Hexagon Transportation Consultants, Inc.

Memorandum

Date: July 5, 2019

To: Alejandra Sanchez, David J. Powers & Associates, Inc.

From: Gicela Del Rio, T.E.

Subject: Trip Generation and Operations Analysis for the Proposed Butterfield Park in Morgan Hill, California

Introduction

Hexagon Transportation Consultants, Inc. has completed a trip generation and operations analysis for the proposed Butterfield Park project in the City of Morgan Hill, California. The project site consists of two city-owned undeveloped parcels (Assessor's Parcel Numbers (APN) 817-06-002 and 817-06-064) generally located south of Butterfield Boulevard, between Monterey Road and the UPRR tracks, and totaling approximately 9.5 acres (see Figure 1). The project as proposed would develop the project site with a high-quality neighborhood park which would include track and field with maintenance areas and a surface parking area.

The project description, analysis procedure and assumptions, results, and recommendations are presented below. It is important to note that this traffic analysis does not constitute, or replace, a comprehensive traffic impact study for the project. Based on the result of the trip generation and operations analysis, City staff will be able to determine if a comprehensive traffic analysis will be necessary for the project.

Project Description

The proposed Butterfield Park would consist of a City park that would mainly serve City of Morgan Hill residents. Based on the latest preliminary conceptual design (site plan dated June 16, 2019 by Verde Design – Figure 2), the project would include 2 BMX pump tracks, 1 baseball field, and supporting amenities including shade structures, picnic areas/tables, areas for pop-up tents, an adult exercise/gym shaded area, and an approximately 1,900-square-foot one story building that would house a public meeting room, concessions, and restrooms. The park also would include a paved walking path that would run along the perimeter of the site and an on-site 214-space parking lot with access via a driveway on Butterfield Boulevard. Due to the presence of a raised center median along Butterfield Boulevard, the project driveway would provide right-in and right-out access only.

The proposed park and its facilities would be used by Morgan Hill residents. It is not anticipated that regional events, or events that would result in a significant amount of traffic being generated from outside of Morgan Hill, would be held at the park. In addition, it is not anticipated that the proposed park would generate a significant amount of traffic during the standard weekday AM (7:00 to 9:00 AM) and PM (4:00 to 6:00 PM) peak hours. The park is anticipated to generate the most visitors on Saturdays.

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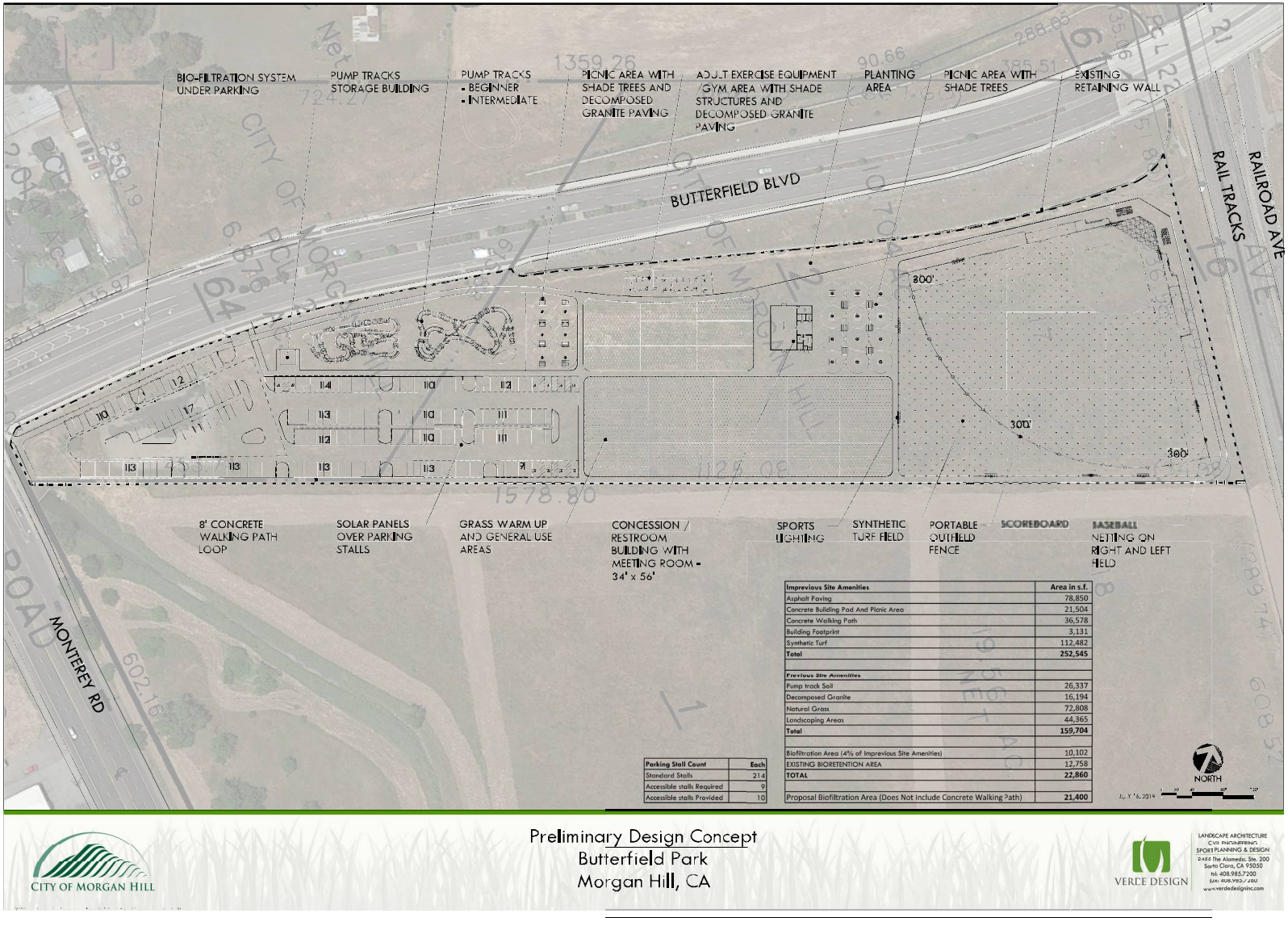
Figure 1
Project Site Location and Study Intersections

Figure 2
Site Plan



Parking Stall Count	Each
Standard Stalls	214
Accessible stalls Required	9
Accessible stalls Provided	10

Impervious Site Amenities	Area in s.f.
Asphalt Paving	78,850
Concrete Building Pad And Picnic Area	21,504
Concrete Walking Path	36,578
Building Footprint	3,131
Synthetic Turf	112,482
Total	**252,545**
Previous Site Amenities	
Pump track Soil	26,337
Decomposed Granite	16,194
Natural Grass	72,808
Landscaping Areas	44,365
Total	**159,704**
Biofiltration Area (4% of Impervious Site Amenities)	10,102
EXISTING BIORETENTION AREA	12,758
TOTAL	**22,860**
Proposal Biofiltration Area (Does Not Include Concrete Walking Path)	**21,400**

Scope of Work

The purpose of the trip generation and operations analysis is to evaluate the magnitude of traffic to be added to the roadway system by the proposed project and its effect on traffic operations in the transportation network immediately surrounding the site. The potential impacts related to the proposed project were evaluated following the standards and methodologies set forth by the City of Morgan Hill and the Santa Clara Valley Transportation Authority (VTA). The VTA administers the County Congestion Management Program (CMP).

Because it is not anticipated that the proposed project would generate a significant amount of traffic during the standard weekday AM and PM peak hours, the trip generation and operations analysis focuses on the proposed project's effect during the Saturday peak-hour at the following signalized intersections:

1. Monterey Road and Watsonville Road/Butterfield Boulevard
2. Butterfield Boulevard and Tennant Avenue
3. Monterey Road and Tennant Avenue/Edmundson Avenue

Traffic conditions were evaluated for the following scenarios:

Scenario 1: *Existing Conditions.* Existing conditions represent existing peak-hour traffic volumes on the existing roadway network. Existing traffic volumes were obtained from new turning-movement traffic counts conducted in June, 2019.

Scenario 2: *Existing plus Project Conditions*. Estimates of project-generated traffic were added to the existing traffic volumes to obtain existing plus project traffic volumes. Existing plus project conditions were evaluated relative to existing conditions to determine potential project impacts.

The study also includes a review of the site access and on-site circulation to determine the adequacy of the proposed site plan in accordance with generally accepted traffic engineering standards. This review considers the following: sight distance, vehicle queuing, traffic control requirements, driveway location and alignment, on-site layout and circulation, and large vehicle access and circulation.

Analysis Methodologies and Level of Service Standards

Traffic conditions at the study intersections were evaluated using level of service (LOS). *Level of Service* is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. The analysis method is described below.

Signalized Intersections

Signalized study intersections are subject to the City of Morgan Hill level of service standards. The City of Morgan Hill level of service methodology is TRAFFIX, which is based on the 2000 *Highway Capacity Manual* (HCM) method for signalized intersections. TRAFFIX evaluates signalized intersections operations based on average control delay time for all vehicles at the intersection. Since TRAFFIX is also the CMP-designated intersections level of service methodology, the City of Morgan Hill methodology employs the CMP defaults values for the analysis parameters, which include adjusted saturation flow rates to reflect conditions in Santa Clara County.

In accordance with the adopted threshold of significance described in the City of Morgan Hill's Guidelines for Preparation of Transportation Impact Reports, dated February 2010, all intersections

within the City of Morgan Hill are required to meet the City's LOS standard of LOS D, with the exception of the following:

- **LOS F** for Downtown intersections and segments including at Main Avenue/Monterey Road, along Monterey Road between Main Avenue and Fifth Street, and along Depot Street at First Street through Fifth Street;
- **LOS E** for the following intersections and freeway zones:
  - Main Avenue and Del Monte Avenue
  - Main Avenue and Depot Street
  - Dunne Avenue and Del Monte Avenue
  - Dunne Avenue and Monterey Avenue
  - Dunne Avenue and Church Street
  - Dunne Avenue and Depot Street
  - Cochrane Road and Monterey Road
  - Tennant Avenue and Monterey Road
  - Tennant Avenue and Butterfield Boulevard
  - Cochrane Road Freeway Zone: from Madrone Parkway/Cochrane Plaza to Cochrane Road/DePaul Drive
  - Dunne Avenue Freeway Zone: from Walnut Grove Drive/East Dunne Avenue to Condit Road/East Dunne Avenue
  - Tennant Avenue Freeway Zone: from Butterfield Boulevard/Tennant Avenue to Condit Road/Tennant Avenue

Both study intersections along Tennant Avenue have a LOS E standard while the intersection of Monterey Road and Butterfield Boulevard/Watsonville Road has a LOS D standard. The correlation between average delay and level of service for signalized intersections is shown in Table 1.

Evaluation of Existing Conditions

The existing roadway network, transit services, bicycle and pedestrian facilities, and traffic conditions are described below.

Existing Roadway Network

The following roadways would provide access to the project site:

Monterey Road is classified in the City of Morgan Hill General Plan as a four-lane major arterial that runs directly through Morgan Hill. It extends from Market Street, in downtown San Jose, to US 101 south of the City of Gilroy. Monterey Road has a posted speed limit of 45 miles per hour (mph) in the vicinity of the project site.

Butterfield Boulevard is a north-south four-lane divided arterial roadway that begins in the north part of town at its intersection with Cochrane Road and extends southward to its intersection with Monterey Road where it changes designation to Watsonville Road. Butterfield Boulevard has a posted speed limit of 45 mph and, along with Monterey Road, serves as a primary north-south route within the City of Morgan Hill. Butterfield Boulevard would provide direct access to the site via one driveway.

Tennant Avenue is classified in the City of Morgan Hill General Plan as a 4- to 6-lane major arterial. Tennant Avenue extends from Monterey Road eastward over US 101 to Carey Avenue where it terminates. West of Monterey Road, Tennant Avenue changes designation to Edmundson Avenue. With a full interchange at US 101, Tennant Avenue provides regional access to the project site.

Table 1
Signalized Intersection Level of Service Definitions Based on Control Delay

Level of Service	Description	Average Control Delay per Vehicle (sec.)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	up to 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	Greater than 80.0

Sources: Transportation Research Board, *2000 Highway Capacity Manual. Traffic Level of Service Analysis Guidelines*, Santa Clara County Transportation Authority Congestion Management Program, June 2003.

Existing Bicycle and Pedestrian Facilities

Pedestrian facilities in the vicinity of the project site include sidewalks along Butterfield Boulevard and marked crosswalks and pedestrian push buttons and signal heads along all approaches of the Monterey Road and Butterfield Boulevard intersection. Additionally, Americans with Disabilities Act (ADA)-compatible wheelchair ramps are installed at all four corners of the Monterey Road and Butterfield Boulevard intersection. Marked crosswalks and pedestrian push buttons and signal heads also are found along all legs of both the intersections of Monterey Road/Tennant Avenue and Butterfield Boulevard/Tennant Avenue.

