Technical Memorandum

Date: December 14, 2018

To: Rod Stinson
Division Manager/Air Quality Specialist
1501 Sports Drive, Suite A
Sacramento, CA 95834

Jurisdiction: Alameda County

From: Chris Kinzel, PE, TE
Vice-President, TJKM

Subject: ***Traffic Impact Analysis for the Proposed Cannabis Cultivation Facility at 7033 Morgan Territory Road, Alameda County***

This technical memorandum presents the results of the traffic impact analysis for the proposed Cannabis Cultivation facility located at 7033 Morgan Territory Road in Alameda County. The proposed 92.53 acre property is located within the Agricultural Zoning District, and the Resource Management land use designation of the East County Area Plan. The project includes the development of one cannabis grow house consisting of a 32,000 square feet greenhouse building, including a 22,000 square feet of canopy and one processing building. Local access to the project site is currently provided via Morgan Territory Road.

TJKM evaluated traffic conditions at two study intersections during the a.m. and p.m. peak hours for a typical weekday. The peak periods observed were between 7-9 a.m. and 4-6 p.m. The study intersections and associated traffic controls are as follows:

1. Morgan Territory Road/Manning Road (Two-Way Stop)
2. Proposed Project Driveway/Morgan Territory Road (One-Way Stop)

Figure 1 illustrates the study intersections and the vicinity map of the proposed project. **Figure 2** shows the proposed project site plan.

This study addresses the following traffic scenarios:

- *Existing Conditions* – This scenario evaluates the study intersections based on existing traffic volumes, lane geometry, and traffic controls.
- *Existing plus Project Conditions* – This scenario is identical to Existing Conditions, but with the addition of traffic from the proposed project.

- *Cumulative (2040) Conditions* – This scenario is similar to Existing Conditions but with the projected growth rate of 2 percent per year for 22 years, which is applied to Existing Conditions traffic volumes to project traffic demands for the horizon year 2040.
- *Cumulative plus Project Conditions* - This scenario is identical to Cumulative Conditions, but with the addition of traffic from the proposed project.

Existing Conditions

Important roadways adjacent to the project site are discussed below:

N. Livermore Avenue is a two lane, north-south roadway, which extends from Manning Road to the City of Livermore. The posted speed limit is 50 mph within the project vicinity. N. Livermore Avenue is accessible to the project via Morgan Territory Road.

Manning Road is a two-lane, east-west roadway, extending from Carneal Road and terminating at N. Livermore Avenue. The posted speed limit is 50 mph within the project vicinity.

Morgan Territory Road is a two-lane, north-south roadway, extending from Manning Road and terminating at Marsh Creek Road. The posted speed limit is 50 mph within the project vicinity. Access to the project will be provided via Morgan Territory Road.

Level of Service Analysis Methodology

Level of Service (LOS) is a qualitative measure that describes operational conditions as they relate to the traffic stream and perceptions by motorists and passengers. The LOS generally describes these conditions in terms of such factors as speed and travel time, delays, freedom to maneuver, traffic interruptions, comfort, convenience and safety. The operational LOS are given letter designations from A to F, with A representing the best operating conditions (free-flow) and F the worst (severely congested flow with high delays). Intersections generally are the capacity-controlling locations with respect to traffic operations on arterial and collector streets.

Unsignalized Intersections

The study intersections under stop control (unsignalized) were analyzed using the 2000 HCM Operations Methodology for unsignalized intersections described in Chapter 17 (HCM 2000). LOS ratings for stop-sign controlled intersections are based on the average control delay expressed in seconds per vehicle. At the side street, controlled intersections or two-way stop sign intersections, the control delay is calculated for each movement, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. **Table 1** summarizes the relationship between delay and LOS for unsignalized intersections.

Each of the study intersections was analyzed using Synchro Version 9 software and HCM 2000 methodology. The LOS methodology is described for unsignalized intersections in detail in **Appendix A**.

Table 1: Level of Service for Unsignalized Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of tolerable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.

Source: Highway Capacity Manual 2000

Significant Impact Criteria/Level of Service Standards

According to the 2012 Alameda Countywide Transportation Plan published by the Alameda County Transportation Commission (ACTC), the LOS standard for highway systems is LOS D. For this study, LOS D is considered to be the acceptable threshold for intersections.

Existing Peak Hour Volumes and Average daily Traffic

The existing operations of the study intersections were evaluated for the highest one-hour volumes during weekday morning and evening peak periods. Turning movement counts for vehicles, bicycles, and pedestrians were conducted during typical weekday day a.m. and p.m. peak periods (7:00-9:00 a.m. and 4:00-6:00 p.m., respectively) at the study intersections on September 20, 2018. In addition, seven day average daily traffic (ADT) counts at the following locations were conducted in September, 2018.

1. Morgan Territory Road north of Manning Road
2. Manning Road west of North Livermore Avenue

Appendix B includes all the data sheets for the collected ADT, vehicle, bicycle, and pedestrian counts. **Figure 3** illustrates the existing lane geometry, traffic controls, ADT and peak hour traffic volumes at the study intersections.

Intersection Level of Service Analysis – Existing Conditions

The peak hour factor based on the counts, was used at both of the study intersections for the existing analysis. The results of the LOS analysis using the Synchro 9 software program for Existing Conditions are summarized in **Table 2**. Under this scenario, the study intersections operate within the Alameda County standards (LOS D or better) for both a.m. and p.m. peak hours.

Table 2: Intersection Level of Service Analysis – Existing Conditions

#	Intersection	Control	Peak Hour	Existing Conditions	
				Average Delay[1]	LOS[2]
1	Morgan Territory Road/Manning Road	Two-Way Stop	AM	10.5	B
			PM	11.7	B
2	Morgan Territory Road/Project Driveway	One-Way Stop	AM	9.0	A
			PM	9.0	A

Notes: AM – morning peak hour (between 7 and 9 a.m.), PM – evening peak hour (between 4 and 6 p.m.)
[1] Total control delay for the worst movement is presented for side-street stop controlled intersections.
[2]LOS = Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package by applying HCM 2000 Methodology.

The average daily traffic on Morgan Territory Road north of Manning Road is 576 vehicles per day, and on Manning Road west of North Livermore Avenue is 2,229 vehicles per day.

Project Trip Generation and Trip Distribution

Based on the information, the proposed project will operate on a continuous spanning of three shifts, seven days per week. There will be five to six cars per shift including employee's i.e two security guards, master grower, and two trimmers. **Table 3** shows the expected trip generation for the proposed project. The project is expected to generate approximately a maximum of 11 weekday a.m. peak hour trips (11 inbound, 0 outbound) and 11 weekday p.m. peak hour trips (0 inbound, 11 outbound) based on the information provided by the project applicant.

Table 3: Proposed Project Trip Generation

#	Land Use Type	Size		A.M. Peak			P.M. Peak		
				In	Out	Total	In	Out	Total
1	Cannabis Cultivation Center	92.53	Acre	11	0	11	0	11	11
		Total Trips		**11**		**11**		**11**	**11**

Notes: Based on the information provided by developer

Trip distribution assumptions for the proposed project were developed based on the existing travel patterns and TJKM's knowledge of the study area.

The distribution assumptions for the proposed development are as follows**:**

- 70 percent to/from Livermore Avenue
- 30 percent to/from Manning Avenue

Figure 4 illustrates the trip distribution percentages and trip assignment project volumes developed for the proposed project. The assigned project trips were then added to traffic volumes under Existing Conditions to generate Existing plus Project Conditions traffic volumes.

Intersection Level of Service Analysis – Existing Plus Project Conditions

The intersection LOS analysis results for Existing plus Project Conditions are summarized in **Table 4**. Under this scenario, the study intersections operate within the Alameda County standards for both a.m. and p.m. peak hours. Based on the Alameda County levels of service impact criteria, the project is expected to have a *less-than-significant* impact at the study intersections under Existing plus Project Conditions. **Figure 5** shows projected turning movement volumes at the study intersections for Existing plus Project Conditions.

Table 4: Intersection Level of Service Analysis – Existing plus Project Conditions

#	Intersection	Control	Peak Hour	Existing plus Project Conditions	
				Average Delay[1]	LOS[2]
1	Morgan Territory Road/Manning Road	Two-Way Stop	AM	10.6	B
			PM	11.8	B
2	Morgan Territory Road/Project Driveway	One-Way Stop	AM	9.0	A
			PM	9.2	A

Notes: AM – morning peak hour (between 7 and 9 a.m.), PM – evening peak hour (between 4 and 6 p.m.)
[1] Total control delay for the worst movement is presented for side-street stop controlled intersections.
[2]LOS = Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package by applying HCM 2000 Methodology.

The expected average daily traffic with the addition of the proposed project traffic is 686 vehicles per day on Morgan Territory Road north of Manning Road and 2,339 vehicles per day on Manning Road west of North Livermore Avenue.

Intersection Level of Service Analysis – Cumulative (2040) Conditions

This section details expected traffic conditions at the study intersections under Cumulative (No Project) Conditions. This analysis scenario is defined as baseline conditions without the proposed project in year 2040. This scenario is similar to the Existing Conditions, but with a projected growth rate of two percent per year applied over 22 years to project traffic demands for the year 2040. A peak hour factor of 0.92 was used for study intersections for Cumulative Conditions analysis. The intersection LOS analysis results for Cumulative Conditions are summarized in **Table 5**. Under this scenario, the study intersections operate within the Alameda County standards for both a.m. and p.m. peak hours. **Figure 6** shows projected turning movement volumes at the study intersections for Cumulative Conditions.

Table 5: Intersection Level of Service Analysis – Cumulative (2040) Conditions

#	Intersection	Control	Peak Hour	Cumulative Conditions	
				Average Delay[1]	LOS[2]
1	Morgan Territory Road/Manning Road	Two-Way Stop	AM	11.6	B
			PM	13.7	B
2	Morgan Territory Road/Project Driveway	One-Way Stop	AM	9.0	A
			PM	9.1	A

Notes: AM – morning peak hour (between 7 and 9 a.m.), PM – evening peak hour (between 4 and 6 p.m.)
[1] Total control delay for the worst movement is presented for side-street stop controlled intersections.
[2]LOS = Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package by applying HCM 2000 Methodology.

Under Cumulative Conditions the expected average daily traffic is 890 vehicles per day on Morgan Territory Road north of Manning Road and 3,446 vehicles per day on Manning Road west of North Livermore Avenue.

Intersection Level of Service Analysis – Cumulative Plus Project Conditions

The intersection LOS analysis results for Cumulative plus Project Conditions are summarized in **Table 6**. Under this scenario, the study intersections operate within the Alameda County standards for both a.m. and p.m. peak hours. Based on the Alameda County levels of service impact criteria, the project is expected to have a *less-than-significant* impact at the study intersections under Cumulative plus Project Conditions. **Figure 7** shows projected turning movement volumes at the study intersections for Cumulative plus Project Conditions.

Table 6: Intersection Level of Service Analysis – Cumulative plus Project Conditions

#	Intersection	Control	Peak Hour	Cumulative plus Project Conditions	
				Average Delay[1]	LOS[2]
1	Morgan Territory Road/Manning Road	Two-Way Stop	AM	11.7	B
			PM	13.7	B
2	Morgan Territory Road/Project Driveway	One-Way Stop	AM	9.0	A
			PM	9.1	A

Notes: AM – morning peak hour (between 7 and 9 a.m.), PM – evening peak hour (between 4 and 6 p.m.)
[1] Total control delay for the worst movement is presented for side-street stop controlled intersections.
[2]LOS = Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package by applying HCM 2000 Methodology.

The expected average daily traffic with the addition of the proposed project traffic is 1000 vehicles per day on Morgan Territory Road north of Manning Road and 3,556 vehicles per day on Manning Road west of North Livermore Avenue.

Level of service worksheets for all the scenarios are attached in the **Appendix C**.

Site Access and On-Site Circulation

This section analyzes site access and internal circulation for passenger vehicles, trucks, pedestrians, and bicycles based on the site plan. The proposed project's access will be via one full access driveway on Morgan Territory Road as shown in the project site plan. The internal circulation for the proposed project was reviewed for issues related to safety and parking. The internal loop roadway is 22 feet wide and accommodates two-way travel. Based on the evaluation, the access roadway is expected to be adequate for passenger vehicles accessing the project site. Emergency vehicles can access the project via Morgan Territory Road. Overall, the proposed on-site vehicle circulation is adequate and should not result in any traffic operations issues on-site that would provide significant impacts on County streets.

The proposed project is not expected to generate pedestrian and bicycle trips. Based on the pedestrian and bicycle counts conducted there is no pedestrian and bicycle activity along Morgan Territory Road.

Sight Distance Analysis

Sight distance is evaluated to determine if a driver will have adequate visibility to enter a roadway safely without resulting in a conflict with traffic already on the roadway. The project access points should be free and clear of any obstructions that would materially and adversely affect sight distance, thereby ensuring that exiting vehicles can see pedestrians on the sidewalk and other vehicles traveling on adjacent roadways. The line of sight between vehicles exiting the driveway and vehicles travelling northbound is clear and visible. The line of sight of vehicles exiting the driveway and vehicles travelling southbound is affected by existing vegetation and the existing horizontal curve, just north of the driveway. In order to improve the sight distance for southbound traffic on Morgan Territory Road the existing trees should be kept trimmed to a minimum of eight feet from the ground. Ground cover and other landscaping should be kept trimmed to a maximum height of three feet. By clearing the vegetation, sight distance of approximately 300 feet (required for the design speed of 40 mph as per the Highway Design Manual (HDM)) is gained for southbound vehicles. TJKM recommends installation of a stop sign and appropriate pavement markings at the project driveway and also install W1-10C blind driveway signs for southbound travelling vehicles.

PARKING

As per the Alameda County Municipal Code, cannabis grow house building requires four spaces per 1000 square feet. The project proposes 26 standard parking spaces of which one space is accessible parking space. Based on the parking criteria, the proposed number of off-street parking spaces should satisfy the parking needs for the project.

CONCLUSIONS

- The proposed project is expected to generate approximately 11 weekday a.m. peak hour trips and 11 weekday p.m. peak hour trips.
- Based on the Alameda County levels of service impact criteria, the project is expected to have a *less-than-significant* impact at the study intersections under Existing, and Cumulative plus Project Conditions.
- Based on the evaluation, the proposed on-site vehicle circulation is adequate and should not result in significant impacts on County streets.
- The proposed number of off-street parking spaces will satisfy the parking needs for the project
- The line of sight between vehicles exiting the driveway and vehicles travelling northbound is clear and visible. The line of sight of vehicles exiting the driveway and vehicles travelling southbound is affected by existing vegetation and the existing horizontal curve, just north of the driveway. In order to improve the sight distance for southbound traffic on Morgan Territory Road the existing trees should be kept trimmed to a minimum of eight feet from the ground. Ground cover and other landscaping should be kept trimmed to a maximum height of three feet. By clearing the vegetation, sight distance of approximately 300 feet (required for the design speed of 40 mph as per the Highway Design Manual (HDM)) is gained for southbound vehicles. TJKM recommends installation of a stop sign and appropriate pavement markings at the project driveway and also install W1-10C blind driveway signs for southbound travelling vehicles.

