DIRIDON STATION AREA INFRASTRUCTURE ANALYSIS

Final Report | January 31, 2017

submitted to: CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

prepared by: HMH

TABLE OF CONTENTS

APPENDICES

[This Page Intentionally Left Blank]

1.0 EXECUTIVE SUMMARY

1.1 Introduction

With the arrival of local and regional transit systems including the California High-Speed Rail (HSR) and Bay Area Rapid Transit (BART) supplementing existing operations of Caltrain, Amtrak, and VTA light rail and buses, the City of San José intends to create a prominent transportation hub in the Diridon Station Area surrounded by high density, transit oriented developments. The City has laid a framework for the area through the Diridon Station Area Plan (DSAP), completed in 2014, which broadly addressed land use, environmental, transportation and implementation strategies.

This Infrastructure Analysis examines the infrastructure and utility components of the planned Diridon Station Area redevelopment. With respect to major elements of streets, sanitary sewer, storm drain, potable water, recycled water, joint trench facilities, parks and related facilities, this report:

- Records significant existing infrastructure facilities and deficiencies
- Indentifies the condition of existing infrastructure
- Recommends improvements to accommodate future, transit-oriented developments
- Estimates the costs of potential improvements
- Explores potential implementation phasing scenarios

This report offers a first look at the detailed utility and transportation infrastructure work necessary to accommodate build out of the proposed land uses in the Diridon Station Area. Major variables including the alignment and timing of HSR and BART, increased sustainability goals, changing State and Federal requirements, ultimate configuration of development proposals and economic vitality within the project horizon years will affect the implementation of the plan. For these reasons, it will be necessary in future years, to more closely assess the planned infrastructure improvements through the Diridon Station Area as these variables become better understood.

1.2 Backbone Facilities

It is anticipated that street frontages and utility systems directly affected by development projects will be required to be improved or replaced through the conditions of approval of the development. However, there are numerous improvements within the Diridon Station Area which will provide broad benefit to the whole area. These substantial improvements should be constructed in larger phases, not parcel-by-parcel as may occur if they are constructed as development frontages. Certain facilities also have place-making value that establishes the quality and character of the Diridon Station Area. These facilities have been identified as backbone facilities and warrant construction early in the build-out of the area or serve large groups of properties toward which a funding mechanism can be established.

1.3 Design Criteria

As a basis for utility demand modeling, the report utilized the DSAP test fit scenario and development constraints within the Program Environmental Impact Report with modifications to include development of the Ballpark site, the Pacific Gas and Electric Company (PG&E) sub-station and Los Gatos Creek frontage within the Diridon Station Area.

Roadway typical sections were developed consistent with roadway typologies in the Envision San José 2040 General Plan and the Diridon Station Area Plan. These sections were then modified consistent with the City's Draft Complete Streets Design Guidelines.

Utility criteria were established consistent with City of San José master planning documents, published design standards and annual reports to identify utilities with insufficient capacity, utilities with known deterioration, and establish a basis for design of new system elements.

1.4 Existing Conditions

Under existing conditions, with the exception of storm drainage and potable water, backbone utilities generally have adequate capacity for the current land use. Localized flooding occurs in the 10-year storm event along San Carlos Street and Stockton Avenue within the Diridon Station Area. Streets are generally in fair condition with moderate Pavement Condition Index (PCI) scores.

1.5 Potential Improvements and Cost Estimates

Using the criteria defined in Chapter 3 of this analysis, potential improvements were identified for systems throughout the Diridon Station Area. In addition to improvements within the Diridon Station Area, the Program Environmental Impact Report identified other facilities which may be impacted by the Diridon Station Area developments. These include the widening of Coleman Avenue North of Market Avenue, the replacement of the San Carlos Overpass over the Caltrain tracks, and other improvements. Substantial proposed improvements include:

- Extension and realignment of Autumn Street,
- Storm drain improvements along Stockton Avenue and San Carlos Street,
- Sanitary sewer upsizing along Autumn Street,
- Extension of reclaimed water into the Diridon Station Area,
- Undergrounding of overhead distribution utilities.

Year 2017 unit costs were assigned to these improvements to identify total costs of the proposed construction of backbone facilities. Utility improvements requiring an upsize in pipe sizes assume a financially conservative approach of removal and replacement. During detailed engineering, other cost-saving strategies such as parallel pipes, interceptor or other trenchless construction measures should be evaluated. These costs, which including factors for engineering, inspection and construction management, are shown in **Table 1.5.1**.

Category	Scale	Estimated Cost
Streets	2.4 Miles	$43.2 M
Parks, Plazas, and Trails	1 Acre	$1.2 M
Sanitary Sewer	2,700 LF	$6.4 M
Storm Drain and Flood Control	7,900 LF	$9.2 M
Potable Water	5,800 LF	$3.9 M
Recycled Water	8,800 LF	$2.9 M
	GRAND TOTAL	**$66.8 M**

Table 1.5.1: Estimated Cost Summary

While this report includes additional Commercial Downtown development on the area occupied by the PG&E substation located south of the Diridon Station, the costs of relocating the facility, preliminarily estimated at $50 million or more, are not included in the total estimated public infrastructure costs listed above.

1.6 Conclusion

With the California High Speed Rail and Bay Area Rapid Transit extension, the new multi-modal station will serve as a hub of economic activity in the City of San José. New policies will encourage high-density, transit oriented developments to shape the Diridon Station Area into a centerpiece of downtown San José. To facilitate these improvements, significant modifications to the public infrastructure will be needed. In order to develop funding mechanisms and strategies, the City must determine feasible options for the projected $67 million backbone infrastructure obligation to be carried by the development of the area.

[This Page Intentionally Left Blank]

2.0 INTRODUCTION

2.1 Background

The City of San José along with its partners at VTA, Caltrain, BART, and California High-Speed Rail intend to build an internationally prominent transportation center and to develop a high density transit-oriented development within the area around the Diridon Station. The Diridon Station Area Plan (DSAP), developed by the City in 2014, integrates transportation infrastructure, commercial and retail developments with open space to create an expansion of Downtown San José. The Diridon Station, San José's historic train station, is a regional transportation hub with the following transit services: Altamont Commuter Express (ACE), Capitol Corridor, Amtrack, Caltrain, VTA light rail, VTA bus, Highway 17 Express, Private Intercity Bus, Monterey Salinas Transit Bus, and Private/Tech Shuttles. BART service to Oakland and other Bay Area destinations is under development, and planning continues for one of the major California High Speed Rail stations to be located at Diridon Station.

The DSAP analyzes the development of land uses within the 250 acres project surrounding the station. The DSAP and the general design guidelines contained within it are intended to be the basis for the City to establish implementation strategies and design guidelines to encourage appropriate transit-oriented development within the Diridon Station Area.

The Diridon Station Area Plan is a blueprint for thirty years of future growth around the Diridon Station, including the SAP Center. For the plan to be relevant over a long period of time, it needs to make a bold framework for development, while also being flexible for change within these guidelines. Over the years, development actions will occur in different forms as markets and other circumstances evolve. The DSAP proposes the bold and aggressive ideas for the Diridon Station Area and outlines many policies and physical design concepts to be developed in the future.

In addition to the Diridon Station Area Plan documents, other related documents, consisting of separate bound reports, address important aspect of the DSAP and its infrastructure context. The related documents include:

- Implementation Strategy Report
- Program Environmental Impact Report (PEIR)
- Transportation Facilities Master Plan

Each of these documents contains information relevant to infrastructure planning, but collectively they fall short of summarizing the totality of infrastructure needs related to the DSAP. Furthermore, they do not identify estimated costs or potential timing and phasing of infrastructure in order to facilitate development in an effective, master planned manner. The DSAP is intended to be a first step in developing and understanding of the total infrastructure requirements and addressing phasing options. However, since the DSAP is a thirty-year blueprint for growth, infrastructure planning must also be flexible for change over a long period of time. Considering these factors as well as limitations of schedule and budget through a grant funded by California High-Speed Rail Authority, it should be understood that this initial Infrastructure Analysis will evolve and be amended as more detailed information becomes available on development needs and timing.