Besides the above mentioned sidewalks along Butterfield Boulevard, sidewalks along segments of Monterey Road and Watsonville Road in the immediate vicinity of the project site are missing. Short segments of sidewalks (100-200 feet long) are present along Monterey Road at its intersection with Butterfield Boulevard, both north and south; however, no sidewalks are present along an approximately 800-foot segment to the north (both sides of the street), and only short segments of sidewalks are found to the south, mainly at bus stops. Along Watsonville Road, sidewalks are missing along the north side of the street for approximately 800 feet west of Butterfield Boulevard and along most of the south side of the street. The missing sidewalks along the adjacent streets would provide a discontinuous sidewalk network between the proposed park from nearby neighborhoods.

Although the missing sidewalks would result in a discontinuous pedestrian network in the immediate vicinity of the project site, the existing bicycle network would provide an alternative mode of access to park users, besides the automobile. Class II bike lanes (defined by the VTA as striped bike lanes on street) are currently provided along the following roadways in the vicinity of the project site:

- Butterfield Boulevard, along its entire length (including the project frontage)
- Watsonville Road, between Monterey Road and Santa Teresa Boulevard/Sunnyside Avenue
- Monterey Road, nearly its entire length within the City of Morgan Hill (including the project frontage), with the exception the Downtown area (between Dunne and Main Avenues)
- Tennant Avenue, west of Monterey Road to east of US 101

Additionally, the Llagas Creek Trail, a Class I bikeway (off-street path which is shared with pedestrians and excludes motor vehicles), runs north/south west of Monterey Road between Watsonville Road and Spring Avenue. The trailhead along Watsonville Road is located approximately ¼-mile west of the project site.

The available bicycle network would provide access between the project site and adjacent neighborhoods as well as most parts of town by connecting to other bicycle facilities in town.

Existing Transit Facilities

Existing transit service to the study area is provided by the VTA. The nearest bus stops to the project site are located on Monterey Road just north and south of Butterfield Boulevard/Watsonville Road. These bus stops are served by Local Route 68.

Local Route 68 operates on Monterey Road and Hale Avenue on its route between the Gilroy Transit Center and the Diridon Transit Center in San Jose with 15-20 minute headways on weekdays during the commute hours between the hours of 4:00 AM and 1:30 AM. On weekends, Route 68 operates with approximately 20-minute headways between the hours of 5:45 AM and 1:30 AM.

Existing Intersection Lane Configurations and Traffic Volumes

The existing lane configurations at the study intersections were determined by observations in the field. Existing Saturday peak-hour traffic volumes were obtained from new manual turning-movement counts conducted on Saturday June 22 and 29, 2019 at the study intersections. Traffic count data was collected for a six-hour period in order to identify the Saturday peak-hour in the vicinity of the project site. Based on the traffic data collection, the Saturday peak-hour at the study intersections occurred between the hours of 12:00 PM and 2:00 PM.

In addition to vehicular volumes, pedestrian and bicycle volumes also were collected at the study intersections. The traffic count data shows that at the intersection of Monterey Road and Butterfield Boulevard/Watsonville Road, a total of 25 pedestrians and 48 bicycles crossed the intersection during the Saturday peak-hour. At the intersection of Monterey Road and Tennant Avenue, 22 pedestrians and 13 bicycles crossed the intersection during the Saturday peak-hour, while at the intersection of Butterfield Boulevard and Tennant Avenue only 1 pedestrian and 4 bicycles crossed the intersection during the Saturday peak-hour. With the available pedestrian and bicycle facilities at the study intersections, the existing pedestrian and bicycle volumes are easily accommodated.

The existing traffic volumes and lane configurations at the study intersections are presented in Figure 3. The intersection turning-movement counts (including pedestrian and bicycle counts) are presented in the Appendix.

Figure 3
Existing Peak-Hour Traffic Volumes and Lane Configurations

Existing Conditions Intersection Level of Service Analysis

The results of the level of service analysis under existing conditions are summarized in Table 2. The results show that, measured against the City of Morgan Hill level of service standards, all the study intersections currently operate at an acceptable level of service under existing conditions during the Saturday peak-hour. The level of service calculation sheets are included in the Appendix.

Table 2
Existing Conditions Intersection Level of Service Results

Int. #	Intersection	Existing Control	LOS Standard	Peak Hour	Count Date	Existing Avg. Delay	Existing LOS
1	Monterey Road and Watsonville Road/Butterfield Boulevard	Signal	D	SAT	06/22/19	43.6	D
2	Butterfield Boulevard and Tennant Avenue	Signal	E	SAT	06/29/19	38.3	D
3	Monterey Road and Tennant Avenue/Edmundson Avenue	Signal	E	SAT	06/22/19	37.8	D

Evaluation of Existing Plus Project Conditions

Traffic conditions at the study intersections were evaluated under existing plus project conditions. Potential project impacts were evaluated relative to existing conditions.

Significant Impact Criteria

Significance criteria are used to establish what constitutes an impact. Significance criteria for impacts on intersections for this analysis is based on the City of Morgan Hill Level of Service standards and impact criteria.

Definition of Significant Signalized Intersection Impacts

All intersections within the City of Morgan Hill are required to meet their adopted level of service standards (LOS E for freeway zone intersections, LOS F for Downtown intersections, and LOS D for all other City intersections).

According to the City of Morgan Hill level of service significant impact thresholds, a development is said to create a significant adverse impact on traffic conditions at a signalized intersection if for either peak hour:

1. The level of service at the intersection degrades from an acceptable level (LOS D or LOS E as identified above) under existing conditions to an unacceptable level (LOS E or F) under project conditions, or
2. The level of service at the intersection is an unacceptable level (LOS E or F as identified above) under existing conditions and the addition of project trips causes the average critical delay to increase by four (4) or more seconds *and* the volume-to-capacity ratio (V/C) to increase by 0.01.

An exception to this rule applies when the addition of project traffic reduces the amount of average delay for critical movements (i.e., the change in average delay for critical movements is negative). In this case, the threshold of significance is an increase in the critical V/C value by 0.01 or more.

Transportation Network Under Existing Plus Project Conditions

The proposed project is not proposing to implement off-site improvements, therefore, it is assumed in this analysis that the roadway network and intersection configurations under existing plus project conditions would be the same as described under existing conditions.

Existing Plus Project Conditions Traffic Volumes

Existing plus project conditions are represented by existing traffic volumes with the addition of traffic generated by the proposed project.

Project Trip Estimates, Distribution, and Assignment

The magnitude of traffic produced by a new development is typically estimated by applying the applicable trip generation rates contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual,* latest edition to the size of the project. The ITE *Trip Generation Manual*, 10th Edition, includes trip generation rates for Public Park (Land Use Code 411). However, the available rates for the public park land use are based on limited data (only five studies) and do not include some of the amenities being proposed as part of the project, such as the baseball fields and the pump tracks. There are no ITE trip generation rates available for baseball fields and pump tracks. For this reason, the trip generation for the proposed project was estimated for each of the project components and based on a combination of ITE trip generation rates and specific project information.

Baseball field

The Saturday peak-hour trip generation for the baseball field was estimated based on the following assumptions:

- One baseball game would end and another game would begin during the peak-hour
- Trips associated with the ending game represent outbound trips while trips associated with the starting game represent inbound trips
- Each team would include 12 players (2 teams per game, 4 teams during the peak-hour)
- A game would generate an average of 1 vehicle per player
- In addition, approximately half of the players would have other family members come to the game, representing 0.5 vehicles per player (spectators)
- Each game would include two officials, or 2 additional vehicles per game

Although it is not likely that all players associated with both ending and starting games would arrive/leave the site during the same hour, making this assumption represents a conservative approach and compensates for other trips that may occur during the peak-hour and are not accounted for in the trip generation estimate (for example, parents dropping-off kids prior to the game for pre-game warm ups, leaving, and coming back at the beginning of the game). Based on the above assumptions, the baseball field would generate a total of 76 trips (38 inbound and 38 outbound) during the Saturday peak-hour.

Pump Tracks

Limited information for pump tracks is available. The nearest pump tracks to the City of Morgan Hill are located in the Cities of San Jose, Aptos, and Santa Cruz. Based on information obtained from Drew Perkins (email correspondence), the Trails Program Director at Mountain Bikers of Santa Cruz, the

peak usage of their most popular track (Harvey West Park) is on Saturdays and on weekday evenings during the summer. According to Mr. Perkins, there are usually 5 to 15 people at the track during the peak usage time. Unfortunately, Mountain Bikers of Santa Cruz does not have actual usage information available for any of their pump tracks.

Because the available information for pump tracks is limited, alternative trip generation rates for a land use with similar trip generation characteristics was used. Thus, the trip generation for the proposed pump tracks was estimated based on ITE trip generation rates for soccer fields (ITE Land Use Code 488). Soccer field trip generation rates are the available ITE rates that most closely compare to the trip generation characteristics of the proposed pump tracks in terms of field usage peak-hour trip generation. Because soccer teams consist of up to 15 players (with two teams per game) and based on the information from the existing pump tracks that estimates up to 15 track users during the peak usage time, it was assumed that both proposed pump tracks would generate traffic equivalent to one soccer field. Based on this assumption, the pump tracks are estimated to generate a total of 41 trips (20 inbound and 21 outbound) during the Saturday peak-hour.

Remaining Park and Supporting Amenities

The trip generation for the remaining park land use and supporting amenities (including shade structures, picnic areas/tables, areas for pop-up tents, restrooms building with meeting room, and adult exercise/gym shaded area) was estimated based on the ITE trip generation rate for Public Park. The size of the park was conservatively assumed to be approximately 4 acres. Based on the ITE trip generation rates, it is estimated that the proposed park would generate a total of 27 trips (15 inbound and 12 outbound) during the Saturday peak hour.

Based on the above assumptions, the proposed project is estimated to generate a total of 144 trips (73 inbound and 71 outbound) during the Saturday peak hour. The project trip generation estimates are presented in Table 3.

The above project trips were assigned to the roadway network based on existing travel patterns in the study area and on the locations of complementary land uses. Due to the presence of a raised center median along Butterfield Boulevard, the project driveway would provide right-in and right-out access only. All inbound project traffic would access the site via the intersection of Monterey Road and Butterfield Boulevard/Watsonville Road and all outbound traffic would travel eastbound/northbound on Butterfield Boulevard to the intersection of Butterfield Boulevard/Tennant Avenue and on to their final destination. Figure 4 shows the project trip distribution assignment at the study intersections. The Saturday peak-hour traffic volumes under existing plus project conditions are presented in Figure 5.

Existing Plus Project Conditions Intersection Level of Service Analysis

The results of the intersection level of service analysis show that all of the study intersections are projected to continue to operate at an acceptable LOS D during the Saturday peak-hour with implementation of the proposed project.

The addition of project traffic would not result in the degradation of the study intersections' level of service nor would it increase the intersections' average delay by more than one second during the Saturday peak-hour (see Table 4). Therefore, the project would not have a significant impact at any of the study intersections.

Table 3
Project Trip Generation

Land Use	ITE Land Use Code	Size	Saturday Peak-Hour Rate	Split In	Split Out	Trips In	Trips Out	Trips Total
Trip Generation Estimate								
Baseball Field[1]		1 Field						
Players		48 (24 per game)				24	24	48
Spectators		24 (12 per game)				12	12	24
Officials		4 (2 per game)				2	2	4
						38	38	76
Pump Track (Soccer Field)[2]	488	1 Field	41.26	48%	52%	20	21	41
Public Park[3]	411	4 Acres	6.8	55%	45%	15	12	27
Total						**73**	**71**	**144**

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

[1] The ITE *Trip Generation Manual* does not provide trip generation rates for baseball field land use. Thus, the trip generation for the baseball field was estimated assuming 12 players per team/2 teams (24 inbound trips), spectators for half the players (12 inbound trips), and 2 officials (2 inbound trips) per game. In addition, during the Saturday peak-hour, one game would end and a second one would begin, resulting in the same number of outbound trips.

[2] The ITE *Trip Generation Manual* does not provide trip generation rates for pump track land use. Thus, it is assumed that the proposed two pump tracks would generate trips equivalent to one soccer field (ITE Land Use 488).

[3] Trip generation for the remaining park land use and supporting amenities was estimated using ITE trip generation rates for Public Park land use (ITE Land Use 411).