Vicinity Map

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Figure 1

Project Site Plan

KEYNOTES

1. BIORETENTION AREA
2. ASPHALT PAVING
3. SECURITY FENCE
4. SECURITY GATE
5. ACCESSIBLE PARKING SPACE
6. FIRE STORAGE TANK
7. APPROXIMATE LOCATION OF (E) WELL
8. TOP OF CREEK

OPEN FIELD

20' 22' 18' 42' 42' 8' 42' 42' 6' 36' 28' 20'

31' 72' 6' 72' 38' 42'

228

30' 9' TYP 120' 20'

N

Figure 1

3 TYP

6 TYP

2

4

5

7

8

1

WELL

9+41 9+00 8+50 8+00 7+50 7+00 6+50 6+00 5+50 5+00 4+50 4+00 3+50 3+00 2+50 2+00 1+60 1+00

CAYETANO CREEK

MORGAN TERRITORY ROAD

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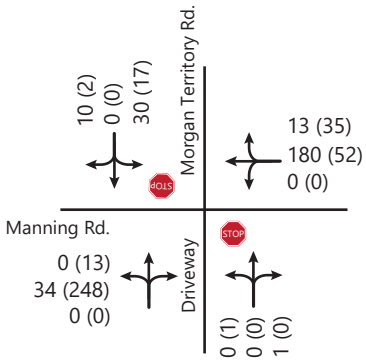
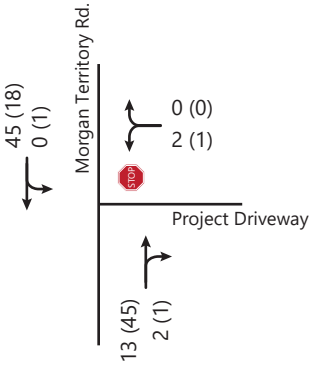
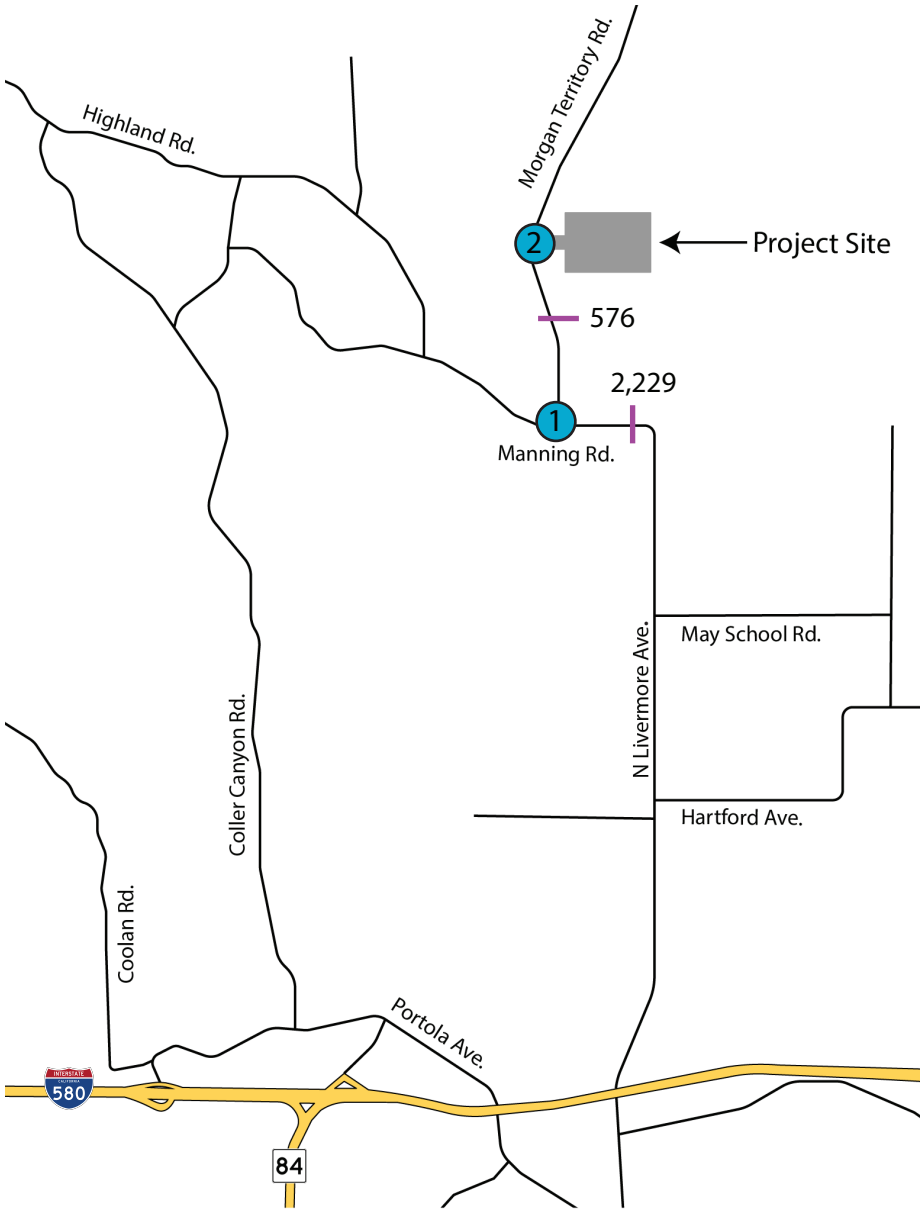
Existing Lane Geometry, Traffic Controls and Peak Hour Traffic Volumes

Intersection #1
Morgan Territory Rd. / Manning Rd.



Intersection #2
Morgan Territory Rd. / Project Driveway





LEGEND

- Project Site
- X — Study Intersections
- Stop Sign
- XX — AM Peak Hour Volumes
- (XX) — PM Peak Hour Volumes
- X,XXX — Average Daily Traffic

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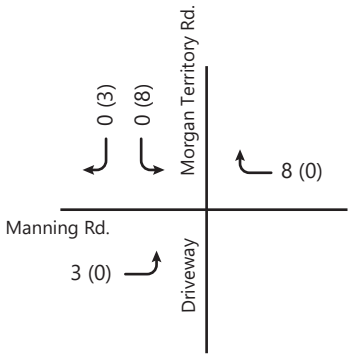
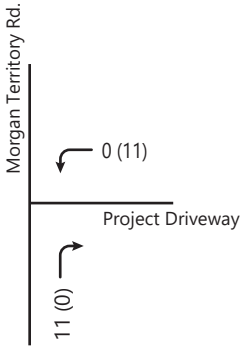
Figure 3

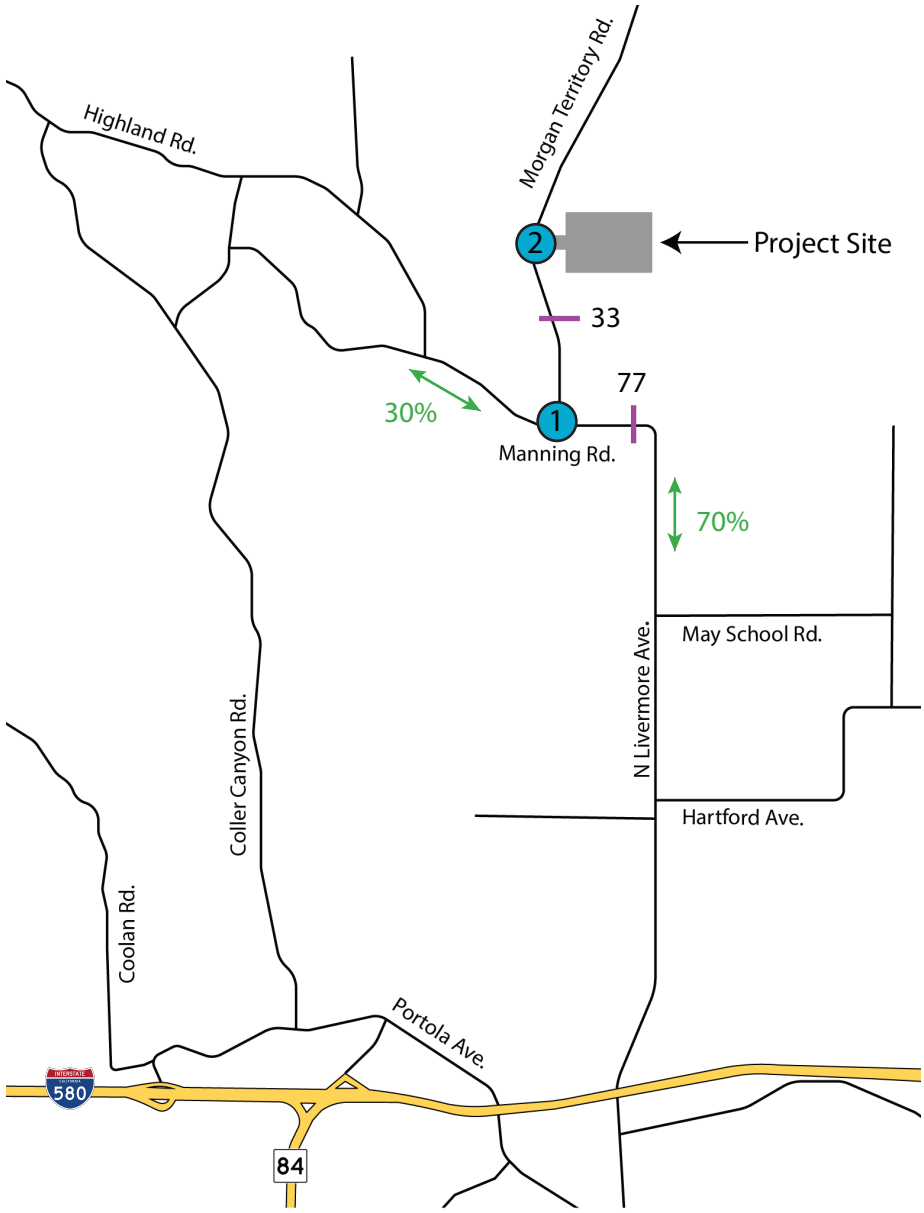
Trip Distribution and Assignment

Intersection #1
Morgan Territory Rd. / Manning Rd.



Intersection #2
Morgan Territory Rd. / Project Driveway





LEGEND

- Project Site
- X — Study Intersections
- XX — AM Peak Hour Trips
- (XX) — PM Peak Hour Trips
- X,XXX — Average Daily Project Trips
- XX% — Trip Distribution

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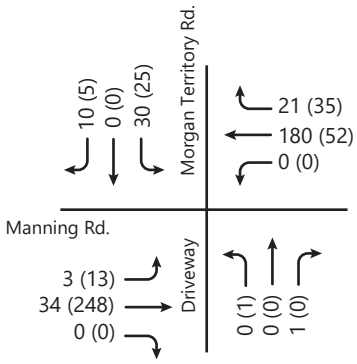
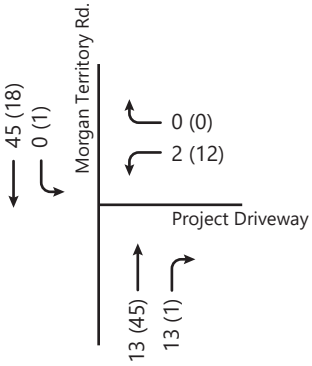
Figure 4

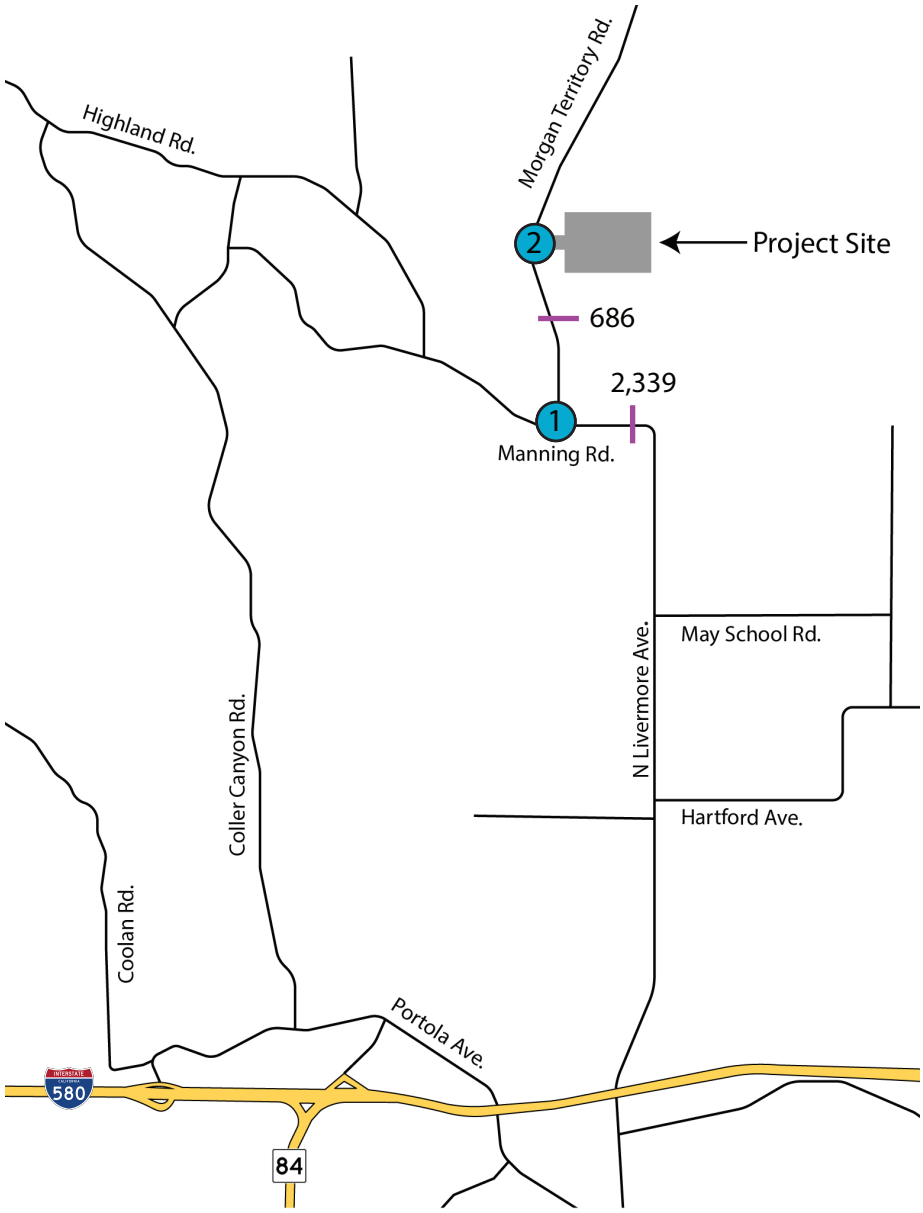
Existing Plus Project Peak Hour Traffic Volumes

Intersection #1
Morgan Territory Rd. / Manning Rd.



