



Prepared by

FEHR & PEERS

160 W Santa Clara St. # 675
San Jose, CA
408.278.1700

Jane Bierstedt
J.Bierstedt@FehrandPeers.com
925.930.7100

Page Street Housing

Traffic Impact Analysis

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Page Street Housing Traffic Impact Analysis (TIA)

Prepared for:
Charities Housing Development Corporation

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SJ17-1776

FEHR  PEERS

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1. Introduction

This report presents the results of a traffic impact analysis (TIA) conducted for the proposed residential development located at 329-353 Page Street in San Jose, California. The site is included in the West San Carlos Urban Village per the Envision San Jose 2040 General Plan. Urban Villages are designed to provide a vibrant and inviting mixed-use setting to attract pedestrians, bicyclists, and transit users of all ages. The purpose of this analysis is to assess the effects of traffic generated by the proposed affordable housing development on traffic operations (namely queuing) of nearby intersections and the project driveway and to recommend improvements to provide adequate vehicular, pedestrian, and bicycle access to the site. The locations of the development site and study intersections are shown on **Figure 1**. The site is located on the west side of Page Street just south of West San Carlos Street. Nearby land uses include houses to the south, the Meridian at Midtown apartment complex across Page Street to the east, and a variety of retail and residential uses on West San Carlos Street.

Project Description

The Project entails demolishing buildings on three single family parcels with 8 dwelling units and constructing a six-story apartment building with 81 affordable studio apartments and one staff apartment. Vehicular access to the site is via a single driveway on Page Street. Pedestrian access is provided via an entry on Page Street and several secure access points around the perimeter. A 40-foot wide green space/pedestrian paseo is located along the southern edge of the site. It will be open to the public during daylight hours and connects to Meridian Park on the east side of Page Street. It is part of a planned pedestrian paseo extending between Buena Vista Avenue and Meridian Avenue. A total of 62 vehicle parking spaces will be provided with 3 Americans with Disabilities Act (ADA) spaces, three spaces at the end of the driveway, and 56 spaces via parking lifts. Four motorcycle parking spaces will be provided. A storage room with capacity of 82 bicycles is provided for on-site secure bicycle parking. Other amenities include laundry facilities, a large community room with a kitchen, and transit passes for residents to encourage public transportation use. The site plan is shown on **Figure 2**.

Scope of Study/Report Overview

This traffic impact analysis evaluates traffic conditions at the following study intersections during the peak one-hour periods of the morning and evening commute hours, known as the AM and PM peak hours, when traffic volumes on the surrounding streets are highest:

- West San Carlos Street and Buena Vista Avenue
- West San Carlos Street and Page Street
- West San Carlos Street and Meridian Avenue
- Meridian Avenue and Douglas Street

Pedestrian, bicycle, and transit facilities and services near the site are described and evaluated with a focus on site access and connections. The site plan is reviewed regarding site access, on-site circulation, and parking. The amount of traffic generated by the project and added to nearby intersections is discussed.

The chapters in this report contain the following items that constitute the Scope of the Study:

Chapter 1. Introduction includes the study purpose, the project description, the study intersections, and an overview of the report.

Chapter 2. Existing Conditions provides descriptions of the transportation system near the site including the roadways, transit service, bicycle facilities, and pedestrian facilities.

Chapter 3. Project Traffic describes the process used to estimate the amount of traffic generated by the Project and assign it to the driveway and nearby intersections, and presents the results.

Chapter 4. Traffic Operations Analysis presents the results of the intersection operations, sight distance and queuing analyses.

Chapter 5. Site Access, On-Site Circulation, and Parking includes an assessment of the site plan regarding access for all modes, an evaluation of vehicle queuing at the site access point, and a comparison of the proposed parking supply to City code requirements.

Chapter 6. Conclusions and Recommendations summarizes the results of the traffic impacts analysis and recommendations for improvements.



SJ17-1776_Fig01_Site Location

- Project Site
- Study Intersection



Figure 1
Site Location

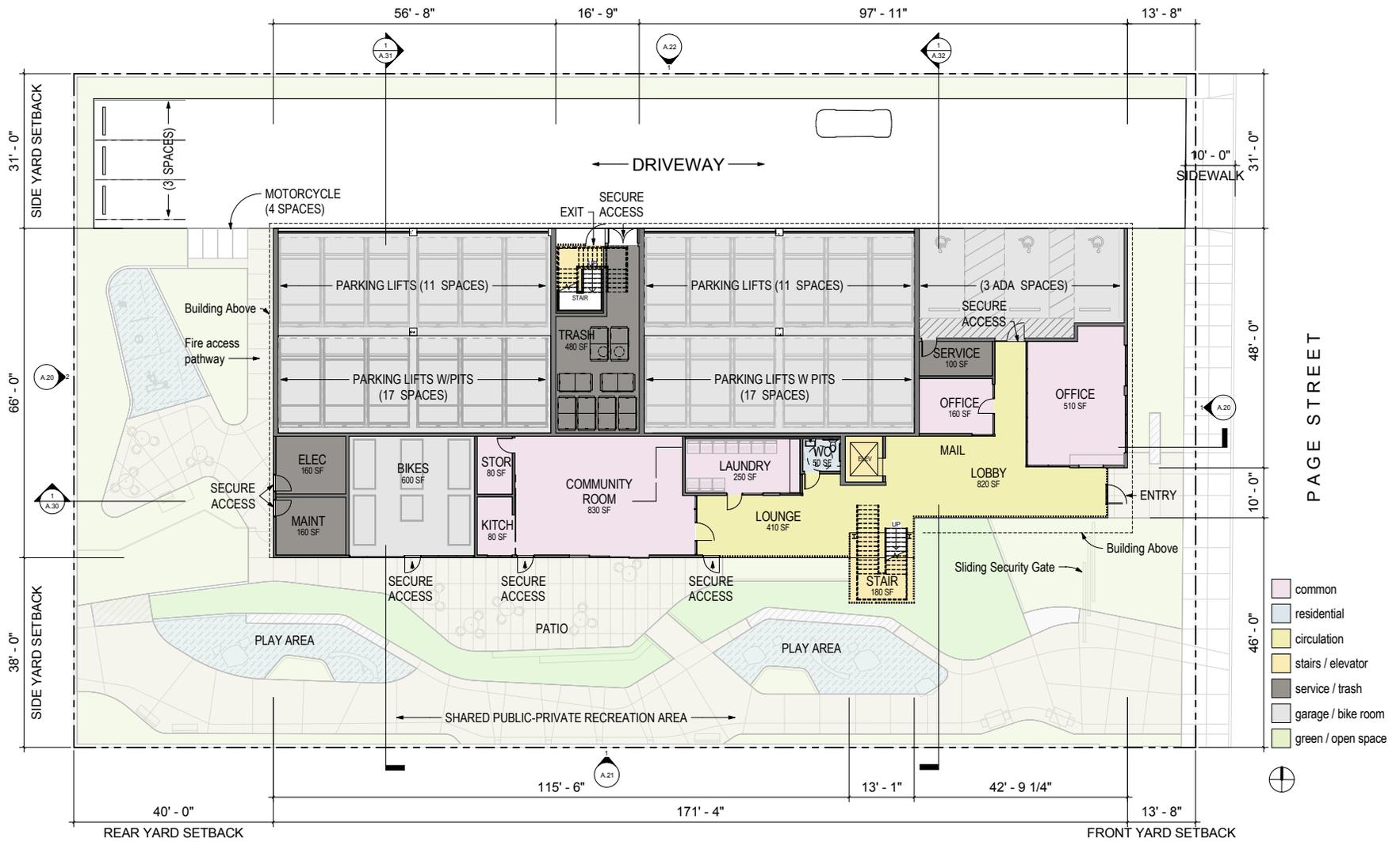


Figure 2
Site Plan



2. Existing Conditions

The transportation system in the vicinity of Page Street Housing is multi-modal and includes freeways, other major roadways, bus and light rail transit (LRT) service, bicycle facilities, and pedestrian facilities.

Roadway Facilities

Regional access is provided by I-280. Local access is provided by West San Carlos Street, Meridian Avenue, Page Street, and Douglas Street.

Roadway Descriptions

Interstate 280 (I-280) is an eight-lane generally north-south freeway located to the south of the site that extends from San Francisco in the north to downtown San Jose in the south. North and west of Leigh Avenue, one of the lanes in each direction is a designated high-occupancy vehicle (HOV) lane and is restricted to vehicles with two or more people, motorcycles, and clean-air vehicles during the morning and evening peak periods. I-280 has a full interchange with Meridian Avenue. Traffic from the larger region will primarily use I-280 and the nearby freeways of SR 87 and I-880 to reach the site.

West San Carlos Street is a four-lane east-west roadway that extends from I-880 in the west (it becomes Stevens Creek Boulevard to the west of Bascom Avenue) to approximately the campus of San Jose State University in the east. It is primarily lined with retail uses.