Figure 4
Project Trip Distribution and Assignment

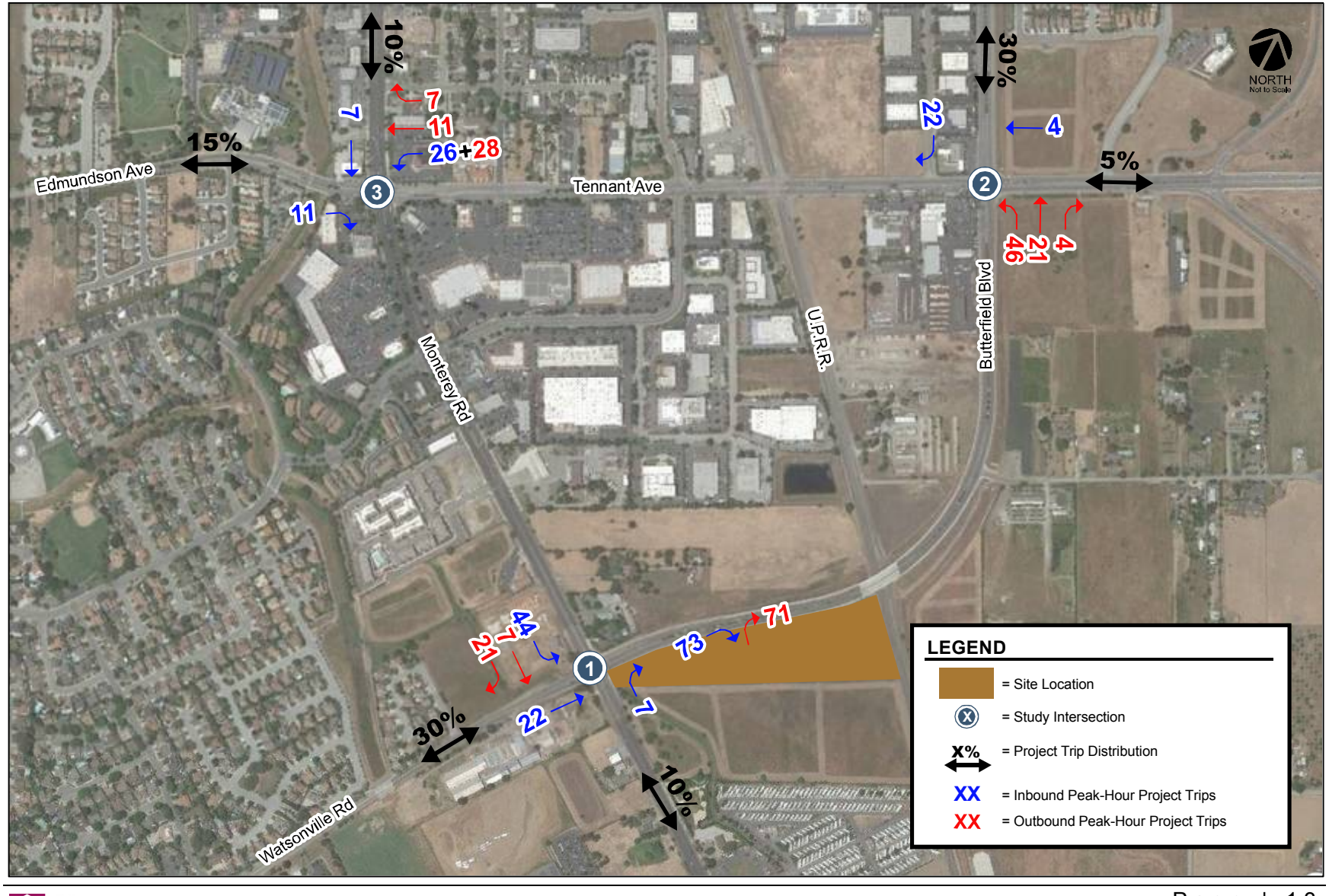


Figure 5
Existing Plus Project Traffic Volumes

Table 4
Existing Plus Project Intersection Level of Service Results

Int. #	Intersection	Existing Control	LOS Standard	Peak Hour	Count Date	Existing		Existing + Project			
						Avg. Delay	LOS	Avg. Delay	LOS	Incr. In Crit. Delay	Incr. In Crit. V/C
1	Monterey Road and Watsonville Road/Butterfield Boulevard	Signal	D	SAT	06/22/19	43.6	D	43.9	D	0.0	0.002
2	Butterfield Boulevard and Tennant Avenue	Signal	E	SAT	06/29/19	38.3	D	38.2	D	1.7	0.051
3	Monterey Road and Tennant Avenue/Edmundson Avenue	Signal	E	SAT	06/22/19	37.8	D	38.6	D	1.2	0.024

Queuing Analysis

The intersection level of service analysis was supplemented with an evaluation of vehicle queue length for high-demand turn-movements. Vehicle queues at the study intersections were estimated using a Poisson probability distribution, which estimates the probability of "n" vehicles for a vehicle movement using the following formula:

$$P(x=n) = \frac{\lambda^n e^{-(\lambda)}}{n!}$$

Where:

P (x=n) = probability of "n" vehicles in queue per lane
n = number of vehicles in the queue per lane
λ = average number of vehicles in the queue per lane (vehicles per hour per lane/signal cycles per hour)

The basis of the analysis is as follows: (1) the Poisson probability distribution is used to estimate the 95th percentile maximum number of queued vehicles per signal cycle for a particular movement; (2) the estimated maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated maximum queue length is compared to the existing or planned available storage capacity for the movement. This analysis thus provides a basis for estimating future left-turn storage requirements at intersections. The 95th percentile queue length value indicates that during the peak hour, a queue of this length or less would occur on 95 percent of the signal cycles. Likewise, a queue length larger than the 95th percentile queue would only occur on 5 percent of the signal cycles (about 3 cycles during the peak hour for a signal with a 60-second cycle length). Therefore, left-turn storage pocket designs based on the 95th percentile queue length would ensure that storage space would be exceeded only 5 percent of the time. The 95th percentile queue length is also known as the "design queue length".

The intersection queuing analysis is summarized in Table 5. Based on the queuing analysis, all study left-turn movements where the project would add a measureable amount of traffic (10 trips per lane or more) currently provide sufficient storage capacity to accommodate peak-hour queue lengths during the Saturday peak-hour and would continue to do so with the addition of project traffic.

Site Access and On-Site Circulation Evaluation

A review of the project site plan was performed to determine if adequate site access and on-site circulation would be provided and to identify any access or circulation issues that should be improved. This review is based on the site plan prepared by Verde Design, dated June 11, 2019, presented on Figure 2, and in accordance with generally accepted traffic engineering standards.

Site Access

Access to the project site would be provided via a single right-in and out access driveway along Butterfield Boulevard. The site plan shows the proposed driveway to be located approximately 320 feet east of the Monterey Road and Butterfield Boulevard intersection. The site driveway would provide direct access to the proposed on-site parking area.

The project site driveway is shown on the site plan to be just over 20 feet wide. According to Section 18.72.060 (Parking design and development standards) of the City of Morgan Hill Municipal Code, the minimum required driveway width at the street entrance should be 35 feet for a two-way commercial driveway.

Table 5
Queuing Analysis Summary

Measurement	Monterey/ Butterfield SBL SAT	Butterfield/ Tennant NBL SAT	Monterey/ Tennant WBL SAT
Existing Conditions			
Cycle/Delay[1] (sec)	155	130	136
Lanes	1	1	2
Volume (vph)	24	20	273
Volume (vphpl)	24	20	137
Avg. Queue (veh/ln.)	1	1	5
Avg. Queue[2] (ft./ln)	26	18	129
95th %. Queue (veh/ln.)	3	2	9
95th %. Queue (ft./ln)	75	50	225
Storage (ft./ ln.)	200	200	300
Adequate (Y/N)	YES	YES	YES
Existing Plus Project Conditions			
Cycle/Delay[1] (sec)	155	130	136
Lanes	1	1	2
Volume (vph)	68	66	327
Volume (vphpl)	68	66	164
Avg. Queue (veh/ln.)	3	2	6
Avg. Queue[2] (ft./ln)	73	60	154
95th %. Queue (veh/ln.)	6	5	11
95th %. Queue (ft./ln)	150	125	275
Storage (ft./ ln.)	200	200	300
Adequate (Y/N)	YES	YES	YES

[1] Vehicle queue calculations based on cycle length for signalized intersections.
[2] Assumes 25 feet per vehicle in the queue.
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound,
R = Right, T = Through, L = Left.

Recommendation: The project site access driveway must be designed to the satisfaction of City of Morgan Hill design standard and guidelines, including the minimum width and turn-radii requirements.

Sight Distance

Adequate sight distance must be provided at the project driveway. The project access point should be free and clear of any obstructions to provide adequate sight distance, thereby ensuring that exiting vehicles can see pedestrians on the sidewalk and other vehicles traveling on the road. Any landscaping and signage should be located in such a way to ensure an unobstructed view for drivers exiting the site. Adequate sight distance (sight distance triangles) should be provided at the project driveway in

accordance with the *American Association of State Highway Transportation Officials* (AASHTO) standards. Sight distance triangles should be measured approximately 10 feet back from the traveled way. Providing the appropriate sight distance reduces the likelihood of a collision at a driveway or intersection and provides drivers with the ability to exit a driveway and locate sufficient gaps in traffic. The minimum acceptable sight distance is often considered the AASHTO stopping sight distance.

Sight distance requirements vary depending on the roadway speeds. Butterfield Boulevard has a posted speed limit of 45 miles per hour (mph). The AASHTO stopping sight distance for a facility with a posted speed limit of 45 mph is 360 feet. Thus, a driver exiting the proposed project driveway must be able to see 360 feet to the west along Butterfield Boulevard in order to stop and avoid a collision.

The intersection of Monterey Road/Butterfield Boulevard is located approximately 320 feet west of the proposed project driveway. However, a clear line of sight is available from the project driveway location to the Monterey Road/Butterfield Boulevard intersection. Additionally, the traffic signal at the Monterey Road/Butterfield Boulevard intersection provides gaps in the eastbound traffic flow along Butterfield Boulevard. Therefore, it can be concluded that the project driveway would meet the AASHTO minimum stopping sight distance requirements.

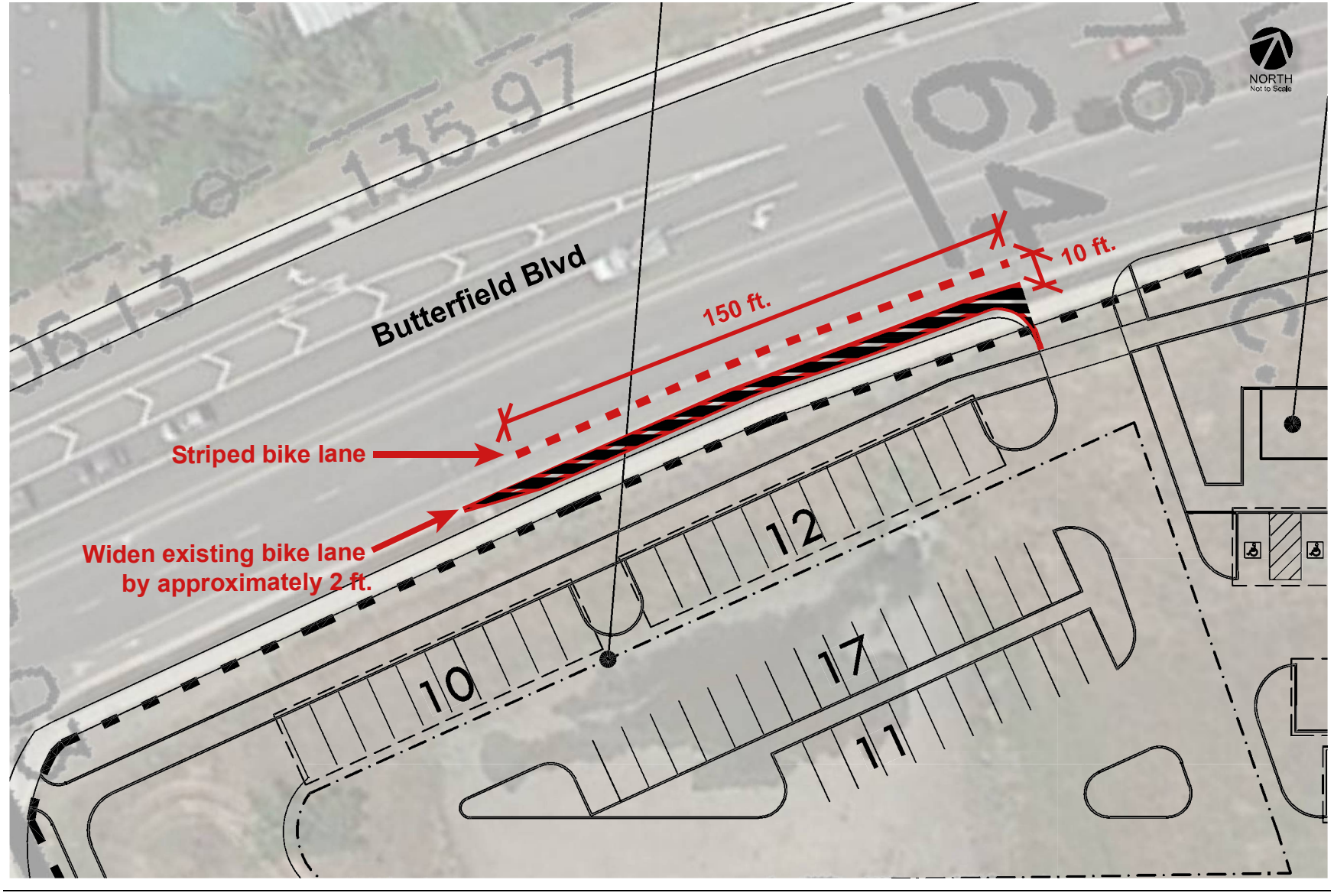
Project Driveway Operations

The estimated project trips at the project site driveways are shown on Figure 4. Based on the project trip generation and trip assignment, it is estimated that approximately 73 and 71 vehicles would enter and exit the site, respectively, during the Saturday peak-hour. Since the project driveway along Butterfield Boulevard would be restricted to right-turns in and out only, and with the benefit of the bike lane along Butterfield Boulevard, in addition to the relatively low project trips at the driveway, project traffic is not anticipated to create operational issue along Butterfield Boulevard. However, because traffic arrival to the site would be dependent of scheduled events at the park rather than spread out evenly throughout the hour, it can be assumed that a large percentage of traffic generated by a specific event would arrive to the site within the same time window. This could result in potential vehicle queues at the project site entrance prior to an event. The traffic signal at the adjacent intersection of Monterey Road/Butterfield Boulevard would control the flow of traffic into the project site. During the beginning of a scheduled event at the park, and based on the project trip generation estimates, it can be assumed that no more than 5 vehicles would arrive to the site at the same time, potentially forming a vehicle queue length of 4-5 vehicles along Butterfield Boulevard at the project site entrance. This potential queue would dissipate as fast as vehicles could enter the site.