Intersection #2
Morgan Territory Rd. / Project Driveway





LEGEND

- Project Site
- X — Study Intersections
- XX — AM Peak Hour Volumes
- (XX) — PM Peak Hour Volumes
- X,XXX — Average Daily Traffic

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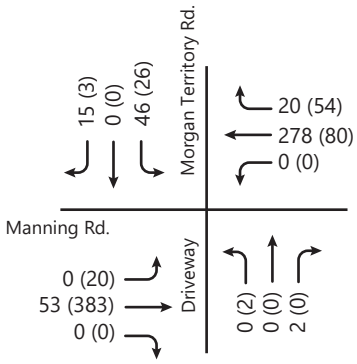
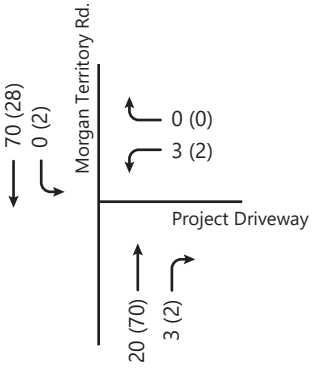
Figure 5

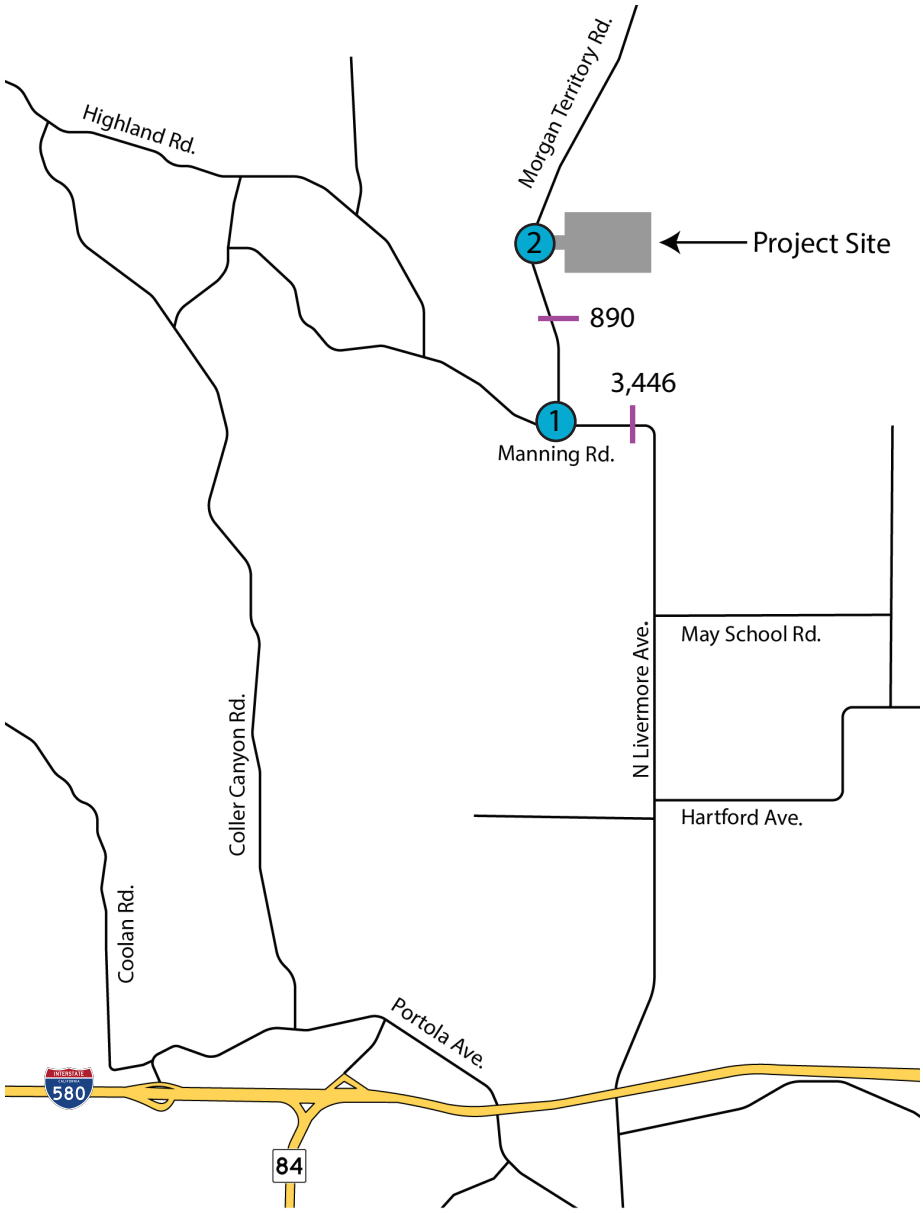
Cumulative Peak Hour Traffic Volumes

Intersection #1
Morgan Teritory Rd. / Manning Rd.



Intersection #2
Morgan Territory Rd. / Project Driveway





LEGEND

- Project Site
- X — Study Intersections
- XX — AM Peak Hour Volumes
- (XX) — PM Peak Hour Volumes
- X,XXX — Average Daily Traffic

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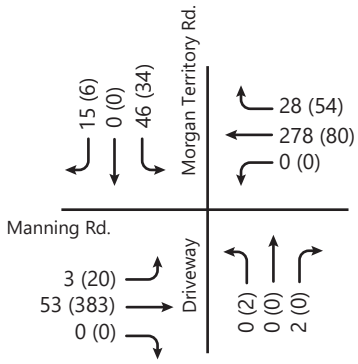
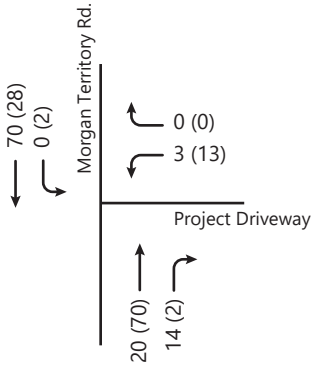
Figure 6

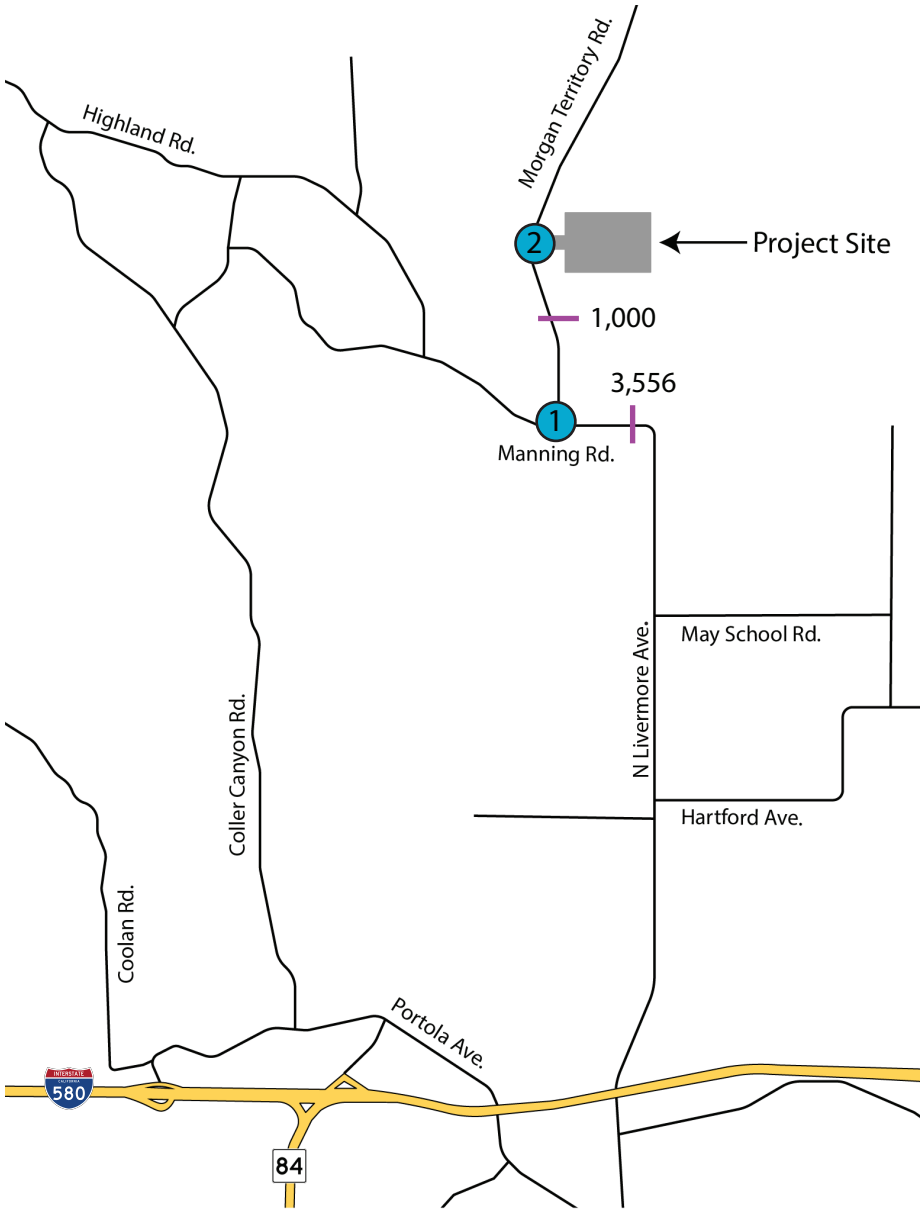
Cumulative Plus Project Peak Hour Traffic Volumes

Intersection #1
Morgan Territory Rd. / Manning Rd.



Intersection #2
Morgan Territory Rd. / Project Driveway





LEGEND

- Project Site
- X — Study Intersections
- XX — AM Peak Hour Volumes
- (XX) — PM Peak Hour Volumes
- X,XXX — Average Daily Traffic

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Figure 7

APPENDIX A – LEVEL OF SERVICE METHODOLOGY

LEVEL OF SERVICE METHODOLOGY

LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in Transportation Research Board, *Highway Capacity Manual 2000*. *Highway Capacity Manual 2000* represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with level-of-service A representing the best operating conditions and level-of-service F the worst. Each level of service represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish service levels.

A general description of service levels for various types of facilities is shown in Table A-I.

Table A-I

Level of Service Description

Facility Type	**Uninterrupted Flow**	**Interrupted Flow**
	Freeways Multi-lane Highways Two-lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections Two-way Stop Control All-way Stop Control
LOS		
A	Free-flow	Very low delay.
B	Stable flow. Presence of other users noticeable.	Low delay.
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay.
D	High density stable flow.	Tolerable delay.
E	Unstable flow.	Limit of acceptable delay.
F	Forced or breakdown flow.	Unacceptable delay

Source: *Highway Capacity Manual 2000*

Urban Streets

The term "urban streets" refers to urban arterials and collectors, including those in downtown areas.

Arterial streets are roads that primarily serve longer through trips. However, providing access to abutting commercial and residential land uses is also an important function of arterials.

Collector streets provide both land access and traffic circulation within residential, commercial and industrial areas. Their access function is more important than that of arterials, and unlike arterials their operation is not always dominated by traffic signals.

Downtown streets are signalized facilities that often resemble arterials. They not only move through traffic but also provide access to local businesses for passenger cars, transit buses, and trucks. Pedestrian conflicts and lane obstructions created by stopping or standing buses, trucks and parking vehicles that cause turbulence in the traffic flow are typical of downtown streets.

The speed of vehicles on urban streets is influenced by three main factors, street environment, interaction among vehicles and traffic control. As a result, these factors also affect quality of service.

The street environment includes the geometric characteristics of the facility, the character of roadside activity and adjacent land uses. Thus, the environment reflects the number and width of lanes, type of median, driveway density, spacing between signalized intersections, existence of parking, level of pedestrian activity and speed limit.

The interaction among vehicles is determined by traffic density, the proportion of trucks and buses, and turning movements. This interaction affects the operation of vehicles at intersections and, to a lesser extent, between signals.

Traffic control (including signals and signs) forces a portion of all vehicles to slow or stop. The delays and speed changes caused by traffic control devices reduce vehicle speeds, however, such controls are needed to establish right-of-way.

The average travel speed for through vehicles along an urban street is the determinant of the operating level of service. The travel speed along a segment, section or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections.

Level-of-service A describes primarily free-flow operations. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal.

Level-of-service B describes reasonably unimpeded operations. The ability to maneuver within the traffic stream is only slightly restricted, and control delays at signalized intersections are not significant.

Level-of-service C describes stable operations, however, ability to maneuver and change lanes in midblock location may be more restricted than at level-of-service B. Longer queues, adverse signal coordination, or both may contribute to lower travel speeds.

Level-of-service D borders on a range in which in which small increases in flow may cause substantial increases in delay and decreases in travel speed. Level-of-service D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors.

Level-of-service E is characterized by significant delays and lower travel speeds. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

Level-of-service F is characterized by urban street flow at extremely low speeds. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing.

The methodology to determine level of service stratifies urban streets into four classifications. The classifications are complex, and are related to functional and design categories. Table A-II describes the functional and design categories, while Table A-III relates these to the urban street classification.

Once classified, the urban street is divided into segments for analysis. An urban street segment is a one-way section of street encompassing a series of blocks or links terminating at a signalized intersection. Adjacent segments of urban streets may be combined to form larger street sections, provided that the segments have similar demand flows and characteristics.

Levels of service are related to the average travel speed of vehicles along the urban street segment or section.

Travel times for existing conditions are obtained by field measurements. The maximum-car technique is used. The vehicle is driven at the posted speed limit unless impeded by actual traffic conditions. In the maximum-car technique, a safe level of vehicular operation is maintained by observing proper following distances and by changing speeds at reasonable rates of acceleration and deceleration. The maximum-car technique provides the best base for measuring traffic performance.

An observer records the travel time and locations and duration of delay. The beginning and ending points are the centers of intersections. Delays include times waiting in queues at signalized intersections. The travel speed is determined by dividing the length of the segment by the travel time. Once the travel speed on the arterial is determined, the level of service is found by comparing the speed to the criteria in Table A-IV. Level-of-service criteria vary for the different classifications of urban street, reflecting differences in driver expectations.

Table A-II

Functional and Design Categories for Urban Streets

Criterion	Functional Category	
	Principal Arterial	**Minor Arterial**
Mobility function	Very important	Important
Access function	Very minor	Substantial
Points connected	Freeways, important activity centers, major traffic generators	Principal arterials
Predominant trips served	Relatively long trips between major points and through trips entering, leaving, and passing through city	Trips of moderate length within relatively small geographical areas

Criterion	Design Category			
	High-Speed	**Suburban**	**Intermediate**	**Urban**
Driveway access density	Very low density	Low density	Moderate density	High density
Arterial type	Multilane divided; undivided or two-lane with shoulders	Multilane divided: undivided or two-lane with shoulders	Multilane divided or undivided; one way, two lane	Undivided one way; two way, two or more lanes
Parking	No	No	Some	Usually
Separate left-turn lanes	Yes	Yes	Usually	Some
Signals per mile	0.5 to 2	1 to 5	4 to 10	6 to 12
Speed limits	45 to 55 mph	40 to 45 mph	30 to 40 mph	25 to 35 mph
Pedestrian activity	Very little	Little	Some	Usually
Roadside development	Low density	Low to medium density	Medium to moderate density	High density

Source: *Highway Capacity Manual 2000*

Table A-III

Urban Street Class based on Function and Design Categories

Design Category	Functional Category	
	Principal Arterial	**Minor Arterial**
High-Speed	I	Not applicable
Suburban	II	II
Intermediate	II	III or IV
Urban	III or IV	IV

Source: *Highway Capacity Manual 2000*

Table A-IV

Urban Street Levels of Service by Class

Urban Street Class	I	II	III	IV
Range of Free Flow Speeds (mph)	45 to 55	35 to 45	30 to 35	25 to 35
Typical Free Flow Speed (mph)	50	40	33	30
Level of Service	**Average Travel Speed (mph)**			
A	>42	>35	>30	>25
B	>34	>28	>24	>19
C	>27	>22	>18	>13
D	>21	>17	>14	>9
E	>16	>13	>10	>7
F	≤16	≤13	≤10	≤7

Source: *Highway Capacity Manual 2000*

Interrupted Flow

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, *i. e.,* in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Specifically, level of service criteria for traffic signals are stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length and the volume to capacity ratio for the lane group.

For each intersection analyzed the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. A

description of levels of service for signalized intersections can be found in Table A-V.

Table A-V

Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Progression is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase doe not serve queued vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestions becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: *Highway Capacity Manual 2000*

The use of control delay, which may also be referred to as signal delay, was introduced in the 1997 update to the *Highway Capacity Manual*, and represents a departure from previous updates. In the third edition, published in 1985 and the 1994 update to the third edition, delay only included stopped delay. Thus, the level of service criteria listed in Table A-V differs from earlier criteria.