Meridian Avenue is a north-south roadway that extends between Park Avenue and Camden Avenue. It has two travel lanes between Park Avenue and West San Carlos Street and four travel lanes south of West San Carlos Street. It has an interchange with I-280 and is lined with retail uses near the site.

Page Street is a two-lane north-south local residential street that forms the eastern edge of the Project site. It extends approximately 1,700 feet south of West San Carlos Street and connects to Chiechi Avenue.

Observations of Roadway Operations

Traffic operations near the site were observed during the week of January 8, 2018 during the AM and PM peak periods. Observations were made along West San Carlos Street between Buena Vista Avenue and Meridian Avenue, Page Street between West San Carlos Street and Douglas Street, and Meridian Avenue between West San Carlos Street and Douglas Street. Directional traffic patterns were observed on West San



Carlos Street, with the primary flow in the westbound direction during the AM peak period and eastbound direction during the PM peak period.

West San Carlos Street/Meridian Avenue

The intersection of West San Carlos Street and Meridian Avenue is a City of San Jose Protected Intersection¹. Heavy eastbound queuing was observed during the PM peak period due to high traffic demand at the intersection, as well as on-street parking maneuvers between Page Street and Meridian Avenue. Vehicle queues on West San Carlos Street extended beyond Buena Vista Avenue (as illustrated below), but most of the queues could be cleared within one signal cycle as enough green time was given to that direction. The observed average cycle length was 140 seconds during both peak periods, matching the signal timing input in the City's Traffix network, and the overall operations were consistent with the calculated LOS values from the Traffix model.



PM Peak Eastbound Queuing at West San Carlos Street/Meridian Avenue (camera facing west)

¹ Per Council Policy 5-3, Transportation Impact Policy, revised June 21, 2005. Protected intersections have been built to their planned maximum capacity. If a proposed development causes a significant level of service impact at it, the development would be required to construct improvements to other segments of the City's transportation system to improve system capacity, including non-auto segments, to be consistent with the City's General Plan multi-modal transportation policies.

West San Carlos Street/Buena Vista Avenue

Observations at the intersection of West San Carlos Street and Buena Vista Avenue indicated that the traffic volumes on the northbound and southbound approaches were fairly low during the peak periods. Therefore, the signal timing at the intersection was designed to coordinate with West San Carlos Street/Meridian Avenue to prioritize the eastbound and westbound traffic flows. The westbound left-turn movement, which would serve one of the primary access maneuvers for westbound West San Carlos Street traffic approaching the Project site, currently has a low demand as the maximum queue length observed was three vehicles.

West San Carlos Street/Page Street

West San Carlos Street and Page Street is a right-in/right-out intersection with a raised median on West San Carlos Street. The eastbound vehicle queues on West San Carlos Street extending from Meridian Avenue to Buena Vista Avenue in the PM peak period created longer delays for vehicles turning right from Page Street as they waited for gaps in traffic. Operations in the AM peak period was efficient as no queuing or blockage was observed. The sight distance for vehicles making the northbound right-turn movement is not ideal as parked vehicles on West San Carlos Street west of Page Street block the direct line of sight, which would require the northbound vehicles to stop beyond the crosswalk to see on-coming traffic before making a decision to turn. This is discussed further in Chapter 4.

Meridian Avenue/Douglas Street

The intersection of Meridian Avenue and Douglas Street is stop-controlled on the eastbound and westbound approaches. (The westbound approach is a driveway to Parkview Family Apartments.) Observations showed that the inbound/outbound traffic to/from Douglas Street did not have difficulties turning from/onto Meridian Avenue during the peak periods. The maximum observed eastbound (outbound) vehicle queue was four vehicles, and the maximum observed northbound left-turn (inbound) queue was two vehicles. There were sufficient gaps in traffic for all of the vehicles to make turns after waiting less than a minute. Southbound vehicle queues on Meridian Avenue built up a few times during the PM peak period, extending from downstream signalized intersections, such as Parkmoor Avenue and Saddle Rack Street, to Douglas Street. However, since the east-west streets between Douglas Street and Parkmoor Avenue are all minor collector streets, most of the queuing would clear when the traffic signal for the southbound direction at Parkmoor Avenue turned green.

Bus and Light Rail Transit (LRT) Service



The Santa Clara Valley Transportation Authority (VTA) operates light rail transit (LRT) and bus service throughout Santa Clara County. Several bus routes operate near the site. Bus and light rail routes with stops within a fifteen-minute walking distance of the site include Route 23, 63, 65, 81, 323, and 902. The closest bus stops are on West San Carlos Street. The stop for eastbound buses is located halfway between Meridian Avenue and Race Street. The stop for westbound buses is located 300 feet to the west of Meridian Avenue. The closest light rail station is the Race Street Station located near the intersection of Race Street and Parkmoor Avenue. Detailed service information of these routes is presented in **Table 1**. The routes and stops near the site are shown on **Figure 3**. VTA also provides Access Paratransit to eligible individuals with disabilities who are prevented from using regular transit services.

Pedestrian and Bicycle Facilities

Pedestrian Facilities

Pedestrian facilities near the Project site include sidewalks, crosswalks, curb ramps, pedestrian signals, and off-street paths that provide safe and convenient routes for pedestrians to access destinations such as stores and restaurants on West San Carlos Street, Meridian Avenue, and Race Street. Nearby destinations within a 10-minute walking distance include Safeway, Walgreens, numerous stores and restaurants, and O'Connor Park. Sidewalks are provided along the project frontage on both sides of Page Street and on both sides of West San Carlos Street. Crosswalks are provided at major nearby intersections around the project site, including West San Carlos Street/Meridian Avenue, West San Carlos Street/Buena Vista Avenue, West San Carlos Street/Race Street, and Meridian Avenue/Auzerais Avenue.

Table 1: Existing Transit Services

Route	From	To	Weekdays		Saturdays		Sundays	
			Operating Hours ¹	Peak Headway ² (minutes)	Operating Hours ¹	Headway ² (minutes)	Operating Hours ¹	Headway ² (minutes)
Santa Clara Valley Transportation Authority (VTA)								
23	De Anza College	Alum Rock	5:20 a.m. – 1:05 a.m.	12	5:40 a.m. – 1:05 a.m.	15	5:35 a.m. – 1:05 a.m.	15
63	Almaden Expwy. & Camden	San Jose State University	6:15 a.m. – 10:25 p.m.	30	7:51 a.m. – 7:38 p.m.	60	8:51 a.m. – 5:40 p.m.	60
65	Kooser & Blossom Hill	Hedding & 13th	5:45 a.m. – 7:55 p.m.	45	-	-	-	-
81	Moffett Field/Ames Center	San Jose State University	6:05 a.m. – 9:05 p.m.	25	9:15 a.m. – 6:20 p.m.	60	-	-
323	Downtown San Jose	De Anza College	6:20 a.m. – 10:40 p.m.	15	8:05 a.m. – 10:30 p.m.	15	9:10 a.m. – 6:40 p.m.	20
902 (Light Rail)	Mountain View	Winchester	4:40 a.m. – 12:45 a.m.	15	6:00 a.m. – 12:45 a.m.	30	6:00 a.m. – 12:45 a.m.	30

1. Operating hours rounded to the nearest 5 minute interval.
2. Headways are defined as the time interval between two transit vehicles traveling in the same direction over the same route.

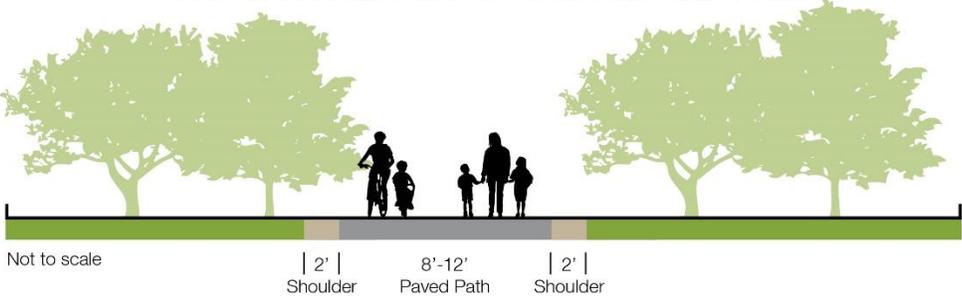
Sources: VTA, January 2018.

Bicycle Facilities

There are four distinct types of bikeway facilities, as described below and shown in the accompanying figures:

SHARED-USE PATH (CLASS I)

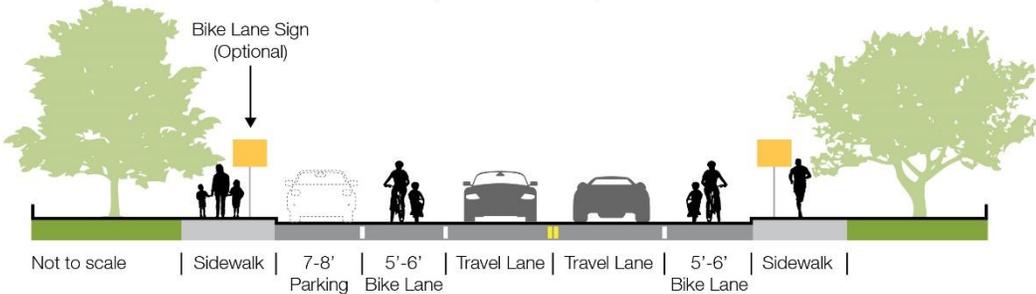
Completely separated right-of-way for exclusive use of bicycles and pedestrians



Class I Bikeways (Shared-Use Paths) provide a completely separate right-of-way and are designated for the exclusive use of bicycles and pedestrians.