The eastbound direction of Butterfield Boulevard adjacent to the proposed project site driveway consists of two 12-foot travel lanes and an 8-foot bike lane, for a total right-of-way of 32 feet. In order to avoid potential inbound vehicular queues from blocking eastbound through traffic on Butterfield Boulevard, it is recommended that Butterfield Boulevard be widened an additional 2-4 feet at the project site entrance, for a distance of approximately 150 feet, in order to provide a total of 34 feet of right-of-way in the eastbound direction to continue to provide two 12-foot through lane and a 10-foot bike lane/right-turn lane. The 150-foot long 10-foot wide bike/right-turn lane at the project site driveway (shown on Figure 6) would provide storage capacity for 6 inbound vehicles and avoid site access activity from interfering with eastbound through traffic on Butterfield Boulevard.

Recommendation: It is recommended that Butterfield Boulevard be widened an additional 2-4 feet at the project site entrance (eastbound direction), for a distance of approximately 150 feet, in order to widened the existing bike lane to provide a 10-foot bike lane/right-turn lane (in addition to the existing two 12-foot through lanes). The 150-foot long 10-foot wide bike/right-turn lane would provide storage capacity for 6 inbound vehicles and avoid site access activity from interfering with eastbound through traffic on Butterfield Boulevard.

Figure 6
Recommended 10-foot Wide Bike/Right-Turn Lane



On-Site Circulation

The proposed project site driveway would provide direct access to the parking area. The site plan shows the parking lot to include 90-degree parking spaces served by various eastbound/westbound two-way drive aisles. The first (northernmost) drive aisle is shown to be located approximately 40 feet south of the site driveway entry point, on the west side of the entrance drive aisle. According to Section 18.72.060 (Parking design and development standards) of the City of Morgan Hill Municipal Code, all parking lots shall provide a minimum 40-foot stacking distance from the travel lane of the adjoining street. The proposed throat length (the distance between the project driveway entry point and the first drive aisle) satisfies the City requirements and would provide storage space for up to two inbound vehicles. However, due to its close proximity to the site entrance and the potential for parking activity/queue lengths from the first drive aisle to interfere with inbound vehicles from the site entrance, it is recommended that access to the first drive aisle be prohibited to inbound traffic. The distance between the site entrance and the second drive aisle is approximately 100 feet, adequate space to store up to four entering vehicles.

Because the proposed project driveway would allow right turns out of the site only, no operational issues with outbound traffic are anticipated. Outbound traffic would be able to store within the site without affecting operations along the adjacent streets.

The proposed parking layout would provide continuous vehicular circulation throughout the parking lot with no dead-end drive aisles. Although drive aisle and parking space dimensions are not listed, the design of the project site should adhere to City of Morgan Hill design guidelines and standards.

Recommendation: Access to the drive aisle closest to the site entrance should be prohibited to inbound traffic to reduce the likelihood of potential vehicular queues from this drive aisle from extending and interfering with the flow of inbound vehicles at the driveway.

Emergency Vehicle and Truck Access and Circulation

The proposed project site driveway also would provide access to larger vehicles, such as emergency vehicles and garbage collector trucks. For this reason, the design of the project site and parking lot, including driveway and drive aisle widths and on-site turn radii, must be adequate to ensure larger vehicles can maneuver through the site without a problem.

Recommendation: The design of the project site, including but not limited to driveways, sidewalks, corner radii, drive aisle width, parking dimensions, and signage, should adhere to City of Morgan Hill design standards and guidelines.

Pedestrian Site Access and Circulation

As discussed previously, there are currently segments of Watsonville Road and Monterey Road (along undeveloped parcels) with missing sidewalks in the vicinity of the project site. Due to the missing sidewalks, pedestrian access to the project site from adjacent neighborhoods would be discontinuous and would require pedestrians along these segments of Watsonville and Monterey Roads to walk along undeveloped roadway shoulders or dirt pathways. The project should be required to install sidewalks along its Monterey Road frontage to contribute to the development of a complete pedestrian network in the vicinity of the project site. However, constructing sidewalks along other undeveloped properties is beyond the project's right-of-way and responsibility. Each of the undeveloped parcels will have to install the missing sidewalks along its frontage as they develop, closing existing sidewalk gaps. Until a complete sidewalk network is available, pedestrians will need to rely on the available pedestrian network (sidewalks along Butterfield Boulevard, most of the north side of Watsonville Road, and most of Monterey Road, north of Butterfield Boulevard, in addition to bike lanes along all adjacent roadways) to access the project site.

The project proposes to construct a pedestrian walking path that would run along the perimeter of the site. The proposed pedestrian pathway would connect to all areas within the site, including the parking lot area, sports fields, and park amenities. In additions, the pathway would connect directly to existing sidewalks along Butterfield Boulevard (at the project site driveway) and to the intersection of Monterey Road/Butterfield Boulevard (at the southeast corner of the intersection). This pathway would provide a connection between the project site and existing pedestrian and bicycle facilities along Monterey Road and Butterfield Boulevard. The site plan also shows what appears to be pedestrian walkways within the parking lot and parking spaces. These walkways would facility pedestrian movement between the parking lot and the park areas.

Overall, pedestrian connectivity within the project site, parking lot, and adjacent pedestrian/bicycle facilities would adequately serve the estimated project demand. Pedestrian access to the project site from the adjacent neighborhoods, however, would need to rely on the available pedestrian network until a complete sidewalk network is available as other undeveloped parcels develop.

Parking

The proposed project site plan shows a total of 214 parking spaces within the on-site parking lot. According to Section 18.72.030 (Required parking spaces) of the City of Morgan Hill Municipal Code, the required number of parking spaces for parks and recreation facilities within the City of Morgan Hill must be determined based on a parking demand study.

Conclusions

The trip generation and operations analysis was conducted to evaluate the magnitude of traffic to be added to the roadway system by the proposed project and its effect on traffic operations in the transportation network immediately surrounding the site. The potential impacts related to the proposed project were evaluated following the standards and methodologies set forth by the City of Morgan Hill and the Santa Clara Valley Transportation Authority (VTA).

The result and recommendations of the trip generation and operations analysis are summarized below:

Existing Traffic Conditions

The results of the level of service analysis show that, measured against the City of Morgan Hill level of service standards, all the study intersections currently operate at an acceptable level of service under existing conditions during the Saturday peak-hour.

Existing Plus Project Traffic Conditions

The results of the intersection level of service analysis show that all of the study intersections are projected to continue to operate at an acceptable LOS D during the Saturday peak-hour with implementation of the proposed project. The addition of project traffic would not result in the degradation of the study intersections' level of service nor would it increase the intersections' average delay by more than one second during the Saturday peak-hour. Therefore, the project would not have a significant impact at any of the study intersections.

Queuing Analysis

The intersection queuing analysis results show that all study left-turn movements where the project would add a measureable amount of traffic (10 trips per lane or more) currently provide sufficient storage capacity to accommodate peak-hour queue lengths during the Saturday peak-hour and would continue to do so with the addition of project traffic.

Site Access

Recommendation: The project site access driveway must be designed to the satisfaction of City of Morgan Hill design standard and guidelines, including the minimum width and turn-radii requirements.

Sight Distance

Based on the AASHTO stopping sight distance requirements for a facility with a posted speed limit of 45 mph, a driver exiting the proposed project driveway must be able to see 360 feet to the west along Butterfield Boulevard in order to stop and avoid a collision.

The intersection of Monterey Road/Butterfield Boulevard is located approximately 320 feet west of the proposed project driveway. However, a clear line of sight is available from the project driveway location to the Monterey Road/Butterfield Boulevard intersection. Additionally, the traffic signal at the Monterey Road/Butterfield Boulevard intersection provides gaps in the eastbound traffic flow along Butterfield Boulevard. Therefore, it can be concluded that the project driveway would meet the AASHTO minimum stopping sight distance requirements.

Project Driveway Operations

Recommendation: It is recommended that Butterfield Boulevard be widened an additional 2-4 feet at the project site entrance (eastbound direction), for a distance of approximately 150 feet, in order to widened the existing bike lane to provide a 10-foot bike lane/right-turn lane (in addition to the existing two 12-foot through lanes). The 150-foot long 10-foot wide bike lane would provide storage capacity for 6 inbound vehicles and avoid site access activity from interfering with eastbound through traffic on Butterfield Boulevard.

On-Site Circulation

Recommendation: Access to the drive aisle closest to the site entrance should be prohibited to inbound traffic to reduce the likelihood of potential vehicular queues from this drive aisle from extending and interfering with the flow of inbound vehicles at the driveway.

Emergency Vehicle and Truck Access and Circulation

Recommendation: The design of the project site, including but not limited to driveways, sidewalks, corner radii, drive aisle width, parking dimensions, and signage, should adhere to City of Morgan Hill design standards and guidelines.

Pedestrian Site Access and Circulation

Overall, pedestrian connectivity within the project site, parking lot, and adjacent pedestrian/bicycle facilities would adequately serve the estimated project demand. Pedestrian access to the project site from the adjacent neighborhoods, however, would need to rely on the available pedestrian network until a complete sidewalk network is available as other undeveloped parcels develop.

Parking

The proposed project site plan shows a total of 214 parking spaces within the on-site parking lot. According to Section 18.72.030 (Required parking spaces) of the City of Morgan Hill Municipal Code, the required number of parking spaces for parks and recreation facilities within the City of Morgan Hill must be determined based on a parking demand study.

Butterfield Park Trip Generation and Operations Analysis
Technical Appendices

July 5, 2019

Traffic Counts

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 1 FINAL
Site Code : 00000001
Start Date : 6/22/2019
Page No : 1

Groups Printed- Vehicles

	MONTEREY RD Southbound					BUTTERFIELD BLVD Westbound					MONTEREY RD Northbound					WATSONVILLE RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
10:00 AM	28	91	4	0	123	1	59	16	0	76	20	79	14	0	113	10	83	35	0	128	440
10:15 AM	47	85	6	1	139	8	81	47	0	136	18	87	4	9	118	7	87	46	0	140	533
10:30 AM	45	99	6	0	150	12	111	31	0	154	22	97	12	0	131	8	68	37	0	113	548
10:45 AM	60	120	8	0	188	10	98	63	0	171	17	121	9	1	148	15	72	39	0	126	633
Total	180	395	24	1	600	31	349	157	0	537	77	384	39	10	510	40	310	157	0	507	2154
11:00 AM	68	132	12	0	212	12	92	59	0	163	20	97	12	0	129	9	76	54	0	139	643
11:15 AM	53	124	13	0	190	5	95	57	0	157	31	92	7	0	130	14	61	39	2	116	593
11:30 AM	63	109	14	1	187	6	83	39	1	129	23	98	8	0	129	5	78	50	0	133	578
11:45 AM	67	138	4	0	209	6	99	49	0	154	22	106	11	0	139	18	76	43	0	137	639
Total	251	503	43	1	798	29	369	204	1	603	96	393	38	0	527	46	291	186	2	525	2453
12:00 PM	57	161	8	0	226	11	95	45	1	152	18	107	6	0	131	13	77	45	0	135	644
12:15 PM	79	156	6	0	241	9	100	56	1	166	18	111	13	0	142	9	75	54	0	138	687
12:30 PM	67	177	9	0	253	7	107	77	0	191	38	80	6	0	124	8	114	37	0	159	727
12:45 PM	84	128	7	0	219	4	124	79	0	207	24	80	14	0	118	11	67	50	0	128	672
Total	287	622	30	0	939	31	426	257	2	716	98	378	39	0	515	41	333	186	0	560	2730
01:00 PM	73	161	2	0	236	15	97	58	0	170	20	93	6	0	119	7	67	55	0	129	654
01:15 PM	65	136	7	0	208	5	88	51	1	145	19	86	5	0	110	9	57	40	0	106	569
01:30 PM	65	160	7	0	232	6	90	49	0	145	17	94	17	0	128	10	58	31	0	99	604
01:45 PM	55	161	10	0	226	7	103	53	0	163	25	82	10	0	117	5	64	55	0	124	630
Total	258	618	26	0	902	33	378	211	1	623	81	355	38	0	474	31	246	181	0	458	2457
02:00 PM	67	150	9	0	226	11	117	57	0	185	27	81	5	0	113	12	74	39	0	125	649
02:15 PM	44	137	8	0	189	4	102	49	0	155	20	97	10	0	127	5	57	35	0	97	568
02:30 PM	54	130	10	0	194	9	100	50	0	159	27	75	9	0	111	15	65	47	0	127	591
02:45 PM	52	131	9	0	192	6	105	50	0	161	20	80	8	0	108	11	62	44	0	117	578
Total	217	548	36	0	801	30	424	206	0	660	94	333	32	0	459	43	258	165	0	466	2386
03:00 PM	61	125	6	0	192	6	84	31	0	121	25	95	6	0	126	11	79	36	0	126	565
03:15 PM	53	115	7	0	175	8	96	51	0	155	19	72	8	0	99	12	79	37	0	128	557
03:30 PM	64	148	5	0	217	8	93	47	0	148	28	71	12	0	111	9	78	44	0	131	607
03:45 PM	56	129	5	0	190	12	93	39	1	145	21	80	11	0	112	5	84	46	0	135	582
Total	234	517	23	0	774	34	366	168	1	569	93	318	37	0	448	37	320	163	0	520	2311
Grand Total	1427	3203	182	2	4814	188	2312	1203	5	3708	539	2161	223	10	2933	238	1758	1038	2	3036	14491
Apprch %	29.6	66.5	3.8	0		5.1	62.4	32.4	0.1		18.4	73.7	7.6	0.3		7.8	57.9	34.2	0.1		
Total %	9.8	22.1	1.3	0	33.2	1.3	16	8.3	0	25.6	3.7	14.9	1.5	0.1	20.2	1.6	12.1	7.2	0	21	