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the *Highway Capacity Manual* and represent a revision of the methodology published in the 1994 update to the 1985 *Highway Capacity Manual*. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, *i. e.,* in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay are determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through a stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in Table A-VI.

Table A-VI

Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of tolerable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.

Source: *Highway Capacity Manual 2000*

APPENDIX B – TRAFFIC COUNTS WORKSHEETS

Prepared by NDS/ATD

VOLUME

Morgan Territory Rd N/O Manning Rd

Day: Tuesday
Date: 9/18/2018

City: Livermore
Project #: CA18_8461_001

DAILY TOTALS	NB	SB	EB	WB	Total
	338	308	0	0	646

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0		12:00	5		7						12	
00:15	0		0						0		12:15	4		9						13	
00:30	0		0						0		12:30	6		6						12	
00:45	0		1	1					1	1	12:45	3	18	3	25					6	43
01:00	0		0						0		13:00	5		4						9	
01:15	0		0						0		13:15	4		2						6	
01:30	0		0						0		13:30	6		3						9	
01:45	0		0						0		13:45	3	18	2	11					5	29
02:00	0		0						0		14:00	4		5						9	
02:15	0		0						0		14:15	6		5						11	
02:30	1		0						1		14:30	8		5						13	
02:45	0	1	1	1					1	2	14:45	7	25	5	20					12	45
03:00	1		0						1		15:00	2		1						3	
03:15	0		0						0		15:15	6		4						10	
03:30	0		0						0		15:30	4		0						4	
03:45	0	1	1	1					1	2	15:45	12	24	5	10					17	34
04:00	1		0						1		16:00	4		6						10	
04:15	0		2						2		16:15	9		3						12	
04:30	0		0						0		16:30	16		8						24	
04:45	0	1	1	3					1	4	16:45	14	43	1	18					15	61
05:00	1		2						3		17:00	16		2						18	
05:15	1		2						3		17:15	13		6						19	
05:30	3		2						5		17:30	14		5						19	
05:45	3	8	2	8					5	16	17:45	13	56	3	16					16	72
06:00	1		9						10		18:00	9		5						14	
06:15	0		4						4		18:15	5		4						9	
06:30	1		5						6		18:30	7		2						9	
06:45	1	3	7	25					8	28	18:45	8	29	1	12					9	41
07:00	0		7						7		19:00	5		1						6	
07:15	3		10						13		19:15	6		4						10	
07:30	2		17						19		19:30	4		1						5	
07:45	4	9	6	40					10	49	19:45	4	19	0	6					4	25
08:00	4		9						13		20:00	2		1						3	
08:15	2		8						10		20:15	4		2						6	
08:30	4		10						14		20:30	4		3						7	
08:45	10	20	7	34					17	54	20:45	3	13	0	6					3	19
09:00	3		10						13		21:00	2		0						2	
09:15	4		3						7		21:15	0		1						1	
09:30	2		8						10		21:30	3		0						3	
09:45	5	14	2	23					7	37	21:45	2	7	6	7					8	14
10:00	2		6						8		22:00	1		1						2	
10:15	1		2						3		22:15	1		0						1	
10:30	3		1						4		22:30	1		0						1	
10:45	7	13	5	14					12	27	22:45	0	3	0	1					0	4
11:00	1		7						8		23:00	1		0						1	
11:15	4		7						11		23:15	0		0						0	
11:30	4		5						9		23:30	0		0						0	
11:45	3	12	7	26					10	38	23:45	0	1	0						0	1
TOTALS		82		176						258	TOTALS		256		132						388
SPLIT %		31.8%		68.2%						39.9%	SPLIT %		66.0%		34.0%						60.1%

DAILY TOTALS	NB	SB	EB	WB	Total
	338	308	0	0	646

AM Peak Hour	08:30	07:15			07:15	PM Peak Hour	16:30	12:00			16:30
AM Pk Volume	21	42			55	PM Pk Volume	59	25			76
Pk Hr Factor	0.525	0.618			0.724	Pk Hr Factor	0.922	0.694			0.792
7 - 9 Volume	29	74	0	0	103	4 - 6 Volume	99	34	0	0	133
7 - 9 Peak Hour	08:00	07:15			07:15	4 - 6 Peak Hour	16:30	16:00			16:30
7 - 9 Pk Volume	20	42	0	0	55	4 - 6 Pk Volume	59	18	0	0	76
Pk Hr Factor	0.500	0.618	0.000	0.000	0.724	Pk Hr Factor	0.922	0.563	0.000	0.000	0.792

Prepared by NDS/ATD

VOLUME

Morgan Territory Rd N/O Manning Rd

Day: Wednesday
Date: 9/19/2018

City: Livermore
Project #: CA18_8461_001

DAILY TOTALS	NB	SB	EB	WB	Total
	342	289	0	0	631

AM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0	
00:15	0		0						0	
00:30	0		0						0	
00:45	0		0						0	
01:00	0		0						0	
01:15	0		0						0	
01:30	0		0						0	
01:45	0		0						0	
02:00	0		0						0	
02:15	0		0						0	
02:30	0		0						0	
02:45	0		0						0	
03:00	1		0						1	
03:15	1		0						1	
03:30	0		0						0	
03:45	0	2	0						0	2
04:00	0		1						1	
04:15	0		0						0	
04:30	0		1						1	
04:45	0		1	3					1	3
05:00	0		0						0	
05:15	2		3						5	
05:30	1		2						3	
05:45	4	7	4	9					8	16
06:00	2		12						14	
06:15	3		5						8	
06:30	1		7						8	
06:45	2	8	0	24					2	32
07:00	0		4						4	
07:15	0		11						11	
07:30	1		8						9	
07:45	1	2	7	30					8	32
08:00	8		13						21	
08:15	1		11						12	
08:30	3		10						13	
08:45	6	18	3	37					9	55
09:00	1		5						6	
09:15	3		5						8	
09:30	0		6						6	
09:45	2	6	3	19					5	25
10:00	3		8						11	
10:15	3		5						8	
10:30	4		3						7	
10:45	6	16	4	20					10	36
11:00	6		6						12	
11:15	3		3						6	
11:30	3		6						9	
11:45	2	14	6	21					8	35
TOTALS		73		163						236
SPLIT %		30.9%		69.1%						37.4%

PM Period	NB		SB		EB		WB		TOTAL	
12:00	2		3						5	
12:15	2		4						6	
12:30	8		5						13	
12:45	4	16	6	18					10	34
13:00	5		0						5	
13:15	5		3						8	
13:30	4		5						9	
13:45	3	17	4	12					7	29
14:00	4		3						7	
14:15	10		6						16	
14:30	4		4						8	
14:45	6	24	6	19					12	43
15:00	4		3						7	
15:15	6		1						7	
15:30	8		4						12	
15:45	15	33	8	16					23	49
16:00	14		6						20	
16:15	14		5						19	
16:30	10		3						13	
16:45	13	51	0	14					13	65
17:00	16		3						19	
17:15	14		6						20	
17:30	10		2						12	
17:45	11	51	5	16					16	67
18:00	6		5						11	
18:15	4		7						11	
18:30	8		2						10	
18:45	4	22	2	16					6	38
19:00	9		3						12	
19:15	5		1						6	
19:30	6		0						6	
19:45	2	22	1	5					3	27
20:00	5		2						7	
20:15	5		0						5	
20:30	2		0						2	
20:45	4	16	1	3					5	19
21:00	0		2						2	
21:15	8		1						9	
21:30	2		1						3	
21:45	1	11	0	4					1	15
22:00	1		1						2	
22:15	0		1						1	
22:30	0		0						0	
22:45	0	1	0	2					0	3
23:00	3		0						3	
23:15	0		0						0	
23:30	1		0						1	
23:45	1	5	1	1					2	6
TOTALS		269		126						395
SPLIT %		68.1%		31.9%						62.6%

DAILY TOTALS	NB	SB	EB	WB	Total
	342	289	0	0	631

						PM Peak Hour					
AM Peak Hour	10:15	07:45			08:00		15:45	15:30			15:45
AM Pk Volume	19	41			55	PM Pk Volume	53	23			75
Pk Hr Factor	0.792	0.788			0.655	Pk Hr Factor	0.883	0.719			0.815
7 - 9 Volume	20	67	0	0	87	4 - 6 Volume	102	30	0	0	132
7 - 9 Peak Hour	08:00	07:45			08:00	4 - 6 Peak Hour	16:15	17:00			17:00
7 - 9 Pk Volume	18	41	0	0	55	4 - 6 Pk Volume	53	16	0	0	67
Pk Hr Factor	0.563	0.788	0.000	0.000	0.655	Pk Hr Factor	0.828	0.667	0.000	0.000	0.838

Prepared by NDS/ATD

VOLUME

Morgan Territory Rd N/O Manning Rd

Day: Thursday
Date: 9/20/2018

City: Livermore
Project #: CA18_8461_001

DAILY TOTALS	NB	SB	EB	WB	Total
	329	311	0	0	640

AM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0	
00:15	0		0						0	
00:30	0		0						0	
00:45	0		0						0	
01:00	0		0						0	
01:15	0		0						0	
01:30	0		0						0	
01:45	0		0						0	
02:00	0		0						0	
02:15	0		0						0	
02:30	0		0						0	
02:45	1	1	0						1	1
03:00	0		0						0	
03:15	0		0						0	
03:30	0		0						0	
03:45	0		0						0	
04:00	0		0						0	
04:15	0		1						1	
04:30	0		1						1	
04:45	0		0	2					0	2
05:00	2		1						3	
05:15	1		5						6	
05:30	4		2						6	
05:45	2	9	4	12					6	21
06:00	2		6						8	
06:15	1		7						8	
06:30	1		10						11	
06:45	3	7	3	26					6	33
07:00	1		8						9	
07:15	3		14						17	
07:30	0		9						9	
07:45	2	6	6	37					8	43
08:00	3		10						13	
08:15	8		15						23	
08:30	2		15						17	
08:45	4	17	8	48					12	65
09:00	4		5						9	
09:15	2		9						11	
09:30	4		5						9	
09:45	1	11	3	22					4	33
10:00	2		5						7	
10:15	4		1						5	
10:30	5		2						7	
10:45	8	19	5	13					13	32
11:00	5		3						8	
11:15	2		7						9	
11:30	3		2						5	
11:45	4	14	8	20					12	34
TOTALS		84		180						264
SPLIT %		31.8%		68.2%						41.3%

PM Period	NB		SB		EB		WB		TOTAL	
12:00	6		5						11	
12:15	5		1						6	
12:30	3		2						5	
12:45	4	18	7	15					11	33
13:00	4		5						9	
13:15	2		2						4	
13:30	5		7						12	
13:45	4	15	3	17					7	32
14:00	6		3						9	
14:15	5		7						12	
14:30	6		3						9	
14:45	6	23	3	16					9	39
15:00	8		3						11	
15:15	8		7						15	
15:30	6		8						14	
15:45	16	38	3	21					19	59
16:00	7		8						15	
16:15	12		3						15	
16:30	6		4						10	
16:45	13	38	4	19					17	57
17:00	11		8						19	
17:15	13		0						13	
17:30	9		6						15	
17:45	7	40	1	15					8	55
18:00	9		3						12	
18:15	5		2						7	
18:30	6		5						11	
18:45	8	28	4	14					12	42
19:00	6		4						10	
19:15	5		2						7	
19:30	0		2						2	
19:45	4	15	1	9					5	24
20:00	3		1						4	
20:15	1		1						2	
20:30	4		1						5	
20:45	6	14	0	3					6	17
21:00	6		1						7	
21:15	2		0						2	
21:30	2		0						2	
21:45	0	10	0	1					0	11
22:00	2		0						2	
22:15	1		0						1	
22:30	1		0						1	
22:45	0	4	0						0	4
23:00	0		0						0	
23:15	1		0						1	
23:30	0		1						1	
23:45	1	2	0	1					1	3
TOTALS		245		131						376
SPLIT %		65.2%		34.8%						58.8%

DAILY TOTALS	NB	SB	EB	WB	Total
	329	311	0	0	640

AM Peak Hour	10:15	08:00			08:00	PM Peak Hour	16:45	15:15			16:45
AM Pk Volume	22	48			65	PM Pk Volume	46	26			64
Pk Hr Factor	0.688	0.800			0.707	Pk Hr Factor	0.885	0.813			0.842
7 - 9 Volume	23	85	0	0	108	4 - 6 Volume	78	34	0	0	112
7 - 9 Peak Hour	08:00	08:00			08:00	4 - 6 Peak Hour	16:45	16:00			16:45
7 - 9 Pk Volume	17	48	0	0	65	4 - 6 Pk Volume	46	19	0	0	64
Pk Hr Factor	0.531	0.800	0.000	0.000	0.707	Pk Hr Factor	0.885	0.594	0.000	0.000	0.842

Prepared by NDS/ATD

VOLUME

Morgan Territory Rd N/O Manning Rd

Day: Friday
Date: 9/21/2018

City: Livermore
Project #: CA18_8461_001

DAILY TOTALS	NB	SB	EB	WB	Total
	314	278	0	0	592

AM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0	
00:15	0		0						0	
00:30	0		0						0	
00:45	0		0						0	
01:00	0		1						1	
01:15	0		0						0	
01:30	0		0						0	
01:45	0		1	2					1	2
02:00	0		0						0	
02:15	0		0						0	
02:30	0		0						0	
02:45	0		0						0	
03:00	1		0						1	
03:15	1		0						1	
03:30	0		0						0	
03:45	0	2	0						0	2
04:00	0		0						0	
04:15	0		0						0	
04:30	0		2						2	
04:45	0		0	2					0	2
05:00	1		3						4	
05:15	1		0						1	
05:30	3		1						4	
05:45	3	8	2	6					5	14
06:00	2		6						8	
06:15	1		12						13	
06:30	2		7						9	
06:45	3	8	4	29					7	37
07:00	1		3						4	
07:15	2		7						9	
07:30	2		13						15	
07:45	2	7	6	29					8	36
08:00	3		11						14	
08:15	6		7						13	
08:30	5		8						13	
08:45	0	14	9	35					9	49
09:00	3		1						4	
09:15	3		7						10	
09:30	2		7						9	
09:45	3	11	4	19					7	30
10:00	1		3						4	
10:15	0		4						4	
10:30	2		4						6	
10:45	4	7	5	16					9	23
11:00	7		2						9	
11:15	3		5						8	
11:30	4		8						12	
11:45	1	15	4	19					5	34
TOTALS		72		157						229
SPLIT %		31.4%		68.6%						38.7%

PM Period	NB		SB		EB		WB		TOTAL	
12:00	7		3						10	
12:15	6		4						10	
12:30	4		4						8	
12:45	2	19	3	14					5	33
13:00	4		4						8	
13:15	4		3						7	
13:30	4		3						7	
13:45	5	17	4	14					9	31
14:00	5		5						10	
14:15	4		1						5	
14:30	7		5						12	
14:45	4	20	9	20					13	40
15:00	7		5						12	
15:15	8		5						13	
15:30	14		3						17	
15:45	11	40	6	19					17	59
16:00	9		8						17	
16:15	7		6						13	
16:30	9		4						13	
16:45	14	39	3	21					17	60
17:00	11		4						15	
17:15	9		4						13	
17:30	9		4						13	
17:45	8	37	1	13					9	50
18:00	9		4						13	
18:15	6		2						8	
18:30	4		5						9	
18:45	2	21	0	11					2	32
19:00	4		0						4	
19:15	6		0						6	
19:30	3		1						4	
19:45	1	14	1	2					2	16
20:00	4		1						5	
20:15	4		2						6	
20:30	2		0						2	
20:45	4	14	0	3					4	17
21:00	5		1						6	
21:15	2		1						3	
21:30	0		0						0	
21:45	1	8	0	2					1	10
22:00	0		0						0	
22:15	2		0						2	
22:30	0		1						1	
22:45	3	5	0	1					3	6
23:00	2		0						2	
23:15	2		1						3	
23:30	1		0						1	
23:45	3	8	0	1					3	9
TOTALS		242		121						363
SPLIT %		66.7%		33.3%						61.3%