BICYCLE LANE (CLASS II)

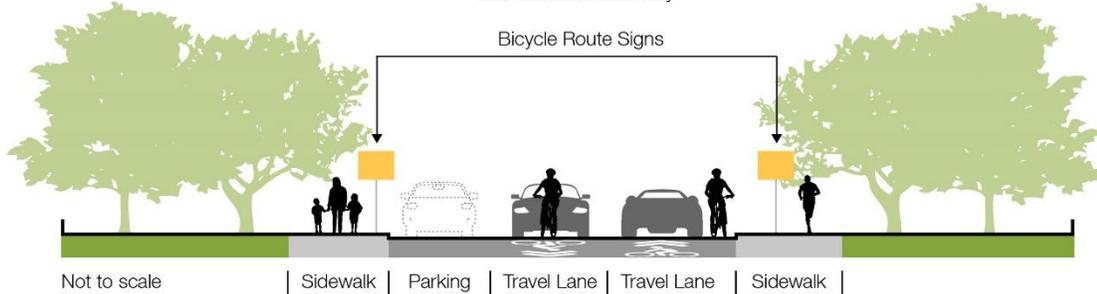
On-street striped lane for one-way bike travel



Class II Bikeways (Bicycle Lanes) are dedicated lanes for bicyclists generally adjacent to the outer vehicle travel lanes. These lanes are typically five (5) feet wide and have special lane markings, pavement legends, and signage.

BICYCLE ROUTE (CLASS III)

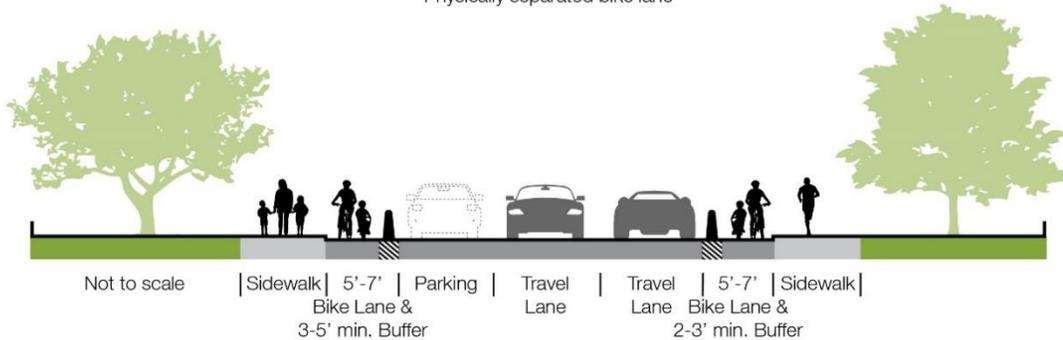
Shared on-street facility



Class III Bikeways (Bicycle Routes) are designated by signs or pavement markings for shared use with motor vehicles, but have no separated bicycle right-of-way or lane striping. Bike routes serve either to: a) provide a connection to other bicycle facilities where dedicated facilities are infeasible, or b) designate preferred routes through high-demand corridors

CYCLE TRACK/SEPARATED BIKEWAY (CLASS IV)

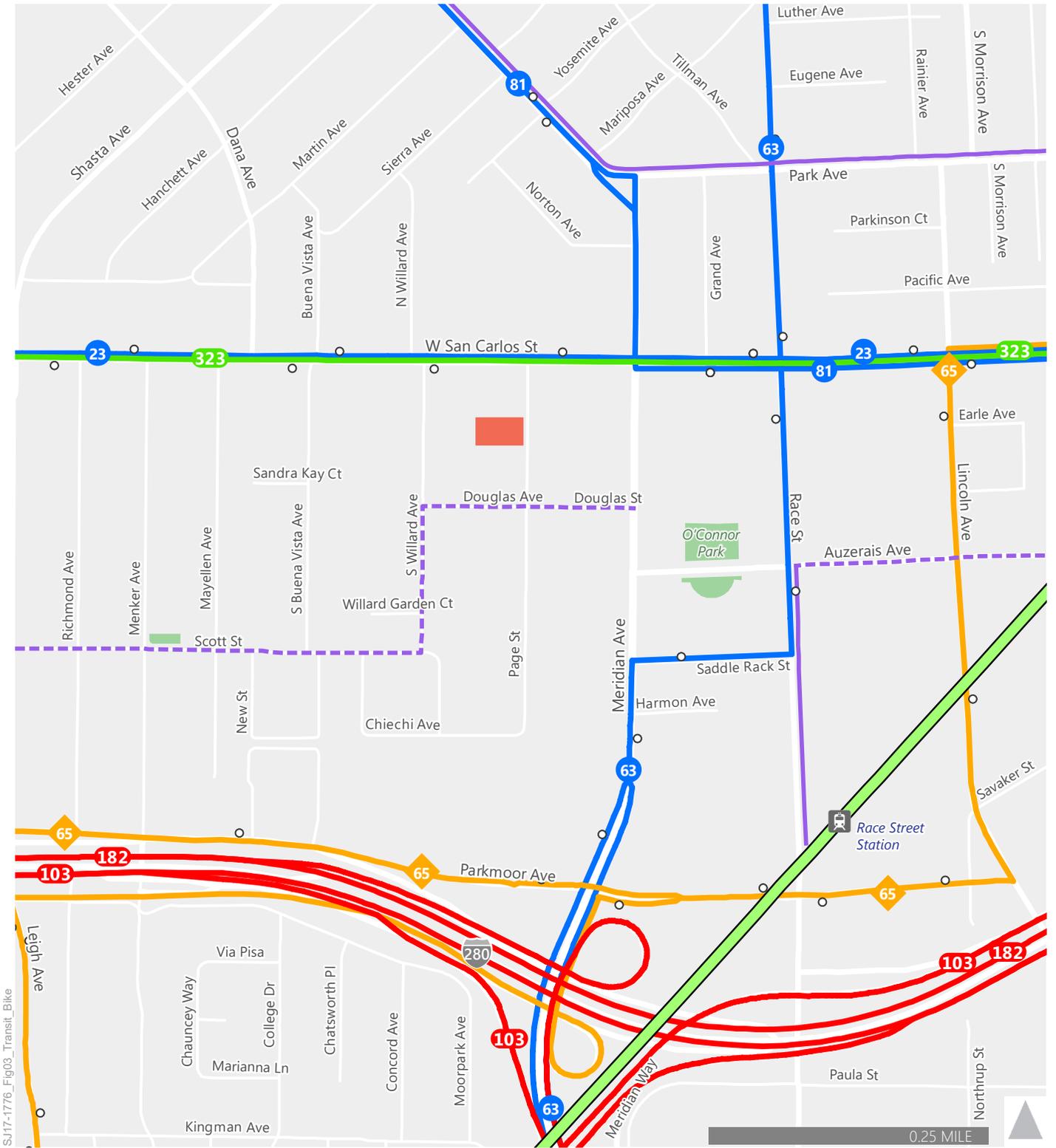
Physically separated bike lane



Class IV Bikeways (cycle tracks or “separated” bikeways) provide a right-of-way designated exclusively for bicycle travel within a roadway and are protected from vehicle traffic by physical barriers, including, but not limited to, grade separation, flexible posts, and inflexible vertical barriers such as raised curbs or parked cars.

The existing bike facilities near the project site are shown on **Figure 3**. Douglas Street, South Willard Avenue (between Douglas Street and Scott Street), Scott Street, and Auzerais Avenue east of Race Street are designated as Class III bike routes. These roadways plus paths through O’Connor Park create a designated east-west route for bicyclists south of Wes San Carlos Street. Race Street south of Auzerais Avenue, Lincoln Avenue, and Park Avenue have Class II bike lanes near the site. Lincoln Avenue provides north-south connectivity to the Willow Glen neighborhood, whereas Park Avenue is a major connection to Santa Clara

University and Downtown San Jose. The Los Gatos Creek Trail Class I bike path serves recreational and local trips with north-south connectivity on an off-roadway facility in the area. It has discontinuous portions between West San Carlos Street and Lincoln Avenue and is continuous between Meridian Avenue and the Town of Los Gatos. It is located approximately 0.8 miles to the east of the site.



Project Site

Existing Transit Routes

- Community Bus Service
- Express Bus Service
- Local Bus Service
- Limited Bus Service
- Light Rail & Light Rail Station
- Bus Stop

Existing Bicycle Facilities

- Bike Lanes
- Bike Route



Figure 3
Existing Transit Service and Bicycle Facilities

3. Project Traffic

This chapter discusses the process used to estimate the amount of traffic generated by the proposed Page Street Housing development both at the site and at nearby intersections.