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File Name : 1 FINAL
Site Code : 00000001
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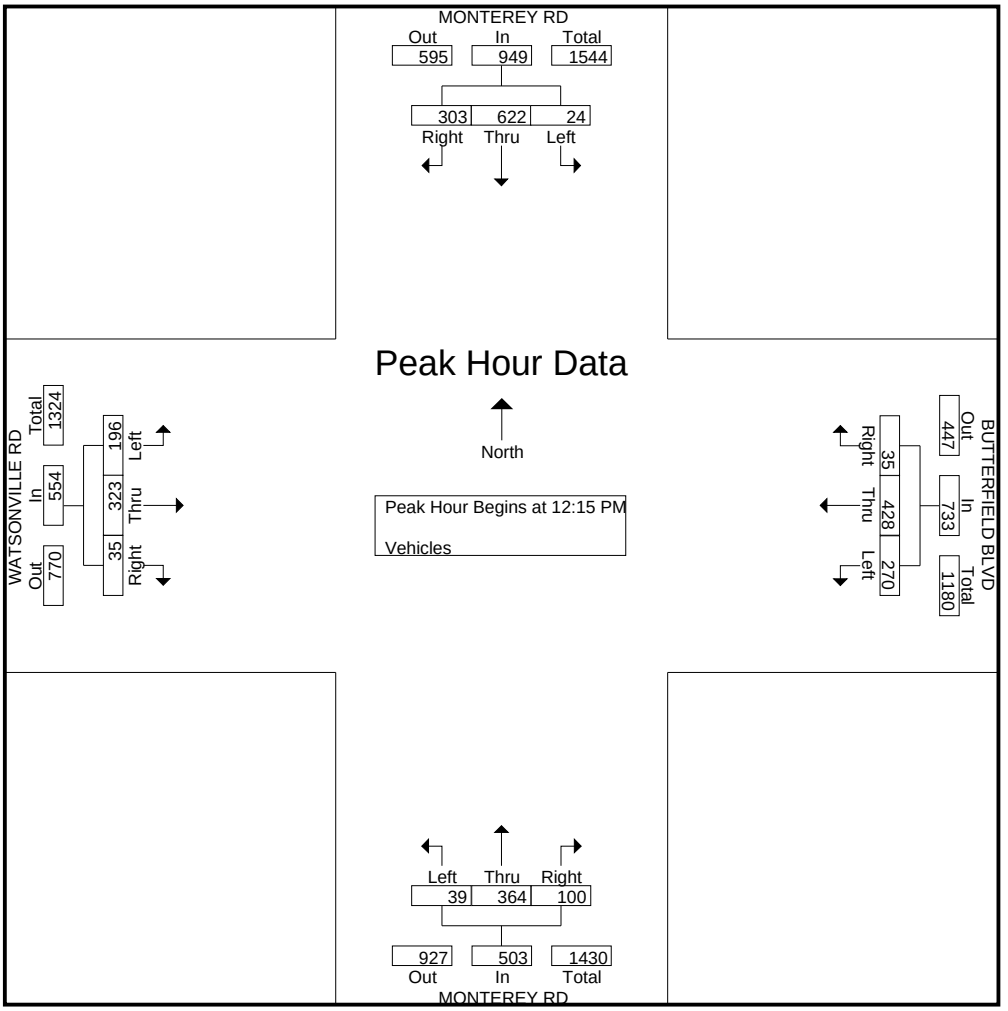
	MONTEREY RD Southbound				BUTTERFIELD BLVD Westbound				MONTEREY RD Northbound				WATSONVILLE RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:15 PM																	
12:15 PM	79	156	6	241	9	100	56	165	18	**111**	13	**142**	9	75	54	138	686
12:30 PM	67	**177**	**9**	**253**	7	107	77	191	**38**	80	6	124	8	**114**	37	**159**	**727**
12:45 PM	**84**	128	7	219	4	**124**	**79**	**207**	24	80	**14**	118	**11**	67	50	128	672
01:00 PM	73	161	2	236	**15**	97	58	170	20	93	6	119	7	67	**55**	129	654
Total Volume	303	622	24	949	35	428	270	733	100	364	39	503	35	323	196	554	2739
% App. Total	31.9	65.5	2.5		4.8	58.4	36.8		19.9	72.4	7.8		6.3	58.3	35.4		
PHF	.902	.879	.667	.938	.583	.863	.854	.885	.658	.820	.696	.886	.795	.708	.891	.871	.942



Traffic Data Service

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File Name : 2 FINAL
Site Code : 00000002
Start Date : 6/22/2019
Page No : 1

Groups Printed- Vehicles

	MONTEREY RD Southbound					TENNANT AVE Westbound					MONTEREY RD Northbound					W EDMUNDSON AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
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10:15 AM	18	108	30	2	158	33	45	47	2	127	26	102	23	2	153	13	63	54	2	132	570
10:30 AM	26	136	40	3	205	28	30	55	1	114	15	131	41	2	189	12	55	33	5	105	613
10:45 AM	16	157	40	0	213	42	33	74	0	149	18	136	33	0	187	14	46	59	3	122	671
Total	76	518	144	6	744	126	135	234	3	498	75	477	127	4	683	48	207	191	12	458	2383
11:00 AM	27	139	39	0	205	18	39	76	1	134	17	99	36	0	152	12	53	44	2	111	602
11:15 AM	21	157	38	3	219	28	22	45	1	96	17	124	17	1	159	13	51	58	4	126	600
11:30 AM	16	143	49	2	210	37	30	50	0	117	25	100	17	3	145	14	56	42	5	117	589
11:45 AM	33	157	61	0	251	29	25	81	1	136	21	102	30	0	153	15	59	51	1	126	666
Total	97	596	187	5	885	112	116	252	3	483	80	425	100	4	609	54	219	195	12	480	2457
12:00 PM	14	225	51	1	291	32	34	65	1	132	14	118	23	1	156	13	58	58	2	131	710
12:15 PM	26	184	60	1	271	36	35	70	3	144	23	132	17	2	174	18	43	30	2	93	682
12:30 PM	22	212	51	2	287	32	43	65	0	140	16	122	23	3	164	20	48	47	1	116	707
12:45 PM	37	219	50	0	306	36	24	73	0	133	22	87	25	3	137	13	58	80	0	151	727
Total	99	840	212	4	1155	136	136	273	4	549	75	459	88	9	631	64	207	215	5	491	2826
01:00 PM	22	187	59	0	268	27	27	76	1	131	18	123	28	1	170	18	36	55	0	109	678
01:15 PM	36	188	48	0	272	32	38	56	4	130	28	98	30	0	156	20	39	47	0	106	664
01:30 PM	23	157	50	1	231	27	37	83	0	147	25	106	31	0	162	15	52	44	2	113	653
01:45 PM	20	165	61	1	247	27	28	65	1	121	16	118	25	1	160	15	44	56	1	116	644
Total	101	697	218	2	1018	113	130	280	6	529	87	445	114	2	648	68	171	202	3	444	2639
02:00 PM	15	190	46	1	252	21	29	66	0	116	19	111	20	0	150	12	52	41	0	105	623
02:15 PM	18	154	30	5	207	20	31	56	0	107	26	125	29	3	183	10	47	45	2	104	601
02:30 PM	20	154	50	2	226	29	27	50	2	108	18	98	21	2	139	13	61	32	6	112	585
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Total	73	633	166	8	880	95	117	221	3	436	89	433	88	10	620	61	208	155	10	434	2370
03:00 PM	15	153	42	5	215	17	34	45	1	97	19	82	19	1	121	16	52	42	1	111	544
03:15 PM	22	143	32	0	197	18	25	59	2	104	17	114	40	0	171	11	43	51	0	105	577
03:30 PM	17	189	45	0	251	28	16	55	2	101	17	80	17	1	115	6	58	45	1	110	577
03:45 PM	24	167	47	4	242	33	22	64	7	126	22	109	19	2	152	9	45	41	0	95	615
Total	78	652	166	9	905	96	97	223	12	428	75	385	95	4	559	42	198	179	2	421	2313
Grand Total	524	3936	1093	34	5587	678	731	1483	31	2923	481	2624	612	33	3750	337	1210	1137	44	2728	14988
Apprch %	9.4	70.4	19.6	0.6		23.2	25	50.7	1.1		12.8	70	16.3	0.9		12.4	44.4	41.7	1.6		
Total %	3.5	26.3	7.3	0.2	37.3	4.5	4.9	9.9	0.2	19.5	3.2	17.5	4.1	0.2	25	2.2	8.1	7.6	0.3	18.2	

Traffic Data Service

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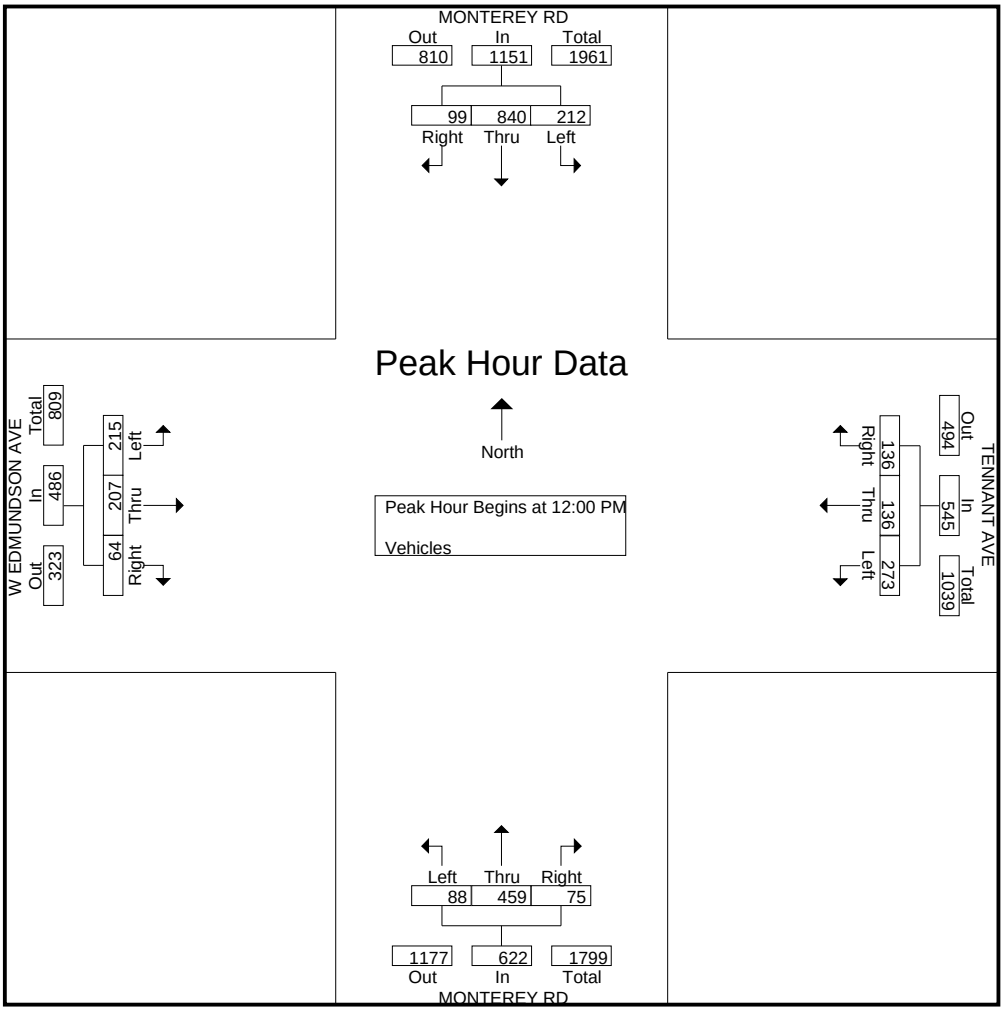
File Name : 2 FINAL
Site Code : 00000002
Start Date : 6/22/2019
Page No : 2