DAILY TOTALS	NB	SB	EB	WB	Total
	314	278	0	0	592

AM Peak Hour	10:45	07:15			07:30	PM Peak Hour	16:30	14:30			15:15
AM Pk Volume	18	37			50	PM Pk Volume	43	24			64
Pk Hr Factor	0.643	0.712			0.833	Pk Hr Factor	0.768	0.667			0.941
7 - 9 Volume	21	64	0	0	85	4 - 6 Volume	76	34	0	0	110
7 - 9 Peak Hour	07:45	07:15			07:30	4 - 6 Peak Hour	16:30	16:00			16:00
7 - 9 Pk Volume	16	37	0	0	50	4 - 6 Pk Volume	43	21	0	0	60
Pk Hr Factor	0.667	0.712	0.000	0.000	0.833	Pk Hr Factor	0.768	0.656	0.000	0.000	0.882

Prepared by NDS/ATD

VOLUME

Morgan Territory Rd N/O Manning Rd

Day: Saturday
Date: 9/22/2018

City: Livermore
Project #: CA18_8461_001

DAILY TOTALS	NB	SB	EB	WB	Total
	249	266	0	0	515

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0		12:00	2		1						3	
00:15	3		0						3		12:15	1		9						10	
00:30	0		2						2		12:30	3		10						13	
00:45	0	3	0	2					0	5	12:45	3	9	7	27					10	36
01:00	1		0						1		13:00	5		2						7	
01:15	1		0						1		13:15	3		4						7	
01:30	0		0						0		13:30	6		4						10	
01:45	0	2	0						0	2	13:45	3	17	1	11					4	28
02:00	0		0						0		14:00	4		1						5	
02:15	0		0						0		14:15	3		5						8	
02:30	0		0						0		14:30	8		3						11	
02:45	0		0						0		14:45	9	24	3	12					12	36
03:00	1		0						1		15:00	3		6						9	
03:15	0		0						0		15:15	6		15						21	
03:30	0		0						0		15:30	4		2						6	
03:45	0	1	0						0	1	15:45	6	19	11	34					17	53
04:00	0		0						0		16:00	5		4						9	
04:15	0		0						0		16:15	3		4						7	
04:30	0		2						2		16:30	3		3						6	
04:45	0		1	3					1	3	16:45	3	14	1	12					4	26
05:00	0		1						1		17:00	5		6						11	
05:15	0		0						0		17:15	8		2						10	
05:30	1		1						2		17:30	2		3						5	
05:45	0	1	1	3					1	4	17:45	3	18	4	15					7	33
06:00	0		3						3		18:00	3		3						6	
06:15	1		0						1		18:15	5		5						10	
06:30	1		2						3		18:30	4		4						8	
06:45	4	6	1	6					5	12	18:45	1	13	1	13					2	26
07:00	4		2						6		19:00	3		4						7	
07:15	2		1						3		19:15	7		3						10	
07:30	2		6						8		19:30	1		3						4	
07:45	6	14	3	12					9	26	19:45	2	13	0	10					2	23
08:00	4		8						12		20:00	0		0						0	
08:15	6		4						10		20:15	0		4						4	
08:30	7		5						12		20:30	1		2						3	
08:45	8	25	8	25					16	50	20:45	3	4	0	6					3	10
09:00	3		5						8		21:00	4		0						4	
09:15	4		13						17		21:15	1		0						1	
09:30	5		5						10		21:30	3		0						3	
09:45	6	18	2	25					8	43	21:45	2	10	0						2	10
10:00	6		2						8		22:00	1		0						1	
10:15	3		9						12		22:15	1		1						2	
10:30	4		7						11		22:30	1		1						2	
10:45	5	18	9	27					14	45	22:45	0	3	1	3					1	6
11:00	5		4						9		23:00	1		0						1	
11:15	1		3						4		23:15	2		0						2	
11:30	5		11						16		23:30	0		0						0	
11:45	2	13	2	20					4	33	23:45	1	4	0						1	4
TOTALS		101		123						224	TOTALS		148		143						291
SPLIT %		45.1%		54.9%						43.5%	SPLIT %		50.9%		49.1%						56.5%

DAILY TOTALS	NB	SB	EB	WB	Total
	249	266	0	0	515

AM Peak Hour	08:00	08:30			08:30	PM Peak Hour	14:30	15:00			14:30
AM Pk Volume	25	31			53	PM Pk Volume	26	34			53
Pk Hr Factor	0.781	0.596			0.779	Pk Hr Factor	0.722	0.567			0.631
7 - 9 Volume	39	37	0	0	76	4 - 6 Volume	32	27	0	0	59
7 - 9 Peak Hour	08:00	08:00			08:00	4 - 6 Peak Hour	16:30	17:00			17:00
7 - 9 Pk Volume	25	25	0	0	50	4 - 6 Pk Volume	19	15	0	0	33
Pk Hr Factor	0.781	0.781	0.000	0.000	0.781	Pk Hr Factor	0.594	0.625	0.000	0.000	0.750

Prepared by NDS/ATD

VOLUME

Morgan Territory Rd N/O Manning Rd

Day: Sunday
Date: 9/23/2018

City: Livermore
Project #: CA18_8461_001

DAILY TOTALS	NB	SB	EB	WB	Total
	189	213	0	0	402

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	0		1						1		12:00	5		6						11	
00:15	0		0						0		12:15	4		7						11	
00:30	1		0						1		12:30	4		5						9	
00:45	1	2	0	1					1	3	12:45	5	18	9	27					14	45
01:00	0		1						1		13:00	4		3						7	
01:15	0		1						1		13:15	6		4						10	
01:30	0		0						0		13:30	1		1						2	
01:45	0		1	3					1	3	13:45	6	17	5	13					11	30
02:00	0		0						0		14:00	4		3						7	
02:15	0		0						0		14:15	6		8						14	
02:30	0		0						0		14:30	1		2						3	
02:45	0		0						0		14:45	5	16	2	15					7	31
03:00	0		0						0		15:00	4		5						9	
03:15	0		0						0		15:15	4		6						10	
03:30	0		0						0		15:30	2		5						7	
03:45	1	1	0						1	1	15:45	5	15	2	18					7	33
04:00	0		0						0		16:00	7		6						13	
04:15	0		0						0		16:15	3		3						6	
04:30	0		0						0		16:30	2		0						2	
04:45	0		0						0		16:45	5	17	4	13					9	30
05:00	0		0						0		17:00	4		2						6	
05:15	0		0						0		17:15	4		4						8	
05:30	0		1						1		17:30	2		1						3	
05:45	0		1	2					1	2	17:45	0	10	2	9					2	19
06:00	0		1						1		18:00	6		2						8	
06:15	0		2						2		18:15	4		2						6	
06:30	1		2						3		18:30	0		3						3	
06:45	0	1	0	5					0	6	18:45	3	13	2	9					5	22
07:00	1		1						2		19:00	4		1						5	
07:15	1		2						3		19:15	0		2						2	
07:30	2		2						4		19:30	0		1						1	
07:45	5	9	1	6					6	15	19:45	3	7	0	4					3	11
08:00	1		1						2		20:00	3		2						5	
08:15	2		5						7		20:15	3		0						3	
08:30	2		5						7		20:30	2		2						4	
08:45	2	7	5	16					7	23	20:45	2	10	3	7					5	17
09:00	1		1						2		21:00	1		0						1	
09:15	4		7						11		21:15	3		0						3	
09:30	4		6						10		21:30	1		0						1	
09:45	2	11	6	20					8	31	21:45	1	6	0						1	6
10:00	2		4						6		22:00	0		1						1	
10:15	2		4						6		22:15	0		1						1	
10:30	1		8						9		22:30	0		0						0	
10:45	7	12	5	21					12	33	22:45	1	1	0	2					1	3
11:00	4		7						11		23:00	0		1						1	
11:15	4		7						11		23:15	1		0						1	
11:30	7		5						12		23:30	0		0						0	
11:45	0	15	2	21					2	36	23:45	0	1	0	1					0	2
TOTALS		58		95						153	TOTALS		131		118						249
SPLIT %		37.9%		62.1%						38.1%	SPLIT %		52.6%		47.4%						61.9%

DAILY TOTALS	NB	SB	EB	WB	Total
	189	213	0	0	402

AM Peak Hour	10:45	10:30			10:45	PM Peak Hour	12:30	12:00			12:00
AM Pk Volume	22	27			46	PM Pk Volume	19	27			45
Pk Hr Factor	0.786	0.844			0.958	Pk Hr Factor	0.792	0.750			0.804
7 - 9 Volume	16	22	0	0	38	4 - 6 Volume	27	22	0	0	49
7 - 9 Peak Hour	07:30	08:00			08:00	4 - 6 Peak Hour	16:00	16:00			16:00
7 - 9 Pk Volume	10	16	0	0	23	4 - 6 Pk Volume	17	13	0	0	30
Pk Hr Factor	0.500	0.800	0.000	0.000	0.821	Pk Hr Factor	0.607	0.542	0.000	0.000	0.577

Prepared by NDS/ATD

VOLUME

Morgan Territory Rd N/O Manning Rd

Day: Monday
Date: 9/24/2018

City: Livermore
Project #: CA18_8461_001

DAILY TOTALS	NB	SB	EB	WB	Total
	303	306	0	0	609

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0		12:00	6		6						12	
00:15	0		0						0		12:15	2		4						6	
00:30	0		0						0		12:30	10		7						17	
00:45	0		0						0		12:45	3	21	3	20					6	41
01:00	0		0						0		13:00	4		7						11	
01:15	0		0						0		13:15	1		3						4	
01:30	0		0						0		13:30	5		6						11	
01:45	0		0						0		13:45	1	11	2	18					3	29
02:00	0		1						1		14:00	4		2						6	
02:15	1		0						1		14:15	11		8						19	
02:30	0		0						0		14:30	5		7						12	
02:45	0	1	0	1					0	2	14:45	6	26	8	25					14	51
03:00	0		0						0		15:00	6		5						11	
03:15	0		0						0		15:15	7		4						11	
03:30	1		0						1		15:30	10		3						13	
03:45	0	1	0						0	1	15:45	9	32	7	19					16	51
04:00	0		0						0		16:00	6		9						15	
04:15	0		0						0		16:15	10		6						16	
04:30	0		1						1		16:30	7		1						8	
04:45	1	1	2	3					3	4	16:45	9	32	6	22					15	54
05:00	0		2						2		17:00	7		4						11	
05:15	3		0						3		17:15	9		2						11	
05:30	1		2						3		17:30	7		1						8	
05:45	5	9	2	6					7	15	17:45	6	29	6	13					12	42
06:00	3		14						17		18:00	10		4						14	
06:15	0		1						1		18:15	3		2						5	
06:30	1		9						10		18:30	5		0						5	
06:45	0	4	3	27					3	31	18:45	8	26	2	8					10	34
07:00	0		6						6		19:00	3		2						5	
07:15	1		8						9		19:15	6		4						10	
07:30	1		10						11		19:30	3		3						6	
07:45	5	7	10	34					15	41	19:45	7	19	1	10					8	29
08:00	5		9						14		20:00	1		2						3	
08:15	5		15						20		20:15	3		1						4	
08:30	3		10						13		20:30	2		1						3	
08:45	2	15	6	40					8	55	20:45	3	9	1	5					4	14
09:00	4		6						10		21:00	0		0						0	
09:15	2		9						11		21:15	2		0						2	
09:30	5		5						10		21:30	1		0						1	
09:45	6	17	3	23					9	40	21:45	1	4	0						1	4
10:00	5		4						9		22:00	1		0						1	
10:15	4		3						7		22:15	0		0						0	
10:30	3		3						6		22:30	1		0						1	
10:45	8	20	6	16					14	36	22:45	0	2	0						0	2
11:00	0		2						2		23:00	0		0						0	
11:15	7		6						13		23:15	1		0						1	
11:30	3		4						7		23:30	0		1						1	
11:45	6	16	3	15					9	31	23:45	0	1	0	1					0	2
TOTALS		91		165						256	TOTALS		212		141						353
SPLIT %		35.5%		64.5%						42.0%	SPLIT %		60.1%		39.9%						58.0%

DAILY TOTALS	NB	SB	EB	WB	Total
	303	306	0	0	609

AM Peak Hour	11:45	07:30			07:45	PM Peak Hour	15:30	14:15			15:30
AM Pk Volume	24	44			62	PM Pk Volume	35	28			60
Pk Hr Factor	0.600	0.733			0.775	Pk Hr Factor	0.875	0.875			0.938
7 - 9 Volume	22	74	0	0	96	4 - 6 Volume	61	35	0	0	96
7 - 9 Peak Hour	07:45	07:30			07:45	4 - 6 Peak Hour	16:15	16:00			16:00
7 - 9 Pk Volume	18	44	0	0	62	4 - 6 Pk Volume	33	22	0	0	54
Pk Hr Factor	0.900	0.733	0.000	0.000	0.775	Pk Hr Factor	0.825	0.611	0.000	0.000	0.844

Prepared by NDS/ATD

VOLUME

Manning Rd W/O Livermore Ave

Day: Tuesday
Date: 9/18/2018

City: Livermore
Project #: CA18_8461_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,405	1,104	2,509

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		**12:00**			12		11		23	
00:15			0		0		0		**12:15**			15		9		24	
00:30			0		0		0		**12:30**			14		10		24	
00:45			0		0		0		**12:45**			14	55	10	40	24	95
01:00			0		0		0		**13:00**			14		9		23	
01:15			0		0		0		**13:15**			10		9		19	
01:30			0		0		0		**13:30**			10		12		22	
01:45			0		1	1	1	1	**13:45**			10	44	13	43	23	87
02:00			0		0		0		**14:00**			18		11		29	
02:15			0		0		0		**14:15**			21		8		29	
02:30			0		1		1		**14:30**			24		19		43	
02:45			1	1	0	1	1	2	**14:45**			44	107	16	54	60	161
03:00			0		1		1		**15:00**			33		8		41	
03:15			0		0		0		**15:15**			54		11		65	
03:30			0		1		1		**15:30**			38		20		58	
03:45			2	2	0	2	2	4	**15:45**			60	185	15	54	75	239
04:00			0		1		1		**16:00**			79		12		91	
04:15			3		0		3		**16:15**			69		13		82	
04:30			0		2		2		**16:30**			67		16		83	
04:45			3	6	3	6	6	12	**16:45**			58	273	20	61	78	334
05:00			2		5		7		**17:00**			60		16		76	
05:15			4		9		13		**17:15**			57		23		80	
05:30			3		11		14		**17:30**			72		17		89	
05:45			2	11	16	41	18	52	**17:45**			58	247	18	74	76	321
06:00			12		11		23		**18:00**			44		14		58	
06:15			5		17		22		**18:15**			49		10		59	
06:30			7		23		30		**18:30**			20		12		32	
06:45			8	32	23	74	31	106	**18:45**			27	140	13	49	40	189
07:00			11		38		49		**19:00**			12		15		27	
07:15			19		48		67		**19:15**			17		8		25	
07:30			18		51		69		**19:30**			6		7		13	
07:45			12	60	56	193	68	253	**19:45**			3	38	7	37	10	75
08:00			11		45		56		**20:00**			4		10		14	
08:15			18		42		60		**20:15**			5		6		11	
08:30			15		38		53		**20:30**			9		7		16	
08:45			8	52	39	164	47	216	**20:45**			0	18	2	25	2	43
09:00			13		22		35		**21:00**			2		3		5	
09:15			12		24		36		**21:15**			4		0		4	
09:30			11		19		30		**21:30**			2		8		10	
09:45			11	47	18	83	29	130	**21:45**			7	15	2	13	9	28
10:00			4		9		13		**22:00**			2		4		6	
10:15			7		13		20		**22:15**			1		2		3	
10:30			2		8		10		**22:30**			2		1		3	
10:45			9	22	13	43	22	65	**22:45**			0	5	0	7	0	12
11:00			14		11		25		**23:00**			4		1		5	
11:15			9		11		20		**23:15**			0		0		0	
11:30			5		6		11		**23:30**			0		0		0	
11:45			12	40	8	36	20	76	**23:45**			1	5	2	3	3	8
TOTALS				273		644		**917**	**TOTALS**				1132		460		**1592**
SPLIT %				29.8%		70.2%		**36.5%**	**SPLIT %**				71.1%		28.9%		**63.5%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,405	1,104	2,509

