6.	
2.	Goetz Road (NS) at Case Road (EW)	7.	
3.	Goetz Road (NS) at Mapes Road (EW)	8.	
4.	Goetz Road (NS) at Ethanac Road (EW)	9.	
5.	Project Driveway (NS) at Mapes Road (EW)	10.	

F. **Study Roadway Segments:**

1.	NA	5.	
2.		6.	
3.		7.	
4.		8.	

G. **Other Jurisdictional Impacts**

Is this project within a City's Sphere of Influence or one-mile radius of City boundaries? Yes

No

If so, name of City Jurisdiction: _____

H. **Site Plan (See attached reduced copy)**

I. **Specific issues to be addressed in the Study (in addition to the standard analysis, to be filled out by Transportation Department)**

A parking study will be completed and included as part of the traffic study. The parking study will consist of calculating the number of on-site parking spaces required based upon Perris parking code requirements. A truck turning template will be provided at the project driveway. Signal warrants will be analyzed at all unsignalized intersections.

Recommended by:

May 23, 2019

Name: Brandon Alvarado, EIT
Consultant's Representative

Date

Approved Scoping Agreement:

City of Perris, Engineering Department

5/29/19

Date

JN 19-0024

Table 1
Project Trip Generation

Land Use/Vehicle Type	Source ¹	Trip Generation Rates per TSF ²						
		AM Peak Hour			PM Peak Hour			Daily
		% In	% Out	Total	% In	% Out	Total	
General Light Industrial	[a]	88%	12%	0.70	13%	87%	0.63	4.96
Percent Cars	[b]	--	--	60.53%	--	--	76.83%	78.60%
Percent Trucks	[b]	--	--	39.47%	--	--	23.17%	21.40%
Car Trips per TSF		0.373	0.051	0.424	0.063	0.421	0.484	3.899
Truck Trips per TSF		0.243	0.033	0.276	0.019	0.127	0.146	1.061
<u>Truck Breakdown by Axle</u>	<u>Percent³</u>							
2-Axle Trucks	32.70%	0.079	0.011	0.090	0.006	0.042	0.048	0.347
3-Axle Trucks	17.90%	0.043	0.006	0.049	0.003	0.023	0.026	0.190
4+ Axle Trucks	49.40%	0.120	0.016	0.136	0.009	0.063	0.072	0.524

Land Use/Vehicle Type	Quantity (TSF) ²	Vehicle Trips Generated						
		AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
General Light Industrial	85.500							
Cars		32	4	36	5	36	41	333
Trucks		7	1	8	1	4	5	30
2-Axle Trucks		4	1	5	0	2	2	16
3-Axle Trucks		10	1	11	1	5	6	45
4+ Axle Trucks		21	3	24	2	11	13	91
TOTAL VEHICLE TRIPS GENERATED		53	7	60	7	47	54	424

Land Use/Vehicle Type	Quantity (TSF) ²	Passenger Car Equivalent (PCE) Trips Generated						
		AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
General Light Industrial	85.500							
Cars		32	4	36	5	36	41	333
Trucks		1.5	11	2	13	2	6	8
2-Axle Trucks		2.0	8	2	10	0	4	4
3-Axle Trucks		3.0	30	3	33	3	15	18
4+ Axle Trucks		--	49	7	56	5	25	30
TOTAL PCE TRIPS GENERATED		81	11	92	10	61	71	545

Notes:

(1) Source:

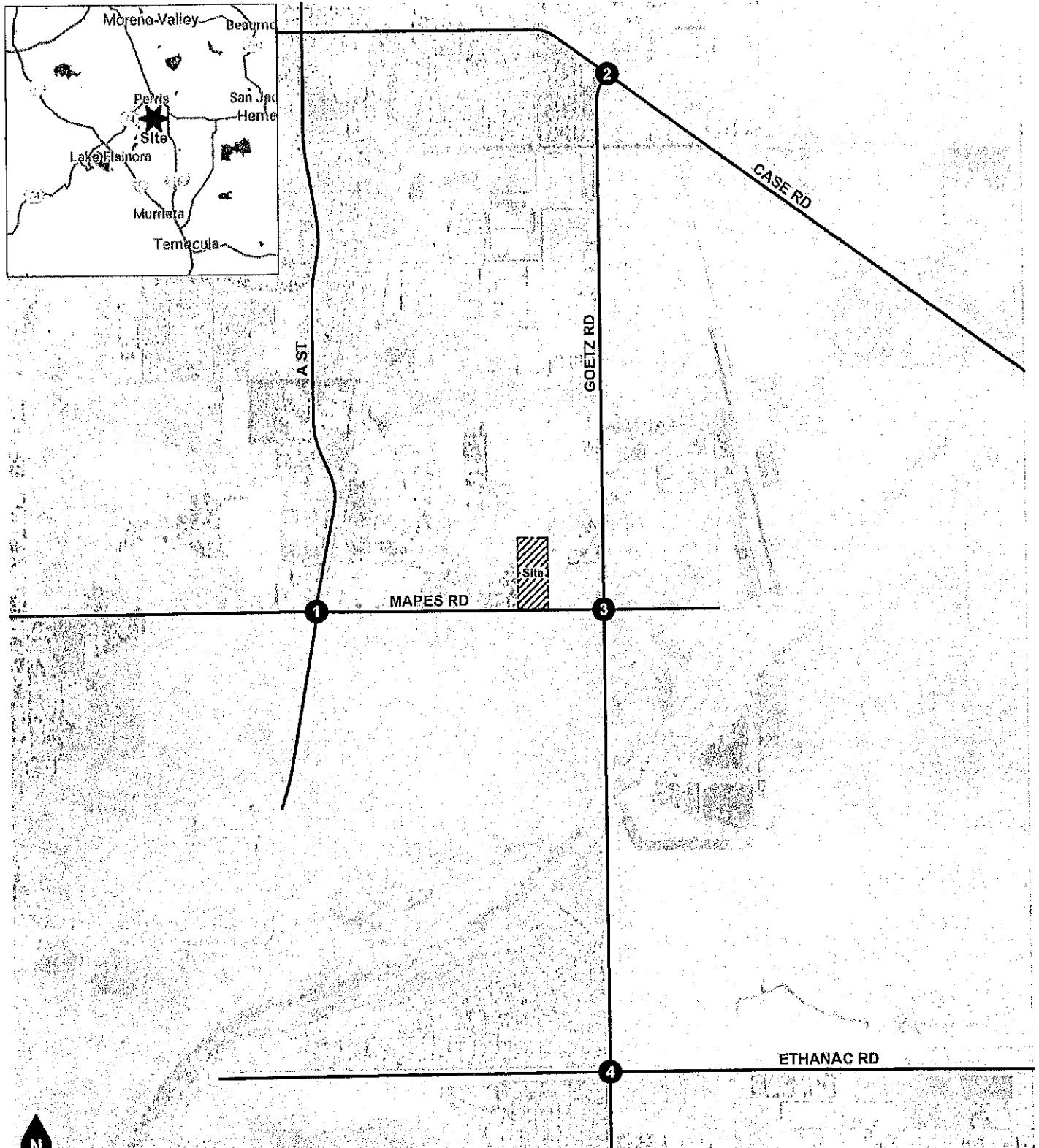
[a] Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017, Land Use Code 150.

[b] City of Fontana, Truck Trip Generation Study, August 2003.

(2) TSF = Thousand Square Feet

(3) Truck by axle percentages obtained from City of Fontana, Truck Trip Generation Study, August 2003.

(4) PCE factors recommended by County of San Bernardino Congestion Management Program.

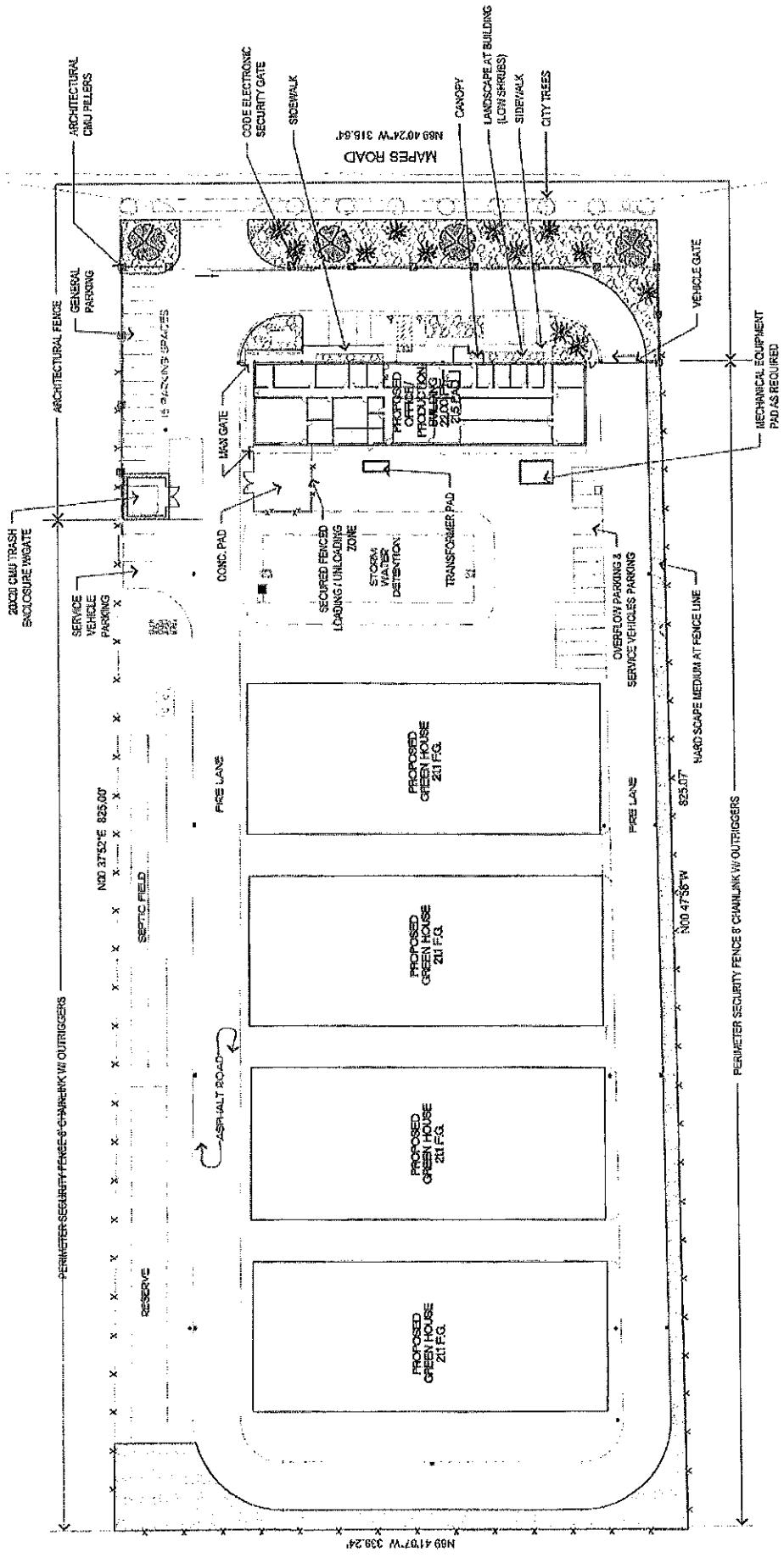


Legend
Study Intersection

Figure 1
Project Location Map

Mapes Road Cultivation & Processing Facility
Scoping Document
19-0024

Figure 2
Site Plan



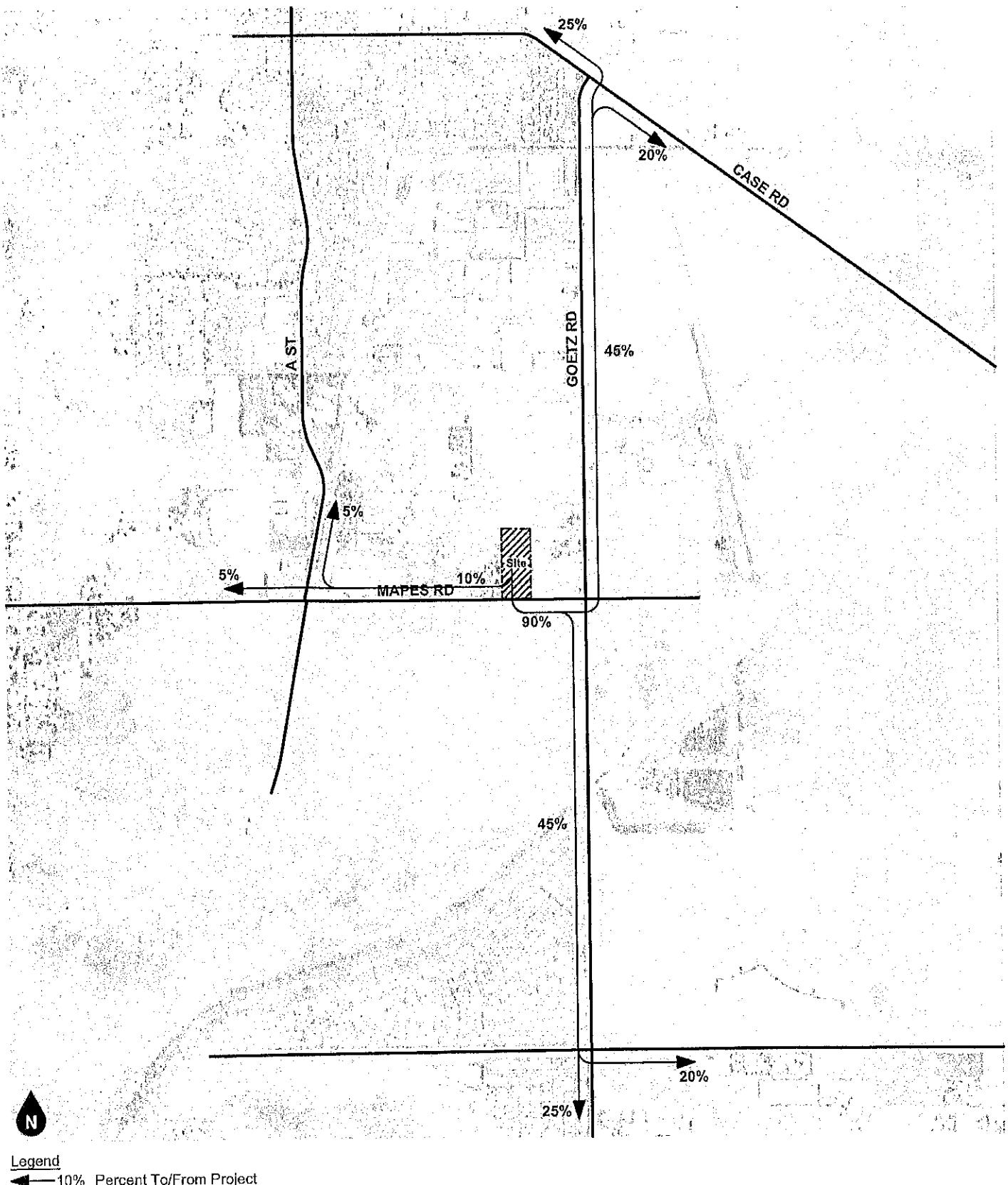


Figure 3
Trip Distribution Map

APPENDIX C

VOLUME COUNT WORKSHEETS

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

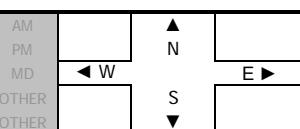
T218

DATE:	Perris
NORTH & SOUTH:	River
EAST & WEST:	Mapes

LOCATION: Perris
NORTH & SOUTH: River
EAST & WEST: Mapes

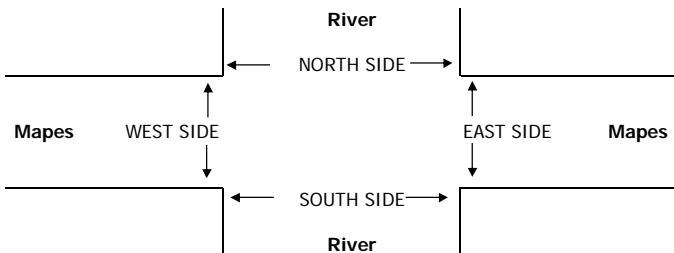
PROJECT #: SC
LOCATION #: 1
CONTROL: STOP ALL

NOTES:



Add U-Turns to Left Turns

AM	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	River			River			Mapes			Mapes			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
7:00 AM	0	0	0	14	0	0	3	23	0	0	46	34	120
7:15 AM	0	0	1	12	0	4	14	27	0	0	57	41	156
7:30 AM	0	0	1	27	0	26	32	36	2	1	52	57	234
7:45 AM	0	1	2	62	0	62	60	30	0	1	51	91	360
8:00 AM	0	0	1	58	2	29	36	46	0	1	58	56	287
8:15 AM	0	0	1	16	1	2	6	28	1	0	37	15	107
8:30 AM	0	0	0	14	0	1	22	43	0	0	28	11	119
8:45 AM	0	0	0	9	0	2	7	20	0	0	18	9	65
VOLUMES	0	1	6	212	3	126	180	253	3	3	347	314	1,448
APPROACH %	0%	14%	86%	62%	1%	37%	41%	58%	1%	0%	52%	47%	
APP/DEPART	7	/	495	341	/	9	436	/	471	664	/	473	0
BEGIN PEAK HR	7:15 AM												
VOLUMES	0	1	5	159	2	121	142	139	2	3	218	245	1,037
APPROACH %	0%	17%	83%	56%	1%	43%	50%	49%	1%	1%	47%	53%	
PEAK HR FACTOR	0.500			0.569			0.786			0.815			0.720
APP/DEPART	6	/	388	282	/	7	283	/	303	466	/	339	0
4:00 PM	0	0	0	32	0	5	6	49	0	0	40	12	144
4:15 PM	0	1	0	24	2	2	6	54	1	0	34	18	142
4:30 PM	0	0	1	18	0	3	4	39	0	1	36	11	113
4:45 PM	0	0	0	18	0	6	2	65	0	0	41	16	148
5:00 PM	0	0	3	17	2	4	5	50	0	2	47	15	145
5:15 PM	0	0	1	11	1	6	0	47	0	1	28	16	111
5:30 PM	0	0	1	12	2	2	2	46	0	0	40	13	118
5:45 PM	1	0	0	15	0	7	13	51	2	0	46	12	147
VOLUMES	1	1	6	147	7	35	38	401	3	4	312	113	1,068
APPROACH %	13%	13%	75%	78%	4%	19%	9%	91%	1%	1%	73%	26%	
APP/DEPART	8	/	152	189	/	14	442	/	554	429	/	348	0
BEGIN PEAK HR	4:15 PM												
VOLUMES	0	1	4	77	4	15	17	208	1	3	158	60	548
APPROACH %	0%	20%	80%	80%	4%	16%	8%	92%	0%	1%	71%	27%	
PEAK HR FACTOR	0.417			0.857			0.843			0.863			0.926
APP/DEPART	5	/	78	96	/	8	226	/	289	221	/	173	0



AM	PEDESTRIAN + BIKE CROSSINGS				TOTAL
	N SIDE	S SIDE	E SIDE	W SIDE	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL	0	0	0	0	0
AM BEGIN PEAK HR	7:15 AM				
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL	0	0	0	0	0
PM BEGIN PEAK HR	4:15 PM				

AM	PEDESTRIAN CROSSINGS					TOTAL
	N SIDE	S SIDE	E SIDE	W SIDE		
7:00 AM	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0
AM BEGIN PEAK HR	7:15 AM					
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0
PM BEGIN PEAK HR	4:15 PM					

AM	BICYCLE CROSSINGS					TOTAL
	NS	SS	ES	WS		
7:00 AM	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0
AM BEGIN PEAK HR	7:15 AM					
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0
PM BEGIN PEAK HR	4:15 PM					