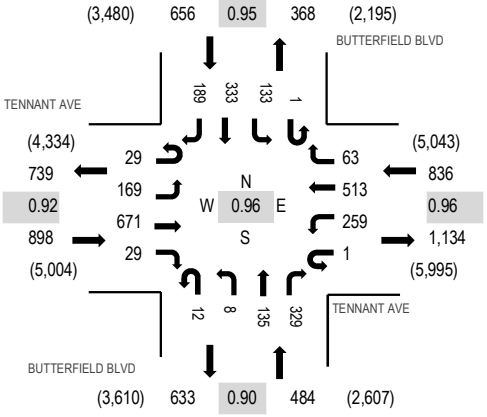
	MONTEREY RD Southbound				TENNANT AVE Westbound				MONTEREY RD Northbound				W EDMUNDSON AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	14	**225**	51	290	32	34	65	131	14	118	23	155	13	**58**	58	129	705
12:15 PM	26	184	**60**	270	**36**	35	70	**141**	**23**	**132**	17	**172**	18	43	30	91	674
12:30 PM	22	212	51	285	32	**43**	65	140	16	122	23	161	**20**	48	47	115	701
12:45 PM	**37**	219	50	**306**	36	24	**73**	133	22	87	**25**	134	13	58	**80**	**151**	**724**
Total Volume	99	840	212	1151	136	136	273	545	75	459	88	622	64	207	215	486	2804
% App. Total	8.6	73	18.4		25	25	50.1		12.1	73.8	14.1		13.2	42.6	44.2		
PHF	.669	.933	.883	.940	.944	.791	.935	.966	.815	.869	.880	.904	.800	.892	.672	.805	.968



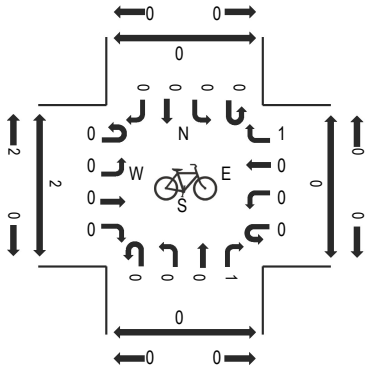
All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

Location: 1 BUTTERFIELD BLVD & TENNANT AVE AM
Date: Saturday, June 29, 2019
Peak Hour: 01:00 PM - 02:00 PM
Peak 15-Minutes: 01:45 PM - 02:00 PM

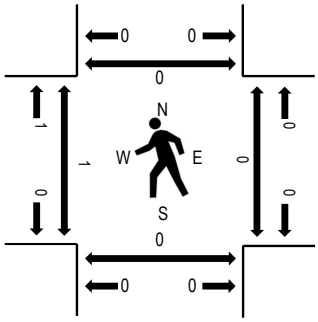
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	TENNANT AVE Eastbound				TENNANT AVE Westbound				BUTTERFIELD BLVD Northbound				BUTTERFIELD BLVD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
10:00 AM	9	39	140	3	0	58	118	10	0	2	27	60	0	21	43	22	552	2,433	0	0	0	0
10:15 AM	8	42	157	1	0	75	134	19	2	6	34	62	2	19	48	44	653	2,526	0	0	0	0
10:30 AM	8	39	112	5	0	77	142	13	5	3	27	62	0	18	54	33	598	2,538	0	0	0	0
10:45 AM	6	31	158	5	0	76	135	17	3	3	25	57	0	22	50	42	630	2,619	0	0	0	0
11:00 AM	15	55	137	4	0	67	125	14	3	3	39	65	0	25	63	30	645	2,647	0	0	0	1
11:15 AM	14	32	145	6	0	65	135	12	3	4	28	74	0	31	61	55	665	2,699	0	0	0	1
11:30 AM	12	53	175	7	0	55	142	12	3	5	32	59	0	23	61	40	679	2,747	0	0	0	0
11:45 AM	12	43	137	10	1	68	134	14	4	4	38	78	1	15	60	39	658	2,820	0	0	0	0
12:00 PM	7	67	162	3	1	73	122	14	1	4	34	61	2	36	65	45	697	2,845	1	0	0	0
12:15 PM	14	55	170	4	0	51	139	11	3	1	29	69	1	23	94	49	713	2,837	0	0	0	0
12:30 PM	6	53	150	6	1	78	139	14	6	3	42	87	1	29	86	51	752	2,829	0	0	2	0
12:45 PM	7	42	163	9	0	54	133	13	1	5	32	61	1	27	84	51	683	2,812	0	0	0	0
1:00 PM	7	51	188	9	0	60	121	19	3	2	26	68	1	26	62	46	689	2,874	0	0	0	0
1:15 PM	4	40	152	8	1	65	122	13	3	2	37	88	0	28	95	47	705	2,861	1	0	0	0
1:30 PM	5	27	185	5	0	66	136	14	4	3	31	82	0	42	91	44	735	2,820	0	0	0	0
1:45 PM	13	51	146	7	0	68	134	17	2	1	41	91	0	37	85	52	745	2,768	0	0	0	0
2:00 PM	3	46	135	8	1	79	127	22	2	0	29	69	0	29	87	39	676	2,660	0	0	0	0
2:15 PM	10	40	163	4	0	68	124	7	1	3	26	68	0	27	78	45	664	2,683	0	0	0	0
2:30 PM	8	51	167	2	0	65	114	23	1	0	31	68	1	23	84	45	683	2,655	0	0	0	0
2:45 PM	5	40	129	2	1	71	121	15	3	0	35	64	1	24	86	40	637	2,631	0	0	0	0
3:00 PM	6	39	134	3	1	69	134	16	4	2	37	66	0	33	108	47	699	2,675	0	0	0	1
3:15 PM	8	32	158	6	1	73	100	18	3	2	30	69	0	22	72	42	636		0	0	0	2
3:30 PM	7	34	131	6	1	69	111	16	3	1	38	74	0	40	92	36	659		0	0	1	0
3:45 PM	10	29	142	10	3	71	106	19	2	4	42	87	1	38	82	35	681		0	0	0	0

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	2	0	0	1	0	1	0	0	0	2	0	2	0	0	8
Lights	29	169	664	29	1	257	507	61	12	8	133	324	1	129	330	189	2,843
Mediums	0	0	5	0	0	1	6	1	0	0	2	3	0	2	3	0	23
Total	29	169	671	29	1	259	513	63	12	8	135	329	1	133	333	189	2,874

Volume Summary Tables

Intersection Number: 1
Traffix Node Number: 422
Intersection Name: Monterey Road and Watsonville Road/Butterfield Boulevard
Peak Hour: AM
Count Date: 6/22/19

	Movements												
	North Approach			East Approach			South Approach			West Approach			Int.
Scenario:	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
Existing Conditions	**303**	**622**	**24**	**35**	**428**	**270**	**100**	**364**	**39**	**35**	**323**	**196**	**2739**
Project Trips	21	7	44	0	0	0	7	0	0	0	22	0	101
Existing Plus Project Conditions	**324**	**629**	**68**	**35**	**428**	**270**	**107**	**364**	**39**	**35**	**345**	**196**	**2840**

Intersection Number: 2
Traffix Node Number: 1111
Intersection Name: Butterfield Boulevard and Tennant Avenue
Peak Hour: AM
Count Date: 6/29/19

	Movements												
	North Approach			East Approach			South Approach			West Approach			Int.
Scenario:	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
Existing Conditions	**189**	**333**	**134**	**63**	**513**	**260**	**329**	**135**	**20**	**29**	**671**	**198**	**2874**
Project Trips	22	0	0	0	4	0	4	21	46	0	0	0	97
Existing Plus Project Conditions	**211**	**333**	**134**	**63**	**517**	**260**	**333**	**156**	**66**	**29**	**671**	**198**	**2971**

Intersection Number: 3
Traffix Node Number: 6674
Intersection Name: Monterey Road and Tennant Avenue/Edmundson Avenue
Peak Hour: AM
Count Date: 6/22/19

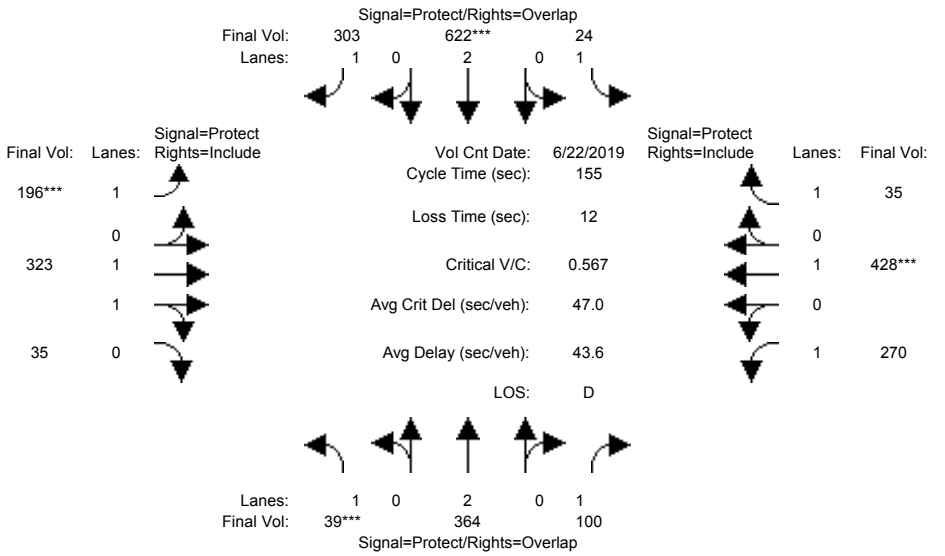
	Movements												
	North Approach			East Approach			South Approach			West Approach			Int.
Scenario:	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
Existing Conditions	**99**	**840**	**212**	**136**	**136**	**273**	**75**	**459**	**88**	**64**	**207**	**215**	**2804**
Project Trips	0	7	0	7	11	54	0	0	0	11	0	0	90
Existing Plus Project Conditions	**99**	**847**	**212**	**143**	**147**	**327**	**75**	**459**	**88**	**75**	**207**	**215**	**2894**

Level of Service Calculations

Butterfield Park
Morgan Hill
Hexagon Transportation Consultants, Inc.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing (SAT)

Intersection #422: Monterey Road and Butterfield Boulevard/Watsonville Road



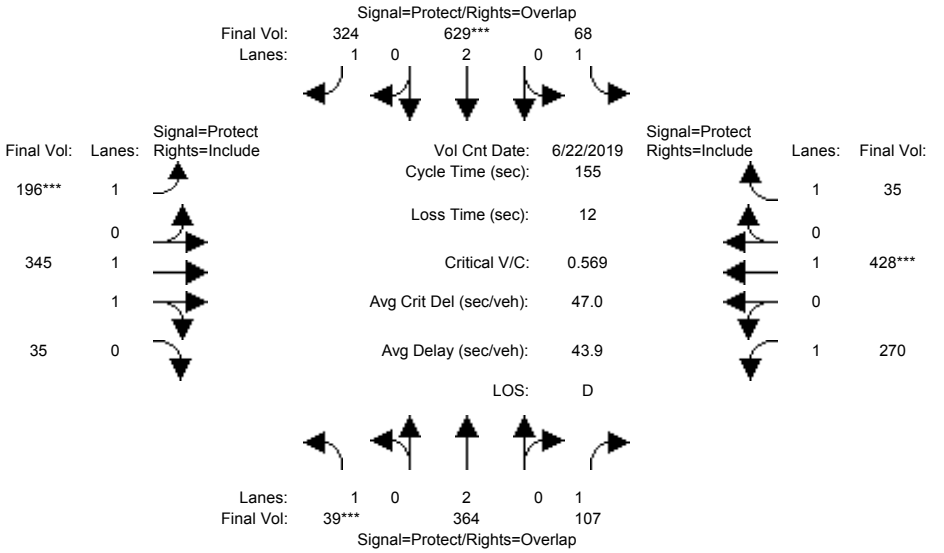
Street Name:	Monterey Rd						Butterfield Blvd/Watsonville Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	7	10	10	7	10	10	7	10	10	7	10	10
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Volume Module: >> Count Date: 22 Jun 2019 << 12:15PM-1:15PM												
Base Vol:	39	364	100	24	622	303	196	323	35	270	428	35
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	364	100	24	622	303	196	323	35	270	428	35
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
ATI:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	39	364	100	24	622	303	196	323	35	270	428	35
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	39	364	100	24	622	303	196	323	35	270	428	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	39	364	100	24	622	303	196	323	35	270	428	35
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	39	364	100	24	622	303	196	323	35	270	428	35
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	1.00	0.92	0.92	1.00	0.92	0.92	0.98	0.95	0.92	1.00	0.92
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	1.80	0.20	1.00	1.00	1.00
Final Sat.:	1750	3800	1750	1750	3800	1750	1750	3338	362	1750	1900	1750
Capacity Analysis Module:												
Vol/Sat:	0.02	0.10	0.06	0.01	0.16	0.17	0.11	0.10	0.10	0.15	0.23	0.02
Crit Moves:	****				****		****				****	
Green Time:	7.0	35.0	91.2	16.5	44.4	74.8	30.4	35.3	35.3	56.3	61.2	61.2
Volume/Cap:	0.49	0.42	0.10	0.13	0.57	0.36	0.57	0.42	0.42	0.42	0.57	0.05
Delay/Veh:	77.0	51.8	14.0	63.1	47.9	25.3	58.7	51.5	51.5	37.6	37.7	29.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	77.0	51.8	14.0	63.1	47.9	25.3	58.7	51.5	51.5	37.6	37.7	29.0
LOS by Move:	E	D	B	E	D	C	E	D	D	D	D	C
HCM2kAvgQ:	3	7	2	1	12	9	10	7	7	10	16	1

Note: Queue reported is the number of cars per lane.