The San Jose Diridon Transportation Master Plan aims to develop a program of transportation services that accommodate future transportation in the area. Its objectives include the following:

- To inform partner agencies of physical constraints and practical transportation operating requirements to be integrated with future public sector and private sector developments,
- To inform the preparation of a funding plan;
- To provide guidance to partner agencies for developing station facility architecture and design concepts.

The DSAP established emerging themes for the overall spirit and characteristics that the community has indicated are important to include as the framework for policies and for the individual projects as they come forward. Many of these themes listed below guide infrastructure development as well.

2.2 Overall Themes

- Establish the Diridon Station Area and surrounding area as the local, citywide, and regional destination where residents and visitors can live, work, and play.
- Foster a vibrant public realm throughout the Diridon Station Area that supports pedestrian activity and integrates public spaces into development with plazas and parks
- Reflect the Silicon Valley spirit of innovation and San José's rich history of transformation and progress through iconic, world-class architecture, distinctive civic spaces, and dynamic built environments.
- Create a strong sense of place for the Diridon Station Area, and an identifier for San José as the center of Silicon Valley and the technological capital of the world.

2.3 Specific Goals

- **Urban Form and Structure.** Create an urban district in the Diridon Station Area with buildings that maximize height potential. The Diridon Station Area should accommodate a mix of uses including commercial, office, and entertainment development.
- **Connectivity.** Establish and strengthen connections to surrounding districts and within the planning area for pedestrians, bicyclists, and motorists, with emphasis on east-west connectivity across SR-87 and the rail corridor.
- **Transportation.** Prioritize pedestrian circulation and transit. Improve pedestrian and bicycle connection to Guadalupe River from the area.
- **Compatibility with surrounding neighborhoods**. Ensure sensitive transitions in scale and design to surrounding residential neighborhoods.
- **Land Use.** Provide a range of commercial and residential uses. Commercial uses would include neighborhood services for surrounding residential areas, and a synergistic mix of entertainment, hotels, shopping, restaurants, and offices.
- **Open Spaces.** Enhance and expand recreational opportunities in the Diridon Station Area, and establish an open space system integrated with Los Gatos Creek and Guadalupe River Park.
- **Art.** Activate the streets, parks, and Diridon Station with art that engages visitors and residents. Integrate art into infrastructure to humanize and enliven standard features.
- **Parking.** Disperse parking in different locations in the planning area and beyond to ensure easy walking access to destinations.

3.0 CRITERIA AND ASSUMPTIONS

3.1 Land Use Assumptions

The land uses assumed for this analysis are based on the land use designations proposed by DSAP approved in June 2014 by City Council. Maximum build-out scenarios for the total plan area and specific development assumptions for individual areas are based on the DSAP 'test-fit' scenario.

These land use designations are consistent with the existing designations in the Envision San José 2040 General Plan (2040 GP) with the exception of a few specific areas listed in **Table 3.1.2.**

The definitions and limitations of each land use within the Diridon Station Area are shown in **Table 3.1.1** below.

Land Use Designation	Maximum Density (du/ac)	Floor Area Ratio (FAR)
Combined Industrial/Commercial	-	Up to 12.0 (1 – 24 Stories)
Commercial Downtown	-	Up to 15.0 (3 – 30 Stories)
Downtown	800	Up to 15.0 (3 – 30 Stories)
Open Space, Parks, and Habitat	-	-
Public/Quasi Public	-	-
Residential Neighborhood	8	Up to 0.7 (1 – 2.5 Stories)
Transit Employment Center	-	Up to 12.0 (4 – 25 Stories)
Transit Residential	50 – 250	2.0 – 12.0 (5 – 25 Stories)
Urban Residential	30 – 95	1.0 – 4.0 (3 – 12 Stories)
Urban Village	250	Up to 10.0

Table 3.1.1: Land Use Designations and Densities as described in the Diridon Station Area Plan

Although DSAP includes minor differences compared to the 2040 GP, the proposed development capacity is consistent with, and is a subset of, the 2040 GP. **Table 3.1.2** below describes the differences between both plans and the land uses assumed for this study.

Site	Location Confined By	2040 GP Land Use	DSAP Land Use	DSA Infrastructure Analysis Land Use
Los Gatos Creek Frontage (H8 & H9)	Autumn St to the West Santa Clara St to the North Park Ave to the South Los Gatos Creek to the East	Commercial Downtown	Open Space, Parks, and Habitat	Commercial Downtown
Whole Foods (C13-18)	Rhodes Ct to the West Julian St to the North North of The Alameda	Urban Residential	Urban Village	Urban Village
Ballpark and PG&E Substation (H7)	Montgomery St to the East North of Park Ave East of Diridon Station	Commercial Downtown	Public/Quasi Public	Commercial Downtown

Table 3.1.2: Land Use Differences between the 2040 GP, the DSAP, and DSA Infrastructure Analysis

Due to external factors, the Ballpark site proposed in the DSAP is unlikely to be developed as previously anticipated. In coordination with the City and consistent with adjacent land uses, this study assumes the Ballpark site at the Northwest corner of Park Avenue and Autumn Street will be developed as Commercial Downtown. Similarly, for the purposes of infrastructure analysis, this study assumes the existing PG&E substation facility south of the existing train station, between the Caltrain tracks and Montgomery Street will be developed as Commercial Downtown. The area northwest of The Alameda and Stockton Avenue, where the Whole Foods grocery store is currently located, will be zoned as Urban Village, consistent with the DSAP. The frontage between Autumn Street and Los Gatos Creek was assumed to be redeveloped into Commercial Downtown rather than Open Space, Parks, and Habitat as classified in the DSAP.

The DSAP developed a 'test-fit' plan that refined the broader land use assumptions by implementing other constraining factors including Federal Aviation Administration (FAA) approach surface constraints on building heights, average household square footages, building layouts, and other defining information. A detailed breakdown of the 'test-fit' can be found in Chapter Four of the DSAP. It is important to note that the 'test-fit' build-out plan is not a prescribed plan, but is a basis for establishing the maximum theoretical possible development. The 'test-fit' maximum build-out totals for four key categories (Commercial/R&D/Light Industrial, Retail/Restaurant, Residential, and Hotel) are consistent with the maximum development cited in the City of San José's Program Environmental Impact Report (PEIR) dated December 2013. The 'test-fit' build-out plan is broken down into project blocks A through H (excludes G). It should be noted that the changes to the Ballpark, the PG&E facility, and the Los Gatos Creek frontage expand upon maximum limits shown in the PEIR. Maximum development square footages were developed based upon direction from City staff to accommodate a more intense use of up to 4 million square feet of Office/R&D on these areas (Blocks H1-6, H7, H8, and H9). If these more intensive uses are proposed for development, additional environmental clearances or amendments to the

environmental document would be required. These assumptions have been made to establish conservative infrastructure demands for this study and are summarized in **Figure 3.1.1** and **Table 3.1.3**