ApA - 16

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

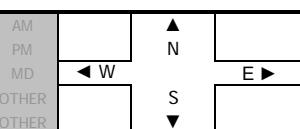
T218

DATE:	Perris
Thu, May 9, 19	Goetz
EAST & WEST:	Case

LOCATION: Perris
NORTH & SOUTH: Goetz
EAST & WEST: Case

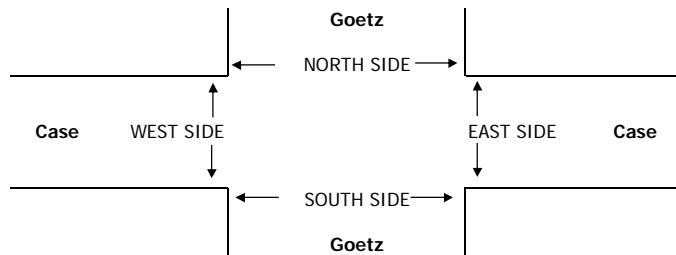
PROJECT #: SC
LOCATION #: 2
CONTROL: SIGNAL

NOTES:



Add U-Turns to Left Turns

AM	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	Goetz			Goetz			Case			Case			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
7:00 AM	31	0	36	0	0	0	0	39	14	27	33	0	180
7:15 AM	45	0	60	0	0	0	0	46	15	39	25	0	230
7:30 AM	40	0	68	0	0	0	0	46	34	60	64	0	312
7:45 AM	53	0	55	0	0	0	0	53	40	76	46	0	323
8:00 AM	29	0	54	0	0	0	0	42	39	71	48	0	283
8:15 AM	19	0	42	0	0	0	0	48	24	41	46	0	220
8:30 AM	30	0	41	0	0	0	0	39	14	25	33	0	182
8:45 AM	19	0	31	0	0	0	0	45	20	31	38	0	184
VOLUMES	266	0	387	0	0	0	0	358	200	370	333	0	1,914
APPROACH %	41%	0%	59%	0%	0%	0%	0%	64%	36%	53%	47%	0%	
APP/DEPART	653	/	0	0	/	570	558	/	745	703	/	599	0
BEGIN PEAK HR	7:15 AM												
VOLUMES	167	0	237	0	0	0	0	187	128	246	183	0	1,148
APPROACH %	41%	0%	59%	0%	0%	0%	0%	59%	41%	57%	43%	0%	
PEAK HR FACTOR	0.935	0.000						0.847			0.865		
APP/DEPART	404	/	0	0	/	374	315	/	424	429	/	350	0
4:00 PM	28	0	56	0	0	0	0	54	41	66	63	0	308
4:15 PM	25	0	48	0	0	0	0	57	46	59	50	0	285
4:30 PM	30	0	56	0	0	0	0	63	31	53	45	0	278
4:45 PM	34	0	54	0	0	0	0	68	28	60	49	0	293
5:00 PM	32	0	44	0	0	0	0	68	41	54	47	0	286
5:15 PM	31	0	43	0	0	0	0	76	40	58	45	0	293
5:30 PM	33	0	35	0	0	0	0	54	33	54	38	0	247
5:45 PM	35	0	42	0	0	0	0	63	40	46	47	0	273
VOLUMES	248	0	378	0	0	0	0	503	300	450	384	0	2,263
APPROACH %	40%	0%	60%	0%	0%	0%	0%	63%	37%	54%	46%	0%	
APP/DEPART	626	/	0	0	/	750	803	/	881	834	/	632	0
BEGIN PEAK HR	4:00 PM												
VOLUMES	117	0	214	0	0	0	0	242	146	238	207	0	1,164
APPROACH %	35%	0%	65%	0%	0%	0%	0%	62%	38%	53%	47%	0%	
PEAK HR FACTOR	0.940	0.000						0.942			0.862		
APP/DEPART	331	/	0	0	/	384	388	/	456	445	/	324	0



AM	PEDESTRIAN + BIKE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL	0	0	0	0	0
AM BEGIN PEAK HR	7:15 AM				
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL	0	0	0	0	0
PM BEGIN PEAK HR	4:00 PM				

AM	PEDESTRIAN CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL	0	0	0	0	0
AM BEGIN PEAK HR	7:15 AM				
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL	0	0	0	0	0
PM BEGIN PEAK HR	4:00 PM				

AM	BICYCLE CROSSINGS				
	NS	SS	ES	WS	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL	0	0	0	0	0
AM BEGIN PEAK HR	7:15 AM				
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL	0	0	0	0	0
PM BEGIN PEAK HR	4:00 PM				

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC, tel: 714 253 7888 cs@aimtd.com

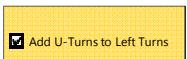
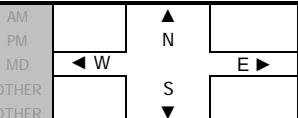
T218

DATE:
Thu, May 9, 19

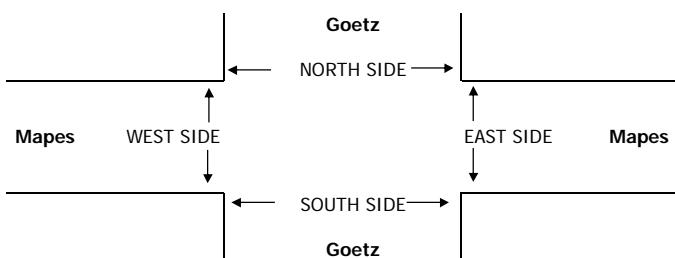
LOCATION: Perris
NORTH & SOUTH: Goetz
EAST & WEST: Mapes

PROJECT #: SC
LOCATION #: 3
CONTROL: STOP E/W

NOTES:



										PM	N	E		
										MD	◀ W	▶ S		
										OTHER				
										OTHER				
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		Goetz			Goetz			Mapes			Mapes			
LANES:		NL 1	NT 1	NR 0	SL 0	ST 1	SR 1	EL 0	ET 1	ER 0	WL 0	WT 1	WR 0	TOTAL
AM	7:00 AM	75	63	0	0	21	13	5	0	35	0	0	0	212
	7:15 AM	83	78	0	0	30	18	7	0	31	0	0	0	247
	7:30 AM	94	85	2	2	32	42	21	0	41	0	0	0	319
	7:45 AM	68	66	4	0	38	90	36	0	46	0	0	0	348
	8:00 AM	34	49	2	0	49	44	51	3	63	0	0	0	295
	8:15 AM	43	38	0	0	38	23	22	0	24	0	0	1	189
	8:30 AM	29	45	2	0	28	4	27	0	33	0	0	0	168
	8:45 AM	28	54	1	0	28	6	4	0	25	1	0	1	148
	VOLUMES	454	478	11	2	264	240	173	3	298	1	0	2	1,926
	APPROACH %	48%	51%	1%	0%	52%	47%	36%	1%	63%	33%	0%	67%	
PM	APP/DEPART	943	/	653	506	/	563	474	/	16	3	/	694	0
	BEGIN PEAK HR	7:15 AM												
	VOLUMES	279	278	8	2	149	194	115	3	181	0	0	0	1,209
	APPROACH %	49%	49%	1%	1%	43%	56%	38%	1%	61%	0%	0%	0%	
	PEAK HR FACTOR	0.780			0.674			0.639			0.000		0.869	
PM	APP/DEPART	565	/	393	345	/	330	299	/	13	0	/	473	0
	4:00 PM	44	40	2	1	87	11	7	0	69	0	0	0	261
	4:15 PM	43	38	0	1	91	12	9	0	71	0	0	1	266
	4:30 PM	41	60	1	0	71	16	6	0	61	4	0	1	261
	4:45 PM	42	48	0	0	82	10	10	0	64	1	0	0	257
	5:00 PM	60	47	1	1	86	11	7	0	68	3	0	2	286
	5:15 PM	30	39	0	1	78	12	9	0	50	0	0	0	219
	5:30 PM	38	39	0	0	61	18	9	0	51	1	0	0	217
	5:45 PM	49	42	0	2	83	10	12	0	59	0	0	0	257
	VOLUMES	347	353	4	6	639	100	69	0	493	9	0	4	2,024
U-TURNS	APPROACH %	49%	50%	1%	1%	86%	13%	12%	0%	88%	69%	0%	31%	
	APP/DEPART	704	/	427	745	/	1,141	562	/	9	13	/	447	0
	BEGIN PEAK HR	4:15 PM												
	VOLUMES	186	193	2	2	330	49	32	0	264	8	0	4	1,070
	APPROACH %	49%	51%	1%	1%	87%	13%	11%	0%	89%	67%	0%	33%	
U-TURNS	PEAK HR FACTOR	0.882			0.916			0.925			0.600		0.935	
	APP/DEPART	381	/	229	381	/	602	296	/	4	12	/	235	0



PEDESTRIAN + BIKE CROSSINGS				
N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
7:15 AM				
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
4:15 PM				

INTERSECTION TURNING MOVEMENT COUNTS

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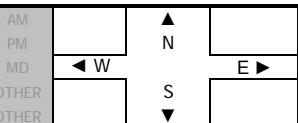
T218

DATE:
Thu, May 9, 19

LOCATION: Perris
NORTH & SOUTH: Goetz
EAST & WEST: Ethanac

PROJECT #: SC
LOCATION #: 4
CONTROL: SIGNAL

NOTES:



Add U-Turns to Left Turns

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	Goetz			Goetz			Ethanac			Ethanac			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	1	1	1	1	2	1	2	1	1	2	1	1	

U-TURNS				
NB 0	SB 0	EB 0	WB 0	TTL

	7:00 AM	0	72	105	54	19	2	6	41	1	14	7	66	387
	7:15 AM	2	74	105	58	23	0	11	35	0	36	12	73	429
	7:30 AM	0	90	88	44	25	4	5	28	2	43	15	64	408
	7:45 AM	0	60	51	48	30	4	4	12	1	43	27	61	341
	8:00 AM	0	35	58	57	52	3	7	18	0	53	25	41	349
	8:15 AM	0	36	82	41	25	4	1	7	1	40	6	38	281
	8:30 AM	0	29	44	41	15	3	2	9	0	49	9	41	242
	8:45 AM	0	37	41	40	18	2	4	6	0	38	8	36	230
AM	VOLUMES	2	433	574	383	207	22	40	156	5	316	109	420	2,667

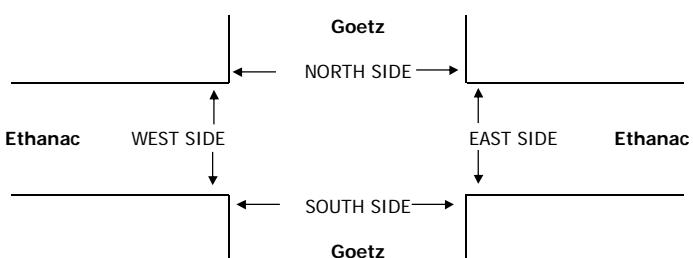
APPROACH %	0%	43%	57%	63%	34%	4%	20%	78%	2%	37%	13%	50%	200%
APP/DEPART	1,009	/	893	612	/	528	201	/	1,113	845	/	133	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	2	296	349	204	97	10	26	116	4	136	61	264	1,565
APPROACH %	0%	46%	54%	66%	31%	3%	18%	79%	3%	30%	13%	57%	
PEAK HR FACTOR	0.894				0.948			0.760			0.880		0.912
APP/DEPART	147	/	56%	211	/	227	146	/	160	161	/	72	0

1 2 3 4 5 6 7 8

APP/DEPART	647	7	586	311	7	237	146	7	669	461	7	13	0
4:00 PM	1	28	36	83	60	3	1	11	0	60	27	47	357
4:15 PM	2	34	35	90	72	10	5	11	2	65	22	57	405
4:30 PM	1	37	44	60	52	3	8	11	0	63	23	55	357
4:45 PM	3	36	61	65	65	8	2	16	1	51	23	52	383
5:00 PM	1	27	48	61	68	7	3	7	0	62	12	60	356

1	0	0	0	1
1	0	1	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

	5:15 PM	1	23	37	68	75	6	6	6	2	60	13	49	346
	5:30 PM	0	36	49	56	45	7	3	13	2	59	21	43	334
	5:45 PM	0	28	40	42	57	7	4	10	2	87	25	50	352
PM	VOLUMES	9	249	350	525	494	51	32	85	9	507	166	413	2,890
	APPROACH %	1%	41%	58%	49%	46%	5%	25%	67%	7%	47%	15%	38%	
	APP/DEPART	608	/	693	1,070	/	1,011	126	/	961	1,086	/	225	0
	BEGIN PEAK HR	4:00 PM												
	VOLUMES	7	135	176	298	249	24	16	49	3	239	95	211	1,502
	APPROACH %	2%	42%	55%	52%	44%	4%	24%	72%	4%	44%	17%	39%	
	PEAK HR FACTOR	0.795			0.830			0.895			0.946			0.927
	APP/DEPART	318	/	361	571	/	493	68	/	523	545	/	125	0



PEDESTRIAN + BIKE CROSSINGS				
N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
7:00 AM				
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
4:00 PM				

APPENDIX D

LEVEL OF SERVICE WORKSHEETS

EXISTING

Vistro File: G:\...\AM E.vistro
Report File: G:\...\E AM.pdf

Mapes Road Cultivation & Processing

Scenario 1 Existing
5/23/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	A St/River Rd (NS) at Mapes Rd (EW)	All-way stop	HCM 6th Edition	WB Right	1.100	48.9	E
2	Goetz Rd (NS) at Case Rd (EW)	Signalized	HCM 6th Edition	WB Left	0.545	19.3	B
3	Goetz Rd (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	EB Left	0.946	171.6	F
4	Goetz Rd (NS) at Ethanac Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.732	26.8	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report**Intersection 1: A St/River Rd (NS) at Mapes Rd (EW)**

Control Type:	All-way stop	Delay (sec / veh):	48.9
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.100

Intersection Setup

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	115.00	55.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	0	1	5	159	2	121	142	139	2	3	218	245
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	5	159	2	121	142	139	2	3	218	245
Peak Hour Factor	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	2	55	1	42	49	48	1	1	76	85
Total Analysis Volume [veh/h]	0	1	7	221	3	168	197	193	3	4	303	340
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings**Lanes**

Capacity per Entry Lane [veh/h]	461	469	555	499	536	647
Degree of Utilization, x	0.02	0.48	0.30	0.40	0.37	1.10

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.05	2.53	1.27	1.87	1.66	19.69
95th-Percentile Queue Length [ft]	1.32	63.29	31.73	46.70	41.57	492.16
Approach Delay [s/veh]	10.94	14.95		13.90		91.14
Approach LOS	B	B		B		F
Intersection Delay [s/veh]			48.87			
Intersection LOS			E			

Intersection Level Of Service Report**Intersection 2: Goetz Rd (NS) at Case Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	19.3
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.545

Intersection Setup

Name	Goetz Rd		Case Rd		Case Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	86.00	100.00	100.00	200.00	94.00	100.00
Speed [mph]	50.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Goetz Rd		Case Rd		Case Rd	
Base Volume Input [veh/h]	167	237	187	128	246	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	167	237	187	128	246	183
Peak Hour Factor	0.8890	0.8890	0.8890	0.8890	0.8890	0.8890
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	67	53	36	69	51
Total Analysis Volume [veh/h]	188	267	210	144	277	206
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No					
Signal Coordination Group	-					
Cycle Length [s]	60					
Coordination Type	Time of Day Pattern Isolated					
Actuation Type	Fully actuated					
Offset [s]	0.0					
Offset Reference	LeadGreen					
Permissive Mode	SingleBand					
Lost time [s]	12.00					

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	7	0	7	0	7	7
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	19	0	21	0	20	41
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	7	0	7	0	0	7
Pedestrian Clearance [s]	10	0	10	0	0	10
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	R	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	12	25	25	11	40
g / C, Green / Cycle	0.20	0.20	0.41	0.41	0.19	0.66
(v / s)_i Volume / Saturation Flow Rate	0.11	0.17	0.11	0.09	0.16	0.11
s, saturation flow rate [veh/h]	1781	1589	1870	1589	1781	1870
c, Capacity [veh/h]	363	324	763	648	337	1241
d1, Uniform Delay [s]	21.33	22.93	11.88	11.60	23.43	3.83
k, delay calibration	0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.15	5.32	0.89	0.79	5.04	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.52	0.83	0.28	0.22	0.82	0.17
d, Delay for Lane Group [s/veh]	22.48	28.25	12.77	12.39	28.46	4.12
Lane Group LOS	C	C	B	B	C	A
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.12	3.53	1.68	1.14	3.74	0.57
50th-Percentile Queue Length [ft/ln]	52.89	88.27	41.97	28.49	93.61	14.29
95th-Percentile Queue Length [veh/ln]	3.81	6.36	3.02	2.05	6.74	1.03
95th-Percentile Queue Length [ft/ln]	95.20	158.89	75.55	51.28	168.51	25.73

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.48	28.25	12.77	12.39	28.46	4.12
Movement LOS	C	C	B	B	C	A
d_A, Approach Delay [s/veh]	25.87		12.62		18.08	
Approach LOS	C		B		B	
d_I, Intersection Delay [s/veh]		19.33				
Intersection LOS		B				
Intersection V/C		0.545				

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.392	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	30.00	30.00	30.00
I_b,int, Bicycle LOS Score for Intersection	4.132	4.717	4.929
Bicycle LOS	D	E	E

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)**

Control Type: Two-way stop Delay (sec / veh): 171.6
 Analysis Method: HCM 6th Edition Level Of Service: F
 Analysis Period: 15 minutes Volume to Capacity (v/c): 0.946

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	279	278	8	2	149	194	115	3	181	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	279	278	8	2	149	194	115	3	181	0	0	0
Peak Hour Factor	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	80	80	2	1	43	56	33	1	52	0	0	0
Total Analysis Volume [veh/h]	321	320	9	2	171	223	132	3	208	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.28	0.00	0.00	0.00	0.00	0.00	0.95	0.02	0.24	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.26	0.00	0.00	7.93	0.00	0.00	171.60	170.80	149.94	46.11	38.77	10.02
Movement LOS	A	A	A	A	A	A	F	F	F	E	E	B
95th-Percentile Queue Length [veh/ln]	1.13	0.00	0.00	0.00	0.00	0.00	15.56	15.56	15.56	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	28.24	0.00	0.00	0.12	0.12	0.00	388.88	388.88	388.88	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		4.57			0.04			158.46				31.63
Approach LOS		A		A			F			D		
d_I, Intersection Delay [s/veh]							41.28					
Intersection LOS							F					

Intersection Level Of Service Report**Intersection 4: Goetz Rd (NS) at Ethanac Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	26.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.732

Intersection Setup

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	150.00	100.00	101.00	150.00	100.00	100.00	200.00	100.00	100.00	150.00	100.00	150.00
Speed [mph]	55.00			55.00			40.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Base Volume Input [veh/h]	2	296	349	204	97	10	26	116	4	136	61	264
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	296	349	204	97	10	26	116	4	136	61	264
Peak Hour Factor	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	81	96	56	27	3	7	32	1	37	17	72
Total Analysis Volume [veh/h]	2	325	383	224	106	11	29	127	4	149	67	289
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing m	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	70											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	16.00											

Phasing & Timing

Control Type	Protecte	Permiss	Permiss									
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-									
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	22	0	15	25	0	12	21	0	12	21	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No										
Maximum Recall	No	No										
Pedestrian Recall	No	No										
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	0	26	26	11	36	36	3	11	11	7	15	15
g / C, Green / Cycle	0.00	0.36	0.36	0.15	0.51	0.51	0.04	0.15	0.15	0.11	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.00	0.17	0.24	0.13	0.03	0.01	0.02	0.04	0.00	0.08	0.02	0.18
s, saturation flow rate [veh/h]	1781	1870	1589	1781	3560	1589	1781	3560	1589	1781	3560	1589
c, Capacity [veh/h]	10	678	576	270	1809	808	81	541	242	190	759	339
d1, Uniform Delay [s]	34.78	17.29	18.82	28.94	8.76	8.56	32.55	26.19	25.32	30.60	22.16	26.57
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.72	2.42	5.97	6.53	0.06	0.03	2.69	0.22	0.03	7.00	0.05	6.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.48	0.66	0.83	0.06	0.01	0.36	0.23	0.02	0.79	0.09	0.85
d, Delay for Lane Group [s/veh]	44.50	19.71	24.78	35.47	8.82	8.59	35.24	26.41	25.35	37.60	22.21	32.64
Lane Group LOS	D	B	C	D	A	A	D	C	C	D	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.06	3.74	5.17	3.70	0.32	0.07	0.51	0.89	0.05	2.62	0.41	4.73
50th-Percentile Queue Length [ft/ln]	1.44	93.62	129.33	92.48	7.93	1.70	12.77	22.13	1.37	65.56	10.18	118.24
95th-Percentile Queue Length [veh/ln]	0.10	6.74	8.90	6.66	0.57	0.12	0.92	1.59	0.10	4.72	0.73	8.30
95th-Percentile Queue Length [ft/ln]	2.59	168.51	222.58	166.47	14.27	3.06	22.98	39.84	2.46	118.01	18.32	207.40