Butterfield Park
Morgan Hill
Hexagon Transportation Consultants, Inc.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Ex + P SAT

Intersection #422: Monterey Road and Butterfield Boulevard/Watsonville Road



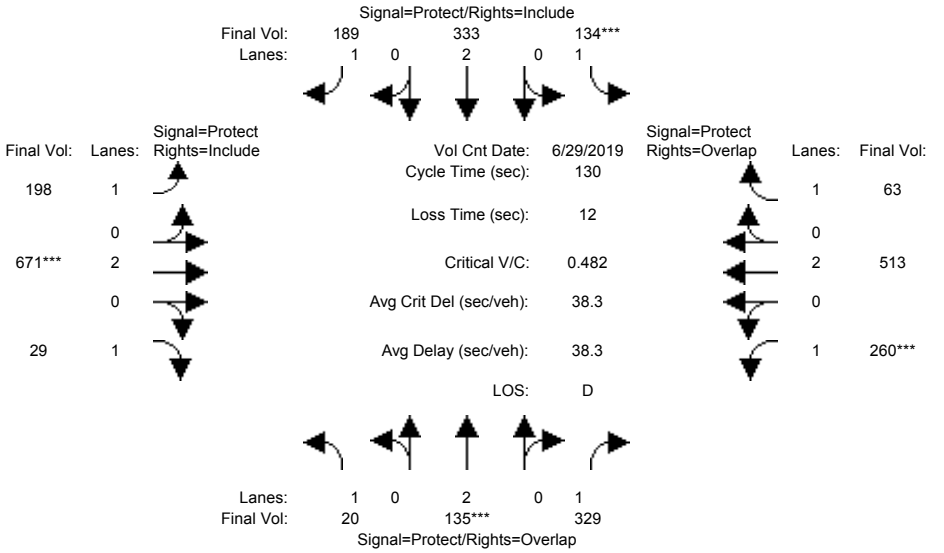
Street Name:	Monterey Rd						Butterfield Blvd/Watsonville Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	7	10	10	7	10	10	7	10	10	7	10	10
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Volume Module: >> Count Date: 22 Jun 2019 << 12:15PM-1:15PM												
Base Vol:	39	364	100	24	622	303	196	323	35	270	428	35
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	364	100	24	622	303	196	323	35	270	428	35
Added Vol:	0	0	7	44	7	21	0	22	0	0	0	0
ATI:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	39	364	107	68	629	324	196	345	35	270	428	35
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	39	364	107	68	629	324	196	345	35	270	428	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	39	364	107	68	629	324	196	345	35	270	428	35
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	39	364	107	68	629	324	196	345	35	270	428	35
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	1.00	0.92	0.92	1.00	0.92	0.92	0.98	0.95	0.92	1.00	0.92
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	1.81	0.19	1.00	1.00	1.00
Final Sat.:	1750	3800	1750	1750	3800	1750	1750	3359	341	1750	1900	1750
Capacity Analysis Module:												
Vol/Sat:	0.02	0.10	0.06	0.04	0.17	0.19	0.11	0.10	0.10	0.15	0.23	0.02
Crit Moves:	****				****		****				****	
Green Time:	7.0	35.2	90.0	16.6	44.8	75.1	30.3	36.5	36.5	54.8	60.9	60.9
Volume/Cap:	0.49	0.42	0.11	0.36	0.57	0.38	0.57	0.44	0.44	0.44	0.57	0.05
Delay/Veh:	77.0	51.5	14.6	65.5	47.7	25.6	58.8	50.9	50.9	38.8	37.9	29.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	77.0	51.5	14.6	65.5	47.7	25.6	58.8	50.9	50.9	38.8	37.9	29.2
LOS by Move:	E	D	B	E	D	C	E	D	D	D	D	C
HCM2kAvgQ:	3	7	2	3	12	10	10	8	8	10	16	1

Note: Queue reported is the number of cars per lane.

Butterfield Park
Morgan Hill
Hexagon Transportation Consultants, Inc.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing (SAT)

Intersection #1111: Butterfield Boulevard and Tennant Avenue



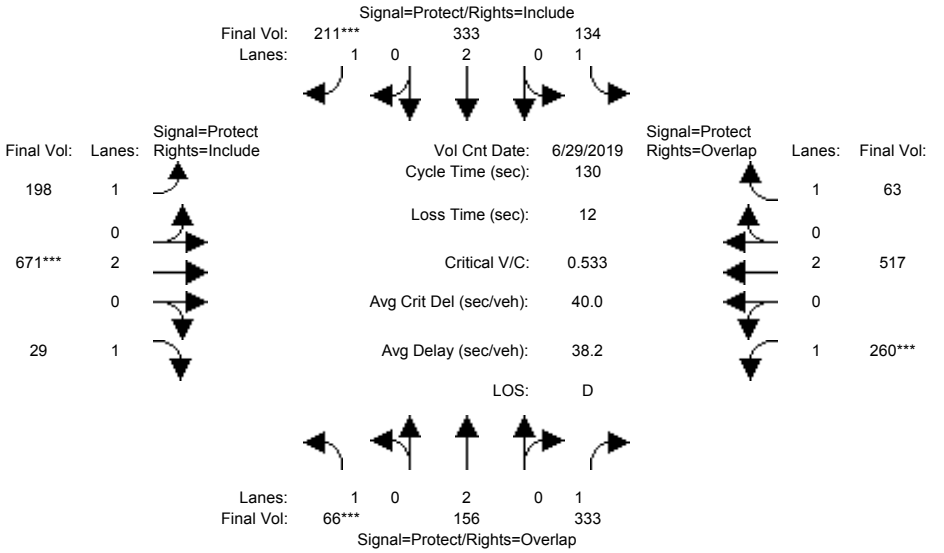
Street Name:	Butterfield Boulevard						Tennant Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Min. Green:	7	10	10	7	10	10	7	10	10	7	10	10
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Volume Module: >> Count Date: 29 Jun 2019 <<												
Base Vol:	20	135	329	134	333	189	198	671	29	260	513	63
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	135	329	134	333	189	198	671	29	260	513	63
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
ATI:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	20	135	329	134	333	189	198	671	29	260	513	63
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	20	135	329	134	333	189	198	671	29	260	513	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	135	329	134	333	189	198	671	29	260	513	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	135	329	134	333	189	198	671	29	260	513	63
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	1.00	0.92	0.92	1.00	0.92	0.92	1.00	0.92	0.92	1.00	0.92
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1750	3800	1750	1750	3800	1750	1750	3800	1750	1750	3800	1750
Capacity Analysis Module:												
Vol/Sat:	0.01	0.04	0.19	0.08	0.09	0.11	0.11	0.18	0.02	0.15	0.14	0.04
Crit Moves:		****		****				****		****		
Green Time:	10.2	10.0	49.9	20.6	20.4	20.4	39.9	47.5	47.5	39.9	47.6	68.1
Volume/Cap:	0.15	0.46	0.49	0.48	0.56	0.69	0.37	0.48	0.05	0.48	0.37	0.07
Delay/Veh:	56.4	58.6	30.9	51.2	51.8	58.9	35.7	32.1	26.7	37.3	30.4	15.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	56.4	58.6	30.9	51.2	51.8	58.9	35.7	32.1	26.7	37.3	30.4	15.3
LOS by Move:	E	E	C	D	D	E	D	C	C	D	C	B
HCM2kAvgQ:	1	3	11	6	7	9	6	10	1	9	7	1

Note: Queue reported is the number of cars per lane.

Butterfield Park
Morgan Hill
Hexagon Transportation Consultants, Inc.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Ex + P SAT

Intersection #1111: Butterfield Boulevard and Tennant Avenue



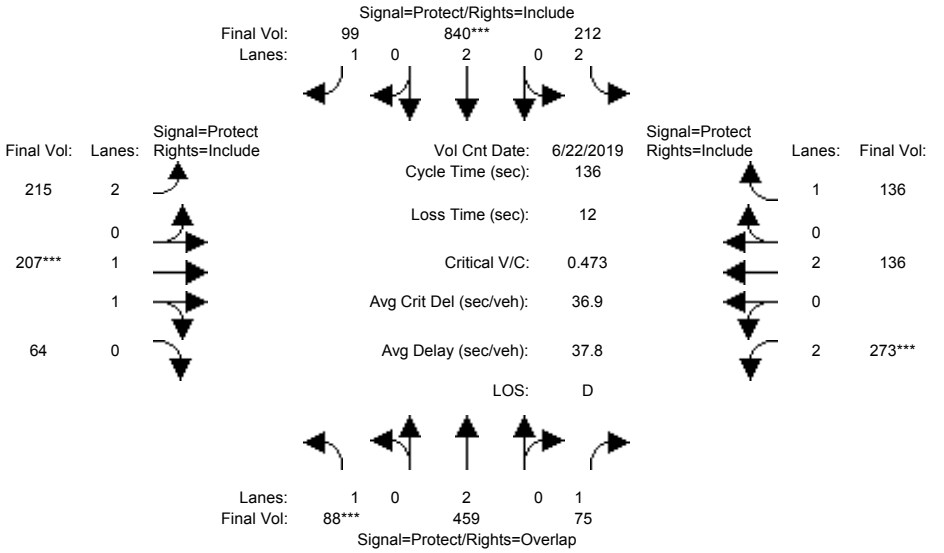
Street Name:	Butterfield Boulevard						Tennant Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Min. Green:	7	10	10	7	10	10	7	10	10	7	10	10
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Volume Module: >> Count Date: 29 Jun 2019 <<												
Base Vol:	20	135	329	134	333	189	198	671	29	260	513	63
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	135	329	134	333	189	198	671	29	260	513	63
Added Vol:	46	21	4	0	0	22	0	0	0	0	4	0
ATI:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	66	156	333	134	333	211	198	671	29	260	517	63
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	66	156	333	134	333	211	198	671	29	260	517	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	66	156	333	134	333	211	198	671	29	260	517	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	66	156	333	134	333	211	198	671	29	260	517	63
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	1.00	0.92	0.92	1.00	0.92	0.92	1.00	0.92	0.92	1.00	0.92
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1750	3800	1750	1750	3800	1750	1750	3800	1750	1750	3800	1750
Capacity Analysis Module:												
Vol/Sat:	0.04	0.04	0.19	0.08	0.09	0.12	0.11	0.18	0.02	0.15	0.14	0.04
Crit Moves:	****					****		****		****		
Green Time:	9.2	19.4	55.6	19.3	29.4	29.4	36.0	43.1	43.1	36.3	43.3	62.6
Volume/Cap:	0.53	0.28	0.44	0.52	0.39	0.53	0.41	0.53	0.05	0.53	0.41	0.07
Delay/Veh:	62.7	49.4	26.7	52.9	42.9	45.6	38.9	35.7	29.6	40.8	33.7	18.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	62.7	49.4	26.7	52.9	42.9	45.6	38.9	35.7	29.6	40.8	33.7	18.2
LOS by Move:	E	D	C	D	D	D	D	D	C	D	C	B
HCM2kAvgQ:	4	3	10	6	6	8	7	10	1	10	8	1

Note: Queue reported is the number of cars per lane.

Butterfield Park
Morgan Hill
Hexagon Transportation Consultants, Inc.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing (SAT)

Intersection #6674: Monterey Road and Tennant Avenue/Edmundson Avenue



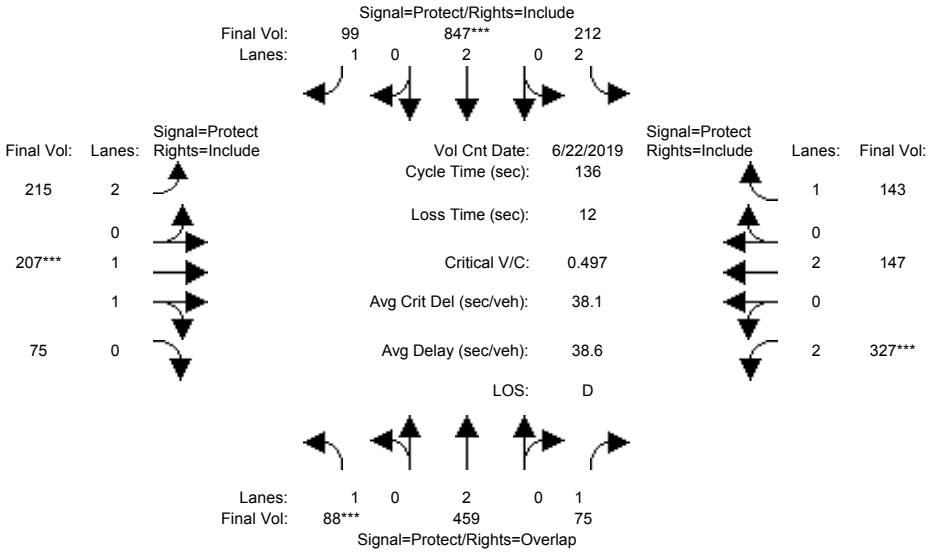
Street Name:	Monterey Rd						Tennant Ave/Edmundson Ave					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	7	10	10	7	10	10	7	10	10	7	10	10
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Volume Module: >> Count Date: 22 Jun 2019 << 12:00PM-1:00PM												
Base Vol:	88	459	75	212	840	99	215	207	64	273	136	136
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	88	459	75	212	840	99	215	207	64	273	136	136
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
ATI:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	88	459	75	212	840	99	215	207	64	273	136	136
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	88	459	75	212	840	99	215	207	64	273	136	136
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	88	459	75	212	840	99	215	207	64	273	136	136
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	88	459	75	212	840	99	215	207	64	273	136	136
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	1.00	0.92	0.83	1.00	0.92	0.83	0.98	0.95	0.83	1.00	0.92
Lanes:	1.00	2.00	1.00	2.00	2.00	1.00	2.00	1.51	0.49	2.00	2.00	1.00
Final Sat.:	1750	3800	1750	3150	3800	1750	3150	2826	874	3150	3800	1750
Capacity Analysis Module:												
Vol/Sat:	0.05	0.12	0.04	0.07	0.22	0.06	0.07	0.07	0.07	0.09	0.04	0.08
Crit Moves:	****				****			****			****	
Green Time:	14.5	50.1	75.0	27.9	63.6	63.6	21.5	21.1	21.1	24.9	24.5	24.5
Volume/Cap:	0.47	0.33	0.08	0.33	0.47	0.12	0.43	0.47	0.47	0.47	0.20	0.43
Delay/Veh:	59.1	31.0	14.3	46.3	25.0	20.5	52.3	53.0	53.0	50.3	47.6	50.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	59.1	31.0	14.3	46.3	25.0	20.5	52.3	53.0	53.0	50.3	47.6	50.5
LOS by Move:	E	C	B	D	C	C	D	D	D	D	D	D
HCM2kAvgQ:	4	7	2	5	12	2	5	6	6	6	2	5

Note: Queue reported is the number of cars per lane.