Trip Generation

The amount of traffic generated by a development is referred to as its vehicle trip generation. It is presented as the number of inbound and outbound vehicles during a typical weekday and during the one-hour periods during the morning and evening commute times, when traffic volumes on the roadway network are at their highest, referred to as the AM and PM peak hours.

The amount of net-new traffic generated is based on numerous variables: the type of use, size/number of units, proximity of complementary uses (e.g., retail near residential), and the amount traffic generated by existing uses on the site. The amount of net-new traffic generated by Page Street Housing was estimated using trip generation rates from the Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017. The manual does not have rates for affordable studio apartments. Therefore, rates for mid-rise multi-family units were used for the proposed project and rates for single-family detached dwelling units² were used for the existing uses on the site. The results are shown in **Table 2**. The project is estimated to generate 28 vehicle trips during the weekday AM peak hour and 33 vehicle trips during the weekday PM peak hour.

These results are conservatively high. Since Page Street Housing is predominantly studio apartments, it is likely that the number of people and vehicle ownership per unit (and therefore vehicle trip generation) will be less than the apartment complexes used to develop the rates. Plus, there are numerous destinations within walking and biking distance and nearby transit services reducing the need to have a vehicle.

² Additional information was provided after the analysis was conducted regarding existing uses on the site. The site contains some ancillary dwelling units bringing the total to approximately 8 units. This would increase the number of existing peak hour trips generated by the site to 3 during the AM peak hour and 4 during the PM peak hour and reduce the amount of net-added traffic by 1 vehicle trip in each peak hour compared to the estimates in Table 2.

Table 2: Trip Generation Estimates

Land Use	ITE Code	Size	Daily		AM Peak Hour			PM Peak Hour				
			Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
Multifamily Housing (Midrise)	221	82 units	5.44	446	0.36	8	22	30	0.44	22	14	36
Single-Family Detached Housing	210	3 units	9.44	28	0.74	1	1	2	0.99	2	1	3
Net-Added Traffic				418		7	21	28		20	13	33

Source: ITE *Trip Generation Manual*, 10th Edition, 2017; Fehr & Peers, 2018.

Trip Distribution

The amount of traffic approaching and departing the site from various directions is primarily based on the relative locations of employment and retail areas and existing travel patterns near the site. The directions of approach and departure are:

- 30% to/from the east on West San Carlos Street
- 40% to/from the south on Meridian Avenue
- 30% to/from the west on West San Carlos Street

Trip Assignment

The trip assignment for AM and PM peak hour Project trips based on the trip generation estimates and the trip distribution pattern is shown on **Figure 4**.

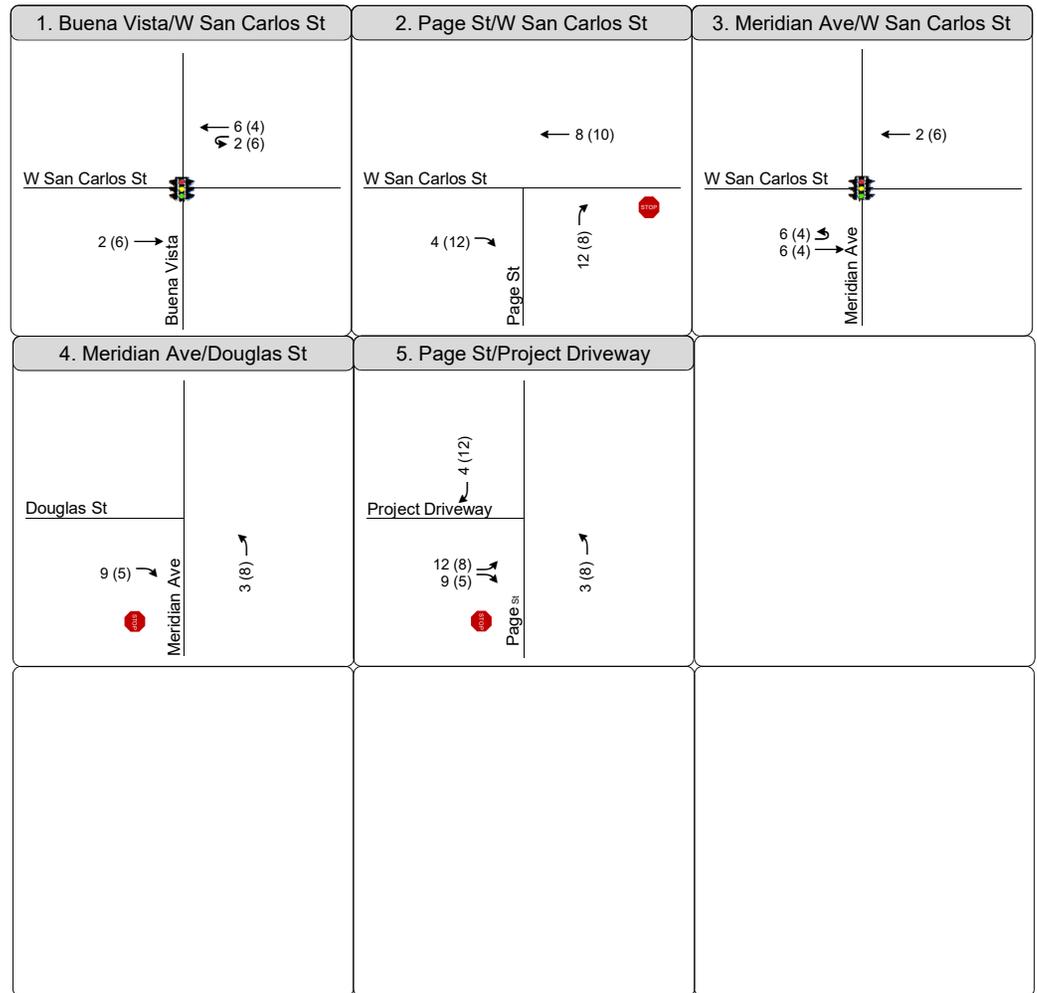
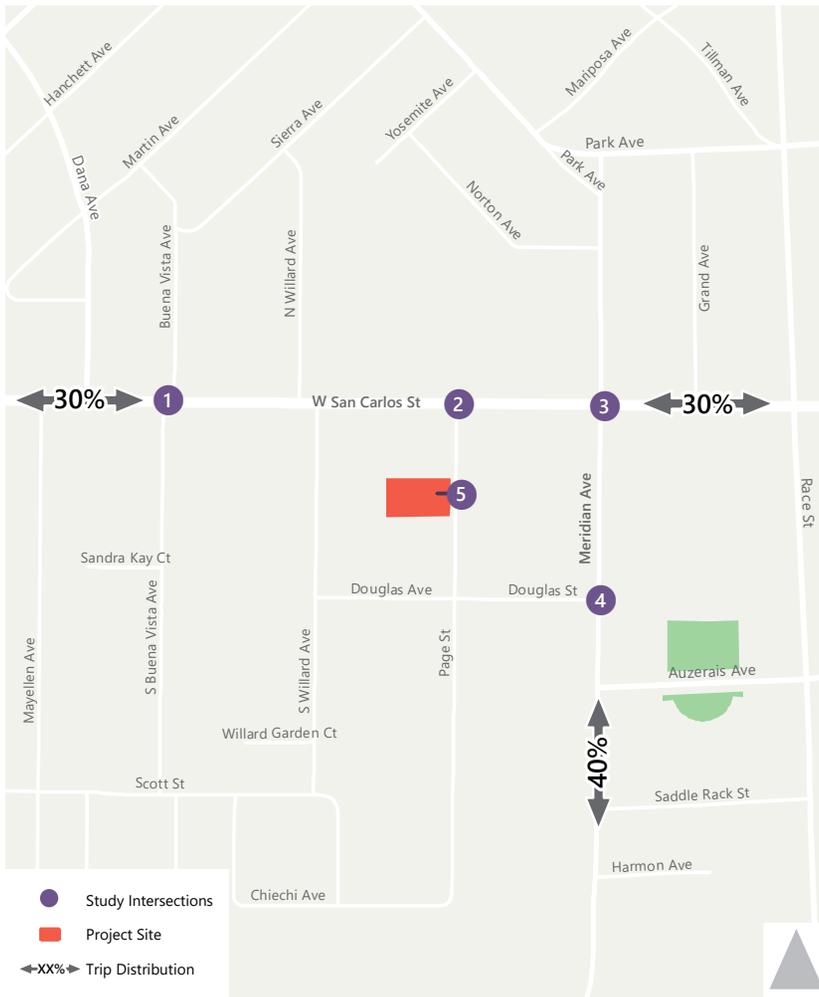


Figure 4
Page Street Housing Vehicle Trip Distribution and Assignment

4. Traffic Operations Analysis

The traffic impact analysis evaluates traffic operations at the study intersection of West San Carlos Street and Meridian Avenue with level of service (LOS) calculations. Vehicle queuing, general traffic operations, and sight distance are also evaluated at other nearby intersections, including:

- West San Carlos Street and Buena Vista Avenue (general traffic operations and westbound left-turn queuing)
- West San Carlos Street and Page Street (general traffic operations and sight distance)
- Meridian Avenue and Douglas Street (general traffic operations, northbound left-turn queuing, and sight distance)

West San Carlos Street/Meridian Avenue

LOS calculations were conducted to assess overall traffic operations of the West San Carlos Street and Meridian Avenue intersection during the weekday AM and PM peak hours. The analysis was conducted for the following scenarios:

- **Scenario 1: Existing Conditions** – Existing volumes obtained from counts plus existing lane configurations and traffic signal timings
- **Scenario 2: Existing with Project Conditions** – Existing volumes plus traffic generated by the Project
- **Scenario 3: Background Conditions** – Existing volumes plus traffic generated by approved but not yet constructed development projects in the City's Approved Trip Inventory (ATI) with existing lane configurations and traffic signal timings
- **Scenario 4: Background with Project Conditions** – Background volumes plus traffic generated by the Project

Analysis Methods

LOS is a measure of traffic operating conditions, which varies from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing over-saturated conditions where traffic flows exceed design capacity resulting in long queues and delays). These ratings represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. The level of service

calculations were conducted using the Traffix analysis software package which is based on methods in the 2000 *Highway Capacity Manual* and is the method adopted by the City of San Jose.

At signalized intersections, the LOS rating reflects the weighted average control delay of all movements measured in seconds per vehicle. **Table 3** summarizes the relationship between the average control delay per vehicle and LOS for signalized intersections.

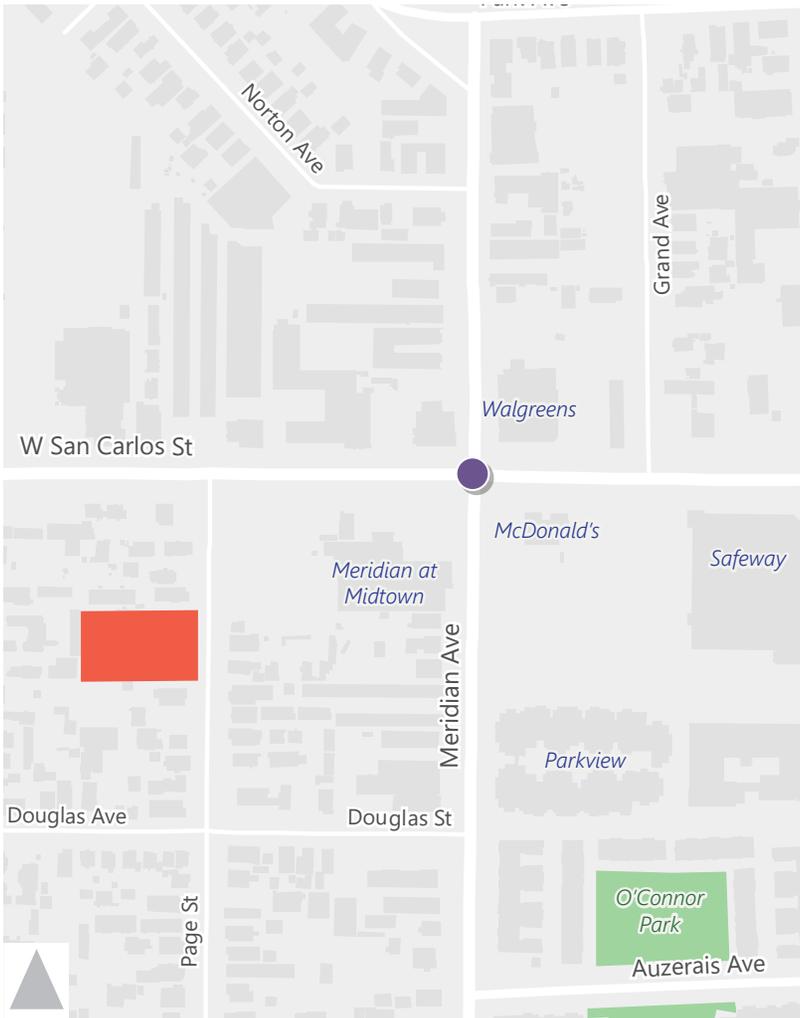
Table 3: Signalized Intersection Level of Service Definitions

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths	≤ 10.0
B+ B B-	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 12.0 12.1 to 18.0 18.1 to 20.0
C+ C C-	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 23.0 23.1 to 32.0 32.1 to 35.0
D+ D D-	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 39.0 39.1 to 51.0 51.1 to 55.0
E+ E E-	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1 to 60.0 60.1 to 75.0 75.1 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0

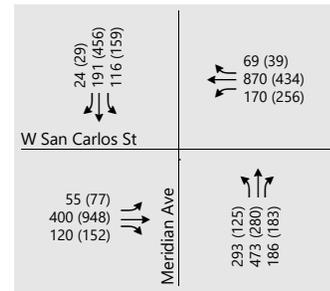
Source: *Traffic Level of Service Analysis Guidelines*, Valley Transportation Authority Congestion Management Program June 2003; *Highway Capacity Manual*, Transportation Research Board, 2000.

Intersection Volumes and Lane Configurations

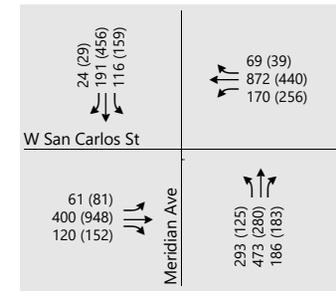
Traffic counts were obtained from the City of San Jose. Traffic forecasts for approved but not yet constructed developments in the area were obtained from the City's Approved Trip Inventory (ATI). These forecasts were added to the existing volumes to obtain traffic forecasts for Background Conditions. The trip assignments in Figure 4 were added to obtain traffic forecasts for Existing plus Project and Background plus Project Conditions. The traffic volumes and lane configurations are shown on **Figure 5**.



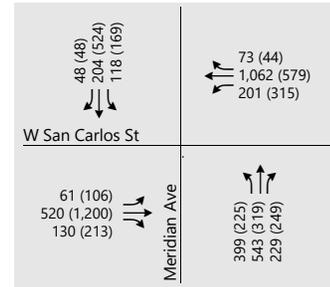
- Project Site
- Study Intersection



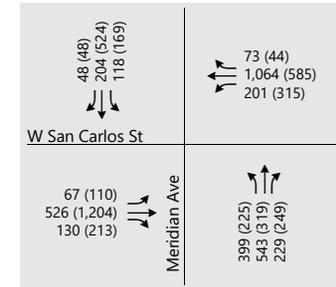
Existing



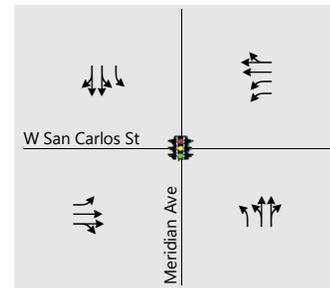
Existing + Project



Background



Background + Project



Lane Configuration

Key: XX (XX) AM (PM)



Figure 5
W. San Carlos St & Meridian Ave
Peak Hour Traffic Volumes and Forecasts



LOS Results

The results of the LOS analysis are presented in **Table 4**. The intersection of West San Carlos Street and Meridian Avenue is a Protected Intersection through the City's Transportation Policy 5-3. Protected Intersections are intersections that have been identified as being built out to their planned maximum capacity and cannot be widened to accommodate more traffic lanes. If a proposed development project has a significant impact on a Protected Intersection, it would need to include construction of improvements to other segments of the citywide transportation system to improve system capacity and/or enhance pedestrian, bicycle, or transit travel modes.

The intersection is projected to operate at LOS D during both peak hours under Existing and Existing plus Project Conditions. These are acceptable operating levels. In general, the field observations of the existing intersection operations are consistent with Traffix analysis results.

Under Background and Background plus Project Conditions, the intersection is projected to maintain its operations at LOS D. With the anticipated increase of traffic under Background Conditions, the average delay is estimated to increase by a few seconds during both peak hours as compared to Existing Conditions. The added Project traffic would have minimal effect on the average delay of the intersection, increasing the Background AM and PM critical movement peak hour delay by 0.4 seconds and 0.1 seconds, respectively. The LOS calculation sheets are contained in **Appendix A**.