Movement, Approach, & Intersection Results

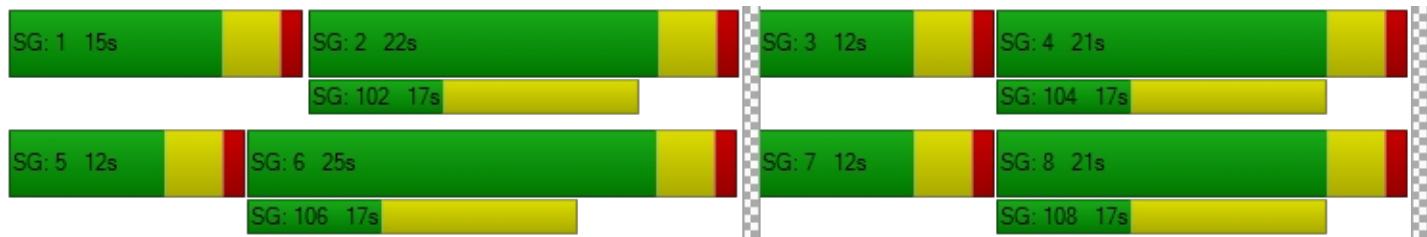
d_M, Delay for Movement [s/veh]	44.50	19.71	24.78	35.47	8.82	8.59	35.24	26.41	25.35	37.60	22.21	32.64
Movement LOS	D	B	C	D	A	A	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	22.52				26.32			27.99			32.72	
Approach LOS	C				C			C			C	
d_I, Intersection Delay [s/veh]					26.79							
Intersection LOS						C						
Intersection V/C					0.732							

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	24.86	24.86	24.86	24.86
I_p,int, Pedestrian LOS Score for Intersection	2.632	2.638	2.625	2.741
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	514	600	486	486
d_b, Bicycle Delay [s]	19.31	17.15	20.06	20.06
I_b,int, Bicycle LOS Score for Intersection	2.731	1.841	1.692	1.837
Bicycle LOS	B	A	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



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Mapes Road Cultivation & Processing

Scenario 1 Existing
5/23/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	A St/River Rd (NS) at Mapes Rd (EW)	All-way stop	HCM 6th Edition	WB Thru	0.332	10.1	B
2	Goetz Rd (NS) at Case Rd (EW)	Signalized	HCM 6th Edition	WB Left	0.526	17.9	B
3	Goetz Rd (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	WB Left	0.078	38.1	E
4	Goetz Rd (NS) at Ethanac Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.574	27.9	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report**Intersection 1: A St/River Rd (NS) at Mapes Rd (EW)**

Control Type:	All-way stop	Delay (sec / veh):	10.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.332

Intersection Setup

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	115.00	55.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	0	1	4	77	4	15	17	208	1	3	158	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	4	77	4	15	17	208	1	3	158	60
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	21	1	4	5	56	0	1	43	16
Total Analysis Volume [veh/h]	0	1	4	83	4	16	18	225	1	3	171	65
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings**Lanes**

Capacity per Entry Lane [veh/h]	660	579	715	645	709	720
Degree of Utilization, x	0.01	0.15	0.02	0.03	0.32	0.33

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.02	0.53	0.07	0.09	1.37	1.46
95th-Percentile Queue Length [ft]	0.57	13.15	1.71	2.15	34.36	36.41
Approach Delay [s/veh]	8.50	9.68		10.02		10.47
Approach LOS	A	A		B		B
Intersection Delay [s/veh]			10.13			
Intersection LOS			B			

Intersection Level Of Service Report**Intersection 2: Goetz Rd (NS) at Case Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	17.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.526

Intersection Setup

Name	Goetz Rd		Case Rd		Case Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	86.00	100.00	100.00	200.00	94.00	100.00
Speed [mph]	50.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Goetz Rd		Case Rd		Case Rd	
Base Volume Input [veh/h]	117	214	242	146	238	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	117	214	242	146	238	207
Peak Hour Factor	0.9450	0.9450	0.9450	0.9450	0.9450	0.9450
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	57	64	39	63	55
Total Analysis Volume [veh/h]	124	226	256	154	252	219
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No					
Signal Coordination Group	-					
Cycle Length [s]	60					
Coordination Type	Time of Day Pattern Isolated					
Actuation Type	Fully actuated					
Offset [s]	0.0					
Offset Reference	LeadGreen					
Permissive Mode	SingleBand					
Lost time [s]	12.00					

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	7	0	7	0	7	7
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	20	0	21	0	19	40
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	7	0	7	0	0	7
Pedestrian Clearance [s]	10	0	10	0	0	10
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations

Lane Group	L	R	C	R	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	11	27	27	10	41
g / C, Green / Cycle	0.18	0.18	0.45	0.45	0.17	0.69
(v / s)_i Volume / Saturation Flow Rate	0.07	0.14	0.14	0.10	0.14	0.12
s, saturation flow rate [veh/h]	1781	1589	1870	1589	1781	1870
c, Capacity [veh/h]	319	284	835	710	312	1287
d1, Uniform Delay [s]	21.80	23.64	10.68	10.21	23.84	3.31
k, delay calibration	0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.78	5.02	0.95	0.70	4.96	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.39	0.79	0.31	0.22	0.81	0.17
d, Delay for Lane Group [s/veh]	22.57	28.66	11.63	10.91	28.80	3.60
Lane Group LOS	C	C	B	B	C	A
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.39	3.01	1.90	1.10	3.43	0.51
50th-Percentile Queue Length [ft/ln]	34.78	75.28	47.42	27.55	85.68	12.66
95th-Percentile Queue Length [veh/ln]	2.50	5.42	3.41	1.98	6.17	0.91
95th-Percentile Queue Length [ft/ln]	62.61	135.51	85.36	49.59	154.23	22.79

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.57	28.66	11.63	10.91	28.80	3.60
Movement LOS	C	C	B	B	C	A
d_A, Approach Delay [s/veh]	26.50		11.36		17.08	
Approach LOS	C		B		B	
d_I, Intersection Delay [s/veh]		17.85				
Intersection LOS		B				
Intersection V/C		0.526				

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.327	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	30.00	30.00	30.00
I_b,int, Bicycle LOS Score for Intersection	4.132	4.809	4.910
Bicycle LOS	D	E	E

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)

Control Type:	Two-way stop	Delay (sec / veh):	38.1
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.078

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	186	193	2	2	330	49	32	0	264	8	0	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	186	193	2	2	330	49	32	0	264	8	0	4
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	52	1	1	88	13	9	0	71	2	0	1
Total Analysis Volume [veh/h]	199	206	2	2	353	52	34	0	282	9	0	4
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.17	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.41	0.08	0.00	0.00
d_M, Delay for Movement [s/veh]	8.77	0.00	0.00	7.65	0.00	0.00	31.33	30.60	18.76	38.10	25.31	11.36
Movement LOS	A	A	A	A	A	A	D	D	C	E	D	B
95th-Percentile Queue Length [veh/ln]	0.62	0.00	0.00	0.00	0.00	0.00	3.63	3.63	3.63	0.27	0.27	0.27
95th-Percentile Queue Length [ft/ln]	15.55	0.00	0.00	0.11	0.11	0.00	90.68	90.68	90.68	6.64	6.64	6.64
d_A, Approach Delay [s/veh]		4.29			0.04			20.11			29.87	
Approach LOS		A			A			C			D	
d_I, Intersection Delay [s/veh]							7.44					
Intersection LOS							E					

Intersection Level Of Service Report

Intersection 4: Goetz Rd (NS) at Ethanac Rd (EW)

Control Type:	Signalized	Delay (sec / veh):	27.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.574

Intersection Setup

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	150.00	100.00	101.00	150.00	100.00	100.00	200.00	100.00	100.00	150.00	100.00	150.00
Speed [mph]	55.00			55.00			40.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Base Volume Input [veh/h]	7	135	176	298	249	24	16	49	3	239	95	211
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	135	176	298	249	24	16	49	3	239	95	211
Peak Hour Factor	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	36	47	80	67	6	4	13	1	64	26	57
Total Analysis Volume [veh/h]	8	146	190	321	269	26	17	53	3	258	102	228
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	80											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	16.00											

Phasing & Timing

Control Type	Protecte	Permiss	Permiss									
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-									
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	21	0	20	29	0	11	21	0	18	28	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No										
Maximum Recall	No	No										
Pedestrian Recall	No	No										
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	80	80	80	80	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	1	30	30	16	44	44	2	5	5	13	16	16
g / C, Green / Cycle	0.02	0.37	0.37	0.20	0.56	0.56	0.03	0.06	0.06	0.17	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.00	0.08	0.12	0.18	0.08	0.02	0.01	0.01	0.00	0.14	0.03	0.14
s, saturation flow rate [veh/h]	1781	1870	1589	1781	3560	1589	1781	3560	1589	1781	3560	1589
c, Capacity [veh/h]	28	690	586	356	1969	879	52	227	101	299	720	322
d1, Uniform Delay [s]	39.02	17.33	18.15	31.30	8.67	8.14	38.16	35.69	35.23	32.48	26.27	29.79
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.35	0.70	1.47	8.33	0.14	0.06	3.58	0.52	0.12	7.32	0.09	2.88
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.28	0.21	0.32	0.90	0.14	0.03	0.33	0.23	0.03	0.86	0.14	0.71
d, Delay for Lane Group [s/veh]	44.37	18.03	19.61	39.64	8.81	8.21	41.74	36.21	35.35	39.80	26.36	32.67
Lane Group LOS	D	B	B	D	A	A	D	D	D	D	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.19	1.72	2.40	6.22	0.90	0.17	0.37	0.49	0.06	5.12	0.75	4.04
50th-Percentile Queue Length [ft/ln]	4.64	42.93	59.90	155.52	22.38	4.27	9.14	12.19	1.40	128.10	18.86	100.91
95th-Percentile Queue Length [veh/ln]	0.33	3.09	4.31	10.31	1.61	0.31	0.66	0.88	0.10	8.84	1.36	7.27
95th-Percentile Queue Length [ft/ln]	8.36	77.28	107.83	257.79	40.29	7.68	16.45	21.94	2.52	220.91	33.94	181.64

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	44.37	18.03	19.61	39.64	8.81	8.21	41.74	36.21	35.35	39.80	26.36	32.67
Movement LOS	D	B	B	D	A	A	D	D	D	D	C	C
d_A, Approach Delay [s/veh]	19.52			24.85			37.47			34.71		
Approach LOS	B			C			D			C		
d_I, Intersection Delay [s/veh]				27.86								
Intersection LOS				C								
Intersection V/C				0.574								

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	29.76	29.76	29.76	29.76
I_p,int, Pedestrian LOS Score for Intersection	2.606	2.653	2.626	2.727
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	425	625	425	600
d_b, Bicycle Delay [s]	24.81	18.91	24.81	19.60
I_b,int, Bicycle LOS Score for Intersection	2.127	2.068	1.620	1.883
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



EXISTING PLUS PROJECT

Vistro File: G:\...\AM E.vistro
Report File: G:\...\EP AM.pdf

Mapes Road Cultivation & Processing

Scenario 2 Existing Plus Project
5/23/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	A St/River Rd (NS) at Mapes Rd (EW)	All-way stop	HCM 6th Edition	WB Right	1.110	50.4	F
2	Goetz Rd (NS) at Case Rd (EW)	Signalized	HCM 6th Edition	NB Right	0.559	19.5	B
3	Goetz Rd (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	EB Left	1.180	277.8	F
4	Goetz Rd (NS) at Ethanac Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.748	27.3	C
5	Project Dwy (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	SB Left	0.028	16.6	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report**Intersection 1: A St/River Rd (NS) at Mapes Rd (EW)**

Control Type: All-way stop Delay (sec / veh): 50.4
 Analysis Method: HCM 6th Edition Level Of Service: F
 Analysis Period: 15 minutes Volume to Capacity (v/c): 1.110

Intersection Setup

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	115.00	55.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	0	1	5	159	2	121	142	139	2	3	218	245
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	4	0	0	0	4	0	0	1	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	5	163	2	121	142	143	2	3	219	246
Peak Hour Factor	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	2	57	1	42	49	50	1	1	76	85
Total Analysis Volume [veh/h]	0	1	7	226	3	168	197	199	3	4	304	342
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings**Lanes**

Capacity per Entry Lane [veh/h]	459	469	554	497	534	650
Degree of Utilization, x	0.02	0.49	0.30	0.40	0.38	1.11

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.05	2.64	1.27	1.88	1.75	20.15
95th-Percentile Queue Length [ft]	1.33	65.90	31.80	46.91	43.72	503.78
Approach Delay [s/veh]	10.97	15.18		14.04		94.61
Approach LOS	B	C		B		F
Intersection Delay [s/veh]			50.35			
Intersection LOS			F			

Intersection Level Of Service Report**Intersection 2: Goetz Rd (NS) at Case Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	19.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.559

Intersection Setup

Name	Goetz Rd		Case Rd		Case Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	86.00	100.00	100.00	200.00	94.00	100.00
Speed [mph]	50.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Goetz Rd		Case Rd		Case Rd	
Base Volume Input [veh/h]	167	237	187	128	246	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	2	0	20	16	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	170	239	187	148	262	183
Peak Hour Factor	0.8890	0.8890	0.8890	0.8890	0.8890	0.8890
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	67	53	42	74	51
Total Analysis Volume [veh/h]	191	269	210	166	295	206
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing mi	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No					
Signal Coordination Group	-					
Cycle Length [s]	60					
Coordination Type	Time of Day Pattern Isolated					
Actuation Type	Fully actuated					
Offset [s]	0.0					
Offset Reference	LeadGreen					
Permissive Mode	SingleBand					
Lost time [s]	12.00					

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	7	0	7	0	7	7
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	19	0	21	0	20	41
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	7	0	7	0	0	7
Pedestrian Clearance [s]	10	0	10	0	0	10
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	R	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	12	24	24	12	40
g / C, Green / Cycle	0.20	0.20	0.40	0.40	0.20	0.66
(v / s)_i Volume / Saturation Flow Rate	0.11	0.17	0.11	0.10	0.17	0.11
s, saturation flow rate [veh/h]	1781	1589	1870	1589	1781	1870
c, Capacity [veh/h]	365	325	742	630	355	1238
d1, Uniform Delay [s]	21.31	22.90	12.34	12.23	23.12	3.86
k, delay calibration	0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.17	5.33	0.96	1.02	5.06	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.52	0.83	0.28	0.26	0.83	0.17
d, Delay for Lane Group [s/veh]	22.48	28.23	13.30	13.25	28.18	4.15
Lane Group LOS	C	C	B	B	C	A
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.15	3.56	1.73	1.38	3.97	0.58
50th-Percentile Queue Length [ft/ln]	53.73	88.90	43.29	34.52	99.17	14.41
95th-Percentile Queue Length [veh/ln]	3.87	6.40	3.12	2.49	7.14	1.04
95th-Percentile Queue Length [ft/ln]	96.72	160.02	77.92	62.13	178.51	25.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.48	28.23	13.30	13.25	28.18	4.15
Movement LOS	C	C	B	B	C	A
d_A, Approach Delay [s/veh]	25.84		13.28		18.30	
Approach LOS	C		B		B	
d_I, Intersection Delay [s/veh]		19.48				
Intersection LOS		B				
Intersection V/C		0.559				

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.417	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	30.00	30.00	30.00
I_b,int, Bicycle LOS Score for Intersection	4.132	4.753	4.959
Bicycle LOS	D	E	E

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)

Control Type:	Two-way stop	Delay (sec / veh):	277.8
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.180

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	279	278	8	2	149	194	115	3	181	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	36	0	0	0	0	36	5	0	4	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	315	278	8	2	149	230	120	3	185	0	0	0
Peak Hour Factor	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	91	80	2	1	43	66	35	1	53	0	0	0
Total Analysis Volume [veh/h]	362	320	9	2	171	265	138	3	213	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.32	0.00	0.00	0.00	0.00	0.00	1.18	0.02	0.24	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.72	0.00	0.00	7.93	0.00	0.00	277.76	276.85	251.09	56.32	47.91	10.02
Movement LOS	A	A	A	A	A	A	F	F	F	F	E	B
95th-Percentile Queue Length [veh/ln]	1.40	0.00	0.00	0.00	0.00	0.00	20.27	20.27	20.27	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	35.12	0.00	0.00	0.12	0.12	0.00	506.74	506.74	506.74	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		5.09			0.04			261.71			38.08	
Approach LOS		A		A			F			E		
d_I, Intersection Delay [s/veh]						64.85						
Intersection LOS							F					

Intersection Level Of Service Report**Intersection 4: Goetz Rd (NS) at Ethanac Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	27.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.748

Intersection Setup

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	150.00	100.00	101.00	150.00	100.00	100.00	200.00	100.00	100.00	150.00	100.00	150.00
Speed [mph]	55.00			55.00			40.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Base Volume Input [veh/h]	2	296	349	204	97	10	26	116	4	136	61	264
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	20	0	2	2	0	0	0	0	0	0	16
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	316	349	206	99	10	26	116	4	136	61	280
Peak Hour Factor	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	87	96	56	27	3	7	32	1	37	17	77
Total Analysis Volume [veh/h]	2	346	383	226	109	11	29	127	4	149	67	307
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0				0
v_di, Inbound Pedestrian Volume crossing m	0				0			0				0
v_co, Outbound Pedestrian Volume crossing m	0				0			0				0
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0				0
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0				0
Bicycle Volume [bicycles/h]	0				0			0				0

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	70											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	16.00											

Phasing & Timing

Control Type	Protecte	Permiss	Permiss									
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-									
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	22	0	15	25	0	12	21	0	12	21	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No										
Maximum Recall	No	No										
Pedestrian Recall	No	No										
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	0	25	25	11	35	35	3	11	11	7	16	16
g / C, Green / Cycle	0.00	0.35	0.35	0.15	0.50	0.50	0.04	0.16	0.16	0.11	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.00	0.19	0.24	0.13	0.03	0.01	0.02	0.04	0.00	0.08	0.02	0.19
s, saturation flow rate [veh/h]	1781	1870	1589	1781	3560	1589	1781	3560	1589	1781	3560	1589
c, Capacity [veh/h]	10	655	557	271	1771	791	81	580	259	190	798	356
d1, Uniform Delay [s]	34.78	18.18	19.52	28.90	9.15	8.94	32.55	25.53	24.68	30.60	21.56	26.21
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.72	3.03	6.78	6.55	0.07	0.03	2.69	0.19	0.02	7.00	0.04	6.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.53	0.69	0.83	0.06	0.01	0.36	0.22	0.02	0.79	0.08	0.86
d, Delay for Lane Group [s/veh]	44.50	21.21	26.30	35.46	9.22	8.97	35.24	25.72	24.71	37.60	21.60	32.41
Lane Group LOS	D	C	C	D	A	A	D	C	C	D	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.06	4.20	5.39	3.73	0.34	0.07	0.51	0.87	0.05	2.62	0.40	5.01
50th-Percentile Queue Length [ft/ln]	1.44	104.99	134.63	93.29	8.47	1.76	12.77	21.75	1.34	65.56	9.99	125.29
95th-Percentile Queue Length [veh/ln]	0.10	7.56	9.19	6.72	0.61	0.13	0.92	1.57	0.10	4.72	0.72	8.68
95th-Percentile Queue Length [ft/ln]	2.59	188.98	229.77	167.93	15.24	3.18	22.98	39.14	2.42	118.01	17.98	217.07