Block ID	Designation Primary Zone	%	Designation Secondary Zone	%	Net Area* (acre)	Retail (SF)	Office/R&D (SF)	Residential (#units)	Hotel (#rooms)
A1–7	Transit Employment Center	100	-		8.7	40,300	576,400	-	-
B1–20	Transit Employment Center	100	-		26.9	-	1,634,000	-	-
C1–4	Urban Village	100	-		7.0	18,000	308,000	-	-
C5–12	Transit Employment Center	100	-		13.3	-	494,000	-	-
C13–18	Urban Village	100	-		9.1	22,800	-	163	-
C19,20	Urban Residential	100	-		3.6	-	-	60	-
D1–8	Transit Residential	81	Urban Residential	19	19.8	36,000	-	895	-
D9–11	Transit Residential	100	-		6.0	25,000	-	280	-
E1–8,11–15	Combined Industrial/Commercial	100	-		19.8	12,000	805,000	80	200
E9,10	Residential Neighborhood	100	-		0.5	-	-	75	-
F1–8	Downtown	100	-		16.1	52,000	-	291	450
F9–18	Downtown	77	Residential Neighborhood	23	7.7	78,000	-	744	-
H1–6	Commercial Downtown	100	-		8.9	140,000	1,570,000	-	250
Diridon Station Area Plan Subtotal					**147.4**	**424,100**	**5,387,400**	**2588**	**900**
H7	Commercial Downtown	100	-		13.7	217,000	2,430,000	-	400
H8	Commercial Downtown	100	-		2.3	27,000	-	108	-
H9	Commercial Downtown	100	-		3.2	37,000	-	150	-
Total w/ Former Ballpark Site & Los Gatos Creek Frontage					**161.1**	**705,100**	**7,817,400**	**2,847**	**1,300**

*Net Area represents shaded developable area, excluding roadway areas shown in black.

NOTES:

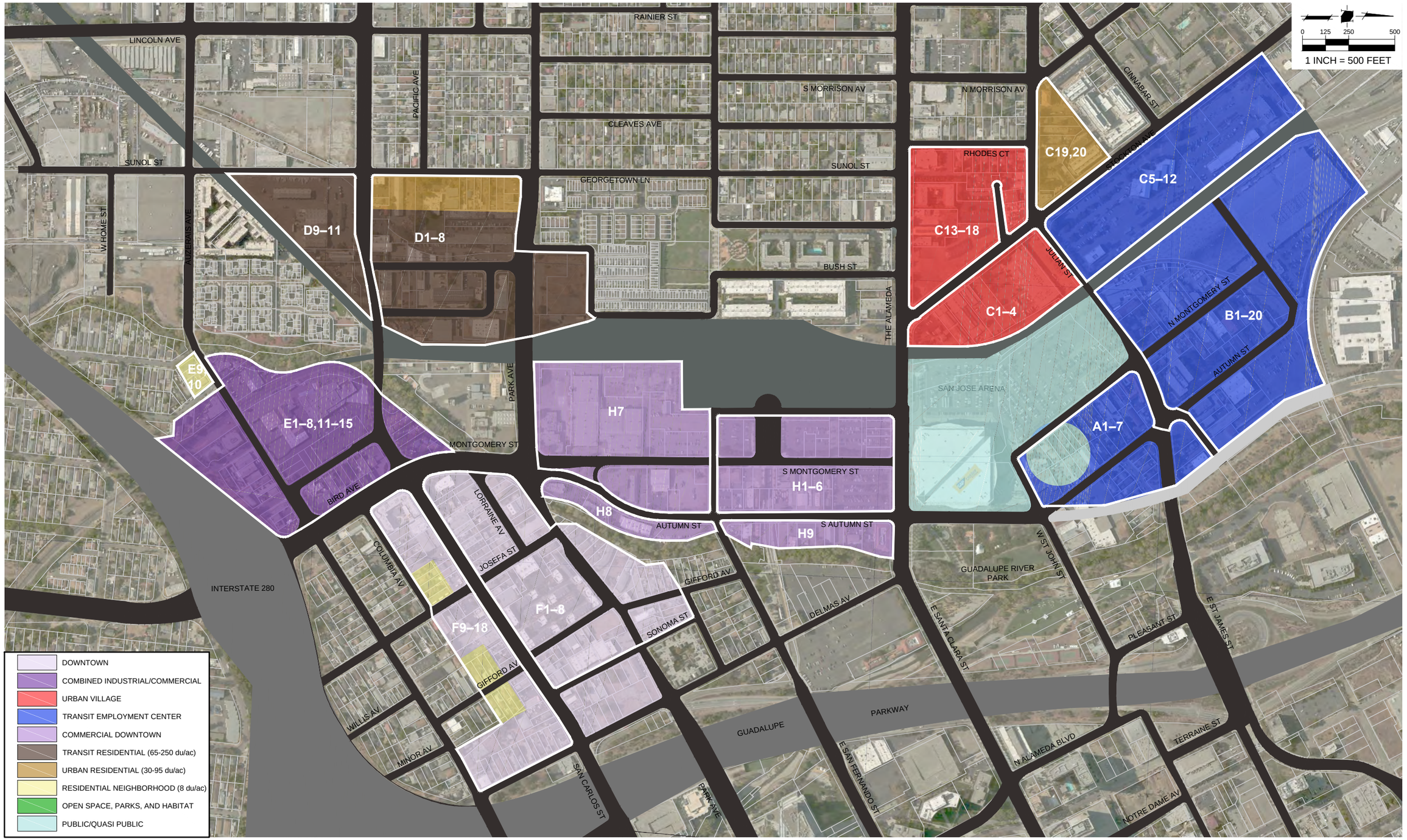
1. Square footages, units, and number of rooms for Retail, Office/R&D, Residential, and Hotel are based on the maximum 'test-fit' build-out totals described in Ch. 4 of the *Diridon Station Area Plan – Final Plan Report* (DSAP) from June 2014. The DSAP subtotal shown above is consitent with the *Program Environmental Impact Report* (PEIR).

2. Block H7 contains former Ballpark and PG&E Substation not included in the "test-fit." The totals of H7 are prorated using identical proportions of the adjacent block H1–6.

Table 3.1.3:Diridon Station Area Land Use Summary

[This Page Intentionally Left Blank]

FIGURE 3.1.1



DIRIDON STATION AREA

LAND USE ASSUMPTIONS EXHIBIT

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

HMH
1570 Oakland Road
San Jose, CA 95131
(408) 487-2200
HMHca.com

3.2 Streets

A major goal of the DSAP was to assess future access for users of all modes to the new transit hub at Diridon Station. The report took an in-depth look at the balance of available right-of-way, multi-modal transportation demand, promotion of transit use, availability of on-street parking, and other constraining factors to recommend Street Typologies for each roadway through the Diridon Station Area. The DSAP recommended street typologies can be found in **Table 3.2.1**. A thorough description of each street typology is discussed in **Section 3.2.1**.

Backbone infrastructure improvements are those that have broad benefit to large areas within the Diridon Station Area or add place-making value that establishes quality and character, and should be constructed in a comprehensive manner, rather than incrementally with each development parcel. It is anticipated that street frontages and utility systems affected by development projects will be required to be improved or replaced through the conditions of approval of the development. However, there are numerous improvements within the Diridon Station Area which will provide broad benefit to the whole area. These substantial improvements should be constructed in larger phases, not parcel-by-parcel as may occur if they are constructed as development frontages.