Table 4: West San Carlos Street/Meridian Avenue Levels of Service

Scenario	Peak Hour ¹	Delay ² (sec/veh)	LOS ³	Incr. in Crit. Mvmnt. Delay ⁴	Incr. in Crit. Mvmnt. V/C ⁵
#1 Existing Conditions	AM	39.7	D	-	-
	PM	44.5	D	-	-
#2 Existing plus Project Conditions	AM	39.9	D	0.30	0.01
	PM	44.4	D	0.00	0.01
#3 Background Conditions	AM	41.8	D	-	-
	PM	50.5	D	-	-
#4 Background plus Project Conditions	AM	42.0	D	0.40	0.00
	PM	50.6	D	0.10	0.01

Notes:

1. AM = morning peak hour (between 7:00 and 9:00 AM), PM = evening peak hour (between 4:00 and 6:00 PM).
2. Whole intersection weighted average control delay expressed in seconds per vehicle.
3. LOS = Level of Service calculations conducted using the Traffix level of service analysis software package, which applies the methodology described in the *2000 HCM*.
4. Increase in critical movement delay due to Project traffic.
5. Increase in critical volume-to-capacity ratio due to Project traffic.

Source: Fehr & Peers, 2018.

General Traffic Operations, Queuing, and Sight Distance

West San Carlos Street/Buena Vista Avenue

This intersection is an offset four-legged signalized intersection. It is currently operating efficiently with the primary traffic flows in the eastbound and westbound direction, and low traffic volumes on from the northbound and southbound approaches. Traffic approaching and departing the site from/to the west would travel through it. Traffic approaching and departing the site from/to the west would travel through it. Traffic approaching from the east on West San Carlos Street cannot turn left onto Page Street because of the raised landscaped median. This traffic could turn left onto Meridian Avenue and approach the site via Douglas Street and Page Street from the south or continue west on West San Carlos Street, make a U-turn at Buena Vista Avenue, and turn right onto Page Street. Based on the trip generation and trip distribution assumptions, approximately 2 vehicles would make this U-turn during the AM peak hour and 6 vehicles during the PM peak hour. The 140-foot left turn pocket is expected to accommodate this added traffic as the maximum queue observed at this location is only three vehicles (approximately 75 feet).

West San Carlos Street/Page Street

Page Street intersects West San Carlos Street as a three-legged T intersection with a stop sign on the Page Street approach. Vehicles are restricted to through movements on West San Carlos Street and right-turn movements into and out of Page Street because of the raised median. Traffic on West San Carlos Street is unimpeded. Based on field observations, traffic can easily turn right from Page Street onto eastbound West San Carlos Street during the AM peak period, the time period with the most added Project traffic, but would experience longer delays during the PM peak period due to the queue spilled back from Meridian Avenue.

City staff requested that a stopping sight distance analysis be conducted for this intersection. The analysis assesses whether drivers of vehicles turning right from Page Street onto West San Carlos Street can see approaching vehicles at a great enough distance to make the movement safely and whether there are any impediments, such as on-street parking and landscaping. The speed limit on West San Carlos Street is 35 miles per hour (mph) which corresponds to a stopping sight distance of 250 feet according to the Caltrans *Highway Design Manual*. This sight distance is illustrated on **Figure 6**.

If vehicles stop at the stop bar, the red curb on the south side of West San Carlos Street would need to be extended approximately 80 feet to the west removing about 4 parking spaces. Stopping sight distance

would be achieved without any modifications to on-street parking if drivers are allowed to encroach into the crosswalk. Any red curb extensions/parking space removal would be the responsibility of the City of San Jose since West San Carlos Street is a public street.

Meridian Avenue/Douglas Street

Douglas Street intersects Meridian Avenue as a three-legged T intersection with a stop sign on the Douglas Street approach. This intersection accommodates all turning movements. Traffic approaching and departing the site from/to the south on Meridian Avenue would travel through this intersection via a northbound left-turn movement and an eastbound right-turn movement. Field observations show that sometimes the southbound queues on Meridian Avenue spill back from downstream signalized intersections to Douglas Street, but they generally dissipate within one signal cycle. Based on the trip generation and trip distribution assumptions, approximately 3 vehicles would make the northbound left turn during the AM peak hour and 8 vehicles during the PM peak hour. Traffic can easily turn left from northbound Meridian Avenue onto westbound Douglas Street and the northbound left-turn pocket is expected to accommodate the added project traffic without affecting the through movements on Meridian Avenue.

City staff also requested that a stopping sight distance analysis be conducted for the Douglas Street approach to this intersection. Vehicles from the Project site would primarily turn right from Douglas Street onto Meridian Avenue. The speed limit on Meridian Avenue is also 35 mph. The sight distance for the Douglas Street approach is met as illustrated on **Figure 7**.



250' - Stopping Sight Distance 



Figure 6
Sight Distance Analysis for Page Street at West San Carlos Street



250' - Stopping Sight Distance 



Figure 7
Sight Distance Analysis for Douglas Street at Meridian Avenue

5. Site Access, On-Site Circulation, and Parking

The site plan (in Figure 2) was reviewed to evaluate site access and on-site circulation for pedestrians, bicycles, personal vehicles, and larger vehicles (e.g., garbage trucks, delivery vehicles, moving vans, and emergency vehicles). The assessment includes specific issues identified by City staff:

- Left-turn queuing at the project driveway
- Sight distance at the project driveway
- Multi-modal site access using proposed crosswalk enhancements connecting Meridian Park to the proposed Project's paseo

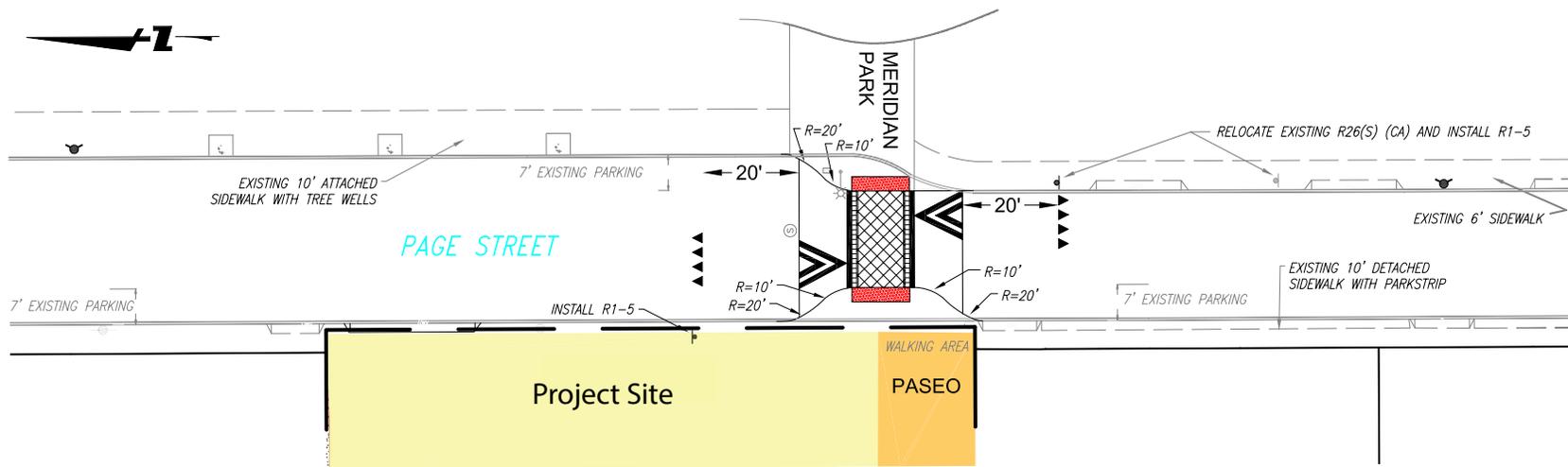
The proposed parking supplies for vehicles and bicycles are compared to City zoning Code requirements.

Site Access and On-Site Circulation

Pedestrians

The building entrance is located on Page Street. A paved entry plaza connects it to the new sidewalk to be constructed on Page Street along the Project's frontage. Pedestrians will use the sidewalk and crosswalks described on page 6, the new sidewalk, and entry plaza to access the site. Pedestrians can use the new park and paseo along the southern side of the site (which is open to the public during daylight hours) for site access and on-site circulation. Additional pedestrian circulation is provided by the walkway along the western edge of the building.

The new park and paseo is part of a planned pedestrian paseo extending between Buena Vista Avenue and Meridian Avenue that will create a pedestrian facility parallel to West San Carlos Street. It will enhance pedestrian access between the site and the surrounding area. The new park and paseo will be connected to Meridian Park located on the eastern side of Page Street via a raised pedestrian crossing shown on **Figure 8**. Pedestrians and bicyclists can access Meridian Avenue directly through Meridian Park.



Source: City of San Jose
Department of Transportation



Figure 8
Raised Pedestrian Crossing on Page Street

Bicycles

There are limited bicycle facilities near the site. The traffic volumes on Page Street are low so bicyclists can share the road with vehicles. They can use Meridian Park or Douglas Street, a designated bike route, to travel between the site and Meridian Avenue. Bicyclists can travel through O'Connor Park to reach the bike lanes on Lincoln Avenue, access the Race Street LRT station, or continue east on Auzerais Avenue to reach the Los Gatos Creek Trail.