Movement, Approach, & Intersection Results

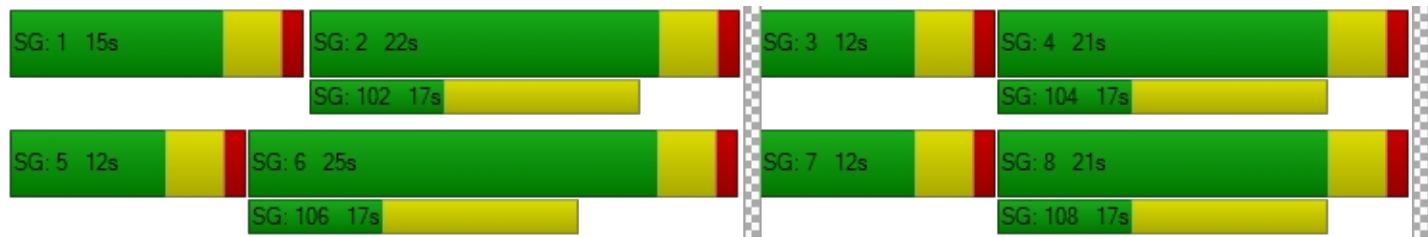
d_M, Delay for Movement [s/veh]	44.50	21.21	26.30	35.46	9.22	8.97	35.24	25.72	24.71	37.60	21.60	32.41
Movement LOS	D	C	C	D	A	A	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	23.94				26.35			27.42			32.51	
Approach LOS		C			C			C			C	
d_I, Intersection Delay [s/veh]					27.28							
Intersection LOS						C						
Intersection V/C					0.748							

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	24.86	24.86	24.86	24.86
I_p,int, Pedestrian LOS Score for Intersection	2.641	2.654	2.625	2.746
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	514	600	486	486
d_b, Bicycle Delay [s]	19.31	17.15	20.06	20.06
I_b,int, Bicycle LOS Score for Intersection	2.766	1.845	1.692	1.847
Bicycle LOS	C	A	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: Project Dwy (NS) at Mapes Rd (EW)

Control Type:	Two-way stop	Delay (sec / veh):	16.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.028

Intersection Setup

Name	Project Dwy		Mapes Rd		Mapes Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Dwy		Mapes Rd		Mapes Rd	
Base Volume Input [veh/h]	0	0	0	299	473	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	9	2	8	0	0	72
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	2	8	299	473	72
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	2	79	124	19
Total Analysis Volume [veh/h]	9	2	8	315	498	76
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	16.59	11.95	8.63	0.00	0.00	0.00
Movement LOS	C	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.10	0.10	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	2.46	2.46	0.61	0.61	0.00	0.00
d_A, Approach Delay [s/veh]		15.74		0.21		0.00
Approach LOS		C		A		A
d_I, Intersection Delay [s/veh]				0.27		
Intersection LOS				C		

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Report File: G:\...\EP PM.pdf

Mapes Road Cultivation & Processing

Scenario 2 Existing Plus Project
5/23/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	A St/River Rd (NS) at Mapes Rd (EW)	All-way stop	HCM 6th Edition	WB Thru	0.341	10.2	B
2	Goetz Rd (NS) at Case Rd (EW)	Signalized	HCM 6th Edition	WB Left	0.537	18.1	B
3	Goetz Rd (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	EB Left	0.318	43.7	E
4	Goetz Rd (NS) at Ethanac Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.583	28.5	C
5	Project Dwy (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	SB Left	0.120	13.5	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report**Intersection 1: A St/River Rd (NS) at Mapes Rd (EW)**

Control Type:	All-way stop	Delay (sec / veh):	10.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.341

Intersection Setup

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	115.00	55.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	0	1	4	77	4	15	17	208	1	3	158	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	1	0	0	0	1	0	0	3	3
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	4	78	4	15	17	209	1	3	161	63
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	21	1	4	5	56	0	1	43	17
Total Analysis Volume [veh/h]	0	1	4	84	4	16	18	226	1	3	174	68
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings**Lanes**

Capacity per Entry Lane [veh/h]	657	578	712	643	707	719
Degree of Utilization, x	0.01	0.15	0.02	0.03	0.32	0.34

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.02	0.53	0.07	0.09	1.39	1.51
95th-Percentile Queue Length [ft]	0.57	13.37	1.72	2.16	34.67	37.78
Approach Delay [s/veh]	8.52	9.72		10.06		10.57
Approach LOS	A	A		B		B
Intersection Delay [s/veh]			10.19			
Intersection LOS			B			

Intersection Level Of Service Report**Intersection 2: Goetz Rd (NS) at Case Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	18.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.537

Intersection Setup

Name	Goetz Rd		Case Rd		Case Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	86.00	100.00	100.00	200.00	94.00	100.00
Speed [mph]	50.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Goetz Rd		Case Rd		Case Rd	
Base Volume Input [veh/h]	117	214	242	146	238	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	15	12	0	3	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	132	226	242	149	240	207
Peak Hour Factor	0.9450	0.9450	0.9450	0.9450	0.9450	0.9450
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	60	64	39	63	55
Total Analysis Volume [veh/h]	140	239	256	158	254	219
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No					
Signal Coordination Group	-					
Cycle Length [s]	60					
Coordination Type	Time of Day Pattern Isolated					
Actuation Type	Fully actuated					
Offset [s]	0.0					
Offset Reference	LeadGreen					
Permissive Mode	SingleBand					
Lost time [s]	12.00					

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	7	0	7	0	7	7
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	20	0	21	0	19	40
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	7	0	7	0	0	7
Pedestrian Clearance [s]	10	0	10	0	0	10
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations

Lane Group	L	R	C	R	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	11	26	26	11	41
g / C, Green / Cycle	0.19	0.19	0.44	0.44	0.18	0.68
(v / s)_i Volume / Saturation Flow Rate	0.08	0.15	0.14	0.10	0.14	0.12
s, saturation flow rate [veh/h]	1781	1589	1870	1589	1781	1870
c, Capacity [veh/h]	333	298	817	695	314	1271
d1, Uniform Delay [s]	21.57	23.39	11.04	10.58	23.81	3.49
k, delay calibration	0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.84	5.04	1.00	0.76	4.98	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.42	0.80	0.31	0.23	0.81	0.17
d, Delay for Lane Group [s/veh]	22.41	28.43	12.04	11.34	28.80	3.79
Lane Group LOS	C	C	B	B	C	A
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.56	3.17	1.95	1.17	3.45	0.54
50th-Percentile Queue Length [ft/ln]	39.12	79.24	48.74	29.14	86.37	13.56
95th-Percentile Queue Length [veh/ln]	2.82	5.71	3.51	2.10	6.22	0.98
95th-Percentile Queue Length [ft/ln]	70.42	142.63	87.74	52.46	155.46	24.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.41	28.43	12.04	11.34	28.80	3.79
Movement LOS	C	C	B	B	C	A
d_A, Approach Delay [s/veh]	26.21		11.78		17.22	
Approach LOS	C		B		B	
d_I, Intersection Delay [s/veh]		18.13				
Intersection LOS		B				
Intersection V/C		0.537				

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.346	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	30.00	30.00	30.00
I_b,int, Bicycle LOS Score for Intersection	4.132	4.816	4.913
Bicycle LOS	D	E	E

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)

Control Type:	Two-way stop	Delay (sec / veh):	43.7
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.318

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	186	193	2	2	330	49	32	0	264	8	0	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	0	0	0	5	27	0	28	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	191	193	2	2	330	54	59	0	292	8	0	4
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	52	1	1	88	14	16	0	78	2	0	1
Total Analysis Volume [veh/h]	204	206	2	2	353	58	63	0	312	9	0	4
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.45	0.09	0.00	0.00
d_M, Delay for Movement [s/veh]	8.81	0.00	0.00	7.65	0.00	0.00	43.72	42.96	30.78	41.86	26.28	11.81
Movement LOS	A	A	A	A	A	A	E	E	D	E	D	B
95th-Percentile Queue Length [veh/ln]	0.64	0.00	0.00	0.00	0.00	0.00	6.76	6.76	6.76	0.29	0.29	0.29
95th-Percentile Queue Length [ft/ln]	16.12	0.00	0.00	0.11	0.11	0.00	168.96	168.96	168.96	7.35	7.35	7.35
d_A, Approach Delay [s/veh]		4.36			0.04			32.95			32.62	
Approach LOS		A			A			D			D	
d_I, Intersection Delay [s/veh]							12.03					
Intersection LOS							E					

Intersection Level Of Service Report**Intersection 4: Goetz Rd (NS) at Ethanac Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	28.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.583

Intersection Setup

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	150.00	100.00	101.00	150.00	100.00	100.00	200.00	100.00	100.00	150.00	100.00	150.00
Speed [mph]	55.00			55.00			40.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Base Volume Input [veh/h]	7	135	176	298	249	24	16	49	3	239	95	211
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	12	16	0	0	0	0	0	0	2
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	138	176	310	265	24	16	49	3	239	95	213
Peak Hour Factor	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	37	47	84	71	6	4	13	1	64	26	57
Total Analysis Volume [veh/h]	8	149	190	334	286	26	17	53	3	258	102	230
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	80											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	16.00											

Phasing & Timing

Control Type	Protecte	Permiss	Permiss									
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-									
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	21	0	20	29	0	11	21	0	18	28	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No										
Maximum Recall	No	No										
Pedestrian Recall	No	No										
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	80	80	80	80	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	1	30	30	16	44	44	2	5	5	13	16	16
g / C, Green / Cycle	0.02	0.37	0.37	0.20	0.56	0.56	0.03	0.06	0.06	0.17	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.00	0.08	0.12	0.19	0.08	0.02	0.01	0.01	0.00	0.14	0.03	0.14
s, saturation flow rate [veh/h]	1781	1870	1589	1781	3560	1589	1781	3560	1589	1781	3560	1589
c, Capacity [veh/h]	28	690	586	356	1969	879	52	227	101	299	720	322
d1, Uniform Delay [s]	39.02	17.36	18.15	31.58	8.71	8.14	38.16	35.69	35.23	32.48	26.27	29.84
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.35	0.72	1.47	11.54	0.16	0.06	3.58	0.52	0.12	7.32	0.09	2.97
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.28	0.22	0.32	0.94	0.15	0.03	0.33	0.23	0.03	0.86	0.14	0.72
d, Delay for Lane Group [s/veh]	44.37	18.08	19.61	43.13	8.87	8.21	41.74	36.21	35.35	39.80	26.36	32.80
Lane Group LOS	D	B	B	D	A	A	D	D	D	D	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.19	1.76	2.40	6.81	0.96	0.17	0.37	0.49	0.06	5.12	0.75	4.08
50th-Percentile Queue Length [ft/ln]	4.64	43.90	59.90	170.19	23.92	4.27	9.14	12.19	1.40	128.10	18.86	102.07
95th-Percentile Queue Length [veh/ln]	0.33	3.16	4.31	11.09	1.72	0.31	0.66	0.88	0.10	8.84	1.36	7.35
95th-Percentile Queue Length [ft/ln]	8.36	79.03	107.83	277.17	43.06	7.68	16.45	21.94	2.52	220.91	33.94	183.73

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	44.37	18.08	19.61	43.13	8.87	8.21	41.74	36.21	35.35	39.80	26.36	32.80
Movement LOS	D	B	B	D	A	A	D	D	D	D	C	C
d_A, Approach Delay [s/veh]	19.53			26.55			37.47			34.75		
Approach LOS	B			C			D			C		
d_I, Intersection Delay [s/veh]				28.48								
Intersection LOS				C								
Intersection V/C				0.583								

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	29.76	29.76	29.76	29.76
I_p,int, Pedestrian LOS Score for Intersection	2.613	2.666	2.626	2.731
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	425	625	425	600
d_b, Bicycle Delay [s]	24.81	18.91	24.81	19.60
I_b,int, Bicycle LOS Score for Intersection	2.132	2.093	1.620	1.884
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: Project Dwy (NS) at Mapes Rd (EW)

Control Type:	Two-way stop	Delay (sec / veh):	13.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.120

Intersection Setup

Name	Project Dwy		Mapes Rd		Mapes Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Dwy		Mapes Rd		Mapes Rd	
Base Volume Input [veh/h]	0	0	0	296	235	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	55	6	2	0	0	10
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	55	6	2	296	235	10
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	2	1	78	62	3
Total Analysis Volume [veh/h]	58	6	2	312	247	11
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	13.50	10.63	7.76	0.00	0.00	0.00
Movement LOS	B	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.44	0.44	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	10.89	10.89	0.11	0.11	0.00	0.00
d_A, Approach Delay [s/veh]		13.23		0.05		0.00
Approach LOS		B		A		A
d_I, Intersection Delay [s/veh]				1.36		
Intersection LOS				B		

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Report File: G:\...\EP AM IMP.pdf

Mapes Road Cultivation & Processing

Scenario 2 Existing Plus Project
6/6/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	Goetz Rd (NS) at Mapes Rd (EW)	Signalized	HCM 6th Edition	EB Right	0.528	14.1	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)

Control Type:	Signalized	Delay (sec / veh):	14.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.528

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	279	278	8	2	149	194	115	3	181	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	36	0	0	0	0	36	5	0	4	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	315	278	8	2	149	230	120	3	185	0	0	0
Peak Hour Factor	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	91	80	2	1	43	66	35	1	53	0	0	0
Total Analysis Volume [veh/h]	362	320	9	2	171	265	138	3	213	0	0	0
Presence of On-Street Parking	No		No									
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing mi	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	60											
Coordination Type	Time of Day Pattern Coordinated											
Actuation Type	Fixed time											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	0.00											

Phasing & Timing

Control Type	Permiss											
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	34	0	0	34	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	C	R	C	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	22	22
g / C, Green / Cycle	0.50	0.50	0.50	0.50	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.30	0.18	0.09	0.17	0.23	0.00
s, saturation flow rate [veh/h]	1214	1861	1867	1589	1544	1870
c, Capacity [veh/h]	625	930	994	795	649	746
d1, Uniform Delay [s]	14.60	9.11	8.26	9.00	15.44	0.00
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.89	1.05	0.38	1.13	3.27	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.35	0.17	0.33	0.55	0.00
d, Delay for Lane Group [s/veh]	18.49	10.16	8.65	10.13	18.71	0.00
Lane Group LOS	B	B	A	B	B	A
Critical Lane Group	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	3.74	2.09	0.97	1.69	3.88	0.00
50th-Percentile Queue Length [ft/ln]	93.56	52.18	24.27	42.33	96.90	0.00
95th-Percentile Queue Length [veh/ln]	6.74	3.76	1.75	3.05	6.98	0.00
95th-Percentile Queue Length [ft/ln]	168.41	93.92	43.69	76.19	174.42	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	18.49	10.16	10.16	8.65	8.65	10.13	18.71	18.71	18.71	0.00	0.00	0.00
Movement LOS	B	B	B	A	A	B	B	B	B	A	A	A
d_A, Approach Delay [s/veh]	14.53			9.54			18.71			0.00		
Approach LOS	B			A			B			A		
d_I, Intersection Delay [s/veh]				14.05								
Intersection LOS					B							
Intersection V/C				0.528								

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1000	1000	733	733
d_b, Bicycle Delay [s]	7.50	7.50	12.03	12.03
I_b,int, Bicycle LOS Score for Intersection	2.700	2.282	2.144	1.560
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



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Mapes Road Cultivation & Processing

Scenario 2 Existing Plus Project
6/6/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	Goetz Rd (NS) at Mapes Rd (EW)	Signalized	HCM 6th Edition	EB Right	0.436	14.2	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)

Control Type:	Signalized	Delay (sec / veh):	14.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.436

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	186	193	2	2	330	49	32	0	264	8	0	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	0	0	0	5	27	0	28	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	191	193	2	2	330	54	59	0	292	8	0	4
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	52	1	1	88	14	16	0	78	2	0	1
Total Analysis Volume [veh/h]	204	206	2	2	353	58	63	0	312	9	0	4
Presence of On-Street Parking	No		No									
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0		0		
v_di, Inbound Pedestrian Volume crossing m	0				0			0		0		
v_co, Outbound Pedestrian Volume crossing	0				0			0		0		
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0		0		
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0		0		
Bicycle Volume [bicycles/h]	0				0			0		0		

Intersection Settings

Located in CBD	No												
Signal Coordination Group	-												
Cycle Length [s]	60												
Coordination Type	Time of Day Pattern Coordinated												
Actuation Type	Fixed time												
Offset [s]	0.0												
Offset Reference	LeadGreen												
Permissive Mode	SingleBand												
Lost time [s]	0.00												

Phasing & Timing

Control Type	Permiss												
Signal group	0	2	0	0	6	0	0	8	0	0	4	0	0
Auxiliary Signal Groups													
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Split [s]	0	34	0	0	34	0	0	26	0	0	26	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0	0
Rest In Walk		No			No			No			No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0
Minimum Recall		No			No			No			No		
Maximum Recall		No			No			No			No		
Pedestrian Recall		No			No			No			No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0												
Pedestrian Walk [s]	0												
Pedestrian Clearance [s]	0												

Lane Group Calculations

Lane Group	L	C	C	R	C	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	22	22
g / C, Green / Cycle	0.50	0.50	0.50	0.50	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.20	0.11	0.19	0.04	0.24	0.01
s, saturation flow rate [veh/h]	1028	1867	1869	1589	1580	999
c, Capacity [veh/h]	479	933	995	795	650	468
d1, Uniform Delay [s]	15.84	8.44	9.26	7.78	15.66	12.12
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.75	0.55	1.00	0.18	3.71	0.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.43	0.22	0.36	0.07	0.58	0.03
d, Delay for Lane Group [s/veh]	18.59	8.99	10.26	7.96	19.37	12.23
Lane Group LOS	B	A	B	A	B	B
Critical Lane Group	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.16	1.21	2.27	0.31	4.19	0.11
50th-Percentile Queue Length [ft/ln]	54.02	30.15	56.65	7.82	104.74	2.87
95th-Percentile Queue Length [veh/ln]	3.89	2.17	4.08	0.56	7.54	0.21
95th-Percentile Queue Length [ft/ln]	97.23	54.27	101.97	14.07	188.53	5.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	18.59	8.99	8.99	10.26	10.26	7.96	19.37	19.37	19.37	12.23	12.23	12.23
Movement LOS	B	A	A	B	B	A	B	B	B	B	B	B
d_A, Approach Delay [s/veh]	13.75			9.94			19.37			12.23		
Approach LOS		B			A		B			B		
d_I, Intersection Delay [s/veh]				14.17								
Intersection LOS						B						
Intersection V/C				0.436								

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1000	1000	733	733
d_b, Bicycle Delay [s]	7.50	7.50	12.03	12.03
I_b,int, Bicycle LOS Score for Intersection	2.239	2.241	2.178	1.581
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



EXISTING PLUS AMBIENT GROWTH PLUS PROJECT

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Mapes Road Cultivation & Processing

Scenario 3 Existing Plus Ambient Growth Plus Project
5/23/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	A St/River Rd (NS) at Mapes Rd (EW)	All-way stop	HCM 6th Edition	WB Right	1.198	65.3	F
2	Goetz Rd (NS) at Case Rd (EW)	Signalized	HCM 6th Edition	NB Right	0.592	19.7	B
3	Goetz Rd (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	EB Left	1.433	401.9	F
4	Goetz Rd (NS) at Ethanac Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.792	28.8	C
5	Project Dwy (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	SB Left	0.030	17.4	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report**Intersection 1: A St/River Rd (NS) at Mapes Rd (EW)**

Control Type: All-way stop Delay (sec / veh): 65.3
 Analysis Method: HCM 6th Edition Level Of Service: F
 Analysis Period: 15 minutes Volume to Capacity (v/c): 1.198

Intersection Setup

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	115.00	55.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	0	1	5	159	2	121	142	139	2	3	218	245
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	4	0	0	0	4	0	0	1	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	5	173	2	128	151	151	2	3	232	261
Peak Hour Factor	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	2	60	1	44	52	52	1	1	81	91
Total Analysis Volume [veh/h]	0	1	7	240	3	178	210	210	3	4	322	363
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings**Lanes**

Capacity per Entry Lane [veh/h]	451	466	550	491	527	689
Degree of Utilization, x	0.02	0.52	0.32	0.43	0.40	1.20