AM Peak Hour				07:00	07:15	**07:15**		**PM Peak Hour**				15:45	16:45	**16:00**
AM Pk Volume				60	200	**260**		**PM Pk Volume**				275	76	**334**
Pk Hr Factor				0.789	0.893	**0.942**		**Pk Hr Factor**				0.870	0.826	**0.918**
7 - 9 Volume	0	0		112	357	**469**		**4 - 6 Volume**	0	0		520	135	**655**
7 - 9 Peak Hour				07:00	07:15	**07:15**		**4 - 6 Peak Hour**				16:00	16:45	**16:00**
7 - 9 Pk Volume	0	0		60	200	**260**		**4 - 6 Pk Volume**	0	0		273	76	**334**
Pk Hr Factor	0.000	0.000		0.789	0.893	**0.942**		**Pk Hr Factor**	0.000	0.000		0.864	0.826	**0.918**

Prepared by NDS/ATD

VOLUME

Manning Rd W/O Livermore Ave

Day: Wednesday
Date: 9/19/2018

City: Livermore
Project #: CA18_8461_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,451	1,133	2,584

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			11		13		24	
00:15			0		0		0		12:15			15		14		29	
00:30			0		2		2		12:30			12		15		27	
00:45			1	1	0	2	1	3	12:45			14	52	10	52	24	104
01:00			1		0		1		13:00			10		9		19	
01:15			1		0		1		13:15			12		6		18	
01:30			0		0		0		13:30			17		13		30	
01:45			0	2	0		0	2	13:45			12	51	8	36	20	87
02:00			0		1		1		14:00			18		11		29	
02:15			0		1		1		14:15			23		14		37	
02:30			0		0		0		14:30			32		17		49	
02:45			0		0	2	0	2	14:45			38	111	15	57	53	168
03:00			0		1		1		15:00			44		10		54	
03:15			0		1		1		15:15			42		11		53	
03:30			0		0		0		15:30			59		21		80	
03:45			0		0	2	0	2	15:45			58	203	20	62	78	265
04:00			1		0		1		16:00			53		20		73	
04:15			1		0		1		16:15			66		32		98	
04:30			1		0		1		16:30			71		17		88	
04:45			2	5	5	5	7	10	16:45			63	253	17	86	80	339
05:00			0		4		4		17:00			57		20		77	
05:15			5		10		15		17:15			80		16		96	
05:30			2		8		10		17:30			55		18		73	
05:45			6	13	16	38	22	51	17:45			51	243	13	67	64	310
06:00			10		13		23		18:00			51		11		62	
06:15			7		14		21		18:15			45		10		55	
06:30			11		26		37		18:30			45		12		57	
06:45			1	29	22	75	23	104	18:45			25	166	9	42	34	208
07:00			10		41		51		19:00			13		12		25	
07:15			13		48		61		19:15			15		5		20	
07:30			22		45		67		19:30			6		9		15	
07:45			16	61	41	175	57	236	19:45			6	40	7	33	13	73
08:00			20		46		66		20:00			5		8		13	
08:15			22		30		52		20:15			1		7		8	
08:30			15		42		57		20:30			7		2		9	
08:45			7	64	44	162	51	226	20:45			3	16	7	24	10	40
09:00			6		25		31		21:00			4		2		6	
09:15			7		35		42		21:15			5		4		9	
09:30			11		22		33		21:30			2		7		9	
09:45			7	31	22	104	29	135	21:45			1	12	2	15	3	27
10:00			10		14		24		22:00			1		3		4	
10:15			11		13		24		22:15			4		0		4	
10:30			9		12		21		22:30			2		0		2	
10:45			15	45	11	50	26	95	22:45			2	9	1	4	3	13
11:00			11		13		24		23:00			1		1		2	
11:15			4		6		10		23:15			0		0		0	
11:30			15		10		25		23:30			1		2		3	
11:45			10	40	7	36	17	76	23:45			2	4	1	4	3	8
TOTALS				291		651		942	TOTALS				1160		482		1642
SPLIT %				30.9%		69.1%		36.5%	SPLIT %				70.6%		29.4%		63.5%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,451	1,133	2,584

AM Peak Hour				07:30	07:15	07:15		PM Peak Hour				16:30	15:30	16:15
AM Pk Volume				80	180	251		PM Pk Volume				271	93	343
Pk Hr Factor				0.909	0.938	0.937		Pk Hr Factor				0.847	0.727	0.875
7 - 9 Volume	0	0		125	337	462		4 - 6 Volume	0	0		496	153	649
7 - 9 Peak Hour				07:30	07:15	07:15		4 - 6 Peak Hour				16:30	16:00	16:15
7 - 9 Pk Volume	0	0		80	180	251		4 - 6 Pk Volume	0	0		271	86	343
Pk Hr Factor	0.000	0.000		0.909	0.938	0.937		Pk Hr Factor	0.000	0.000		0.847	0.672	0.875

Prepared by NDS/ATD

VOLUME

Manning Rd W/O Livermore Ave

Day: Thursday
Date: 9/20/2018

City: Livermore
Project #: CA18_8461_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,493	1,225	2,718

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			10		17		27	
00:15			1		0		1		12:15			10		10		20	
00:30			0		1		1		12:30			13		13		26	
00:45			0	1	0	1	0	2	12:45			18	51	11	51	29	102
01:00			1		0		1		13:00			9		8		17	
01:15			0		0		0		13:15			14		13		27	
01:30			0		0		0		13:30			15		19		34	
01:45			0	1	1	1	1	2	13:45			12	50	12	52	24	102
02:00			0		1		1		14:00			21		15		36	
02:15			1		0		1		14:15			30		8		38	
02:30			0		0		0		14:30			20		8		28	
02:45			0	1	1	2	1	3	14:45			48	119	16	47	64	166
03:00			0		1		1		15:00			36		14		50	
03:15			0		0		0		15:15			60		15		75	
03:30			0		0		0		15:30			56		18		74	
03:45			0		0	1	0	1	15:45			58	210	17	64	75	274
04:00			0		1		1		16:00			49		12		61	
04:15			2		0		2		16:15			74		15		89	
04:30			1		2		3		16:30			66		17		83	
04:45			0	3	3	6	3	9	16:45			52	241	28	72	80	313
05:00			2		6		8		17:00			67		23		90	
05:15			4		6		10		17:15			63		26		89	
05:30			5		15		20		17:30			83		10		93	
05:45			3	14	16	43	19	57	17:45			54	267	10	69	64	336
06:00			9		10		19		18:00			45		8		53	
06:15			11		13		24		18:15			28		10		38	
06:30			7		23		30		18:30			34		13		47	
06:45			7	34	24	70	31	104	18:45			23	130	17	48	40	178
07:00			11		28		39		19:00			16		14		30	
07:15			11		43		54		19:15			26		6		32	
07:30			19		50		69		19:30			8		4		12	
07:45			12	53	51	172	63	225	19:45			9	59	9	33	18	92
08:00			21		35		56		20:00			7		5		12	
08:15			15		56		71		20:15			7		1		8	
08:30			22		38		60		20:30			7		9		16	
08:45			14	72	48	177	62	249	20:45			4	25	8	23	12	48
09:00			11		52		63		21:00			5		6		11	
09:15			19		45		64		21:15			2		6		8	
09:30			10		36		46		21:30			3		3		6	
09:45			12	52	19	152	31	204	21:45			4	14	1	16	5	30
10:00			12		13		25		22:00			2		2		4	
10:15			2		20		22		22:15			3		2		5	
10:30			8		9		17		22:30			3		1		4	
10:45			3	25	28	70	31	95	22:45			3	11	2	7	5	18
11:00			13		12		25		23:00			2		2		4	
11:15			15		11		26		23:15			0		0		0	
11:30			16		8		24		23:30			2		1		3	
11:45			12	56	11	42	23	98	23:45			0	4	3	6	3	10
TOTALS				312		737		1049	TOTALS				1181		488		1669
SPLIT %				29.7%		70.3%		38.6%	SPLIT %				70.8%		29.2%		61.4%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,493	1,225	2,718

AM Peak Hour				08:00	08:15	07:30		PM Peak Hour				17:00	16:30	16:45
AM Pk Volume				72	194	259		PM Pk Volume				267	94	352
Pk Hr Factor				0.818	0.866	0.912		Pk Hr Factor				0.804	0.839	0.946
7 - 9 Volume	0	0		125	349	474		4 - 6 Volume	0	0		508	141	649
7 - 9 Peak Hour				08:00	07:30	07:30		4 - 6 Peak Hour				17:00	16:30	16:45
7 - 9 Pk Volume	0	0		72	192	259		4 - 6 Pk Volume	0	0		267	94	352
Pk Hr Factor	0.000	0.000		0.818	0.857	0.912		Pk Hr Factor	0.000	0.000		0.804	0.839	0.946

Prepared by NDS/ATD

VOLUME

Manning Rd W/O Livermore Ave

Day: Friday
Date: 9/21/2018

City: Livermore
Project #: CA18_8461_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,534	1,196	2,730

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			9		9		18	
00:15			0		0		0		12:15			18		16		34	
00:30			1		2		3		12:30			19		7		26	
00:45			0	1	0	2	0	3	12:45			8	54	5	37	13	91
01:00			1		0		1		13:00			23		12		35	
01:15			0		0		0		13:15			24		13		37	
01:30			0		0		0		13:30			14		14		28	
01:45			1	2	0		1	2	13:45			19	80	7	46	26	126
02:00			0		0		0		14:00			23		10		33	
02:15			0		0		0		14:15			34		8		42	
02:30			0		0		0		14:30			43		8		51	
02:45			0		1	1	1	1	14:45			36	136	7	33	43	169
03:00			1		1		2		15:00			69		15		84	
03:15			0		1		1		15:15			66		9		75	
03:30			0		0		0		15:30			59		25		84	
03:45			0	1	1	3	1	4	15:45			79	273	14	63	93	336
04:00			0		0		0		16:00			68		19		87	
04:15			1		0		1		16:15			65		12		77	
04:30			1		0		1		16:30			48		25		73	
04:45			1	3	3	3	4	6	16:45			71	252	26	82	97	334
05:00			4		8		12		17:00			56		10		66	
05:15			1		5		6		17:15			58		14		72	
05:30			2		15		17		17:30			64		17		81	
05:45			2	9	15	43	17	52	17:45			56	234	25	66	81	300
06:00			4		14		18		18:00			48		19		67	
06:15			16		22		38		18:15			39		11		50	
06:30			5		16		21		18:30			30		10		40	
06:45			3	28	29	81	32	109	18:45			18	135	6	46	24	181
07:00			7		29		36		19:00			16		12		28	
07:15			12		25		37		19:15			9		7		16	
07:30			18		69		87		19:30			9		2		11	
07:45			16	53	59	182	75	235	19:45			3	37	6	27	9	64
08:00			10		54		64		20:00			5		8		13	
08:15			15		60		75		20:15			5		6		11	
08:30			12		45		57		20:30			1		9		10	
08:45			14	51	39	198	53	249	20:45			5	16	5	28	10	44
09:00			9		23		32		21:00			2		10		12	
09:15			13		31		44		21:15			2		7		9	
09:30			10		15		25		21:30			2		1		3	
09:45			7	39	11	80	18	119	21:45			5	11	5	23	10	34
10:00			10		7		17		22:00			3		0		3	
10:15			10		12		22		22:15			4		2		6	
10:30			11		28		39		22:30			5		3		8	
10:45			16	47	22	69	38	116	22:45			3	15	6	11	9	26
11:00			12		20		32		23:00			4		2		6	
11:15			12		15		27		23:15			1		3		4	
11:30			12		16		28		23:30			4		2		6	
11:45			11	47	11	62	22	109	23:45			1	10	3	10	4	20
TOTALS				281		724		1005	TOTALS				1253		472		1725
SPLIT %				28.0%		72.0%		36.8%	SPLIT %				72.6%		27.4%		63.2%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,534	1,196	2,730

AM Peak Hour				07:30	07:30	07:30		PM Peak Hour				15:00	16:00	15:30
AM Pk Volume				59	242	301		PM Pk Volume				273	82	341
Pk Hr Factor				0.819	0.877	0.865		Pk Hr Factor				0.864	0.788	0.917
7 - 9 Volume	0	0		104	380	484		4 - 6 Volume	0	0		486	148	634
7 - 9 Peak Hour				07:30	07:30	07:30		4 - 6 Peak Hour				16:00	16:00	16:00
7 - 9 Pk Volume	0	0		59	242	301		4 - 6 Pk Volume	0	0		252	82	334
Pk Hr Factor	0.000	0.000		0.819	0.877	0.865		Pk Hr Factor	0.000	0.000		0.887	0.788	0.861

Prepared by NDS/ATD

VOLUME

Manning Rd W/O Livermore Ave

Day: Saturday
Date: 9/22/2018

City: Livermore
Project #: CA18_8461_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	735	684	1,419