Personal Vehicles

Vehicles enter and exit the site via the driveway on Page Street that provides access to the on-site vehicle and motorcycle parking spaces. Entering vehicles cannot turnaround. Therefore, it is recommended that a sign with "Reserved Parking Only" be placed near Page Street so that visitors do not enter and then have to back out of the site. A potential reconfiguration of the motorcycle and vehicle parking spaces at the end of the driveway to facilitate access/egress to these spaces is shown on **Figure 9**. The Department of Transportation recommends this reconfiguration.

The City requested a queuing analysis be conducted for vehicles turning left into the driveway. The highest hourly volume for this movement is projected to be 8 vehicles during the AM peak hour. With the low traffic volumes on Page Street, these vehicles will be able to enter the site without forming long queues and would not impede traffic flows on Page Street.

Other Vehicles

Trash bins would be moved for curbside pick-up so garbage trucks would not need to enter the site. Emergency vehicles would either use the driveway, park on Page Street, or possibly enter the paseo as needed to respond to an emergency. (The proposed fire access diagram is included in **Appendix B**.) It is recommended that the Fire Department review the site plan for emergency vehicle access. Delivery vehicles and ridehailing (Uber, Lyft) vehicles would park on Page Street. Residents moving into and out of the apartments may park their vehicle/moving truck on-site as shown on Figure 9. It is recommended that the office manage these operations with timed permits to ensure that the vehicles are parked during non-peak periods for short durations.

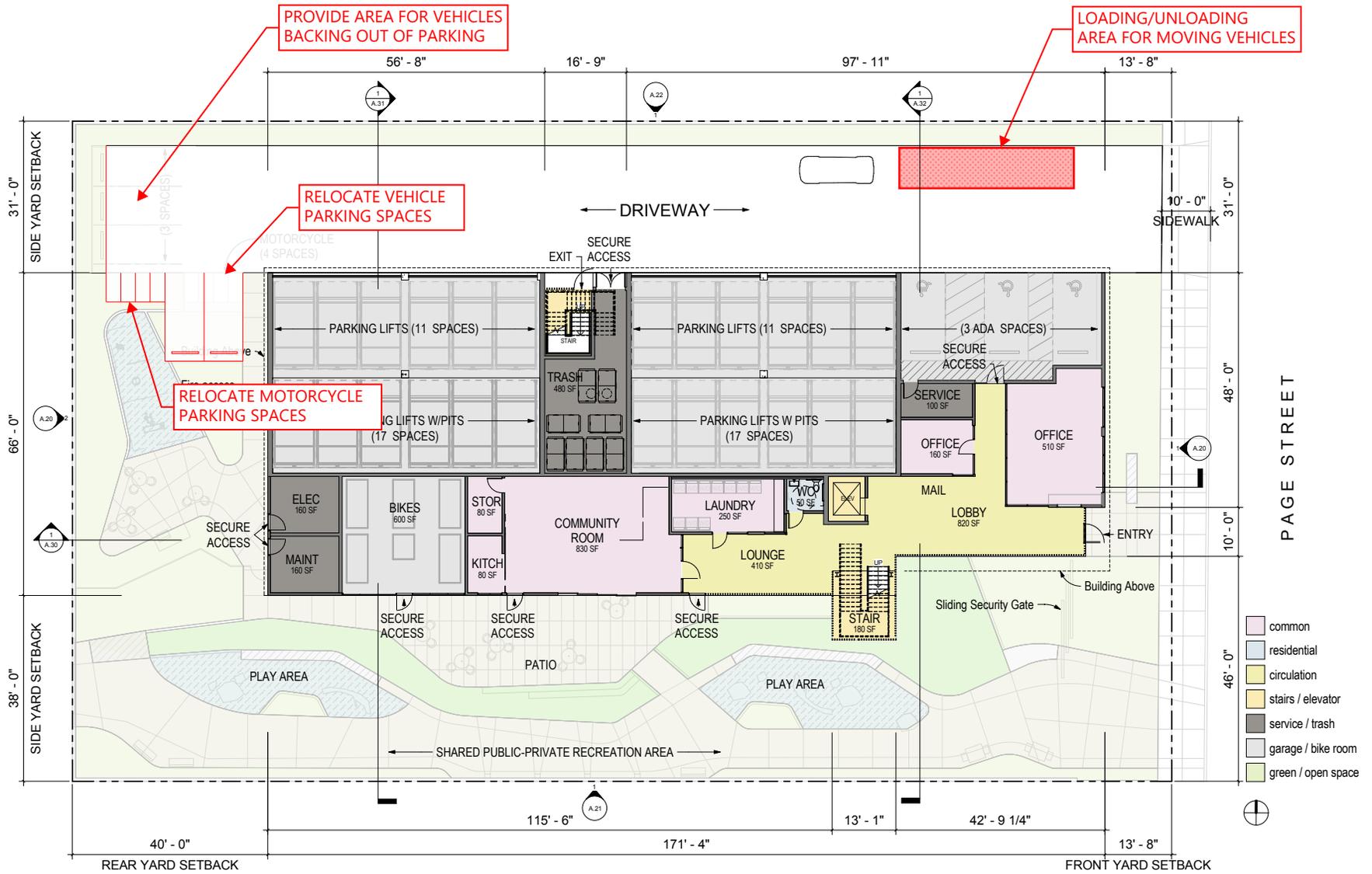


Figure 9

Potential Parking Space Relocation

Driveway Sight Distance

City staff requested that a stopping sight distance analysis be conducted for the 26-foot site driveway to assess whether drivers of vehicles exiting the site can see approaching vehicles (in both directions) at great enough distances to make the movement safely. The de facto speed limit on Page Street is 25 mph, which corresponds to a stopping sight distance of 150 feet according to the Caltrans *Highway Design Manual*. As illustrated on **Figure 10**, the parking space on the west side of Page Street just north of the driveway would need to be removed. Any on-street parking space removal would be the responsibility of the City of San Jose since Page Street is a public street.

Parking

The proposed vehicle parking supply includes 56 parking spaces provided using lifts, three surface spaces and three Americans with Disabilities Act (ADA) spaces for a total of 62 spaces, or a ratio of 0.76 spaces per unit. In addition, 4 motorcycle parking spaces will be provided. A bicycle storage room with the capacity for 82 bicycles, or one per unit, will be provided.

The City's bicycle parking requirement for studio apartments is one bicycle space per four units. The Project exceeds the bicycle parking requirements by providing one per unit.

The City's vehicle parking requirement for studio apartments is 1.25 vehicle spaces per unit or 103 spaces. The parking requirement can be reduced between 20 and 50 percent depending on Transportation Demand Management (TDM) measures used at the site. The Project's TDM measures include:

- Transit passes will be provided to residents to encourage bus and LRT use
- Secure bicycle parking is provided for all units to encourage bicycle use
- Page Street Housing is located in the West San Carlos Urban Village and is within a short walking distance of numerous stores, restaurants, and parks. The site's location in a mixed-use area with multiple nearby destinations encourages walking and biking

Plus, according to California State Government Code, Title 7, Chapter 4.3 Density Bonuses: Section 65915(p)(2)...“if a development includes the maximum percentage of low-income or very low income units provided for in paragraphs (1) and (2) of subdivision (f) and is located within one-half mile of a major transit stop, as defined in subdivision (b) of Section 21155 of the Public Resources Code, and there is unobstructed access to the major transit stop from the development, then, upon the request of the developer, a city, county, or city and county shall not impose a vehicular parking ratio, inclusive of handicapped and guest parking, that exceeds 0.5 spaces per bedroom.”

The amount of provided parking meets the California State Government Code and the City of San Jose's code with the allowable TDM reduction.



250' - Stopping Sight Distance 



Figure 10
Sight Distance Analysis for Site Driveway

6. Conclusions and Recommendations

The results of the traffic impact analysis for the proposed Page Street Housing development are:

- It is estimated to generate 28 vehicle trips during the weekday AM peak hour and 33 vehicle trips during the weekday PM peak hour.
- The traffic and parking demand will be reduced due to the site's proximity to nearby bus routes and numerous stores, restaurants, and parks, the ample bicycle parking, and transit passes provided to residents.
- Traffic congestion occurs on eastbound West San Carlos Street during the PM peak period resulting in traffic queuing. Queuing at the other intersections in the vicinity of the site is relatively minor.
- The intersection of West San Carlos Street and Meridian Avenue is projected to operate at LOS D during both peak hours under Existing and Background Conditions both with and without the Project. The Project will have a negligible effect on its operations.
- The westbound left-turn pocket at the intersection of West San Carlos Street and Buena Vista Avenue has sufficient capacity to accommodate Project traffic.
- Vehicles can easily turn right from Page Street onto West San Carlos Street during the AM peak period. Vehicles making this movement have to wait for a traffic gap during the PM peak period due to the vehicle queues. Most Project traffic making this movement occurs during the AM peak hour.
- A new park/pedestrian paseo, provided along the southern edge of the site, is part of a planned pedestrian paseo extending between Buena Vista Avenue and Meridian Avenue, and will improve pedestrian circulation in the area.
- The vehicle parking supply will be adequate given the site's location and TDM measures.
- The bicycle parking supply exceeds City requirements.