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.05	2.96	1.39	2.12	1.94	24.70
95th-Percentile Queue Length [ft]	1.35	74.00	34.85	52.90	48.43	617.51
Approach Delay [s/veh]	11.11	15.94		14.74		127.06
Approach LOS	B	C		B		F
Intersection Delay [s/veh]			65.26			
Intersection LOS			F			

Intersection Level Of Service Report**Intersection 2: Goetz Rd (NS) at Case Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	19.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.592

Intersection Setup

Name	Goetz Rd		Case Rd		Case Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	86.00	100.00	100.00	200.00	94.00	100.00
Speed [mph]	50.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Goetz Rd		Case Rd		Case Rd	
Base Volume Input [veh/h]	167	237	187	128	246	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	2	0	20	16	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	180	253	198	156	277	194
Peak Hour Factor	0.8890	0.8890	0.8890	0.8890	0.8890	0.8890
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	71	56	44	78	55
Total Analysis Volume [veh/h]	202	285	223	175	312	218
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No					
Signal Coordination Group	-					
Cycle Length [s]	60					
Coordination Type	Time of Day Pattern Isolated					
Actuation Type	Fully actuated					
Offset [s]	0.0					
Offset Reference	LeadGreen					
Permissive Mode	SingleBand					
Lost time [s]	12.00					

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	7	0	7	0	7	7
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	19	0	21	0	20	41
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	7	0	7	0	0	7
Pedestrian Clearance [s]	10	0	10	0	0	10
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations

Lane Group	L	R	C	R	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	13	23	23	12	39
g / C, Green / Cycle	0.21	0.21	0.38	0.38	0.21	0.65
(v / s)_i Volume / Saturation Flow Rate	0.11	0.18	0.12	0.11	0.18	0.12
s, saturation flow rate [veh/h]	1781	1589	1870	1589	1781	1870
c, Capacity [veh/h]	381	340	707	601	371	1221
d1, Uniform Delay [s]	20.97	22.65	13.20	13.07	22.86	4.10
k, delay calibration	0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.15	5.51	1.17	1.22	5.16	0.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.53	0.84	0.32	0.29	0.84	0.18
d, Delay for Lane Group [s/veh]	22.11	28.15	14.37	14.29	28.02	4.42
Lane Group LOS	C	C	B	B	C	A
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.25	3.76	1.95	1.54	4.18	0.65
50th-Percentile Queue Length [ft/ln]	56.24	94.09	48.74	38.51	104.61	16.37
95th-Percentile Queue Length [veh/ln]	4.05	6.77	3.51	2.77	7.53	1.18
95th-Percentile Queue Length [ft/ln]	101.22	169.37	87.73	69.32	188.30	29.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.11	28.15	14.37	14.29	28.02	4.42
Movement LOS	C	C	B	B	C	A
d_A, Approach Delay [s/veh]	25.65		14.34		18.31	
Approach LOS	C		B		B	
d_I, Intersection Delay [s/veh]		19.72				
Intersection LOS			B			
Intersection V/C		0.592				

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.445	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	30.00	30.00	30.00
I_b,int, Bicycle LOS Score for Intersection	4.132	4.789	5.007
Bicycle LOS	D	E	F

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)**

Control Type: Two-way stop Delay (sec / veh): 401.9
 Analysis Method: HCM 6th Edition Level Of Service: F
 Analysis Period: 15 minutes Volume to Capacity (v/c): 1.433

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	279	278	8	2	149	194	115	3	181	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	36	0	0	0	0	36	5	0	4	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	332	295	8	2	158	242	127	3	196	0	0	0
Peak Hour Factor	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	96	85	2	1	45	70	37	1	56	0	0	0
Total Analysis Volume [veh/h]	382	339	9	2	182	278	146	3	226	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.35	0.00	0.00	0.00	0.00	0.00	1.43	0.03	0.26	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.00	0.00	0.00	7.98	0.00	0.00	401.85	400.68	370.70	66.21	55.05	10.15
Movement LOS	A	A	A	A	A	A	F	F	F	F	F	B
95th-Percentile Queue Length [veh/ln]	1.57	0.00	0.00	0.00	0.00	0.00	25.26	25.26	25.26	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	39.16	0.00	0.00	0.12	0.12	0.00	631.47	631.47	631.47	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		5.23			0.03			383.07				43.80
Approach LOS		A			A			F				E
d_I, Intersection Delay [s/veh]							94.12					
Intersection LOS							F					

Intersection Level Of Service Report**Intersection 4: Goetz Rd (NS) at Ethanac Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	28.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.792

Intersection Setup

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	150.00	100.00	101.00	150.00	100.00	100.00	200.00	100.00	100.00	150.00	100.00	150.00
Speed [mph]	55.00			55.00			40.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Base Volume Input [veh/h]	2	296	349	204	97	10	26	116	4	136	61	264
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	20	0	2	2	0	0	0	0	0	0	16
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	334	370	218	105	11	28	123	4	144	65	296
Peak Hour Factor	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	92	101	60	29	3	8	34	1	39	18	81
Total Analysis Volume [veh/h]	2	366	406	239	115	12	31	135	4	158	71	325
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	70											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	16.00											

Phasing & Timing

Control Type	Protecte	Permiss	Permiss									
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-									
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	22	0	15	25	0	12	21	0	12	21	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No										
Maximum Recall	No	No										
Pedestrian Recall	No	No										
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	70	70	70	70	70	70	70	70	70	70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	0	23	23	11	34	34	3	12	12	8	16	16
g / C, Green / Cycle	0.00	0.33	0.33	0.16	0.49	0.49	0.05	0.17	0.17	0.11	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.00	0.20	0.26	0.13	0.03	0.01	0.02	0.04	0.00	0.09	0.02	0.20
s, saturation flow rate [veh/h]	1781	1870	1589	1781	3560	1589	1781	3560	1589	1781	3560	1589
c, Capacity [veh/h]	10	622	529	281	1726	770	84	606	271	199	835	373
d1, Uniform Delay [s]	34.78	19.46	21.02	28.79	9.64	9.40	32.44	25.14	24.25	30.41	21.00	25.87
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.72	4.05	10.26	7.17	0.07	0.04	2.65	0.18	0.02	6.96	0.04	6.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.59	0.77	0.85	0.07	0.02	0.37	0.22	0.01	0.79	0.08	0.87
d, Delay for Lane Group [s/veh]	44.50	23.51	31.28	35.96	9.72	9.44	35.09	25.33	24.27	37.36	21.04	32.23
Lane Group LOS	D	C	C	D	A	A	D	C	C	D	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.06	4.78	6.39	3.98	0.37	0.08	0.54	0.92	0.05	2.77	0.42	5.30
50th-Percentile Queue Length [ft/ln]	1.44	119.42	159.81	99.51	9.34	2.01	13.57	22.90	1.33	69.24	10.40	132.40
95th-Percentile Queue Length [veh/ln]	0.10	8.36	10.54	7.16	0.67	0.14	0.98	1.65	0.10	4.99	0.75	9.07
95th-Percentile Queue Length [ft/ln]	2.59	209.03	263.47	179.11	16.81	3.61	24.43	41.22	2.39	124.63	18.73	226.75

Movement, Approach, & Intersection Results

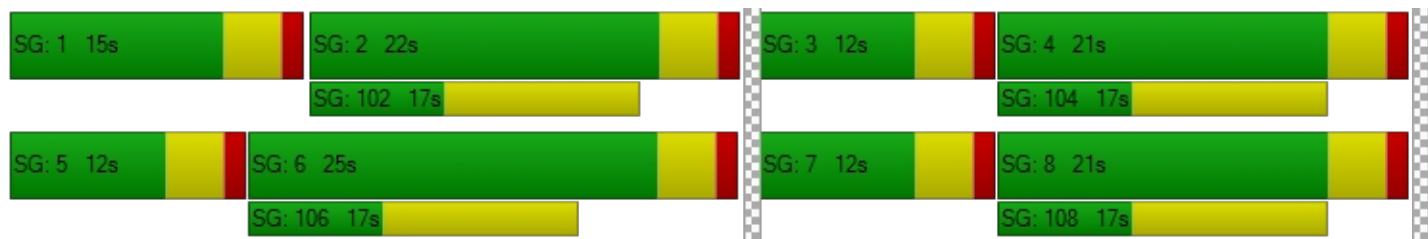
d_M, Delay for Movement [s/veh]	44.50	23.51	31.28	35.96	9.72	9.44	35.09	25.33	24.27	37.36	21.04	32.23
Movement LOS	D	C	C	D	A	A	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	27.64			26.84			27.08			32.26		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]				28.81								
Intersection LOS					C							
Intersection V/C				0.792								

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	24.86	24.86	24.86	24.86
I_p,int, Pedestrian LOS Score for Intersection	2.662	2.675	2.627	2.764
Crosswalk LOS	B	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	514	600	486	486
d_b, Bicycle Delay [s]	19.31	17.15	20.06	20.06
I_b,int, Bicycle LOS Score for Intersection	2.837	1.862	1.700	1.864
Bicycle LOS	C	A	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 5: Project Dwy (NS) at Mapes Rd (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	17.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.030

Intersection Setup

Name	Project Dwy		Mapes Rd		Mapes Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Dwy		Mapes Rd		Mapes Rd	
Base Volume Input [veh/h]	0	0	0	299	473	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	9	2	8	0	0	72
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	2	8	317	501	72
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	2	83	132	19
Total Analysis Volume [veh/h]	9	2	8	334	527	76
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.01	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	17.40	12.25	8.72	0.00	0.00	0.00
Movement LOS	C	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.10	0.10	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	2.62	2.62	0.62	0.62	0.00	0.00
d_A, Approach Delay [s/veh]	16.46		0.20		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]			0.26			
Intersection LOS			C			

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Mapes Road Cultivation & Processing

Scenario 3 Existing Plus Ambient Growth Plus Project
5/23/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	A St/River Rd (NS) at Mapes Rd (EW)	All-way stop	HCM 6th Edition	WB Thru	0.363	10.5	B
2	Goetz Rd (NS) at Case Rd (EW)	Signalized	HCM 6th Edition	WB Left	0.569	18.4	B
3	Goetz Rd (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	EB Left	0.364	56.0	F
4	Goetz Rd (NS) at Ethanac Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.618	28.6	C
5	Project Dwy (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	SB Left	0.126	14.0	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report**Intersection 1: A St/River Rd (NS) at Mapes Rd (EW)**

Control Type:	All-way stop	Delay (sec / veh):	10.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.363

Intersection Setup

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	115.00	55.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	0	1	4	77	4	15	17	208	1	3	158	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	1	0	0	0	1	0	0	3	3
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	4	83	4	16	18	221	1	3	170	67
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	22	1	4	5	60	0	1	46	18
Total Analysis Volume [veh/h]	0	1	4	90	4	17	19	239	1	3	184	72
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings**Lanes**

Capacity per Entry Lane [veh/h]	646	571	703	638	701	712
Degree of Utilization, x	0.01	0.16	0.02	0.03	0.34	0.36

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.02	0.59	0.07	0.09	1.52	1.66
95th-Percentile Queue Length [ft]	0.58	14.65	1.86	2.30	38.06	41.60
Approach Delay [s/veh]	8.62	9.90		10.34		10.91
Approach LOS	A	A		B		B
Intersection Delay [s/veh]			10.48			
Intersection LOS			B			

Intersection Level Of Service Report**Intersection 2: Goetz Rd (NS) at Case Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	18.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.569

Intersection Setup

Name	Goetz Rd		Case Rd		Case Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	86.00	100.00	100.00	200.00	94.00	100.00
Speed [mph]	50.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Goetz Rd		Case Rd		Case Rd	
Base Volume Input [veh/h]	117	214	242	146	238	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	15	12	0	3	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	139	239	257	158	254	219
Peak Hour Factor	0.9450	0.9450	0.9450	0.9450	0.9450	0.9450
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	63	68	42	67	58
Total Analysis Volume [veh/h]	147	253	272	167	269	232
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No					
Signal Coordination Group	-					
Cycle Length [s]	60					
Coordination Type	Time of Day Pattern Isolated					
Actuation Type	Fully actuated					
Offset [s]	0.0					
Offset Reference	LeadGreen					
Permissive Mode	SingleBand					
Lost time [s]	12.00					

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	7	0	7	0	7	7
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	20	0	21	0	19	40
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	7	0	7	0	0	7
Pedestrian Clearance [s]	10	0	10	0	0	10
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations

Lane Group	L	R	C	R	L	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	12	25	25	11	40
g / C, Green / Cycle	0.19	0.19	0.42	0.42	0.18	0.67
(v / s)_i Volume / Saturation Flow Rate	0.08	0.16	0.15	0.11	0.15	0.12
s, saturation flow rate [veh/h]	1781	1589	1870	1589	1781	1870
c, Capacity [veh/h]	349	311	786	668	329	1255
d1, Uniform Delay [s]	21.21	23.14	11.84	11.30	23.55	3.71
k, delay calibration	0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.81	5.12	1.21	0.90	5.00	0.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.42	0.81	0.35	0.25	0.82	0.18
d, Delay for Lane Group [s/veh]	22.02	28.26	13.05	12.20	28.56	4.04
Lane Group LOS	C	C	B	B	C	A
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.62	3.34	2.20	1.30	3.64	0.62
50th-Percentile Queue Length [ft/ln]	40.59	83.61	55.08	32.58	91.06	15.48
95th-Percentile Queue Length [veh/ln]	2.92	6.02	3.97	2.35	6.56	1.11
95th-Percentile Queue Length [ft/ln]	73.07	150.51	99.14	58.65	163.91	27.86

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.02	28.26	13.05	12.20	28.56	4.04
Movement LOS	C	C	B	B	C	A
d_A, Approach Delay [s/veh]	25.97		12.73		17.20	
Approach LOS	C		B		B	
d_I, Intersection Delay [s/veh]		18.35				
Intersection LOS		B				
Intersection V/C		0.569				

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	20.01	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.370	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	30.00	30.00	30.00
I_b,int, Bicycle LOS Score for Intersection	4.132	4.857	4.959
Bicycle LOS	D	E	E

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)**

Control Type: Two-way stop Delay (sec / veh): 56.0
 Analysis Method: HCM 6th Edition Level Of Service: F
 Analysis Period: 15 minutes Volume to Capacity (v/c): 0.364

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	186	193	2	2	330	49	32	0	264	8	0	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	0	0	0	5	27	0	28	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	202	205	2	2	350	57	61	0	308	8	0	4
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	55	1	1	94	15	16	0	82	2	0	1
Total Analysis Volume [veh/h]	216	219	2	2	374	61	65	0	329	9	0	4
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.49	0.10	0.00	0.00
d_M, Delay for Movement [s/veh]	8.96	0.00	0.00	7.67	0.00	0.00	56.01	55.02	41.22	49.61	29.34	12.95
Movement LOS	A	A	A	A	A	A	F	F	E	E	D	B
95th-Percentile Queue Length [veh/ln]	0.71	0.00	0.00	0.00	0.00	0.00	8.63	8.63	8.63	0.35	0.35	0.35
95th-Percentile Queue Length [ft/ln]	17.72	0.00	0.00	0.11	0.11	0.00	215.85	215.85	215.85	8.81	8.81	8.81
d_A, Approach Delay [s/veh]		4.43			0.04			43.66			38.33	
Approach LOS		A			A			E			E	
d_I, Intersection Delay [s/veh]							15.34					
Intersection LOS							F					

Intersection Level Of Service Report**Intersection 4: Goetz Rd (NS) at Ethanac Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	28.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.618

Intersection Setup

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	150.00	100.00	101.00	150.00	100.00	100.00	200.00	100.00	100.00	150.00	100.00	150.00
Speed [mph]	55.00			55.00			40.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Base Volume Input [veh/h]	7	135	176	298	249	24	16	49	3	239	95	211
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	12	16	0	0	0	0	0	0	2
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	146	187	328	280	25	17	52	3	253	101	226
Peak Hour Factor	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	39	50	88	76	7	5	14	1	68	27	61
Total Analysis Volume [veh/h]	8	157	202	354	302	27	18	56	3	273	109	244
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	80											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	16.00											

Phasing & Timing

Control Type	Protecte	Permiss	Permiss									
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-									
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	21	0	21	31	0	11	20	0	18	27	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No										
Maximum Recall	No	No										
Pedestrian Recall	No	No										
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	80	80	80	80	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	1	28	28	17	44	44	2	5	5	14	17	17
g / C, Green / Cycle	0.02	0.35	0.35	0.21	0.55	0.55	0.03	0.06	0.06	0.17	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.00	0.08	0.13	0.20	0.08	0.02	0.01	0.02	0.00	0.15	0.03	0.15
s, saturation flow rate [veh/h]	1781	1870	1589	1781	3560	1589	1781	3560	1589	1781	3560	1589
c, Capacity [veh/h]	28	650	552	379	1938	865	54	232	104	312	747	334
d1, Uniform Delay [s]	39.02	18.64	19.56	31.04	9.10	8.47	38.08	35.61	35.11	32.23	25.83	29.58
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.35	0.88	1.87	10.81	0.17	0.07	3.49	0.53	0.11	7.69	0.09	3.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.28	0.24	0.37	0.94	0.16	0.03	0.33	0.24	0.03	0.88	0.15	0.73
d, Delay for Lane Group [s/veh]	44.37	19.52	21.42	41.85	9.27	8.54	41.57	36.14	35.22	39.93	25.92	32.68
Lane Group LOS	D	B	C	D	A	A	D	D	D	D	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.19	1.95	2.71	7.10	1.05	0.18	0.38	0.51	0.06	5.44	0.80	4.33
50th-Percentile Queue Length [ft/ln]	4.64	48.87	67.79	177.56	26.26	4.58	9.62	12.86	1.39	135.95	19.94	108.22
95th-Percentile Queue Length [veh/ln]	0.33	3.52	4.88	11.47	1.89	0.33	0.69	0.93	0.10	9.26	1.44	7.74
95th-Percentile Queue Length [ft/ln]	8.36	87.97	122.01	286.83	47.26	8.25	17.31	23.14	2.51	231.57	35.89	193.53

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	44.37	19.52	21.42	41.85	9.27	8.54	41.57	36.14	35.22	39.93	25.92	32.68
Movement LOS	D	B	C	D	A	A	D	D	D	D	C	C
d_A, Approach Delay [s/veh]	21.11			26.13			37.37			34.66		
Approach LOS	C			C			D			C		
d_I, Intersection Delay [s/veh]				28.62								
Intersection LOS					C							
Intersection V/C				0.618								

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	29.76	29.76	29.76	29.76
I_p,int, Pedestrian LOS Score for Intersection	2.631	2.687	2.628	2.748
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	425	675	400	575
d_b, Bicycle Delay [s]	24.81	17.56	25.60	20.31
I_b,int, Bicycle LOS Score for Intersection	2.165	2.123	1.623	1.904
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 5: Project Dwy (NS) at Mapes Rd (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	14.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.126

Intersection Setup

Name	Project Dwy		Mapes Rd		Mapes Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Dwy		Mapes Rd		Mapes Rd	
Base Volume Input [veh/h]	0	0	0	296	235	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	55	6	2	0	0	10
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	55	6	2	314	249	10
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	2	1	83	66	3
Total Analysis Volume [veh/h]	58	6	2	331	262	11
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.13	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	13.95	10.82	7.79	0.00	0.00	0.00
Movement LOS	B	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.46	0.46	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	11.45	11.45	0.12	0.12	0.00	0.00
d_A, Approach Delay [s/veh]	13.66		0.05		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]			1.33			
Intersection LOS			B			

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Report File: G:\...\EAP AM IMP.pdf

Mapes Road Cultivation & Processing

Scenario 3 Existing Plus Ambient Growth Plus Project
6/6/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	Goetz Rd (NS) at Mapes Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.561	14.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)

Control Type: Signalized Delay (sec / veh): 14.7
 Analysis Method: HCM 6th Edition Level Of Service: B
 Analysis Period: 15 minutes Volume to Capacity (v/c): 0.561

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	279	278	8	2	149	194	115	3	181	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	36	0	0	0	0	36	5	0	4	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	332	295	8	2	158	242	127	3	196	0	0	0
Peak Hour Factor	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	96	85	2	1	45	70	37	1	56	0	0	0
Total Analysis Volume [veh/h]	382	339	9	2	182	278	146	3	226	0	0	0
Presence of On-Street Parking	No		No									
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	60											
Coordination Type	Time of Day Pattern Coordinated											
Actuation Type	Fixed time											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	0.00											