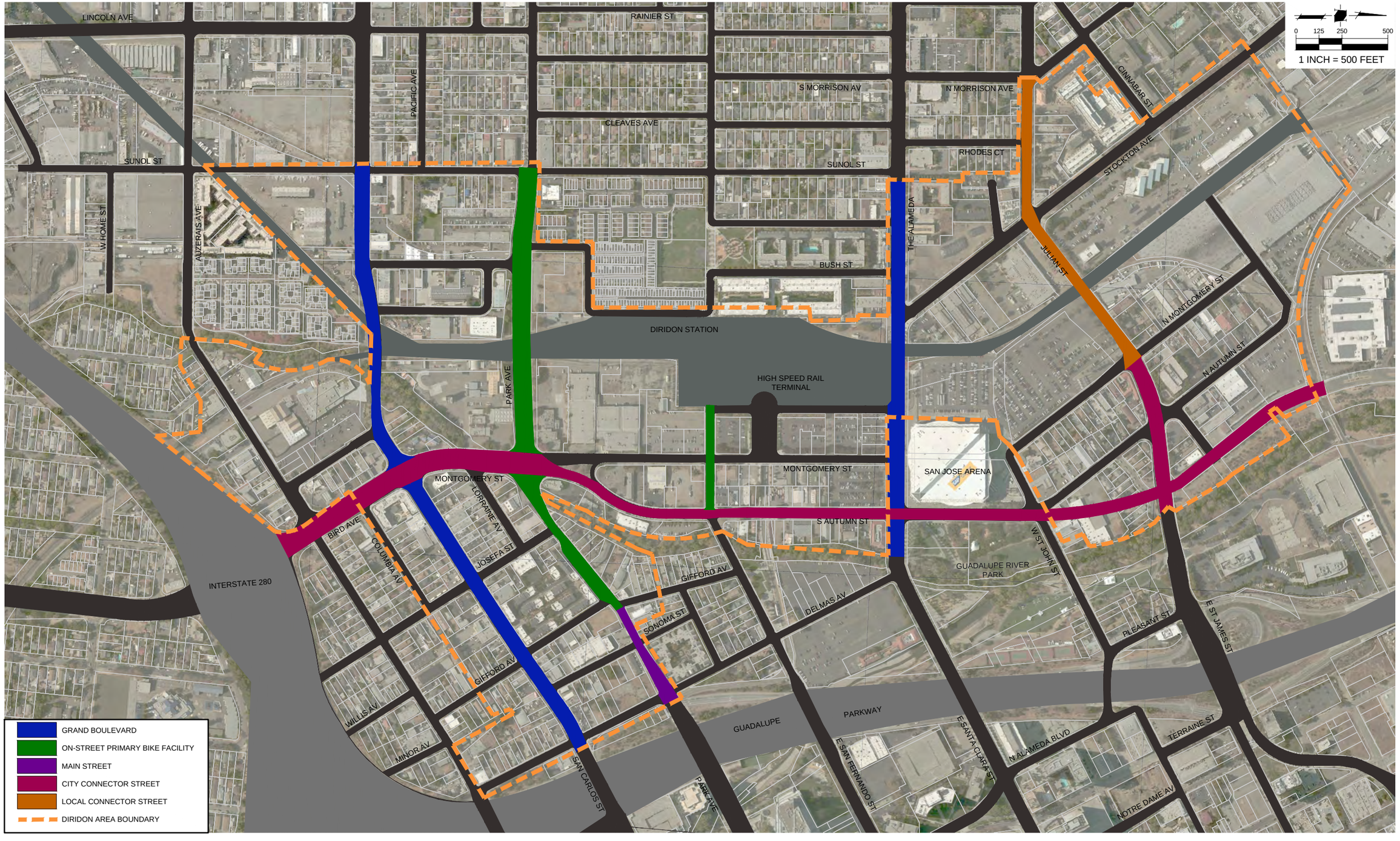
It is understood that many of the non-backbone, minor streets within the Diridon Station Area will be improved in conjunction with fronting developments similar to “in-tract” street improvements in typical subdivision developments. For this reason minor streets were not included in this analysis to develop cost sharing or funding mechanisms for the larger Diridon Station Area. A summary of backbone streets is shown in **Table 3.2.1** and **Figure 3.2.1**.

Backbone Street	Typology	Right-of-Way Width
San Carlos Street	Grand Boulevard	48’, 94’
Park Avenue	On-Street Primary Bicycle Facility	140’
	Main Street	70’
San Fernando Street	On-Street Primary Bicycle Facility	60’
Santa Clara Street /The Alameda	Grand Boulevard	118’
Julian Street	Local Street Connector	90’
St. James Street	City Street Connector	94’
Autumn Street	City Street Connector	72’
Montgomery Street	City Street Connector	130’
Bird Ave	City Street Connector	130’

Table 3.2.1: Backbone Streets for Infrastructure Analysis

[This Page Intentionally Left Blank]

FIGURE 3.2.1



DIRIDON STATION AREA
BACKBONE STREETS EXHIBIT

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

HMH
1570 Oakland Road
San Jose, CA 95131
(408) 487-2200
HMHca.com

3.2.1 Street Typologies

To ensure a balanced, multimodal transportation network, the 2040 GP and the DSAP organize streets according to "typologies." Street typologies expand upon functional classifications and consider street context and travel modes. **Figure 3.2.1** depicts the backbone streets within the Diridon Station Area along with their proposed street typologies.

The proposed typologies intend to provide a network of "complete streets" that accommodates various users of the streets. Complete streets address the needs of all uses in the transportation network, improve safety for all users, and increase the accessibility and viability of alternative travel modes to the automobile. This concept applies to all types of roads from downtown pedestrian streets to high-capacity commercial corridors, and it considers the range of users, including children, the disabled, and seniors.

The typical cross section renderings of the street typologies, shown in this section, are extracted directly from the DSAP.

Grand Boulevard

Grand Boulevards serve as major transportation corridors that connect City neighborhoods. In most cases these are primary routes for VTA light-rail, bus rapid transit (BRT), and standard/community buses, as well as other public transit vehicles. Signal priority for transit vehicles, bus stops, and-where appropriate-exclusive transit lanes can be provided. Other travel modes, including automobiles, bicycles, and trucks, are accommodated in the roadway, but transit has priority. Within the public right-of-way, special features may include enhanced landscaping, distinctive and attractive lighting, and identification banners. These streets accommodate moderate to high volumes of through traffic within and beyond the city. Pedestrians are accommodated with ample sidewalks on both sides, and pedestrian amenities are enhanced around transit stops. Transit service is accommodated within other street typologies but is a primary mode on Grand Boulevards. **Figure 3.2.2** and **Figure 3.2.3** depict a Grand Boulevard typical section.