Appendix A:

Intersection Level of Service Calculations

City of San Jose
Citywide Traffic Database
(updated August 13, 2015)

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #3693 MERIDIAN/SAN CARLOS

Cycle (sec): 140 Critical Vol./Cap.(X): 0.575
Loss Time (sec): 12 Average Delay (sec/veh): 39.7
Optimal Cycle: 49 Level Of Service: D

Table with columns: Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, Lanes.

Volume Module: >> Count Date: 14 Feb 2013 << 7:30-8:30AM

Table with columns: Base Vol, Growth Adj, Initial Bse, Added Vol, ATI, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

Table with columns: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with columns: Vol/Sat, Crit Moves, Green Time, Volume/Cap, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

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

City of San Jose
Citywide Traffic Database
(updated August 13, 2015)

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #3693 MERIDIAN/SAN CARLOS

Cycle (sec): 140 Critical Vol./Cap.(X): 0.579
Loss Time (sec): 12 Average Delay (sec/veh): 39.9
Optimal Cycle: 49 Level Of Service: D

Table with columns: Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, Lanes.

Volume Module:

Table with columns: Base Vol, Growth Adj, Initial Bse, Added Vol, ATI, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

Table with columns: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with columns: Vol/Sat, Crit Moves, Green Time, Volume/Cap, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

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

City of San Jose
Citywide Traffic Database
(updated August 13, 2015)

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #3693 MERIDIAN/SAN CARLOS

Cycle (sec): 140 Critical Vol./Cap.(X): 0.696
Loss Time (sec): 12 Average Delay (sec/veh): 44.4
Optimal Cycle: 63 Level Of Service: D

Table with columns: Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, Lanes.

Volume Module:

Table with columns: Base Vol, Growth Adj, Initial Bse, Added Vol, ATI, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

Table with columns: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with columns: Vol/Sat, Crit Moves, Green Time, Volume/Cap, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

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

City of San Jose
Citywide Traffic Database
(updated Jun 5, 2015)

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #3693 MERIDIAN/SAN CARLOS

Cycle (sec): 140 Critical Vol./Cap.(X): 0.688
Loss Time (sec): 12 Average Delay (sec/veh): 41.8
Optimal Cycle: 61 Level Of Service: D

Table with columns: Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, Lanes.

Volume Module: >> Count Date: 14 Feb 2013 << 7:30-8:30AM

Table with columns: Base Vol, Growth Adj, Initial Bse, Added Vol, ATI, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

Table with columns: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with columns: Vol/Sat, Crit Moves, Green Time, Volume/Cap, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

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

City of San Jose
Citywide Traffic Database
(updated Jun 5, 2015)

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #3693 MERIDIAN/SAN CARLOS

Cycle (sec): 140 Critical Vol./Cap.(X): 0.864
Loss Time (sec): 12 Average Delay (sec/veh): 50.5
Optimal Cycle: 109 Level Of Service: D

Table with columns: Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, Lanes.

Table with columns: Volume Module, Count, Date (14 Feb 2013), Time (5:00-6:00PM), and various volume/adjustment metrics.

Table with columns: Saturation Flow Module, Sat/Lane, Adjustment, Lanes, Final Sat.

Table with columns: Capacity Analysis Module, Vol/Sat, Crit Moves, Green Time, Volume/Cap, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

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

City of San Jose
Citywide Traffic Database
(updated Jun 5, 2015)

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #3693 MERIDIAN/SAN CARLOS

Cycle (sec): 140 Critical Vol./Cap.(X): 0.692
Loss Time (sec): 12 Average Delay (sec/veh): 42.0
Optimal Cycle: 62 Level Of Service: D

Table with columns: Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, Lanes.

Volume Module:

Table with columns: Base Vol, Growth Adj, Initial Bse, Added Vol, ATI, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

Table with columns: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with columns: Vol/Sat, Crit Moves, Green Time, Volume/Cap, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

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

City of San Jose
Citywide Traffic Database
(updated Jun 5, 2015)

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #3693 MERIDIAN/SAN CARLOS

Cycle (sec): 140 Critical Vol./Cap.(X): 0.865
Loss Time (sec): 12 Average Delay (sec/veh): 50.6
Optimal Cycle: 109 Level Of Service: D

Table with columns: Approach (North Bound, South Bound, East Bound, West Bound), Movement (L, T, R), Control, Rights, Min. Green, Y+R, Lanes.

Volume Module:

Table with columns: Base Vol, Growth Adj, Initial Bse, Added Vol, ATI, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, Reduced Vol, PCE Adj, MLF Adj, Final Volume.

Saturation Flow Module:

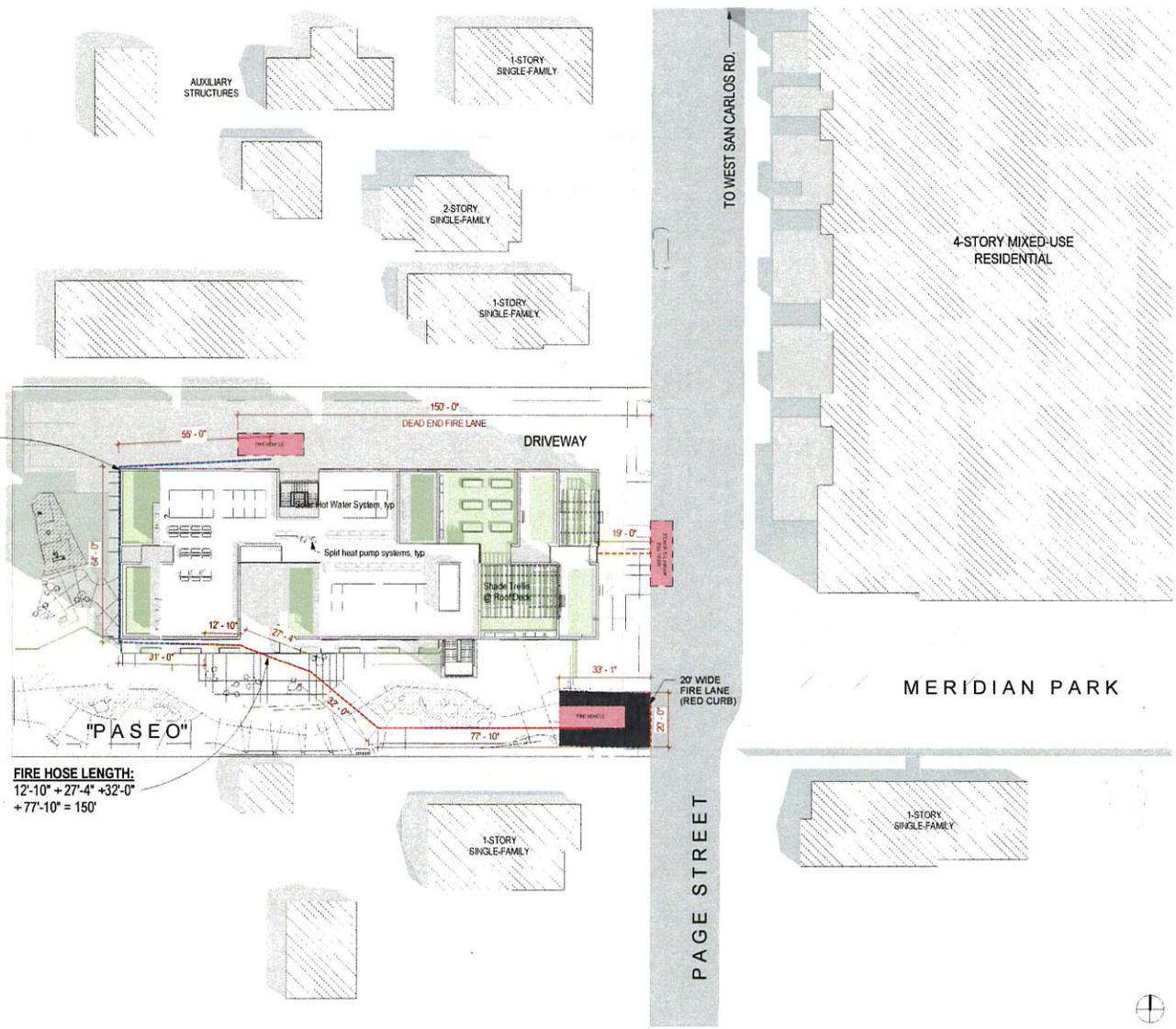
Table with columns: Sat/Lane, Adjustment, Lanes, Final Sat.

Capacity Analysis Module:

Table with columns: Vol/Sat, Crit Moves, Green Time, Volume/Cap, Delay/Veh, User DelAdj, AdjDel/Veh, LOS by Move, HCM2kAvgQ.

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

Appendix B:
Fire Access Diagram



FIRE HOSE LENGTH:
 $55'-0" + 64'-0" + 31'-0" = 150'$

FIRE HOSE LENGTH:
 $12'-10" + 27'-4" + 32'-0" + 77'-10" = 150'$