Phasing & Timing

Control Type	Permiss											
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	34	0	0	34	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	C	R	C	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	22	22
g / C, Green / Cycle	0.50	0.50	0.50	0.50	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.32	0.19	0.10	0.17	0.24	0.00
s, saturation flow rate [veh/h]	1202	1861	1867	1589	1542	1870
c, Capacity [veh/h]	615	931	994	795	649	746
d1, Uniform Delay [s]	15.20	9.22	8.32	9.09	15.74	0.00
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.66	1.15	0.41	1.21	3.73	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.62	0.37	0.19	0.35	0.58	0.00
d, Delay for Lane Group [s/veh]	19.87	10.37	8.73	10.30	19.47	0.00
Lane Group LOS	B	B	A	B	B	A
Critical Lane Group	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	4.16	2.24	1.04	1.80	4.22	0.00
50th-Percentile Queue Length [ft/ln]	104.01	56.02	26.00	44.94	105.52	0.00
95th-Percentile Queue Length [veh/ln]	7.49	4.03	1.87	3.24	7.59	0.00
95th-Percentile Queue Length [ft/ln]	187.22	100.84	46.80	80.90	189.75	0.00

Movement, Approach, & Intersection Results

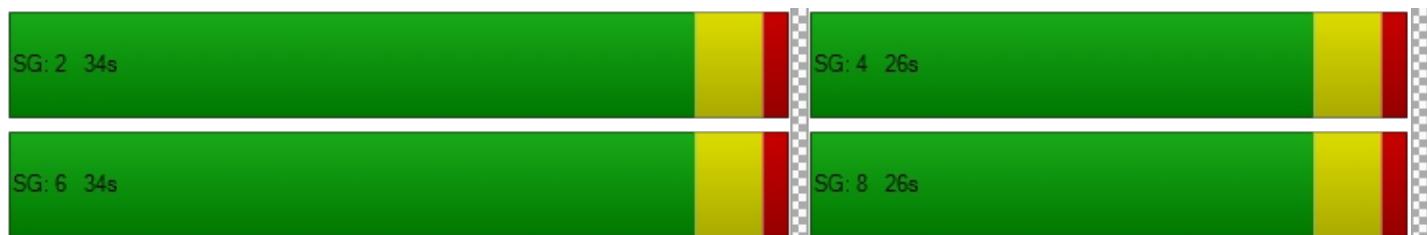
d_M, Delay for Movement [s/veh]	19.87	10.37	10.37	8.73	8.73	10.30	19.47	19.47	19.47	0.00	0.00	0.00
Movement LOS	B	B	B	A	A	B	B	B	B	A	A	A
d_A, Approach Delay [s/veh]	15.34			9.68			19.47			0.00		
Approach LOS	B			A			B			A		
d_I, Intersection Delay [s/veh]				14.66								
Intersection LOS						B						
Intersection V/C						0.561						

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1000	1000	733	733
d_b, Bicycle Delay [s]	7.50	7.50	12.03	12.03
I_b,int, Bicycle LOS Score for Intersection	2.764	2.322	2.178	1.560
Bicycle LOS	C	B	B	A

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



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Mapes Road Cultivation & Processing

Scenario 3 Existing Plus Ambient Growth Plus Project
6/6/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	Goetz Rd (NS) at Mapes Rd (EW)	Signalized	HCM 6th Edition	EB Right	0.464	14.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)

Control Type:	Signalized	Delay (sec / veh):	14.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.464

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	186	193	2	2	330	49	32	0	264	8	0	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	0	0	0	5	27	0	28	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	202	205	2	2	350	57	61	0	308	8	0	4
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	55	1	1	94	15	16	0	82	2	0	1
Total Analysis Volume [veh/h]	216	219	2	2	374	61	65	0	329	9	0	4
Presence of On-Street Parking	No		No									
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0		0		
v_di, Inbound Pedestrian Volume crossing m	0				0			0		0		
v_co, Outbound Pedestrian Volume crossing m	0				0			0		0		
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0		0		
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0		0		
Bicycle Volume [bicycles/h]	0				0			0		0		

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	60											
Coordination Type	Time of Day Pattern Coordinated											
Actuation Type	Fixed time											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	0.00											

Phasing & Timing

Control Type	Permiss											
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	34	0	0	34	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	C	R	C	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	22	22
g / C, Green / Cycle	0.50	0.50	0.50	0.50	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.21	0.12	0.20	0.04	0.25	0.01
s, saturation flow rate [veh/h]	1008	1867	1869	1589	1580	959
c, Capacity [veh/h]	464	933	995	795	649	453
d1, Uniform Delay [s]	16.59	8.51	9.39	7.80	15.91	12.12
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.34	0.60	1.10	0.19	4.18	0.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.47	0.24	0.38	0.08	0.61	0.03
d, Delay for Lane Group [s/veh]	19.93	9.10	10.48	7.99	20.10	12.24
Lane Group LOS	B	A	B	A	C	B
Critical Lane Group	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.41	1.29	2.44	0.33	4.51	0.12
50th-Percentile Queue Length [ft/ln]	60.19	32.33	60.99	8.24	112.85	2.88
95th-Percentile Queue Length [veh/ln]	4.33	2.33	4.39	0.59	8.00	0.21
95th-Percentile Queue Length [ft/ln]	108.34	58.19	109.78	14.83	199.96	5.18

Movement, Approach, & Intersection Results

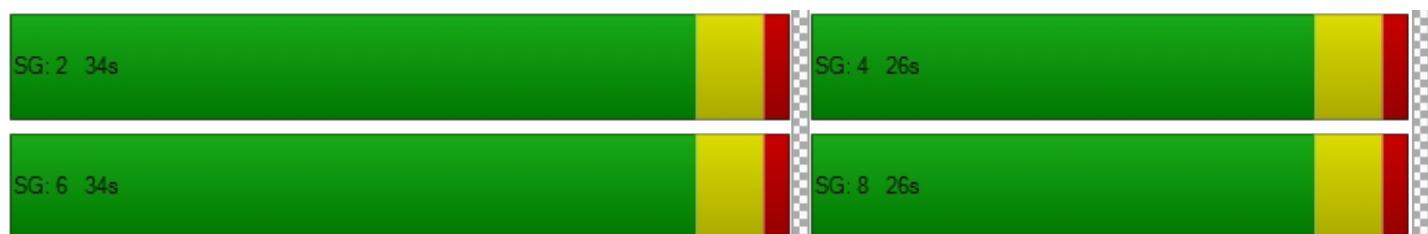
d_M, Delay for Movement [s/veh]	19.93	9.10	9.10	10.48	10.48	7.99	20.10	20.10	20.10	12.24	12.24	12.24
Movement LOS	B	A	A	B	B	A	C	C	C	B	B	B
d_A, Approach Delay [s/veh]	14.45			10.13			20.10			12.24		
Approach LOS	B			B			C			B		
d_I, Intersection Delay [s/veh]				14.69								
Intersection LOS						B						
Intersection V/C						0.464						

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1000	1000	733	733
d_b, Bicycle Delay [s]	7.50	7.50	12.03	12.03
I_b,int, Bicycle LOS Score for Intersection	2.281	2.281	2.210	1.581
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



EXISTING PLUS AMBIENT GROWTH PLUS PROJECT PLUS CUMULATIVE

Mapes Road Cultivation & Processing

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Scenario 4 Existing Plus Ambient Growth Plus Project Plus Cumulative

Report File: G:\...\EAPC AM.pdf

5/31/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	A St/River Rd (NS) at Mapes Rd (EW)	All-way stop	HCM 6th Edition	WB Right	1.198	65.3	F
2	Goetz Rd (NS) at Case Rd (EW)	Signalized	HCM 6th Edition	WB Left	0.529	44.7	D
3	Goetz Rd (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	EB Left	1.502	436.0	F
4	Goetz Rd (NS) at Ethanac Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.706	45.3	D
5	Project Dwy (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	SB Left	0.030	17.4	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report**Intersection 1: A St/River Rd (NS) at Mapes Rd (EW)**

Control Type:	All-way stop	Delay (sec / veh):	65.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.198

Intersection Setup

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	115.00	55.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	0	1	5	159	2	121	142	139	2	3	218	245
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	4	0	0	0	4	0	0	1	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	5	173	2	128	151	151	2	3	232	261
Peak Hour Factor	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	2	60	1	44	52	52	1	1	81	91
Total Analysis Volume [veh/h]	0	1	7	240	3	178	210	210	3	4	322	363
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings**Lanes**

Capacity per Entry Lane [veh/h]	451	466	550	491	527	689
Degree of Utilization, x	0.02	0.52	0.32	0.43	0.40	1.20

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.05	2.96	1.39	2.12	1.94	24.70
95th-Percentile Queue Length [ft]	1.35	74.00	34.85	52.90	48.43	617.51
Approach Delay [s/veh]	11.11	15.94		14.74		127.06
Approach LOS	B	C		B		F
Intersection Delay [s/veh]			65.26			
Intersection LOS			F			

Intersection Level Of Service Report**Intersection 2: Goetz Rd (NS) at Case Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	44.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.529

Intersection Setup

Name	Goetz Rd		Case Rd		Case Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	86.00	100.00	100.00	200.00	94.00	100.00
Speed [mph]	50.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Goetz Rd		Case Rd		Case Rd	
Base Volume Input [veh/h]	167	237	187	128	246	183
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	21	2	0	26	16	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	198	253	198	162	277	194
Peak Hour Factor	0.8890	0.8890	0.8890	0.8890	0.8890	0.8890
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	71	56	46	78	55
Total Analysis Volume [veh/h]	223	285	223	182	312	218
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No					
Signal Coordination Group	-					
Cycle Length [s]	115					
Coordination Type	Time of Day Pattern Isolated					
Actuation Type	Fully actuated					
Offset [s]	0.0					
Offset Reference	LeadGreen					
Permissive Mode	SingleBand					
Lost time [s]	12.00					

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	7	0	7	0	7	7
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	35	0	65	0	15	80
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	7	0	7	0	0	7
Pedestrian Clearance [s]	10	0	10	0	0	10
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations

Lane Group	L	R	C	R	L	C
C, Cycle Length [s]	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	23	61	61	19	84
g / C, Green / Cycle	0.20	0.20	0.53	0.53	0.17	0.73
(v / s)_i Volume / Saturation Flow Rate	0.13	0.18	0.12	0.11	0.18	0.12
s, saturation flow rate [veh/h]	1781	1589	1870	1589	1781	1870
c, Capacity [veh/h]	356	318	991	842	295	1366
d1, Uniform Delay [s]	42.03	44.80	14.43	14.35	47.95	4.73
k, delay calibration	0.11	0.21	0.50	0.50	0.21	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.80	15.14	0.53	0.59	49.95	0.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.63	0.90	0.23	0.22	1.06	0.16
d, Delay for Lane Group [s/veh]	43.84	59.94	14.96	14.94	97.90	4.98
Lane Group LOS	D	E	B	B	F	A
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	5.72	8.89	3.04	2.49	12.27	1.34
50th-Percentile Queue Length [ft/ln]	143.07	222.26	76.09	62.26	306.63	33.54
95th-Percentile Queue Length [veh/ln]	9.65	13.78	5.48	4.48	18.50	2.42
95th-Percentile Queue Length [ft/ln]	241.16	344.51	136.96	112.07	462.54	60.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.84	59.94	14.96	14.94	97.90	4.98
Movement LOS	D	E	B	B	F	A
d_A, Approach Delay [s/veh]	52.87		14.95		59.68	
Approach LOS	D		B		E	
d_I, Intersection Delay [s/veh]		44.73				
Intersection LOS			D			
Intersection V/C		0.529				

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.03	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.495	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	57.50	57.50	57.50
I_b,int, Bicycle LOS Score for Intersection	4.132	4.801	5.007
Bicycle LOS	D	E	F

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)**

Control Type: Two-way stop Delay (sec / veh): 436.0
 Analysis Method: HCM 6th Edition Level Of Service: F
 Analysis Period: 15 minutes Volume to Capacity (v/c): 1.502

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	279	278	8	2	149	194	115	3	181	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	36	18	0	0	6	36	5	0	4	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	332	313	8	2	164	242	127	3	196	0	0	0
Peak Hour Factor	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	96	90	2	1	47	70	37	1	56	0	0	0
Total Analysis Volume [veh/h]	382	360	9	2	189	278	146	3	226	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.35	0.00	0.00	0.00	0.00	0.00	1.50	0.03	0.26	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.04	0.00	0.00	8.03	0.00	0.00	435.95	434.54	403.14	69.42	57.23	10.29
Movement LOS	B	A	A	A	A	A	F	F	F	F	F	B
95th-Percentile Queue Length [veh/ln]	1.58	0.00	0.00	0.01	0.01	0.00	26.16	26.16	26.16	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	39.51	0.00	0.00	0.13	0.13	0.00	654.02	654.02	654.02	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		5.11			0.03			416.16				45.65
Approach LOS		A		A		A		F		E		
d_I, Intersection Delay [s/veh]							100.26					
Intersection LOS							F					

Intersection Level Of Service Report

Intersection 4: Goetz Rd (NS) at Ethanac Rd (EW)

Control Type: Signalized Delay (sec / veh): 45.3
 Analysis Method: HCM 6th Edition Level Of Service: D
 Analysis Period: 15 minutes Volume to Capacity (v/c): 0.706

Intersection Setup

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	150.00	100.00	101.00	150.00	100.00	100.00	200.00	100.00	100.00	150.00	100.00	150.00
Speed [mph]	55.00			55.00			40.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Base Volume Input [veh/h]	2	296	349	204	97	10	26	116	4	136	61	264
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	23	0	2	11	0	0	0	0	0	0	16
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	337	370	218	114	11	28	123	4	144	65	296
Peak Hour Factor	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120	0.9120
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	92	101	60	31	3	8	34	1	39	18	81
Total Analysis Volume [veh/h]	2	370	406	239	125	12	31	135	4	158	71	325
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	120											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	16.00											

Phasing & Timing

Control Type	Protecte	Permiss	Permiss									
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-									
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	62	0	20	70	0	11	21	0	17	27	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No										
Maximum Recall	No	No										
Pedestrian Recall	No	No										
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	0	58	58	16	74	74	5	17	17	12	25	25
g / C, Green / Cycle	0.00	0.48	0.48	0.13	0.61	0.61	0.04	0.15	0.15	0.10	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.00	0.20	0.26	0.13	0.04	0.01	0.02	0.04	0.00	0.09	0.02	0.20
s, saturation flow rate [veh/h]	1781	1870	1589	1781	3560	1589	1781	3560	1589	1781	3560	1589
c, Capacity [veh/h]	7	906	770	238	2186	976	67	517	231	184	752	336
d1, Uniform Delay [s]	59.61	19.87	21.41	52.00	9.26	9.00	56.55	45.57	43.96	52.91	38.10	46.94
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.32
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	22.20	1.36	2.57	29.01	0.05	0.02	4.89	0.27	0.03	10.79	0.05	32.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.29	0.41	0.53	1.01	0.06	0.01	0.46	0.26	0.02	0.86	0.09	0.97
d, Delay for Lane Group [s/veh]	81.81	21.24	23.98	81.01	9.31	9.03	61.45	45.84	43.98	63.70	38.15	79.00
Lane Group LOS	F	C	C	F	A	A	E	D	D	E	D	E
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.10	6.42	7.74	8.73	0.59	0.11	1.00	1.78	0.10	5.12	0.83	12.27
50th-Percentile Queue Length [ft/ln]	2.51	160.57	193.44	218.22	14.73	2.83	24.95	44.57	2.57	127.89	20.71	306.68
95th-Percentile Queue Length [veh/ln]	0.18	10.58	12.30	13.61	1.06	0.20	1.80	3.21	0.18	8.82	1.49	18.01
95th-Percentile Queue Length [ft/ln]	4.52	264.48	307.49	340.30	26.51	5.10	44.91	80.22	4.62	220.62	37.27	450.28

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	81.81	21.24	23.98	81.01	9.31	9.03	61.45	45.84	43.98	63.70	38.15	79.00
Movement LOS	F	C	C	F	A	A	E	D	D	E	D	E
d_A, Approach Delay [s/veh]	22.83			54.88			48.64			69.40		
Approach LOS	C			D			D			E		
d_I, Intersection Delay [s/veh]				45.32								
Intersection LOS					D							
Intersection V/C				0.706								

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersection	2.694	2.708	2.655	2.792
Crosswalk LOS	B	B	B	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	967	1100	283	383
d_b, Bicycle Delay [s]	16.02	12.15	44.20	39.20
I_b,int, Bicycle LOS Score for Intersection	2.843	1.870	1.700	1.864
Bicycle LOS	C	A	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 5: Project Dwy (NS) at Mapes Rd (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	17.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.030

Intersection Setup

Name	Project Dwy		Mapes Rd		Mapes Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Dwy		Mapes Rd		Mapes Rd	
Base Volume Input [veh/h]	0	0	0	299	473	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	9	2	8	0	0	72
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	2	8	317	501	72
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	2	83	132	19
Total Analysis Volume [veh/h]	9	2	8	334	527	76
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.01	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	17.40	12.25	8.72	0.00	0.00	0.00
Movement LOS	C	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.10	0.10	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	2.62	2.62	0.62	0.62	0.00	0.00
d_A, Approach Delay [s/veh]	16.46		0.20		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]			0.26			
Intersection LOS			C			

Mapes Road Cultivation & Processing

Vistro File: G:\...\PM E.vistro

Scenario 4 Existing Plus Ambient Growth Plus Project Plus Cumulative

Report File: G:\...\EAPC PM.pdf

5/31/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	A St/River Rd (NS) at Mapes Rd (EW)	All-way stop	HCM 6th Edition	WB Thru	0.363	10.5	B
2	Goetz Rd (NS) at Case Rd (EW)	Signalized	HCM 6th Edition	WB Left	0.509	31.6	C
3	Goetz Rd (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	EB Left	0.386	63.6	F
4	Goetz Rd (NS) at Ethanac Rd (EW)	Signalized	HCM 6th Edition	WB Left	0.618	29.7	C
5	Project Dwy (NS) at Mapes Rd (EW)	Two-way stop	HCM 6th Edition	SB Left	0.126	14.0	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report**Intersection 1: A St/River Rd (NS) at Mapes Rd (EW)**

Control Type:	All-way stop	Delay (sec / veh):	10.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.363

Intersection Setup

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	115.00	55.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			No		

Volumes

Name	River Rd			A St			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	0	1	4	77	4	15	17	208	1	3	158	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	1	0	0	0	1	0	0	3	3
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	4	83	4	16	18	221	1	3	170	67
Peak Hour Factor	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260	0.9260
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	22	1	4	5	60	0	1	46	18
Total Analysis Volume [veh/h]	0	1	4	90	4	17	19	239	1	3	184	72
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings**Lanes**

Capacity per Entry Lane [veh/h]	646	571	703	638	701	712
Degree of Utilization, x	0.01	0.16	0.02	0.03	0.34	0.36

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.02	0.59	0.07	0.09	1.52	1.66
95th-Percentile Queue Length [ft]	0.58	14.65	1.86	2.30	38.06	41.60
Approach Delay [s/veh]	8.62	9.90		10.34		10.91
Approach LOS	A	A		B		B
Intersection Delay [s/veh]			10.48			
Intersection LOS			B			

Intersection Level Of Service Report**Intersection 2: Goetz Rd (NS) at Case Rd (EW)**

Control Type:	Signalized	Delay (sec / veh):	31.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.509

Intersection Setup

Name	Goetz Rd		Case Rd		Case Rd	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	86.00	100.00	100.00	200.00	94.00	100.00
Speed [mph]	50.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		No		No	