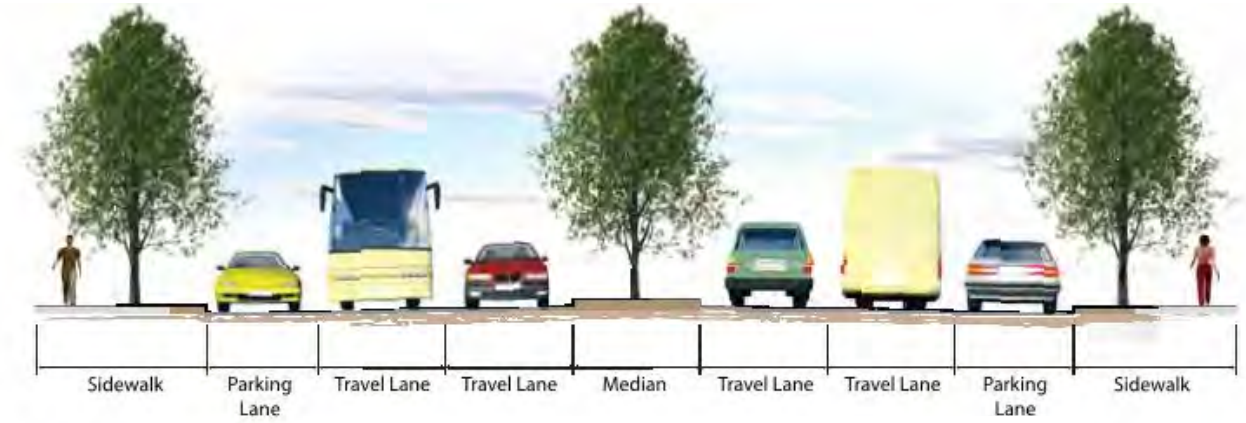


Figure 3.2.2: Grand Boulevard – Transit & Parking

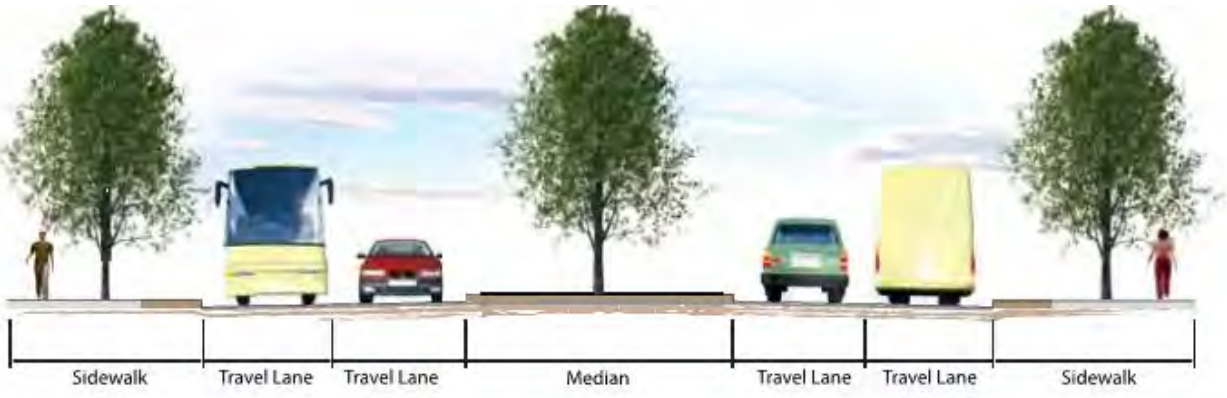


Figure 3.2.3: Grand Boulevard – Transit

On-Street Primary Bicycle Facility

On-Street Primary Bicycle Facilities are classified with either Class II (bike lanes) or Class III (signed routes) bikeways and are principal routes for bicycles providing continuous access and connections to the local and regional bicycle network. High volumes of motor vehicle traffic are generally discouraged, but may be allowed in localized areas where necessary to accommodate adjacent land uses. Local automobile, truck, and transit traffic are accommodated in the roadway, but bicycles have priority. Neighborhood traffic management strategies to slow and discourage automobile and truck traffic may be appropriate. Pedestrian accommodations should be present. **Figure 3.2.4** depicts an On-Street Primary Bicycle Facility typical section.

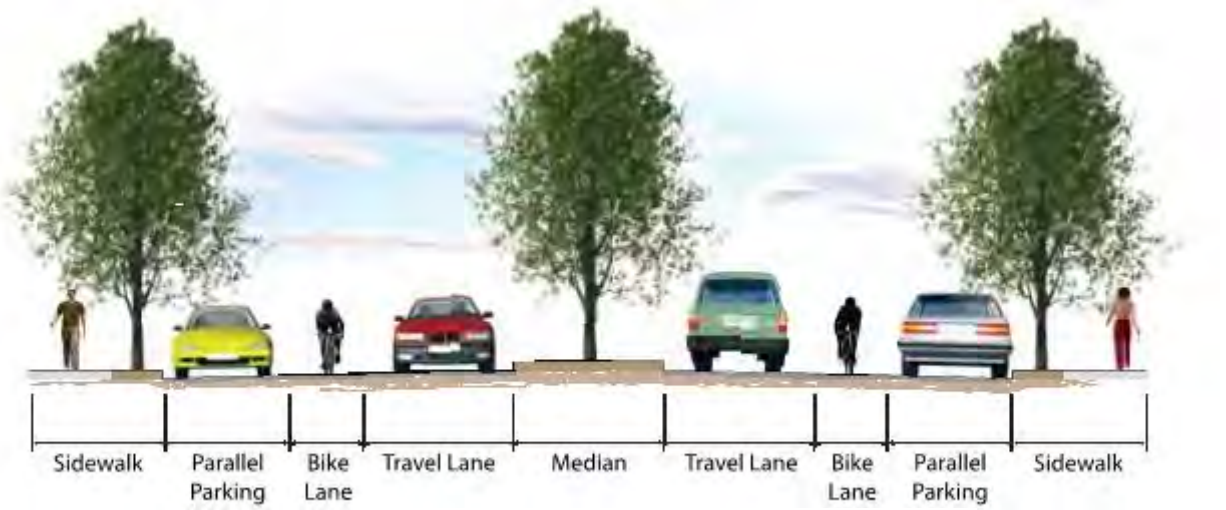


Figure 3.2.4: On-Street Primary Bicycle Facility

Main Street

Main Streets are roadways that play an important commercial and social role for the local neighborhood area, supporting retail and service activities that serve the local neighborhood residents, and providing an urban street space for social community gathering and recreational activities. The Main Street's physical form supports many transportation modes, with significant emphasis given to pedestrian activity. Like many City streets, Main Streets should also be "Complete Streets", designed and operated to enable safe, attractive and comfortable access and travel for all users, so that pedestrians, bicyclists, motorists and public transport users of all ages and abilities are able to safely and comfortably move along and across a Main Street. Main Streets are streets on which high volumes of pedestrian traffic are encouraged on the sidewalks. Sidewalks should be wide with ample pedestrian amenities, including street trees, high-quality landscaping, pedestrian curb extensions or bulb outs, enhanced street crossings, and pedestrian-oriented signage identifying trails and points of interest. Pedestrian crossings should have a high priority at intersections. Building frontages should be pedestrian oriented and pedestrian scale with buildings and entrances located adjacent to public sidewalks. **Figure 3.2.5** depicts a Main Street typical section.

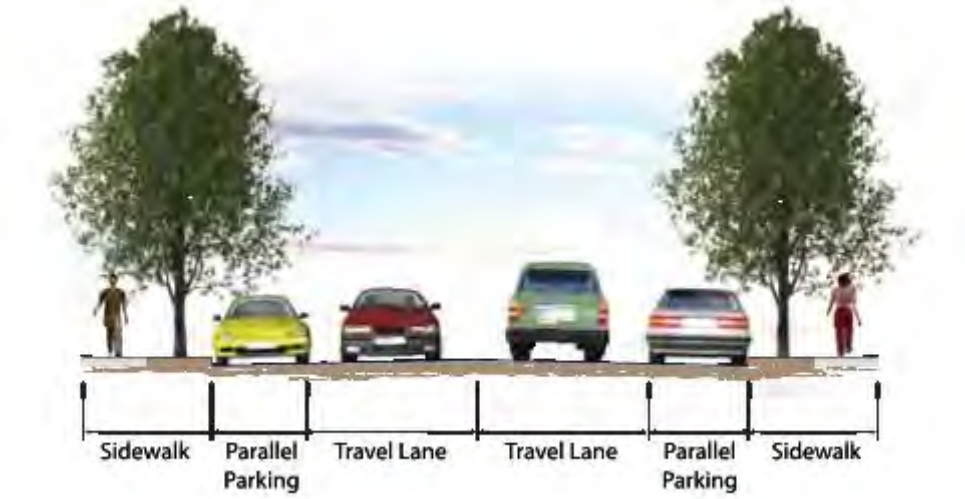


Figure 3.2.5: Main Street

City Connector Street

Automobiles, bicycles, pedestrians, and trucks are prioritized equally on a City Connector Street. Transit use, if any, is incidental. These streets typically have four or six traffic lanes and would accommodate moderate to high volumes of through traffic within and beyond the City. Pedestrians are accommodated with sidewalks. **Figure 3.2.6** and **Figure 3.2.7** depict a City Connector Street typical section.