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			10		9		19	
00:15			0		2		2		12:15			16		14		30	
00:30			2		1		3		12:30			13		13		26	
00:45			1	3	0	3	1	6	12:45			21	60	19	55	40	115
01:00			0		2		2		13:00			20		16		36	
01:15			0		2		2		13:15			9		17		26	
01:30			1		1		2		13:30			13		15		28	
01:45			0	1	0	5	0	6	13:45			10	52	10	58	20	110
02:00			0		0		0		14:00			18		8		26	
02:15			1		0		1		14:15			14		10		24	
02:30			0		1		1		14:30			12		17		29	
02:45			0	1	1	2	1	3	14:45			12	56	12	47	24	103
03:00			0		1		1		15:00			14		21		35	
03:15			0		0		0		15:15			28		13		41	
03:30			0		1		1		15:30			15		10		25	
03:45			0		0	2	0	2	15:45			26	83	19	63	45	146
04:00			1		0		1		16:00			17		18		35	
04:15			0		0		0		16:15			12		13		25	
04:30			3		1		4		16:30			15		10		25	
04:45			1	5	1	2	2	7	16:45			10	54	5	46	15	100
05:00			1		0		1		17:00			20		9		29	
05:15			0		1		1		17:15			17		14		31	
05:30			1		3		4		17:30			9		10		19	
05:45			2	4	2	6	4	10	17:45			12	58	5	38	17	96
06:00			2		1		3		18:00			8		9		17	
06:15			0		3		3		18:15			6		7		13	
06:30			2		5		7		18:30			13		8		21	
06:45			2	6	6	15	8	21	18:45			11	38	7	31	18	69
07:00			3		6		9		19:00			8		7		15	
07:15			7		4		11		19:15			12		11		23	
07:30			8		13		21		19:30			10		4		14	
07:45			7	25	14	37	21	62	19:45			2	32	6	28	8	60
08:00			7		11		18		20:00			5		3		8	
08:15			12		11		23		20:15			12		5		17	
08:30			10		13		23		20:30			5		3		8	
08:45			12	41	16	51	28	92	20:45			0	22	5	16	5	38
09:00			12		7		19		21:00			4		7		11	
09:15			22		11		33		21:15			5		5		10	
09:30			16		11		27		21:30			2		4		6	
09:45			8	58	14	43	22	101	21:45			3	14	4	20	7	34
10:00			11		17		28		22:00			2		4		6	
10:15			13		8		21		22:15			5		1		6	
10:30			13		10		23		22:30			5		4		9	
10:45			14	51	15	50	29	101	22:45			5	17	0	9	5	26
11:00			14		15		29		23:00			1		2		3	
11:15			8		11		19		23:15			2		2		4	
11:30			24		13		37		23:30			0		0		0	
11:45			5	51	11	50	16	101	23:45			0	3	3	7	3	10
TOTALS				246		266		512	TOTALS				489		418		907
SPLIT %				48.0%		52.0%		36.1%	SPLIT %				53.9%		46.1%		63.9%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	735	684	1,419

AM Peak Hour				08:45	10:45	10:45		PM Peak Hour				15:15	12:45	15:00
AM Pk Volume				62	54	114		PM Pk Volume				86	67	146
Pk Hr Factor				0.705	0.900	0.770		Pk Hr Factor				0.768	0.882	0.811
7 - 9 Volume	0	0		66	88	154		4 - 6 Volume	0	0		112	84	196
7 - 9 Peak Hour				08:00	08:00	08:00		4 - 6 Peak Hour				16:30	16:00	16:00
7 - 9 Pk Volume	0	0		41	51	92		4 - 6 Pk Volume	0	0		62	46	100
Pk Hr Factor	0.000	0.000		0.854	0.797	0.821		Pk Hr Factor	0.000	0.000		0.775	0.639	0.714

Prepared by NDS/ATD

VOLUME

Manning Rd W/O Livermore Ave

Day: Sunday
Date: 9/23/2018

City: Livermore
Project #: CA18_8461_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	539	534	1,073

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			3		0		3		12:00			9		9		18	
00:15			0		0		0		12:15			18		8		26	
00:30			1		3		4		12:30			16		23		39	
00:45			1	5	1	4	2	9	12:45			19	62	12	52	31	114
01:00			2		2		4		13:00			13		16		29	
01:15			0		0		0		13:15			12		10		22	
01:30			0		0		0		13:30			11		7		18	
01:45			1	3	1	3	2	6	13:45			11	47	10	43	21	90
02:00			0		0		0		14:00			11		11		22	
02:15			0		0		0		14:15			13		10		23	
02:30			0		0		0		14:30			6		7		13	
02:45			0		0		0		14:45			10	40	11	39	21	79
03:00			0		0		0		15:00			8		20		28	
03:15			0		0		0		15:15			13		13		26	
03:30			1		0		1		15:30			13		12		25	
03:45			0	1	1	1	1	2	15:45			12	46	16	61	28	107
04:00			0		0		0		16:00			12		8		20	
04:15			0		0		0		16:15			12		9		21	
04:30			0		1		1		16:30			18		12		30	
04:45			0		0	1	0	1	16:45			6	48	11	40	17	88
05:00			0		0		0		17:00			4		14		18	
05:15			0		0		0		17:15			10		14		24	
05:30			1		1		2		17:30			9		7		16	
05:45			0	1	0	1	0	2	17:45			6	29	3	38	9	67
06:00			1		2		3		18:00			7		18		25	
06:15			3		3		6		18:15			8		9		17	
06:30			2		6		8		18:30			6		9		15	
06:45			0	6	2	13	2	19	18:45			6	27	8	44	14	71
07:00			2		8		10		19:00			7		7		14	
07:15			2		3		5		19:15			5		5		10	
07:30			3		4		7		19:30			9		2		11	
07:45			2	9	9	24	11	33	19:45			12	33	8	22	20	55
08:00			4		5		9		20:00			9		6		15	
08:15			6		5		11		20:15			4		9		13	
08:30			6		3		9		20:30			5		5		10	
08:45			6	22	2	15	8	37	20:45			3	21	4	24	7	45
09:00			13		6		19		21:00			1		2		3	
09:15			7		5		12		21:15			3		3		6	
09:30			8		13		21		21:30			4		2		6	
09:45			10	38	3	27	13	65	21:45			2	10	1	8	3	18
10:00			11		6		17		22:00			2		1		3	
10:15			14		6		20		22:15			1		1		2	
10:30			13		5		18		22:30			1		0		1	
10:45			10	48	10	27	20	75	22:45			0	4	1	3	1	7
11:00			9		10		19		23:00			1		0		1	
11:15			11		12		23		23:15			1		1		2	
11:30			10		13		23		23:30			0		0		0	
11:45			7	37	8	43	15	80	23:45			0	2	0	1	0	3
TOTALS				170		159		329	TOTALS				369		375		744
SPLIT %				51.7%		48.3%		30.7%	SPLIT %				49.6%		50.4%		69.3%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	539	534	1,073

AM Peak Hour				11:45	11:45	11:45		PM Peak Hour				12:15	12:30	12:15
AM Pk Volume				50	48	98		PM Pk Volume				66	61	125
Pk Hr Factor				0.694	0.522	0.628		Pk Hr Factor				0.868	0.663	0.801
7 - 9 Volume	0	0		31	39	70		4 - 6 Volume	0	0		77	78	155
7 - 9 Peak Hour				08:00	07:00	07:45		4 - 6 Peak Hour				16:00	16:30	16:30
7 - 9 Pk Volume	0	0		22	24	40		4 - 6 Pk Volume	0	0		48	51	89
Pk Hr Factor	0.000	0.000		0.917	0.667	0.909		Pk Hr Factor	0.000	0.000		0.667	0.911	0.742

Prepared by NDS/ATD

VOLUME

Manning Rd W/O Livermore Ave

Day: Monday
Date: 9/24/2018

City: Livermore
Project #: CA18_8461_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,404	1,166	2,570

AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	0	0	12:00			10	14	24
00:15			0	0	0	12:15			12	9	21
00:30			0	0	0	12:30			13	9	22
00:45			0	0	0	12:45			16	18	34
01:00			0	0	0	13:00			18	5	23
01:15			0	0	0	13:15			16	7	23
01:30			0	0	0	13:30			18	12	30
01:45			0	1	1	13:45			13	5	18
02:00			0	0	0	14:00			18	11	29
02:15			0	1	1	14:15			27	19	46
02:30			0	0	0	14:30			35	12	47
02:45			0	0	0	14:45			39	10	49
03:00			0	0	0	15:00			32	14	46
03:15			0	1	1	15:15			47	14	61
03:30			1	2	3	15:30			42	12	54
03:45			1	0	1	15:45			65	15	80
04:00			1	1	2	16:00			67	11	78
04:15			1	0	1	16:15			74	17	91
04:30			1	1	2	16:30			59	15	74
04:45			4	4	8	16:45			64	14	78
05:00			3	4	7	17:00			50	17	67
05:15			0	12	12	17:15			54	20	74
05:30			2	12	14	17:30			69	15	84
05:45			3	17	20	17:45			47	13	60
06:00			16	18	34	18:00			46	14	60
06:15			4	21	25	18:15			38	11	49
06:30			5	19	24	18:30			16	12	28
06:45			10	33	43	18:45			24	16	40
07:00			9	41	50	19:00			10	4	14
07:15			10	30	40	19:15			11	10	21
07:30			17	52	69	19:30			6	4	10
07:45			14	48	62	19:45			11	8	19
08:00			17	49	66	20:00			4	5	9
08:15			18	46	64	20:15			9	8	17
08:30			24	47	71	20:30			6	8	14
08:45			15	45	60	20:45			3	6	9
09:00			17	42	59	21:00			3	2	5
09:15			11	30	41	21:15			2	1	3
09:30			12	27	39	21:30			1	4	5
09:45			13	34	47	21:45			1	1	2
10:00			6	17	23	22:00			3	1	4
10:15			9	12	21	22:15			2	0	2
10:30			3	12	15	22:30			2	2	4
10:45			11	18	29	22:45			1	0	1
11:00			7	6	13	23:00			1	0	1
11:15			9	12	21	23:15			1	1	2
11:30			11	11	22	23:30			3	1	4
11:45			9	13	22	23:45			1	0	1
TOTALS			294	739	1033	TOTALS			1110	427	1537
SPLIT %			28.5%	71.5%	40.2%	SPLIT %			72.2%	27.8%	59.8%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,404	1,166	2,570

AM Peak Hour			08:00	07:30	07:45	PM Peak Hour			15:45	16:30	15:45
AM Pk Volume			74	195	263	PM Pk Volume			265	66	323
Pk Hr Factor			0.771	0.938	0.926	Pk Hr Factor			0.895	0.825	0.887
7 - 9 Volume	0	0	124	358	482	4 - 6 Volume	0	0	484	122	606
7 - 9 Peak Hour			08:00	07:30	07:45	4 - 6 Peak Hour			16:00	16:30	16:00
7 - 9 Pk Volume	0	0	74	195	263	4 - 6 Pk Volume	0	0	264	66	321
Pk Hr Factor	0.000	0.000	0.771	0.938	0.926	Pk Hr Factor	0.000	0.000	0.892	0.825	0.882

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 18-08462-001
Date : 09/20/2018

Unshifted Count = All Vehicles & Uturns

	Morgan Territory Rd Southbound					Manning Rd Westbound					Morgan Territory Rd Northbound					Manning Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	7	0	1	0	8	0	28	0	0	28	0	0	0	0	0	1	3	0	0	4	40	0
7:15	8	0	6	0	14	0	41	3	0	44	0	0	0	0	0	0	6	0	0	6	64	0
7:30	9	0	0	0	9	0	49	0	0	49	0	0	0	0	0	0	10	0	0	10	68	0
7:45	3	0	3	0	6	0	49	2	0	51	0	0	0	0	0	0	8	0	0	8	65	0
Total	27	0	10	0	37	0	167	5	0	172	0	0	0	0	0	1	27	0	0	28	237	0
8:00	9	0	1	0	10	0	33	3	0	36	0	0	1	0	1	0	9	0	0	9	56	0
8:15	9	0	6	0	15	0	49	8	0	57	0	0	0	0	0	0	7	0	0	7	79	0
8:30	10	0	5	0	15	0	35	2	0	37	0	0	0	0	0	0	8	0	0	8	60	0
8:45	6	0	2	0	8	0	44	4	0	48	0	0	0	0	0	0	8	0	0	8	64	0
Total	34	0	14	0	48	0	161	17	0	178	0	0	1	0	1	0	32	0	0	32	259	0
16:00	8	0	0	0	8	0	8	5	0	13	0	0	0	0	0	3	43	0	0	46	67	0
16:15	3	0	0	0	3	0	6	9	0	15	0	0	0	0	0	2	69	0	0	71	89	0
16:30	4	0	0	0	4	0	14	3	0	17	0	0	0	0	0	3	63	0	0	66	87	0
16:45	3	0	1	0	4	0	17	9	0	26	0	0	0	0	0	4	52	0	0	56	86	0
Total	18	0	1	0	19	0	45	26	0	71	0	0	0	0	0	12	227	0	0	239	329	0
17:00	7	0	1	1	9	0	12	10	0	22	0	0	0	0	0	2	58	0	0	60	91	1
17:15	0	0	0	0	0	0	17	11	0	28	0	0	0	1	1	3	64	0	0	67	96	1
17:30	6	0	0	0	6	0	6	5	0	11	0	0	0	0	0	4	74	0	0	78	95	0
17:45	1	0	0	0	1	0	9	3	0	12	0	0	0	0	0	3	54	0	0	57	70	0
Total	14	0	1	1	16	0	44	29	0	73	0	0	0	1	1	12	250	0	0	262	352	2
Grand Total	93	0	26	1	120	0	417	77	0	494	0	0	1	1	2	25	536	0	0	561	1177	2
Apprch %	77.5%	0.0%	21.7%	0.8%		0.0%	84.4%	15.6%	0.0%		0.0%	0.0%	50.0%	50.0%		4.5%	95.5%	0.0%	0.0%			
Total %	7.9%	0.0%	2.2%	0.1%	10.2%	0.0%	35.4%	6.5%	0.0%	42.0%	0.0%	0.0%	0.1%	0.1%	0.2%	2.1%	45.5%	0.0%	0.0%	47.7%	100.0%	

AM PEAK HOUR	Morgan Territory Rd Southbound					Manning Rd Westbound					Morgan Territory Rd Northbound					Manning Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	9	0	0	0	9	0	49	0	0	49	0	0	0	0	0	0	10	0	0	10	68
7:45	3	0	3	0	6	0	49	2	0	51	0	0	0	0	0	0	8	0	0	8	65
8:00	9	0	1	0	10	0	33	3	0	36	0	0	1	0	1	0	9	0	0	9	56
8:15	9	0	6	0	15	0	49	8	0	57	0	0	0	0	0	0	7	0	0	7	79
Total Volume	30	0	10	0	40	0	180	13	0	193	0	0	1	0	1	0	34	0	0	34	268
% App Total	75.0%	0.0%	25.0%	0.0%		0.0%	93.3%	6.7%	0.0%		0.0%	0.0%	100.0%	0.0%		0.0%	100.0%	0.0%	0.0%		
PHF	.833	.000	.417	.000	.667	.000	.918	.406	.000	.846	.000	.000	.250	.000	.250	.000	.850	.000	.000	.850	.848

PM PEAK HOUR	Morgan Territory Rd Southbound					Manning Rd Westbound					Morgan Territory Rd Northbound					Manning Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	3	0	1	0	4	0	17	9	0	26	0	0	0	0	0	4	52	0	0	56	86
17:00	7	0	1	1	9	0	12	10	0	22	0	0	0	0	0	2	58	0	0	60	91
17:15	0	0	0	0	0	0	17	11	0	28	0	0	0	1	1	3	64	0	0	67	96
17:30	6	0	0	0	6	0	6	5	0	11	0	0	0	0	0	4	74	0	0	78	95
Total Volume	16	0	2	1	19	0	52	35	0	87	0	0	0	1	1	13	248	0	0	261	368
% App Total	84.2%	0.0%	10.5%	5.3%		0.0%	59.8%	40.2%	0.0%		0.0%	0.0%	0.0%	100.0%		5.0%	95.0%	0.0%	0.0%		
PHF	.571	.000	.500	.250	.528	.000	.765	.795	.000	.777	.000	.000	.000	.250	.250	.813	.838	.000	.000	.837	.958

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 18-08462-001
Date : 09/20/2018

Bank 1 Count = Bikes & Peds

	Morgan Territory Rd Southbound					Manning Rd Westbound					Morgan Territory Rd Northbound					Manning Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%				
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%	

AM PEAK HOUR	Morgan Territory Rd Southbound					Manning Rd Westbound					Morgan Territory Rd Northbound					Manning Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App 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%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000

PM PEAK HOUR	Morgan Territory Rd Southbound					Manning Rd Westbound					Morgan Territory Rd Northbound					Manning Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App 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%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 18-08462-002
Date : 09/20/2018