Volumes

Name	Goetz Rd		Case Rd		Case Rd	
Base Volume Input [veh/h]	117	214	242	146	238	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	12	0	23	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	151	239	257	178	254	219
Peak Hour Factor	0.9450	0.9450	0.9450	0.9450	0.9450	0.9450
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	40	63	68	47	67	58
Total Analysis Volume [veh/h]	160	253	272	188	269	232
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No					
Signal Coordination Group	-					
Cycle Length [s]	115					
Coordination Type	Time of Day Pattern Isolated					
Actuation Type	Fully actuated					
Offset [s]	0.0					
Offset Reference	LeadGreen					
Permissive Mode	SingleBand					
Lost time [s]	12.00					

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	7	0	7	0	7	7
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	47	0	54	0	14	68
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	7	0	7	0	0	7
Pedestrian Clearance [s]	10	0	10	0	0	10
Rest In Walk	No		No			No
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	No		No		No	No
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0					
Pedestrian Walk [s]	0					
Pedestrian Clearance [s]	0					

Lane Group Calculations

Lane Group	L	R	C	R	L	C
C, Cycle Length [s]	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21	63	63	19	86
g / C, Green / Cycle	0.18	0.18	0.55	0.55	0.17	0.75
(v / s)_i Volume / Saturation Flow Rate	0.09	0.16	0.15	0.12	0.15	0.12
s, saturation flow rate [veh/h]	1781	1589	1870	1589	1781	1870
c, Capacity [veh/h]	322	288	1020	867	301	1402
d1, Uniform Delay [s]	42.37	45.86	13.90	13.47	46.72	4.12
k, delay calibration	0.11	0.11	0.50	0.50	0.11	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.18	8.55	0.64	0.57	9.43	0.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.50	0.88	0.27	0.22	0.89	0.17
d, Delay for Lane Group [s/veh]	43.55	54.41	14.54	14.04	56.16	4.37
Lane Group LOS	D	D	B	B	E	A
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	4.04	7.41	3.67	2.47	8.07	1.27
50th-Percentile Queue Length [ft/ln]	100.94	185.31	91.73	61.86	201.65	31.86
95th-Percentile Queue Length [veh/ln]	7.27	11.88	6.60	4.45	12.72	2.29
95th-Percentile Queue Length [ft/ln]	181.69	296.93	165.11	111.35	318.10	57.35

Movement, Approach, & Intersection Results

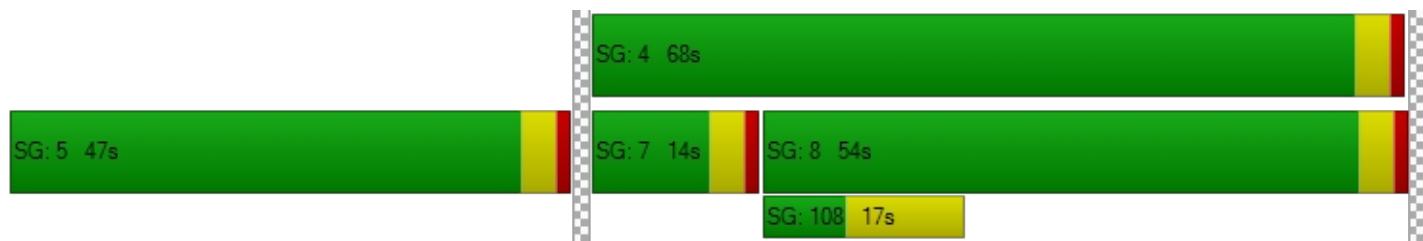
d_M, Delay for Movement [s/veh]	43.55	54.41	14.54	14.04	56.16	4.37
Movement LOS	D	D	B	B	E	A
d_A, Approach Delay [s/veh]	50.21		14.33		32.18	
Approach LOS	D		B		C	
d_I, Intersection Delay [s/veh]		31.62				
Intersection LOS			C			
Intersection V/C		0.509				

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.03	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.423	0.000	0.000
Crosswalk LOS	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	0	0
d_b, Bicycle Delay [s]	57.50	57.50	57.50
I_b,int, Bicycle LOS Score for Intersection	4.132	4.891	4.959
Bicycle LOS	D	E	E

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)**

Control Type: Two-way stop Delay (sec / veh): 63.6
 Analysis Method: HCM 6th Edition Level Of Service: F
 Analysis Period: 15 minutes Volume to Capacity (v/c): 0.386

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	186	193	2	2	330	49	32	0	264	8	0	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	12	0	0	20	5	27	0	28	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	202	217	2	2	370	57	61	0	308	8	0	4
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	58	1	1	99	15	16	0	82	2	0	1
Total Analysis Volume [veh/h]	216	232	2	2	396	61	65	0	329	9	0	4
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.50	0.11	0.00	0.00
d_M, Delay for Movement [s/veh]	9.05	0.00	0.00	7.70	0.00	0.00	63.64	62.46	47.80	54.00	31.14	13.70
Movement LOS	A	A	A	A	A	A	F	F	E	F	D	B
95th-Percentile Queue Length [veh/ln]	0.73	0.00	0.00	0.00	0.00	0.00	9.47	9.47	9.47	0.38	0.38	0.38
95th-Percentile Queue Length [ft/ln]	18.13	0.00	0.00	0.11	0.11	0.00	236.67	236.67	236.67	9.62	9.62	9.62
d_A, Approach Delay [s/veh]		4.35			0.03			50.41			41.60	
Approach LOS		A			A			F			E	
d_I, Intersection Delay [s/veh]							17.00					
Intersection LOS							F					

Intersection Level Of Service Report**Intersection 4: Goetz Rd (NS) at Ethanac Rd (EW)**

Control Type: Signalized Delay (sec / veh): 29.7
 Analysis Method: HCM 6th Edition Level Of Service: C
 Analysis Period: 15 minutes Volume to Capacity (v/c): 0.618

Intersection Setup

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right									
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	0	1	0	1
Pocket Length [ft]	150.00	100.00	101.00	150.00	100.00	100.00	200.00	100.00	100.00	150.00	100.00	150.00
Speed [mph]	55.00			55.00			40.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Goetz Rd			Goetz Rd			Ethanac Rd			Ethanac Rd		
Base Volume Input [veh/h]	7	135	176	298	249	24	16	49	3	239	95	211
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	13	0	12	22	0	0	0	0	0	0	2
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	156	187	328	286	25	17	52	3	253	101	226
Peak Hour Factor	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	42	50	88	77	7	5	14	1	68	27	61
Total Analysis Volume [veh/h]	8	168	202	354	309	27	18	56	3	273	109	244
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing m	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	80											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	16.00											

Phasing & Timing

Control Type	Protecte	Permiss	Permiss									
Signal group	5	2	0	1	6	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-									
Minimum Green [s]	7	7	0	7	7	0	7	7	0	7	7	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	21	0	21	31	0	11	21	0	17	27	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No										
Maximum Recall	No	No										
Pedestrian Recall	No	No										
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	C
C, Cycle Length [s]	80	80	80	80	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	1	29	29	17	45	45	2	5	5	13	16	16
g / C, Green / Cycle	0.02	0.36	0.36	0.21	0.56	0.56	0.03	0.06	0.06	0.16	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.00	0.09	0.13	0.20	0.09	0.02	0.01	0.02	0.00	0.15	0.03	0.15
s, saturation flow rate [veh/h]	1781	1870	1589	1781	3560	1589	1781	3560	1589	1781	3560	1589
c, Capacity [veh/h]	28	673	572	379	1981	885	54	233	104	290	704	314
d1, Uniform Delay [s]	39.02	18.06	18.83	31.04	8.64	8.03	38.08	35.60	35.11	33.20	26.64	30.50
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.35	0.89	1.71	10.81	0.17	0.06	3.49	0.53	0.11	14.01	0.10	4.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.28	0.25	0.35	0.94	0.16	0.03	0.33	0.24	0.03	0.94	0.15	0.78
d, Delay for Lane Group [s/veh]	44.37	18.95	20.54	41.85	8.81	8.09	41.57	36.13	35.22	47.21	26.74	34.64
Lane Group LOS	D	B	C	D	A	A	D	D	D	D	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.19	2.05	2.63	7.10	1.03	0.18	0.38	0.51	0.06	5.99	0.81	4.48
50th-Percentile Queue Length [ft/ln]	4.64	51.27	65.87	177.56	25.76	4.39	9.62	12.86	1.39	149.68	20.33	112.00
95th-Percentile Queue Length [veh/ln]	0.33	3.69	4.74	11.47	1.85	0.32	0.69	0.93	0.10	10.00	1.46	7.95
95th-Percentile Queue Length [ft/ln]	8.36	92.29	118.56	286.83	46.37	7.90	17.31	23.14	2.51	250.00	36.60	198.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	44.37	18.95	20.54	41.85	8.81	8.09	41.57	36.13	35.22	47.21	26.74	34.64
Movement LOS	D	B	C	D	A	A	D	D	D	D	C	C
d_A, Approach Delay [s/veh]	20.34			25.73			37.37			38.74		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]				29.69								
Intersection LOS					C							
Intersection V/C					0.618							

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	29.76	29.76	29.76	29.76
I_p,int, Pedestrian LOS Score for Intersection	2.637	2.694	2.628	2.748
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	425	675	425	575
d_b, Bicycle Delay [s]	24.81	17.56	24.81	20.31
I_b,int, Bicycle LOS Score for Intersection	2.183	2.129	1.623	1.904
Bicycle LOS	B	B	A	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report**Intersection 5: Project Dwy (NS) at Mapes Rd (EW)**

Control Type:	Two-way stop	Delay (sec / veh):	14.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.126

Intersection Setup

Name	Project Dwy		Mapes Rd		Mapes Rd	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Dwy		Mapes Rd		Mapes Rd	
Base Volume Input [veh/h]	0	0	0	296	235	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	55	6	2	0	0	10
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	55	6	2	314	249	10
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	2	1	83	66	3
Total Analysis Volume [veh/h]	58	6	2	331	262	11
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.13	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	13.95	10.82	7.79	0.00	0.00	0.00
Movement LOS	B	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.46	0.46	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	11.45	11.45	0.12	0.12	0.00	0.00
d_A, Approach Delay [s/veh]	13.66		0.05		0.00	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]			1.33			
Intersection LOS			B			

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Mapes Road Cultivation & Processing

Scenario 4 Existing Plus Ambient Growth Plus Project Plus Cumulative

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6/6/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	Goetz Rd (NS) at Mapes Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.563	14.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)

Control Type:	Signalized	Delay (sec / veh):	14.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.563

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	279	278	8	2	149	194	115	3	181	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	36	18	0	0	6	36	5	0	4	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	332	313	8	2	164	242	127	3	196	0	0	0
Peak Hour Factor	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690	0.8690
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	96	90	2	1	47	70	37	1	56	0	0	0
Total Analysis Volume [veh/h]	382	360	9	2	189	278	146	3	226	0	0	0
Presence of On-Street Parking	No		No									
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0			0	
v_di, Inbound Pedestrian Volume crossing m	0				0			0			0	
v_co, Outbound Pedestrian Volume crossing m	0				0			0			0	
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0			0	
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0			0	
Bicycle Volume [bicycles/h]	0				0			0			0	

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	60											
Coordination Type	Time of Day Pattern Coordinated											
Actuation Type	Fixed time											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	0.00											

Phasing & Timing

Control Type	Permiss											
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	34	0	0	34	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	C	R	C	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	22	22
g / C, Green / Cycle	0.50	0.50	0.50	0.50	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.32	0.20	0.10	0.17	0.24	0.00
s, saturation flow rate [veh/h]	1194	1862	1867	1589	1542	1870
c, Capacity [veh/h]	609	931	994	795	649	746
d1, Uniform Delay [s]	15.37	9.35	8.35	9.09	15.74	0.00
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.83	1.26	0.43	1.21	3.73	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.63	0.40	0.19	0.35	0.58	0.00
d, Delay for Lane Group [s/veh]	20.19	10.62	8.78	10.30	19.47	0.00
Lane Group LOS	C	B	A	B	B	A
Critical Lane Group	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	4.21	2.42	1.08	1.80	4.22	0.00
50th-Percentile Queue Length [ft/ln]	105.29	60.41	27.12	44.94	105.52	0.00
95th-Percentile Queue Length [veh/ln]	7.58	4.35	1.95	3.24	7.59	0.00
95th-Percentile Queue Length [ft/ln]	189.43	108.74	48.81	80.90	189.75	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.19	10.62	10.62	8.78	8.78	10.30	19.47	19.47	19.47	0.00	0.00	0.00
Movement LOS	C	B	B	A	A	B	B	B	B	A	A	A
d_A, Approach Delay [s/veh]	15.49			9.68			19.47			0.00		
Approach LOS		B			A		B			A		
d_I, Intersection Delay [s/veh]					14.72							
Intersection LOS						B						
Intersection V/C						0.563						

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1000	1000	733	733
d_b, Bicycle Delay [s]	7.50	7.50	12.03	12.03
I_b,int, Bicycle LOS Score for Intersection	2.799	2.333	2.178	1.560
Bicycle LOS	C	B	B	A

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Mapes Road Cultivation & Processing
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Report File: G:\...\EAPC PM IMP.pdf

Scenario 4 Existing Plus Ambient Growth Plus Project Plus Cumulative
6/6/2019

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
3	Goetz Rd (NS) at Mapes Rd (EW)	Signalized	HCM 6th Edition	NB Left	0.468	14.8	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 3: Goetz Rd (NS) at Mapes Rd (EW)

Control Type:	Signalized	Delay (sec / veh):	14.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.468

Intersection Setup

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	0	0	0	0	0	0
Pocket Length [ft]	96.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	Goetz Rd			Goetz Rd			Mapes Rd			Mapes Rd		
Base Volume Input [veh/h]	186	193	2	2	330	49	32	0	264	8	0	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	12	0	0	20	5	27	0	28	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	202	217	2	2	370	57	61	0	308	8	0	4
Peak Hour Factor	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	58	1	1	99	15	16	0	82	2	0	1
Total Analysis Volume [veh/h]	216	232	2	2	396	61	65	0	329	9	0	4
Presence of On-Street Parking	No		No									
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0				0			0		0		0
v_di, Inbound Pedestrian Volume crossing m	0				0			0		0		0
v_co, Outbound Pedestrian Volume crossing m	0				0			0		0		0
v_ci, Inbound Pedestrian Volume crossing mi	0				0			0		0		0
v_ab, Corner Pedestrian Volume [ped/h]	0				0			0		0		0
Bicycle Volume [bicycles/h]	0				0			0		0		0

Intersection Settings

Located in CBD	No											
Signal Coordination Group	-											
Cycle Length [s]	60											
Coordination Type	Time of Day Pattern Coordinated											
Actuation Type	Fixed time											
Offset [s]	0.0											
Offset Reference	LeadGreen											
Permissive Mode	SingleBand											
Lost time [s]	0.00											

Phasing & Timing

Control Type	Permiss											
Signal group	0	2	0	0	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	7	0	0	7	0	0	7	0	0	7	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	34	0	0	34	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

Lane Group	L	C	C	R	C	C
C, Cycle Length [s]	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	22	22
g / C, Green / Cycle	0.50	0.50	0.50	0.50	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.22	0.13	0.21	0.04	0.25	0.01
s, saturation flow rate [veh/h]	988	1867	1869	1589	1580	959
c, Capacity [veh/h]	448	934	995	795	649	453
d1, Uniform Delay [s]	17.16	8.57	9.53	7.80	15.91	12.12
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.69	0.64	1.20	0.19	4.18	0.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.48	0.25	0.40	0.08	0.61	0.03
d, Delay for Lane Group [s/veh]	20.85	9.22	10.73	7.99	20.10	12.24
Lane Group LOS	C	A	B	A	C	B
Critical Lane Group	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.49	1.38	2.63	0.33	4.51	0.12
50th-Percentile Queue Length [ft/ln]	62.27	34.54	65.69	8.24	112.85	2.88
95th-Percentile Queue Length [veh/ln]	4.48	2.49	4.73	0.59	8.00	0.21
95th-Percentile Queue Length [ft/ln]	112.08	62.17	118.25	14.83	199.96	5.18

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.85	9.22	9.22	10.73	10.73	7.99	20.10	20.10	20.10	12.24	12.24	12.24
Movement LOS	C	A	A	B	B	A	C	C	C	B	B	B
d_A, Approach Delay [s/veh]	14.80			10.36			20.10			12.24		
Approach LOS	B			B			C			B		
d_I, Intersection Delay [s/veh]				14.81								
Intersection LOS						B						
Intersection V/C						0.468						

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	0.0	0.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersection	0.000	0.000	0.000	0.000
Crosswalk LOS	F	F	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1000	1000	733	733
d_b, Bicycle Delay [s]	7.50	7.50	12.03	12.03
I_b,int, Bicycle LOS Score for Intersection	2.302	2.317	2.210	1.581
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX E

TRAFFIC SIGNAL WARRANT WORKSHEETS

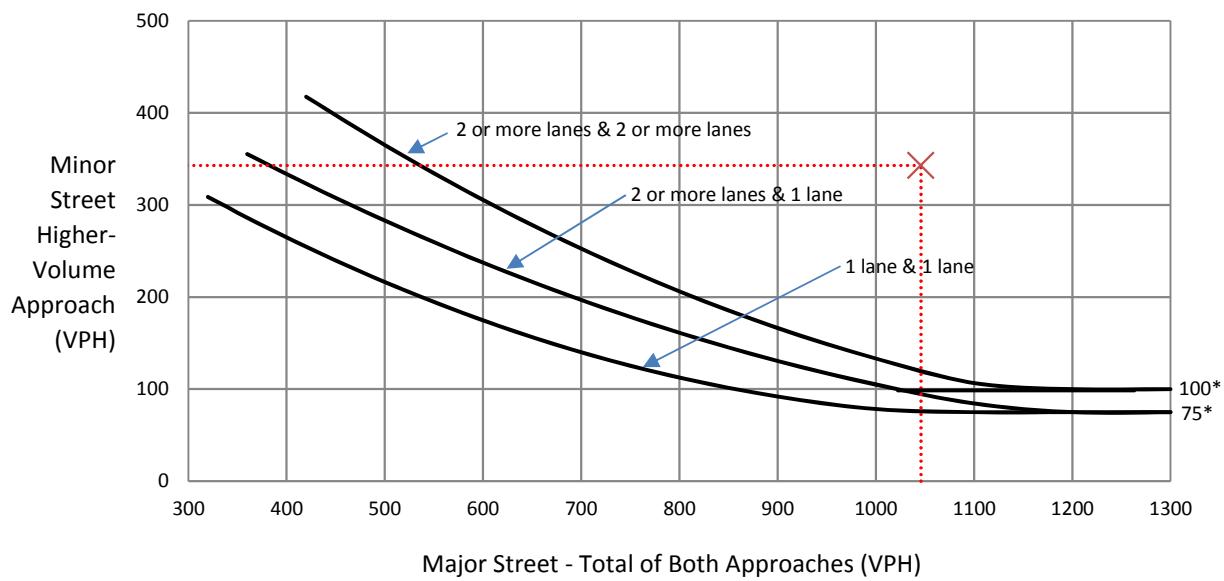
Figure E-1

Goetz Road (NS) / Mapes Road (EW) - #3
Existing
Morning Peak Hour

Major Street: Goetz Road _____ Volume: 1046
Minor Street: Mapes Road _____ Volume: 343

Warrant 3, Peak Hour Vehicular Volume (70% Factor)

(Community less than 10,000 population or above 40 mph on the major street)



TRAFFIC SIGNAL WARRANT IS SATISFIED

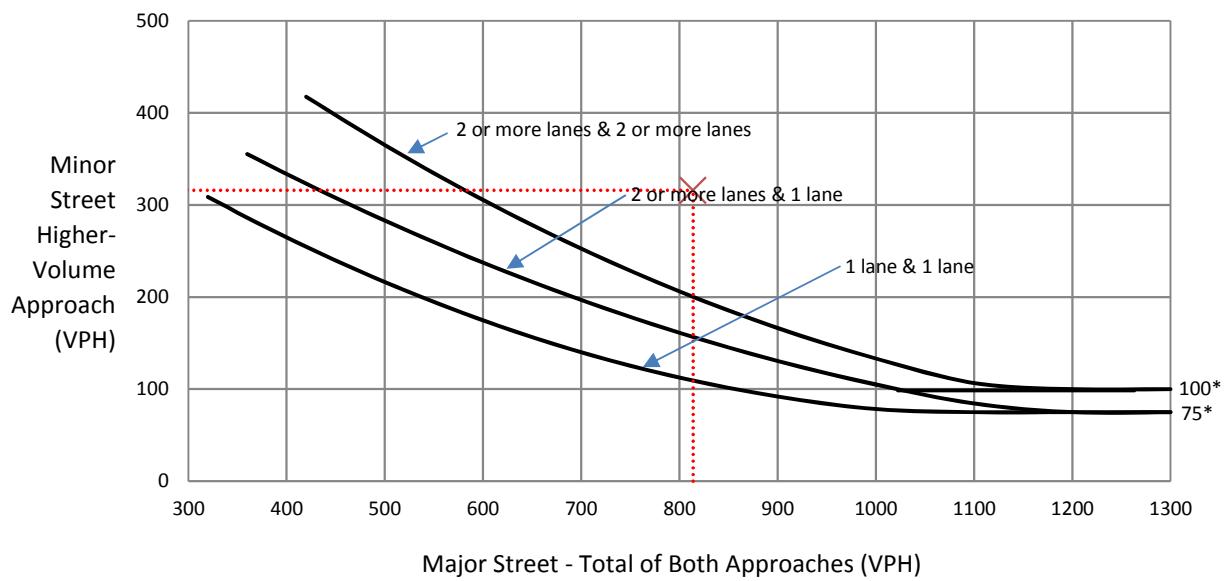
Figure E-2

Goetz Road (NS) / Mapes Road (EW) - #3
Existing
Evening Peak Hour

Major Street: Goetz Road _____ Volume: 814
Minor Street: Mapes Road _____ Volume: 316

Warrant 3, Peak Hour Vehicular Volume (70% Factor)

(Community less than 10,000 population or above 40 mph on the major street)



TRAFFIC SIGNAL WARRANT IS SATISFIED

APPENDIX F

CITY OF PERRIS ZONING CODE PARKING ORDINANCE

Sec. 19.69.030. - Non-residential regulations.