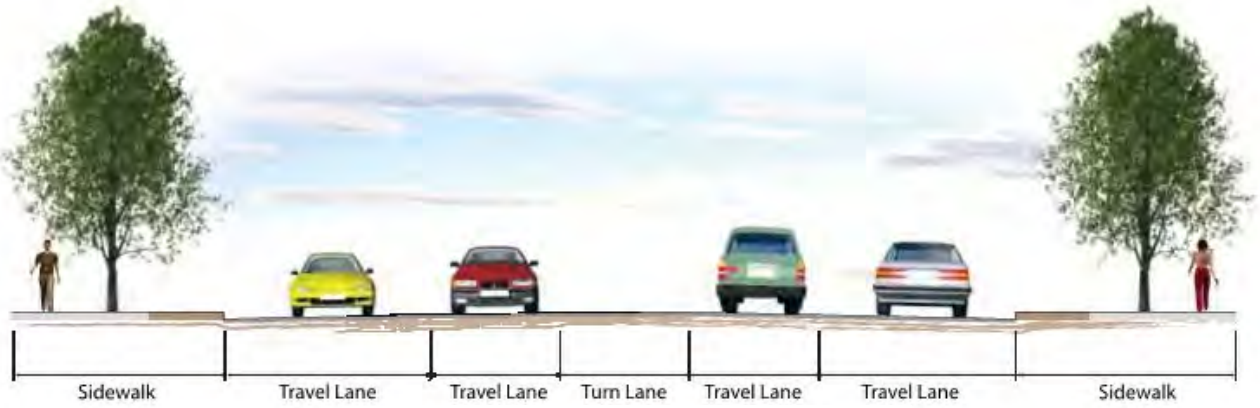


Figure 3.2.6: City Connector Street

Figure 3.2.7: City Connector Street with Median

Local Connector Street

Automobiles, bicycles, pedestrians, and trucks are prioritized equally in the roadway. Transit use, if any, is incidental. These streets have two traffic lanes and would accommodate low to moderate volumes of through traffic within the City. Pedestrians are accommodated with sidewalks. **Figure 3.2.8** depicts a Local Connector Street typical section.

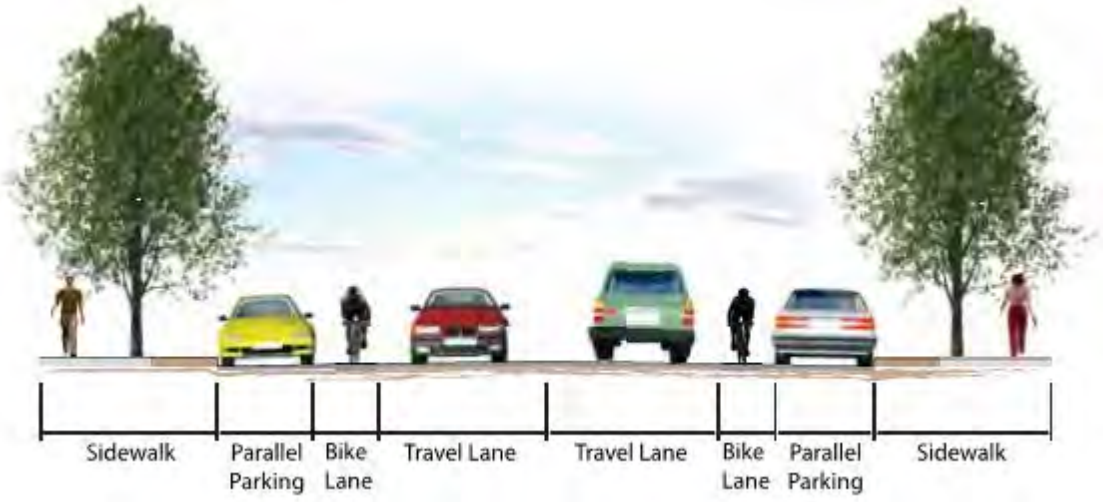


Figure 3.2.8: Local Connector Street

3.2.2 Conditions Assessment

The City of San José is responsible for maintaining the largest municipal road network in northern California with about 2,400 miles of roads. For street maintenance, the City runs a program to evaluate pavement condition. The evaluation is summarized by the Pavement Condition Index (PCI). A PCI rating scale was developed by the US Army Corps of Engineers as a method to visually assess pavement condition and assign a numerical index between 0 and 100.

The City provided PCI ratings for backbone streets in the Diridon Station Area. This information is summarized in **Figure 3.2.1**. These PCI ratings were used to assume whether roadway improvements should expect to grind and overlay the existing pavement or assume a full-depth reconstruction. In conjunction with the City, a PCI threshold of 69 or lower was identified as the point at which a developer should be assumed to fully reconstruct the existing roadway section.

3.2.3 Design Criteria

Proposed roadway improvements included in this analysis will adhere to the intent of the street typographies defined above. Where feasible, these widths will be applied to the backbone streets in this study while respecting existing right-of-way constraints. Roadway designs will be supplemented by the City of San José's Draft Complete Streets Design Guidelines shown in **Table 3.2.2**, the City of San José's Standard Details, the California Manual on Uniform Traffic Control Devices, the National Association of City Transportation Officials' Urban Bikeway Design and Urban Street Design Guides, and Caltrans Highway Design Manual.

In order to propose improvements and estimate potential construction costs, the following assumptions were made:

- Additional right-of-way will not be acquired for existing backbone streets although dedications of additional right-of-way to provide consistent improvements fronting developments may be required as conditions of approval
- Existing streets will be repaved with Hot Mix Asphalt (HMA) overlays or new structural sections
- On-street parking will be limited along backbone streets

In support of the overall goals of the DSAP to strengthen connectivity and prioritize pedestrian circulation and transit, the following characteristics will be implemented where feasible:

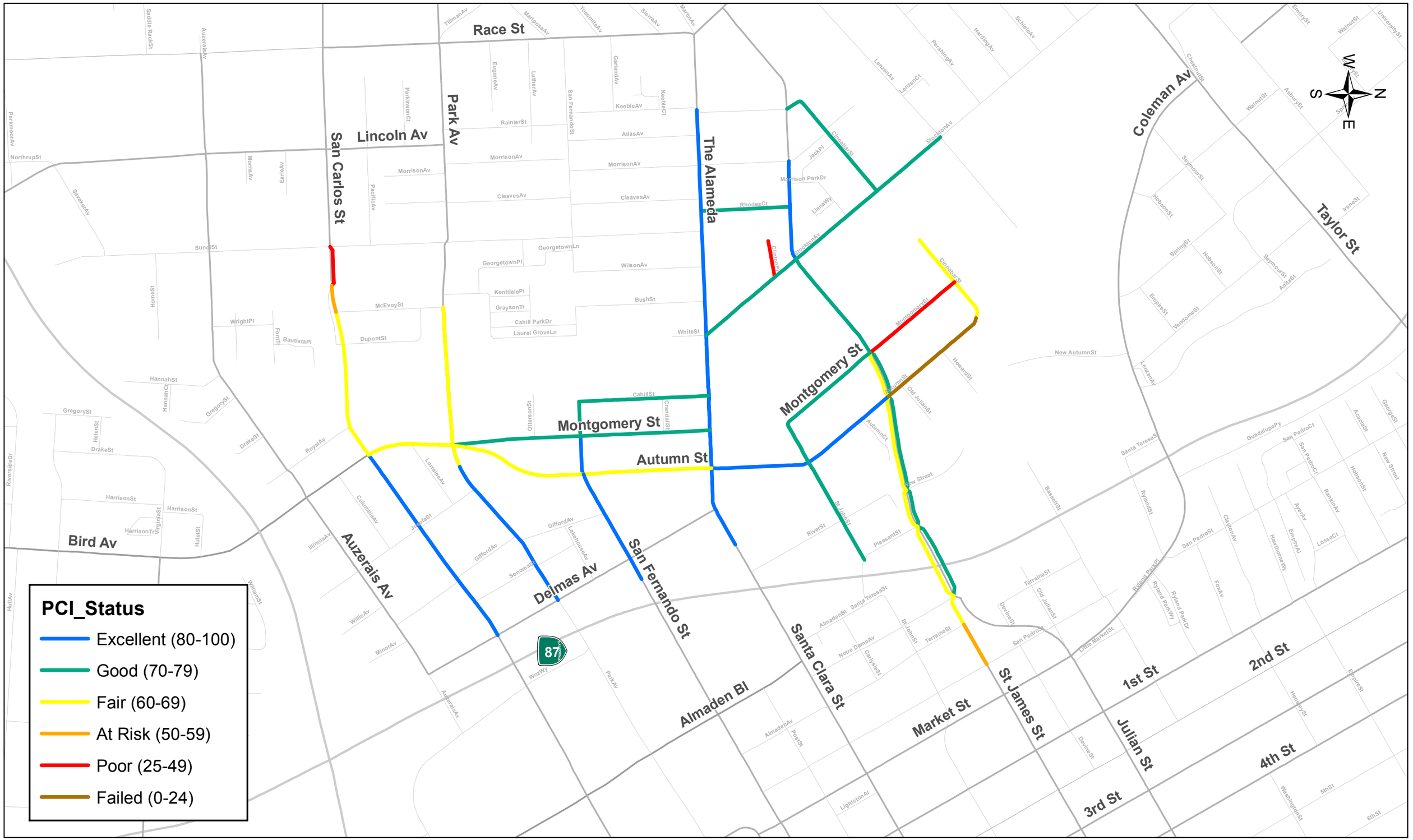
- Pedestrian amenities and curb bulb-outs,
- Street trees and decorative lighting,
- Bus stops, where applicable.