Unshifted Count = All Vehicles & Uturns

	Morgan Territory Rd Southbound					Project Dwy Westbound					Morgan Territory Rd Northbound					Project Dwy Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	0	7	0	0	7	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	8	0
7:15	0	13	0	0	13	1	0	0	0	1	0	3	0	0	3	0	0	0	0	0	17	0
7:30	0	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
7:45	0	4	0	0	4	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	6	0
Total	0	34	0	0	34	1	0	0	0	1	0	6	0	0	6	0	0	0	0	0	41	0
8:00	0	10	0	0	10	1	0	0	0	1	0	3	0	0	3	0	0	0	0	0	14	0
8:15	0	12	0	0	12	1	0	0	0	1	0	5	2	0	7	0	0	0	0	0	20	0
8:30	0	15	0	0	15	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	17	0
8:45	0	8	0	0	8	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	11	0
Total	0	45	0	0	45	2	0	0	0	2	0	13	2	0	15	0	0	0	0	0	62	0
16:00	0	3	0	0	3	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	10	0
16:15	0	1	0	0	1	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	13	0
16:30	0	4	0	0	4	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	10	0
16:45	0	4	0	0	4	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	16	0
Total	0	12	0	0	12	0	0	0	0	0	0	37	0	0	37	0	0	0	0	0	49	0
17:00	1	7	0	0	8	1	0	0	0	1	0	9	1	0	10	0	0	0	0	0	19	0
17:15	0	1	0	0	1	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	17	0
17:30	0	6	0	0	6	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	14	0
17:45	0	1	0	0	1	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	8	0
Total	1	15	0	0	16	1	0	0	0	1	0	40	1	0	41	0	0	0	0	0	58	0
Grand Total	1	106	0	0	107	4	0	0	0	4	0	96	3	0	99	0	0	0	0	0	210	0
Apprch %	0.9%	99.1%	0.0%	0.0%		100.0%	0.0%	0.0%	0.0%		0.0%	97.0%	3.0%	0.0%		0.0%	0.0%	0.0%	0.0%			
Total %	0.5%	50.5%	0.0%	0.0%	51.0%	1.9%	0.0%	0.0%	0.0%	1.9%	0.0%	45.7%	1.4%	0.0%	47.1%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	

AM PEAK HOUR	Morgan Territory Rd Southbound					Project Dwy Westbound					Morgan Territory Rd Northbound					Project Dwy Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	0	10	0	0	10	1	0	0	0	1	0	3	0	0	3	0	0	0	0	0	14
8:15	0	12	0	0	12	1	0	0	0	1	0	5	2	0	7	0	0	0	0	0	20
8:30	0	15	0	0	15	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	17
8:45	0	8	0	0	8	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	11
Total Volume	0	45	0	0	45	2	0	0	0	2	0	13	2	0	15	0	0	0	0	0	62
% App Total	0.0%	100.0%	0.0%	0.0%		100.0%	0.0%	0.0%	0.0%		0.0%	86.7%	13.3%	0.0%		0.0%	0.0%	0.0%	0.0%		
PHF	.000	.750	.000	.000	.750	.500	.000	.000	.000	.500	.000	.650	.250	.000	.536	.000	.000	.000	.000	.000	.775

PM PEAK HOUR	Morgan Territory Rd Southbound					Project Dwy Westbound					Morgan Territory Rd Northbound					Project Dwy Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	0	4	0	0	4	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	16
17:00	1	7	0	0	8	1	0	0	0	1	0	9	1	0	10	0	0	0	0	0	19
17:15	0	1	0	0	1	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	17
17:30	0	6	0	0	6	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	14
Total Volume	1	18	0	0	19	1	0	0	0	1	0	45	1	0	46	0	0	0	0	0	66
% App Total	5.3%	94.7%	0.0%	0.0%		100.0%	0.0%	0.0%	0.0%		0.0%	97.8%	2.2%	0.0%		0.0%	0.0%	0.0%	0.0%		
PHF	.250	.643	.000	.000	.594	.250	.000	.000	.000	.250	.000	.703	.250	.000	.719	.000	.000	.000	.000	.000	.868

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

File Name : 18-08462-002
Date : 09/20/2018

Bank 1 Count = Bikes & Peds

	Morgan Territory Rd Southbound					Project Dwy Westbound					Morgan Territory Rd Northbound					Project Dwy Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%				
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%	

AM PEAK HOUR	Morgan Territory Rd Southbound					Project Dwy Westbound					Morgan Territory Rd Northbound					Project Dwy Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App 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%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000

PM PEAK HOUR	Morgan Territory Rd Southbound					Project Dwy Westbound					Morgan Territory Rd Northbound					Project Dwy Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App 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%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000

APPENDIX C – LEVEL OF SERVICE WORKSHEETS FOR EXISTING AND CUMULATIVE CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	34	0	0	180	13	0	0	1	30	0	10
Future Volume (Veh/h)	0	34	0	0	180	13	0	0	1	30	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.25	0.25	0.25	0.67	0.67	0.67
Hourly flow rate (vph)	0	40	0	0	212	15	0	0	4	45	0	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	227			40			274	267	40	264	260	220
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	227			40			274	267	40	264	260	220
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	93	100	98
cM capacity (veh/h)	1341			1570			666	639	1031	687	645	820

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	40	227	4	60
Volume Left	0	0	0	45
Volume Right	0	15	4	15
cSH	1341	1570	1031	716
Volume to Capacity	0.00	0.00	0.00	0.08
Queue Length 95th (ft)	0	0	0	7
Control Delay (s)	0.0	0.0	8.5	10.5
Lane LOS			A	B
Approach Delay (s)	0.0	0.0	8.5	10.5
Approach LOS			A	B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	0	13	2	0	45
Future Volume (Veh/h)	2	0	13	2	0	45
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.50	0.54	0.54	0.75	0.75
Hourly flow rate (vph)	4	0	24	4	0	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	86	26			28	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	86	26			28	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	915	1050			1585	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	4	28	60
Volume Left	4	0	0
Volume Right	0	4	0
cSH	915	1700	1585
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	248	0	0	52	35	1	0	0	17	0	2
Future Volume (Veh/h)	13	248	0	0	52	35	1	0	0	17	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.78	0.78	0.78	0.25	0.25	0.25	0.53	0.53	0.53
Hourly flow rate (vph)	15	295	0	0	67	45	4	0	0	32	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	112			295			418	437	295	414	414	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			295			418	437	295	414	414	90
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	100	94	100	100
cM capacity (veh/h)	1478			1266			538	508	744	544	523	968

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	310	112	4	36
Volume Left	15	0	4	32
Volume Right	0	45	0	4
cSH	1478	1266	538	572
Volume to Capacity	0.01	0.00	0.01	0.06
Queue Length 95th (ft)	1	0	1	5
Control Delay (s)	0.4	0.0	11.7	11.7
Lane LOS	A		B	B
Approach Delay (s)	0.4	0.0	11.7	11.7
Approach LOS			B	B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	30.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	0	45	1	1	18
Future Volume (Veh/h)	1	0	45	1	1	18
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.25	0.72	0.72	0.60	0.60
Hourly flow rate (vph)	4	0	63	1	2	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	98	64			64	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	98	64			64	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	900	1001			1538	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	4	64	32
Volume Left	4	0	2
Volume Right	0	1	0
cSH	900	1700	1538
Volume to Capacity	0.00	0.04	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.0	0.0	0.5
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	0.5
Approach LOS	A		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	34	0	0	180	21	0	0	1	30	0	10
Future Volume (Veh/h)	3	34	0	0	180	21	0	0	1	30	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.25	0.25	0.25	0.67	0.67	0.67
Hourly flow rate (vph)	4	40	0	0	212	25	0	0	4	45	0	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	237			40			288	285	40	276	272	224
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	237			40			288	285	40	276	272	224
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	93	100	98
cM capacity (veh/h)	1330			1570			651	622	1031	672	632	815

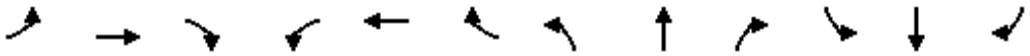
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	44	237	4	60
Volume Left	4	0	0	45
Volume Right	0	25	4	15
cSH	1330	1570	1031	703
Volume to Capacity	0.00	0.00	0.00	0.09
Queue Length 95th (ft)	0	0	0	7
Control Delay (s)	0.7	0.0	8.5	10.6
Lane LOS	A		A	B
Approach Delay (s)	0.7	0.0	8.5	10.6
Approach LOS			A	B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	0	13	13	0	45
Future Volume (Veh/h)	2	0	13	13	0	45
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.50	0.54	0.54	0.75	0.75
Hourly flow rate (vph)	4	0	24	24	0	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	96	36			48	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	96	36			48	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	903	1037			1559	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	4	48	60
Volume Left	4	0	0
Volume Right	0	24	0
cSH	903	1700	1559
Volume to Capacity	0.00	0.03	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	248	0	0	52	35	1	0	0	25	0	5
Future Volume (Veh/h)	13	248	0	0	52	35	1	0	0	25	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.78	0.78	0.78	0.25	0.25	0.25	0.53	0.53	0.53
Hourly flow rate (vph)	15	295	0	0	67	45	4	0	0	47	0	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	112			295			424	437	295	414	414	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			295			424	437	295	414	414	90
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	100	91	100	99
cM capacity (veh/h)	1478			1266			532	508	744	544	523	968

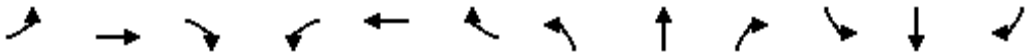
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	310	112	4	56
Volume Left	15	0	4	47
Volume Right	0	45	0	9
cSH	1478	1266	532	585
Volume to Capacity	0.01	0.00	0.01	0.10
Queue Length 95th (ft)	1	0	1	8
Control Delay (s)	0.4	0.0	11.8	11.8
Lane LOS	A		B	B
Approach Delay (s)	0.4	0.0	11.8	11.8
Approach LOS			B	B

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	30.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	0	45	1	1	18
Future Volume (Veh/h)	12	0	45	1	1	18
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.25	0.72	0.72	0.60	0.60
Hourly flow rate (vph)	48	0	63	1	2	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	98	64			64	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	98	64			64	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			100	
cM capacity (veh/h)	900	1001			1538	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	64	32
Volume Left	48	0	2
Volume Right	0	1	0
cSH	900	1700	1538
Volume to Capacity	0.05	0.04	0.00
Queue Length 95th (ft)	4	0	0
Control Delay (s)	9.2	0.0	0.5
Lane LOS	A		A
Approach Delay (s)	9.2	0.0	0.5
Approach LOS	A		

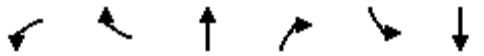
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	53	0	0	278	20	0	0	2	46	0	15
Future Volume (Veh/h)	0	53	0	0	278	20	0	0	2	46	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	58	0	0	302	22	0	0	2	50	0	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	324			58			387	382	58	373	371	313
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	324			58			387	382	58	373	371	313
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	91	100	98
cM capacity (veh/h)	1236			1546			559	551	1008	583	559	727

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	58	324	2	66
Volume Left	0	0	0	50
Volume Right	0	22	2	16
cSH	1236	1546	1008	612
Volume to Capacity	0.00	0.00	0.00	0.11
Queue Length 95th (ft)	0	0	0	9
Control Delay (s)	0.0	0.0	8.6	11.6
Lane LOS			A	B
Approach Delay (s)	0.0	0.0	8.6	11.6
Approach LOS			A	B

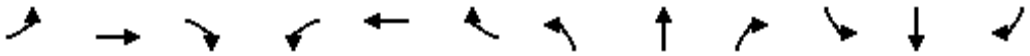
Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	32.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	0	20	3	0	70
Future Volume (Veh/h)	3	0	20	3	0	70
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	0	22	3	0	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	100	24			25	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	100	24			25	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	899	1053			1589	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	25	76
Volume Left	3	0	0
Volume Right	0	3	0
cSH	899	1700	1589
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	383	0	0	80	54	2	0	0	26	0	3
Future Volume (Veh/h)	20	383	0	0	80	54	2	0	0	26	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	416	0	0	87	59	2	0	0	28	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	146			416			580	606	416	576	576	116
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	146			416			580	606	416	576	576	116
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	100	100	93	100	100
cM capacity (veh/h)	1436			1143			420	405	637	423	421	936

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	438	146	2	31
Volume Left	22	0	2	28
Volume Right	0	59	0	3
cSH	1436	1143	420	447
Volume to Capacity	0.02	0.00	0.00	0.07
Queue Length 95th (ft)	1	0	0	6
Control Delay (s)	0.5	0.0	13.6	13.7
Lane LOS	A		B	B
Approach Delay (s)	0.5	0.0	13.6	13.7
Approach LOS			B	B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	42.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	0	70	2	2	28
Future Volume (Veh/h)	2	0	70	2	2	28
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	76	2	2	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	111	77			78	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	111	77			78	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	885	984			1520	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	78	32
Volume Left	2	0	2
Volume Right	0	2	0
cSH	885	1700	1520
Volume to Capacity	0.00	0.05	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.1	0.0	0.5
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	0.5
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	53	0	0	278	28	0	0	2	46	0	15
Future Volume (Veh/h)	3	53	0	0	278	28	0	0	2	46	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	58	0	0	302	30	0	0	2	50	0	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	332			58			397	396	58	383	381	317
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			58			397	396	58	383	381	317
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	91	100	98
cM capacity (veh/h)	1227			1546			550	540	1008	573	550	724

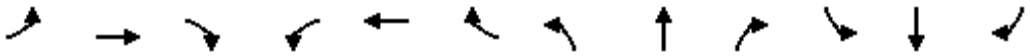
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	61	332	2	66
Volume Left	3	0	0	50
Volume Right	0	30	2	16
cSH	1227	1546	1008	603
Volume to Capacity	0.00	0.00	0.00	0.11
Queue Length 95th (ft)	0	0	0	9
Control Delay (s)	0.4	0.0	8.6	11.7
Lane LOS	A		A	B
Approach Delay (s)	0.4	0.0	8.6	11.7
Approach LOS			A	B

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	33.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	0	20	14	0	70
Future Volume (Veh/h)	3	0	20	14	0	70
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	0	22	15	0	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	106	30			37	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	106	30			37	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	892	1045			1574	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	37	76
Volume Left	3	0	0
Volume Right	0	15	0
cSH	892	1700	1574
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	13.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	383	0	0	80	54	2	0	0	34	0	6
Future Volume (Veh/h)	20	383	0	0	80	54	2	0	0	34	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	416	0	0	87	59	2	0	0	37	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	146			416			584	606	416	576	576	116
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	146			416			584	606	416	576	576	116
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	100	100	91	100	99
cM capacity (veh/h)	1436			1143			415	405	637	423	421	936

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	438	146	2	44
Volume Left	22	0	2	37
Volume Right	0	59	0	7
cSH	1436	1143	415	463
Volume to Capacity	0.02	0.00	0.00	0.09
Queue Length 95th (ft)	1	0	0	8
Control Delay (s)	0.5	0.0	13.7	13.6
Lane LOS	A		B	B
Approach Delay (s)	0.5	0.0	13.7	13.6
Approach LOS			B	B

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	42.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	0	70	2	2	28
Future Volume (Veh/h)	13	0	70	2	2	28
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	0	76	2	2	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	111	77			78	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	111	77			78	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	885	984			1520	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	14	78	32
Volume Left	14	0	2
Volume Right	0	2	0
cSH	885	1700	1520
Volume to Capacity	0.02	0.05	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.1	0.0	0.5
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	0.5
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	13.8%	ICU Level of Service	A
Analysis Period (min)	15		