(a) *General provisions.*

- (1) *Amount of facilities required.* Any building or structure constructed, located, or expanded and any use of land established after the effective date of the ordinance from which this chapter is derived, or any subsequent amendment thereto, shall be required to provide off-street parking facilities in accordance with this chapter.
- (2) *Non-conforming uses.* Any use of property which on the effective date of the ordinance from which this chapter is derived, or any subsequent amendment thereto, is nonconforming as to the regulations relating to off-street parking facilities, may be continued in the same manner as if the parking facilities were conforming. However, if such parking facilities do exist, they shall not be reduced.
- (3) *Voluntary establishment.* Nothing in this chapter shall be deemed to prevent the voluntary establishment of off-street parking facilities in excess of those required by this chapter, provided that all regulations governing the location, design, and operation of such facilities are met.
- (4) *Provision is a continuing obligation.* The required off-street parking shall be a continuing obligation. It is unlawful to discontinue or dispense with the required vehicle parking facilities without providing other vehicle-parking facilities which meet the requirements of this chapter.
- (5) *Development plan approval.* Development plan review for all new construction, expansion or change in use shall be submitted to and approved in accordance with chapter 19.50 or any other applicable review procedure. This review shall include parking review and analysis.
- (6) *Permit requirements.*
 - a. No building shall be occupied and no final inspection shall be given, until off-street parking facilities are provided in accordance with the provisions of this chapter.
 - b. No parking area shall be re-surfaced and/or re-striped without a parking plan submitted to and approved by the planning and community development department and the city engineer.
- (7) *Use limitations for required areas.* Required parking areas shall be used exclusively for vehicle parking in conjunction with a permitted use, and shall not be reduced or encroached upon in any manner.

(b) *General regulations.*

- (1) *Number of spaces required.* Based upon the gross floor area size, the following number of spaces shall be required:
 - a. *Commercial/office/service uses.*
 1. Neighborhood or community shopping center: One space for every 200 square feet.
 2. General retail trades: One space for every 250 square feet.
 3. Retail furniture/appliance: One space for every 500 square feet.
 4. Restaurants, cafes, bars and cocktail lounges: One space for every 50 square feet of dining or serving area.
 5. Drive-in, fast food restaurants: One space for every 50 square feet of dining or serving area, plus ten additional spaces. Adequate stacking to accommodate eight vehicles shall be provided for drive-through lanes.
 6. Motels/hotels: 1.1 spaces per guest room/quarters.
 7. Rail, bus, transportation terminals: One space for every three fixed seats in waiting area of terminal, or one space for every 50 square feet of waiting area in the terminal, whichever is greater.
 8. Banks, savings and loan, and financial institutions: One space for every 150 square feet. Where drive-through service is provided, there shall be adequate stacking to accommodate five vehicles.
 9. Plant nurseries, lumberyard, building material yards, outdoor sales of merchandise: One space for every 500 square feet of indoor area and outdoor sales/display area to ten spaces and one space for every 2,000 square feet exceeding the ten spaces.
 10. Automobile and machinery sales: One space for every 50 square feet of indoor area and, one space for every 2,000 square feet of outdoor sales/display area, provided that areas exceeding 10,000 square feet shall require one space for every 5,000 square feet.

11. Automobile lube and tunes (quick lubes): Three spaces for every service bay, plus adequate stacking to accommodate.
 12. Automobile repair: Five spaces for every service bay.
 13. Automobile washing (full service automatic): Ten spaces, plus adequate stacking to accommodate six vehicles.
 14. Automobile washing (self-serving): One space per bay, plus adequate stacking to accommodate one vehicle per bay.
- b. *Places of assembly.*
1. Stadium/auditorium/arena: One space for every five fixed seats, and one space for every 250 square feet of non-seating area.
 2. Private clubs/lodges: One space for every 50 square feet of assembly area.
 3. Churches: One space for every three fixed seats, or one space for every 40 square feet of assembly area for non-fixed seating. For pews, one seating space is equal to 18 lineal inches of pew.
 4. Chapels/mortuaries: One space for every four fixed seats, or one space for every 40 square feet of assembly area for non-fixed seating. For pews, one seating space is equal to 18 lineal inches of pew.
- c. *Professional services.*
1. Medical, dental, clinics: One space for every 200 square feet.
 2. Professional offices: One space for every 300 square feet.
 3. Model home real estate complex: Five spaces minimum, plus two spaces for every model home unit.
 4. Veterinary services: six spaces minimum, plus one space for every 500 square feet in excess of 1,000 square feet.
 5. Hospitals: One space for every two beds, based upon maximum occupancy and one space for every employee on the largest shift.
 6. Urgent care centers: One space for every 200 square feet and one space for every employee on the largest shift.
- d. *Industrial uses.*
1. Manufacturing: One space for every 500 square feet of manufacturing building area, and one space for every company vehicle, and the space required for additional uses on the site; or one space for every employee, whichever is largest.
 2. **Warehousing: One space per 1,000 square feet of gross floor area for the first 20,000 square feet and one space per 2,000 square feet for that portion over 20,000 square feet.**
 3. High-cube warehousing: One space per 1,000 square feet of gross floor area for the first 20,000 square feet, plus one space per 2,000 square feet for the second 20,000 square feet, plus one space per 5,000 square feet for that portion over 40,000 square feet. Parking for office area comprising less than ten percent of the total gross square footage of the building shall be included in this calculation. Office area over ten percent shall be calculated at the professional office rate. Truck and trailer parking shall be provided at the rate of one oversized space for every 5,000 square feet of gross floor area. Truck docks shall not be included in this calculation.
 4. Mini-warehousing: One space for every 2,000 square feet of warehouse area, and appropriate number of spaces for associated office area and caretaker's residence.
 5. Salvage/junk/auto wrecking yards: One space for every five vehicle storage spaces, to ten spaces, and one space for every 12 spaces in excess of ten spaces, based upon maximum occupancy.
 6. Storage yards: One space for every 1,000 square feet, plus spaces required for additional uses on the site.
- e. *Educational services and care facilities.*
1. Child care: One space for every five children, and one space for every employee on the largest shift. A minimum of four spaces shall be provided. A semicircular drive or its equivalent, with sufficient space for one passenger loading area.
 2. Schools:

- (i) Grades K—8: Five spaces, plus two spaces per classroom. A semicircular drive or its equivalent with sufficient space for two passenger loading areas.
 - (ii) Grades 9—12: One space for every three students enrolled and one space for every employee on the largest shift.
 - (iii) Colleges/universities: One space for every three enrolled, full time day students and one space for every employee on the largest shift.
 - (iv) Trade/vocational business school: One space for every three students, plus one space for every employee on the largest shift.
3. Residential care facility/group homes: One space for every two residences, based upon maximum occupancy, and one space for every employee on the largest shift.
 4. Convalescent hospital/nursing homes: One space for every four residences, based upon maximum occupancy, and one space for every employee on the largest shift.
 5. Emergency shelter facilities: One space per four beds, and/or one-half per bedroom designated as a family unit with children, plus one space per staff member. Bike rack parking for a minimum of ten bicycles shall be provided at the facility.
- f. *Entertainment/recreation.*
1. Dance/night clubs: One space for every 20 square feet of dance area, and one space for every three fixed seats, or one space for every 20 square feet of seating area where there are no fixed seats.
 2. Amusement enterprises: One space for every four persons attending, based upon maximum attendance.
 3. Golf courses/driving ranges: Three spaces for every hole, or one space per green tee, plus the spaces required for additional uses on the site.
 4. Miniature golf: Six spaces for every hole, and the spaces required for additional uses on the site.
 5. Billiards parlors: Two spaces for every table.
 6. Skating rinks: One space for every three fixed seats, and one space for every 250 square feet.
 7. Pools (commercial): One space for every 100 square feet of water surface area and one space for every employee, with a ten space minimum.
 8. Tennis/handball/racquetball: Two spaces for each court.
 9. Theaters/movie houses: One space for every four seats, plus five employee spaces.
 10. Arcades: One space for every three machines.
 11. Bowling alleys: Four spaces for every lane, and the spaces required for additional uses on the site.
 12. Gyms/health clubs: One space for every 250 square feet.
 13. Parks: One space for every 8,000 square feet of active recreative area, and one space for every acre of passive area.
- (2) *Number of spaces for unspecified uses.* Any use not specifically listed herein shall be determined by the planning and community development director. Such determination shall be based upon the requirements of comparable uses as specified herein.
- (3) *Bicycle parking.* Facilities with 200 or more required parking spaces may provide a bicycle parking area to accommodate no less than five locking bicycles. Facilities with 500 or more required parking spaces may provide a bicycle parking area to accommodate no less than 15 locking bicycles. Bicycle parking areas shall be located near main entrances or buildings. For every two bicycle spaces provided, credit for one vehicle parking space shall be given.
- (4) *Motorcycle parking.* Facilities with 200 or more required parking spaces may provide a motorcycle parking area with an overall dimension of seven feet in length and area not less than 56 square feet. Facilities with 500 or more required parking spaces may provide a motorcycle parking area with an overall dimension of seven feet in length and area not less than 70 square feet. For every two motorcycle spaces provided, credit for one vehicle parking space may be given.
- (5) *Shared parking provisions.* Shared parking may be approved provided that times of operation of the involved entities are not the same, as specified herein:
- a. Up to 50 percent of the parking facilities¹⁷⁷ required by this chapter for a use considered to be primarily a day time

(on-peak) use may be provided by a use considered to be a night time or Sunday (off-peak) use; up to 50 percent of the parking facilities required by this chapter for a use considered to be a night time or Sunday use may be provided by a use considered to be primarily a daytime use, provided that a reciprocal parking area shall be subject to conditions as stipulated herein.

- b. The following uses are considered to be daytime uses: banks, business and professional offices, retail stores, service shops and similar uses. The following uses are considered to be night time or Sunday uses: auditoriums, churches, fraternal organizations and theatres. The development services department shall determine the parking requirements of the uses proposed for shared parking.
- c. Conditions required for shared parking:
 - 1. Shared parking facility areas shall be located within 200 feet of the buildings and uses.
 - 2. Applicant shall demonstrate that there is no substantial conflict in the principal operating hours for the buildings and uses.
 - 3. Parties concerned in the shared use of off-street parking facilities shall execute an agreement for such use by a proper legal instrument approved by the city attorney as to form and content.
- (6) *Transportation Demand Management Ordinance.* The requirements and provisions of the Transportation Demand Management Ordinance shall be complied with in accordance with chapter 7.40, including, but not limited to, reduced parking provisions, parking analysis, and penalties.
- (7) *Handicapped spaces.* Handicapped parking spaces shall be provided in accordance with the requirements of state and federal law. The parking standards within this chapter are in accordance with those established by the state and federal government at the time of adoption of this chapter. Any changes in the state or federal requirements for handicapped standards shall preempt the affected requirements of this chapter.
 - a. *Space size.* Each parking space designated for use by the handicapped shall consist of a rectangular area not less than 14 feet wide by 19 feet long. When more than one space is provided, in lieu of providing a 14-foot wide parking stall, provide a nine-foot parking on each side of a five foot loading and unloading area in the center.
 - b. *Van accessible.* Each van accessible parking space designated for use by the handicapped shall consist of a rectangular area not less than 17 feet wide by 19 feet long. When more than one space is provided, in lieu of providing a 17-foot wide parking stall, provide a nine-foot parking space on each side of an eight-foot loading and unloading area in the center.
 - c. *Labeling.* All handicapped parking stalls shall be individually labeled and signed in accordance with state and federal requirements.
 - 1. Handicap parking sign 80 inches high.
 - 2. Typical symbol/blue field 48 inches by 48 inches: white wheelchair 36 inches by 36 inches.
 - 3. 48-inch minimum walkway with curb cut style ramp, not to exceed a 1:12 slope.
 - d. Handicapped parking spaces required by this chapter shall count toward fulfilling off-street parking requirements.
 - e. Handicapped parking spaces shall be provided for all uses at the following rate:

Total Number of Parking Spaces Provided	Number of Handicapped Stalls
1—25	1
26—50	2
51—75	3

76—100	4
101—150	5
151—200	6
201—300	7
301—400	8
401—500	9
501—1,000	2 percent of total
1001 +	20 +1 for each 100 over 1,000

- f. Handicapped spaces shall be located to provide for safety and optimum proximity to the entrances of greatest incidence of use when more than one building is served by the parking lot. Such spaces shall be located so that a handicapped person is not compelled to wheel or walk behind parked vehicles.

(c) *Development standards.*

(1) *Location of parking facilities.*

- a. Parking facilities required by this chapter shall be located on the same lot or parcel of land as the use they are intended to service, except in cases of large centers with reciprocal access and parking agreements, and uses with approved shared parking agreements.
- b. Parking facilities shall be located and oriented to access the main entrance or front of buildings. Parking shall not be located behind buildings to the greatest extend possible.

(2) *Dimensions of parking spaces.*

- a. Each off-street parking space shall have a dimension not less than nine feet in width and 19 feet in length, except parallel parking stall which shall be a minimum of eight feet in width and 24 feet in length. No part of the area of a required parking space shall be utilized for driveway, aisles, walkway or other required improvements.
- b. A compact parking stall shall be permitted subject to the following:
 - 1. A compact stall shall be a dimension not less than eight feet in width and 16 feet in length.
 - 2. Compact stalls shall be permitted for projects that provide more than 40 off-street parking spaces.
 - 3. Developments with 40 to 800 required off-street parking may be permitted to utilize a maximum of 15 percent compact stalls. Developments with 800 or more required off-street parking may be permitted to utilize a maximum of 25 percent compact stalls.
 - 4. Compact spaces shall be dispersed throughout the development, and not be located at the main entrance.
 - 5. Compact spaces shall be designated "COMPACT" and shall be visible day and night.

(3) *Access to off-street parking.* The following requirements shall govern access to off-street parking facilities:

- a. Forward travel to and from parking facilities from a dedicated street or alley is required. The parking area shall be adequate to facilitate the turning of vehicles to permit forward travel upon entering a street.
- b. All uses which adjoin an expressway, primary or secondary arterial street, as designated in the city general plan, shall whenever possible minimize the number of access points, to alleviate the proliferation of driveways.
- c. The access to all off-street parking facilities shall be designed in a manner which will not interfere with the safe movement of traffic.

- d. Entryway to parking areas shall be well-defined and recognizable with adequate lighting and signage provided to facilitate movement on-site and off-site.
- e. Concrete and/or accented paving driveway approaches shall be provided for ingress to and egress from all parking facilities. Each parking space shall be easily accessible to the intended user. The width of driveway entrances and exits from a public street shall be measured at the property line and shall comply with the following standards, unless specific exceptions are made by the city engineer:
 - 1. Minimum driveway width for single-lane entrances and/or exits: 20 feet.
 - 2. Minimum driveway width for combined entrances and exits: 26 feet.
 - 3. Maximum driveway width for multiple entrances and exits: 60 feet.

(4) *Circulation within parking area.*

- a. Minimum aisle width for two-way circulation shall be 26 feet, unless otherwise specified. In areas commonly used by oversized vehicles, such as delivery and loading areas, the minimum aisle width shall be 30 feet.
- b. Two-way circulation with perpendicular parking is encouraged; however, angled parking with one-way circulation is permissible within parking areas subject to the following regulations:

Parking Angle	Stall Width	Stall Depth	Aisle Width
0 degrees	8 feet	24 feet	15 feet
30 degrees	9 feet	19 feet	15 feet
45 degrees	9 feet	20 feet	16 feet
60 degrees	9 feet	21 feet	18 feet
90 degrees	9 feet	19 feet	24 feet

(5) *Improvements to parking areas.* All required off-street parking areas shall have the following improvements:

- a. All off-street parking areas and vehicle sales areas, and any driveways used for access shall be paved. Acceptable means of paving shall include asphaltic, concrete or other permanent, impervious material as approved by the city engineer.
- b. Individual parking stalls shall be legibly marked off on the pavement by means of painting or contrasting materials. Arrows painted on paving shall dictate direction of traffic flow. Parking stall striping, directional arrows and parking stall identification shall meet the following standards:
 - 1. All parking stalls shall be clearly striped and permanently maintained with four-inch side double or hairpin lines on the surface of the parking facility, with the two lines located an equal distance of nine inches on either side of the stall sidelines.
 - 2. All drive aisles, entrances and exits shall be clearly marked with directional arrows painted on the parking surface.
- c. Vehicle overhangs shall be permissible, subject to the following provisions:
 - 1. Vehicle overhang may encroach into a landscaped area, provided that a minimum landscape area is not less than seven feet in width, and the landscape overhang area is above and beyond that of the amount of landscape area required.
 - 2. Vehicle overhang may encroach into a walkway, provided that a minimum unimpeded walkway width not less than five feet is maintained.
- d. Wheel stops shall be required where necessary to alleviate any conditions that may result in vehicular damage to

on-site facilities.

- e. Parking area surfaces shall be graded and drained so as to dispose of all surface water. Drainage shall be taken to the curb or gutter and away from adjoining property. Such drainage facilities shall not be allowed to cross the surface of a public sidewalk.
- f. Walkways for pedestrians shall be provided to connect parking areas to destination points. Walkways shall be paved, lighted and have adequate marking for easy identification and direction of pedestrian traffic.
- g. Landscaping.
 1. Landscaping shall be dispersed throughout the parking area, at a rate of one tree for every six stalls. Trees within parking areas shall be a minimum size of 15-gallon, with no less than 25 percent having a minimum size of 24-inch box.
 2. A six-inch curb with a 12-inch concrete walkway shall be constructed along the planter on end stalls adjacent to vehicle parking areas to facilitate access to parked vehicles.
 3. All landscaping shall be within planters bounded by a curb at least six inches wide and six inches high.
- h. Parking areas shall have lighting capable of providing illumination for security and safety. The minimum requirement is one foot candle, maintained across the surface of the parking area. Lighting standards shall be energy efficient and in scale with the height and use of the structure. Any illumination, including security lighting, shall utilize full-cut-off fixtures, and be directed away from adjoining properties and public right-of-way.
- i. Parking areas used for private and public parking shall be developed and maintained in good condition and in accordance with the provisions of this chapter.

(Code 1972, § 19.69.030; Ord. No. 1087, 2001; Ord. No. 1241, 2008; Ord. No. 1256, 6-2009; Ord. No. 1296, 8-2013)



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