Typology	Grand Boulevard City Connector Street	Main Street Local Connector Street Residential Street
Functional Class	Arterials	Local Streets
Interior Lane		
Next to centerline/adjacent lane	10' – 11'	10'
Next to curb median	10' – 11'	10'
Next to painted median	10' – 11'	10'
One lane next to median with parking	26' – Lane striped at 11' parking, bike lane or flex space in remainder	
One lane next to median without parking	20' – Lane striped at 11' parking, bike lane or flex space in remainder	
Curb Lane		
With parking	18' (includes parking lane width)	17' (includes parking lane width)
No parking with bike lane	11' (plus bike lane)	10' (plus bike lane)
No parking without bike lane	10' – 14'	
Part-time parking	10' – 12'	
With buses	11' – 15' (dimensions typically not applicable on local streets)	
Turn Lane		
Left turn	9' – 10'	
2-way left turn	10' – 12'	10'
Left turn adjacent to median island	10'	
Double left turn lanes	9' – 10'	
Rigth turn	10' – 12'	9' – 10'
Bike Facilities	See Chapter VI "Bicycle Design"	
Parking	7' – 8'	7'

Table 3.2.2: City of San José Draft Complete Streets Design Guidelines

Diridon Station Area:
Pavement Condition Index (PCI) Ratings

FIGURE 3.2.2



3.3 Sanitary Sewer

This analysis assessed the existing sanitary sewer system under future build out scenarios and recommends improvements to the system to accommodate anticipated developments. The City of San José Sanitary Sewer Master Plan Capacity Assessment – Phase II and Update of Phase I (Sanitary Sewer Master Plan) was used as a basis for capacity metrics. The City of San José currently operates a model that is used to identify capacity deficiencies. Pipes that are found to have such deficiencies are subject to improvements that will meet current standard design guidelines described in the Sanitary Sewer Master Plan and Public Works Development Manual from 2002 (Development Manual).

As discussed in Chapter 3.2, backbone improvements are those that have broad benefit to large areas of the Diridon Station Area or add place-making value, and should be constructed in a comprehensive manner, rather than incrementally with each development. Individual developments will still be obligated to construct frontage improvements, sanitary sewer services and localized sanitary sewer improvements beyond those listed in this study consistent with City policies and as required by conditions of approval.

The criteria below will be applied to backbone sanitary sewer systems. The Diridon Station Area has three backbone systems which generally carry flows from the southern, residential areas of the Valley through the intensified Diridon Station Area and north to the San José-Santa Clara Regional Wastewater Facility treatment plant located near Alviso. Through the Diridon Station Area, these backbone systems vary in size from 18 inches to 36 inches in diameter. These backbone pipe segments generally follow the north-south ground profile at approximately 0.2%. Backbone facilities within the Diridon Station Area are shown in **Figure 3.3.1**. Non-backbone pipes and laterals assumed to be ungraded if required as a condition of the adjacent development would not be funded through an area-wide program and therefore are not included in this analysis.

3.3.1 Sanitary Sewer Modeling System

The City evaluated the future sanitary sewer network in the Diridon Station Area using a comprehensive hydraulic modeling system. The modeling system used a systematic process that incorporated population estimates, land use assumptions, and water use and flow monitory data. Several steps are involved in model-building for the Diridon Station Area. The general methodology is summarized below.

- The model network is comprised of links and nodes, which represent pipes and junction structures, respectively.
- The Diridon Station Area is divided into subcatchment areas based on the sewer network configuration
- Sewer loads are estimated by zone assignments, land use, unit flow factors **(Table 3.3.1)**, and diurnal patterns for each block. These loads are applied to the block's closest upstream manholes and are assigned proportional to pipe lengths fronting the land use block.
- Representative results of dry weather days from the flow monitoring period were selected and compared to metered flows. The model is calibrated by refining the residential and non-residential unit flow rates, 24-hour diurnal flow patterns, and

non-rainfall period groundwater infiltration (GWI) to match the observed flow volumes and peaks at each metered location.

- Representative results of wet weather days from the flow monitoring period were selected and compared to metered flows. The model is developed and calibrated governing the volume and response pattern of rainfall-dependent infiltration/inflow (RDI/I) into the modeled system.
- The calibrated model was run for future flow scenarios established for the land uses defined in Chapter 3.1 under dry and wet weather conditions. The model included currently planned Capital Improvement Projects (CIP) planned for implementation prior to the 2025 horizon.
- Model outputs of flow rates and hydraulic depths are used to determine if the pipe are deficient under the criteria.

Proposed Land Use	Unit Flow Factor
Residential Flow	
Residential (#units)	192.4 gpd/unit
Non-Residential flow	
Retail (sf)	0.076 gpd/sf
Office/R&D (sf)	0.14 gpd/sf
Hotel (#rooms)	100 gpd/room

Table 3.3.1: Unit Flow Factors

3.3.2 Existing Facility Capacity Criteria

As described in the Sanitary Sewer Master Plan, the existing flow of the sanitary sewer system was calibrated based on flow monitoring data collected in the winter of 2007/2008. Flow monitoring from later years, water use data, and recent development were used to supplement and validate the estimate of existing sanitary sewer flows.

Existing potential capacity deficiencies were identified under dry and wet weather conditions as defined by the City of San José's revised level of service (LOS) criteria. The criteria define a deficient pipe as:

- Modeled flow exceeds 90% of capacity during peak dry weather flow
- Modeled flow exceeds 110% of capacity during peak wet weather flow under a 10-year design storm event and upstream or downstream of the pipe surcharge

Pipes which do not meet the criteria above in the proposed build out scenario are identified by the model.

3.3.3 Conditions Assessment

Currently, the City of San José utilizes asset management software, along with available Closed Circuit Television (CCTV) data and maintenance records, to analyze collected data and determine the risk level and remaining functionality of the City's sanitary sewer system. Sewer pipes are video inspected and the physical condition are rated in accordance with the National Association of Sewer Service Companies' (NASSCO) Pipeline Assessment Certification Program (PACP) standards. Defect data collected through CCTV inspections are used in a decision tree model to determine a program level repair or rehabilitation plan for each pipeline.