Butterfield Park
Morgan Hill
Hexagon Transportation Consultants, Inc.

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Ex + P SAT

Intersection #6674: Monterey Road and Tennant Avenue/Edmundson Avenue



Street Name:	Monterey Rd						Tennant Ave/Edmundson Ave					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	7	10	10	7	10	10	7	10	10	7	10	10
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Volume Module: >> Count Date: 22 Jun 2019 << 12:00PM-1:00PM												
Base Vol:	88	459	75	212	840	99	215	207	64	273	136	136
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	88	459	75	212	840	99	215	207	64	273	136	136
Added Vol:	0	0	0	0	7	0	0	0	11	54	11	7
ATI:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	88	459	75	212	847	99	215	207	75	327	147	143
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	88	459	75	212	847	99	215	207	75	327	147	143
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	88	459	75	212	847	99	215	207	75	327	147	143
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	88	459	75	212	847	99	215	207	75	327	147	143
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	1.00	0.92	0.83	1.00	0.92	0.83	0.98	0.95	0.83	1.00	0.92
Lanes:	1.00	2.00	1.00	2.00	2.00	1.00	2.00	1.45	0.55	2.00	2.00	1.00
Final Sat.:	1750	3800	1750	3150	3800	1750	3150	2715	984	3150	3800	1750
Capacity Analysis Module:												
Vol/Sat:	0.05	0.12	0.04	0.07	0.22	0.06	0.07	0.08	0.08	0.10	0.04	0.08
Crit Moves:	****				****			****		****		
Green Time:	13.8	48.0	76.4	26.7	61.0	61.0	22.4	20.9	20.9	28.4	26.8	26.8
Volume/Cap:	0.50	0.34	0.08	0.34	0.50	0.13	0.41	0.50	0.50	0.50	0.20	0.41
Delay/Veh:	60.0	32.5	13.7	47.4	26.9	22.0	51.4	53.5	53.5	48.1	45.7	48.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	60.0	32.5	13.7	47.4	26.9	22.0	51.4	53.5	53.5	48.1	45.7	48.5
LOS by Move:	E	C	B	D	C	C	D	D	D	D	D	D
HCM2kAvgQ:	4	7	1	5	12	3	5	6	6	7	2	5

Note: Queue reported is the number of cars per lane.

Queuing Analysis

Monterey/Butterfield
SBL
Existing Conditions
Avg. Queue Per Lane in Veh= 1.0
Percentile = 0.95 3

Individual Probability	Cumulative Probability	Number of Queued Vehicles
0.3558	0.3558	0
0.3677	0.7235	1
0.1900	0.9135	2
0.0654	0.9789	3
0.0169	0.9958	4
0.0035	0.9993	5
0.0006	0.9999	6
0.0001	1.0000	7
0.0000	1.0000	8
0.0000	1.0000	9
0.0000	1.0000	10
0.0000	1.0000	11
0.0000	1.0000	12
0.0000	1.0000	13
0.0000	1.0000	14
0.0000	1.0000	15
0.0000	1.0000	16
0.0000	1.0000	17
0.0000	1.0000	18
0.0000	1.0000	19
0.0000	1.0000	20
0.0000	1.0000	21
0.0000	1.0000	22
0.0000	1.0000	23
0.0000	1.0000	24
0.0000	1.0000	25
0.0000	1.0000	26
0.0000	1.0000	27
0.0000	1.0000	28
0.0000	1.0000	29
0.0000	1.0000	30
0.0000	1.0000	31
0.0000	1.0000	32
0.0000	1.0000	33
0.0000	1.0000	34
0.0000	1.0000	35
0.0000	1.0000	36
0.0000	1.0000	37
0.0000	1.0000	38
0.0000	1.0000	39
0.0000	1.0000	40
0.0000	1.0000	41
0.0000	1.0000	42
0.0000	1.0000	43
0.0000	1.0000	44
0.0000	1.0000	45

Monterey/Butterfield
SBL
Existing Plus Project Conditions
Avg. Queue Per Lane in Veh= 2.9
Percentile = 0.95 6

Individual Probability	Cumulative Probability	Number of Queued Vehicles
0.0535	0.0535	0
0.1567	0.2102	1
0.2294	0.4396	2
0.2238	0.6634	3
0.1638	0.8272	4
0.0959	0.9232	5
0.0468	0.9700	6
0.0196	0.9896	7
0.0072	0.9967	8
0.0023	0.9991	9
0.0007	0.9998	10
0.0002	0.9999	11
0.0000	1.0000	12
0.0000	1.0000	13
0.0000	1.0000	14
0.0000	1.0000	15
0.0000	1.0000	16
0.0000	1.0000	17
0.0000	1.0000	18
0.0000	1.0000	19
0.0000	1.0000	20
0.0000	1.0000	21
0.0000	1.0000	22
0.0000	1.0000	23
0.0000	1.0000	24
0.0000	1.0000	25
0.0000	1.0000	26
0.0000	1.0000	27
0.0000	1.0000	28
0.0000	1.0000	29
0.0000	1.0000	30
0.0000	1.0000	31
0.0000	1.0000	32
0.0000	1.0000	33
0.0000	1.0000	34
0.0000	1.0000	35
0.0000	1.0000	36
0.0000	1.0000	37
0.0000	1.0000	38
0.0000	1.0000	39
0.0000	1.0000	40
0.0000	1.0000	41
0.0000	1.0000	42
0.0000	1.0000	43
0.0000	1.0000	44
0.0000	1.0000	45

Butterfield/Tennant
NBL
Existing Conditions
Avg. Queue Per Lane in Veh= 0.7
Percentile = 0.95 2

Individual Probability	Cumulative Probability	Number of Queued Vehicles
0.4857	0.4857	0
0.3508	0.8364	1
0.1267	0.9631	2
0.0305	0.9936	3
0.0055	0.9991	4
0.0008	0.9999	5
0.0001	1.0000	6
0.0000	1.0000	7
0.0000	1.0000	8
0.0000	1.0000	9
0.0000	1.0000	10
0.0000	1.0000	11
0.0000	1.0000	12
0.0000	1.0000	13
0.0000	1.0000	14
0.0000	1.0000	15
0.0000	1.0000	16
0.0000	1.0000	17
0.0000	1.0000	18
0.0000	1.0000	19
0.0000	1.0000	20
0.0000	1.0000	21
0.0000	1.0000	22
0.0000	1.0000	23
0.0000	1.0000	24
0.0000	1.0000	25
0.0000	1.0000	26
0.0000	1.0000	27
0.0000	1.0000	28
0.0000	1.0000	29
0.0000	1.0000	30
0.0000	1.0000	31
0.0000	1.0000	32
0.0000	1.0000	33
0.0000	1.0000	34
0.0000	1.0000	35
0.0000	1.0000	36
0.0000	1.0000	37
0.0000	1.0000	38
0.0000	1.0000	39
0.0000	1.0000	40
0.0000	1.0000	41
0.0000	1.0000	42
0.0000	1.0000	43
0.0000	1.0000	44
0.0000	1.0000	45

Butterfield/Tennant
NBL
Existing Plus Project Conditions
Avg. Queue Per Lane in Veh= 2.4
Percentile = 0.95 5

Individual Probability	Cumulative Probability	Number of Queued Vehicles
0.0922	0.0922	0
0.2198	0.3121	1
0.2620	0.5741	2
0.2081	0.7822	3
0.1240	0.9062	4
0.0591	0.9653	5
0.0235	0.9888	6
0.0080	0.9968	7
0.0024	0.9992	8
0.0006	0.9998	9
0.0002	1.0000	10
0.0000	1.0000	11
0.0000	1.0000	12
0.0000	1.0000	13
0.0000	1.0000	14
0.0000	1.0000	15
0.0000	1.0000	16
0.0000	1.0000	17
0.0000	1.0000	18
0.0000	1.0000	19
0.0000	1.0000	20
0.0000	1.0000	21
0.0000	1.0000	22
0.0000	1.0000	23
0.0000	1.0000	24
0.0000	1.0000	25
0.0000	1.0000	26
0.0000	1.0000	27
0.0000	1.0000	28
0.0000	1.0000	29
0.0000	1.0000	30
0.0000	1.0000	31
0.0000	1.0000	32
0.0000	1.0000	33
0.0000	1.0000	34
0.0000	1.0000	35
0.0000	1.0000	36
0.0000	1.0000	37
0.0000	1.0000	38
0.0000	1.0000	39
0.0000	1.0000	40
0.0000	1.0000	41
0.0000	1.0000	42
0.0000	1.0000	43
0.0000	1.0000	44
0.0000	1.0000	45

Monterey/Tennant
WBL
Existing Conditions
Avg. Queue Per Lane in Veh= 5.2
Percentile = 0.95 9

Individual Probability	Cumulative Probability	Number of Queued Vehicles
0.0058	0.0058	0
0.0297	0.0355	1
0.0766	0.1121	2
0.1317	0.2437	3
0.1697	0.4134	4
0.1750	0.5885	5
0.1504	0.7389	6
0.1108	0.8498	7
0.0714	0.9212	8
0.0409	0.9621	9
0.0211	0.9832	10
0.0099	0.9931	11
0.0043	0.9974	12
0.0017	0.9991	13
0.0006	0.9997	14
0.0002	0.9999	15
0.0001	1.0000	16
0.0000	1.0000	17
0.0000	1.0000	18
0.0000	1.0000	19
0.0000	1.0000	20
0.0000	1.0000	21
0.0000	1.0000	22
0.0000	1.0000	23
0.0000	1.0000	24
0.0000	1.0000	25
0.0000	1.0000	26
0.0000	1.0000	27
0.0000	1.0000	28
0.0000	1.0000	29
0.0000	1.0000	30
0.0000	1.0000	31
0.0000	1.0000	32
0.0000	1.0000	33
0.0000	1.0000	34
0.0000	1.0000	35
0.0000	1.0000	36
0.0000	1.0000	37
0.0000	1.0000	38
0.0000	1.0000	39
0.0000	1.0000	40
0.0000	1.0000	41
0.0000	1.0000	42
0.0000	1.0000	43
0.0000	1.0000	44
0.0000	1.0000	45

Monterey/Tennant
WBL
Existing Plus Project Conditions
Avg. Queue Per Lane in Veh= 6.2
Percentile = 0.95 11

Individual Probability	Cumulative Probability	Number of Queued Vehicles
0.0021	0.0021	0
0.0128	0.0149	1
0.0396	0.0545	2
0.0816	0.1361	3
0.1260	0.2621	4
0.1556	0.4177	5
0.1602	0.5780	6
0.1414	0.7193	7
0.1091	0.8285	8
0.0749	0.9034	9
0.0463	0.9496	10
0.0260	0.9756	11
0.0134	0.9890	12
0.0064	0.9954	13
0.0028	0.9982	14
0.0012	0.9993	15
0.0004	0.9998	16
0.0002	0.9999	17
0.0001	1.0000	18
0.0000	1.0000	19
0.0000	1.0000	20
0.0000	1.0000	21
0.0000	1.0000	22
0.0000	1.0000	23
0.0000	1.0000	24
0.0000	1.0000	25
0.0000	1.0000	26
0.0000	1.0000	27
0.0000	1.0000	28
0.0000	1.0000	29
0.0000	1.0000	30
0.0000	1.0000	31
0.0000	1.0000	32
0.0000	1.0000	33
0.0000	1.0000	34
0.0000	1.0000	35
0.0000	1.0000	36
0.0000	1.0000	37
0.0000	1.0000	38
0.0000	1.0000	39
0.0000	1.0000	40
0.0000	1.0000	41
0.0000	1.0000	42
0.0000	1.0000	43
0.0000	1.0000	44
0.0000	1.0000	45