Some of the sanitary sewer segments within the Diridon Station Area have CCTV information available however, the majority of the area does not. It is recommended that any proposed repairs/rehabilitation of the sanitary sewer pipes be based on performed CCTV inspection data. As CCTV data become available for the Diridon Station Area, the data should be compiled and analyzed using the City's asset management software. At minimum based on NASSCO standards when data is available all grade 4 and 5 defects found in pipes should be repaired.

The Pipeline Assessment & Certification Program (PACP) uses a numerical grading system to define the severity of pipe defects identified by the severity grades below. Severity grades for structural defects and operations and maintenance defects are assigned based on the risk of further deterioration or failure. The numerical system uses numbers ranging from 1 to 5 with 1 being a minor defect and 5 being a severe defect. The severity ranking considers the immediate defect, risk of failure, and rate of deterioration.

- Severity Grade 5 – Pipe segment has failed or will likely fail within the next five years - requires immediate attention.
- Severity Grade 4 – Pipe segment has severe defects - risk of failure within the next five to ten years.
- Severity Grade 3 – Pipe segment has moderate defects - deterioration may continue, at a ten to twenty year timeframe.
- Severity Grade 2 – Pipe segment has minor defects - pipe unlikely to fail for at least 20 years.
- Severity Grade 1 – Pipe segment has minor defects - failure unlikely in the foreseeable future.

The PACP also uses a Quick Structural Rating system, which is a shorthand method of expressing the number of occurrences for the 2 highest grade levels. The quick grading system uses four numerical characters:

- The first number is the highest severity grade occurring along the entire pipe length.
- The second number is the total number of times that the highest severity grade was noted in all of the defects along the pipe length.
- The third number is the next highest severity grade occurring along the pipe length 4.

- The fourth number is the total number of the second highest severity grade occurrences, which is formatted the same way as the second character.

For example, a code of 3224 would mean that the pipe's worst severity grade for any defect was 3 (moderate defect) and that there were two defects identified with a severity of grade 3, and four grade 2 defects were identified in the pipe segment. This also summarizes that no grade 4 or 5 defects were found. The quick grading system allows the pipe defects to be summarized in an efficient manner.

3.3.4 Design Criteria

The design criteria for proposed sanitary sewer pipes are consistent with the Sanitary Sewer Master Plan and the Development Manual:

- New sanitary sewer pipes shall be designed less than 2/3 full for peak wet weather flows under a 10-year design storm event.
- A Manning's "n" of 0.013 is assumed for all pipes.
- Daily cleaning velocity of at least 2 fps is required for gravity pipes.
- Daily cleaning velocity of at least 3 fps is required for inverted siphons and force mains.
- The minimum inside diameter for sanitary mains is 6 inches.
- Manholes shall be installed at:
    - All changes in direction
    - All changes in pipe size
    - At all intersections of mains
    - 400' maximum spacing
- No public or private storm drain shall be connected to the sanitary sewer system
- Sanitary sewer pipe material shall be VCP unless HDPE or other materials are specified on a case by case basis

FIGURE 3.3.1

0 125 250 500

1 INCH = 500 FEET

36"HDP @ 0.4%
21"VCP @ 0.3%
8"VCP

33"HDP @ 0.5%
21"VCP
8"VCP

33"HDP @ 0.5%
21"VCP

33"HDP @ 0.2%
21"VCP
6"VCP @ 0.5%

21"VCP
6"VCP

36"HDP @ 0.3%
6"VCP

36"HDP @ 0.3%
6"VCP

36"HDP @ 0.3%
6"VCP

24"VCP
8"VCP

24"VCP
8"VCP

24"VCP
8"VCP

24"VCP
8"VCP @ 2%

24"VCP @ 0.2%
8"VCP

21"VCP
6"VCP

21"VCP
6"VCP

21"VCP
6"VCP

21"VCP @ 0.2%
10"VCP

21"VCP @ 0.2%
8"VCP

27"VCP @ 0.2%
6"VCP @ 2%

27"VCP
6"VCP

27"VCP @ 0.2%
8"VCP

36"HDP @ 0.2%

36"HDP @ 0.2%

33"HDP @ 0.1%

36"HDP @ 0.1%
6"VCP

36"HDP @ 0.01%
8"VCP

27"VCP @ 0.1%
8"VCP

30"VCP @ 0.2%

36"CPL @ 0.4%

33"CPL @ 0.3%

33"CPL @ 0.3%

36"RCP @ 0.2%
8"VCP

21"VCP @ 0.2%

24"VCP @ 0.2%

21"VCP @ 0.2%

30"DI @ 0.7%

36"RCP @ 0.3%

24"VCP @ 0.2%
8"VCP

24"RCP @ 0.3%
16"DI
8"VCP

36"VCP

18"VCP
8"VCP

18"VCP

16"VCP
6"VCP

33"CPL @ 0.5%
18"VCP @ 0.2%

42"VCP

48"VCP

33"CPL @ 0.3%
10"VCP @ 0.2%

42"PVC @ 0.2%
8"VCP

RAINIER ST
CLEAVES AVE
S MORRISON AV
N MORRISON AVE
CINNABAR ST
STOCKTON AVE
RHODES CT
SUNOL ST
THE ALAMEDA
JULIAN ST
BUSH ST
W HOME ST
AUZERAIS AVE
PACIFIC AVE
DIRIDON STATION
HIGH SPEED RAIL TERMINAL
PARK AVE
N MONTGOMERY ST
N AUTUMN ST
MONTGOMERY ST
SAN JOSE ARENA
S AUTUMN ST
W ST JOHN ST
GUADALUPE RIVER PARK
PLEASANT ST
E ST JAMES ST
TERRAINE ST
N ALAMEDA BLVD
NOTRE DAME AV
INTERSTATE 280
BIRD AVE
COLUMBIA AV
LORRAINE AV
JOSEFA ST
GIFFORD AV
SONOMA ST
DELMAS AV
WILLIS AV
MINOR AV
SAN CARLOS ST
PARK AVE
GUADALUPE PARKWAY
N SAN FERNANDO ST
E SANTA CLARA ST

SS BACKBONE SANITARY SEWER PIPE

SS SS NON-BACKBONE SANITARY SEWER PIPE

DIRIDON STATION AREA BOUNDARY

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

DIRIDON STATION AREA
BACKBONE SANITARY SEWER EXHIBIT

HMH
1570 Oakland Road
San Jose, CA 95131
(408) 487-2200
HMHca.com

3.4 Storm Drain and Flood Control

The City of San José is in the process of developing a storm drain model that represents the piping system, integrated riverine system, and overland flows throughout the City. The City currently maintains a calibrated trunk line model which includes pipes 24" and greater under existing conditions to assess storm drain needs for the City. Model results of the existing trunk line storm drain system with existing land use conditions and a 10-year design storm were provided by the City of San José's Public Works Department and were used as a basis for capacity analysis. For selected watersheds without modeled trunk line systems, a 10-year design storm was applied to the area using the rational method. Manning's equation was used to calculate conservative pipe sizes using existing slopes. Pipes that are found to have capacity deficiencies are considered for improvements that will meet current standard design guidelines described in The Santa Clara County Drainage Manual and The Development Manual.

As discussed in Chapter 3.2, backbone improvements are those that have broad benefit to large areas of the DSAP or add place-making value, and should be constructed in a comprehensive manner, rather than incrementally with each development. Individual developments will still be obligated to construct frontage improvements, storm drain services and localized storm drain improvements beyond those listed in this study consistent with City policies and as required by conditions of approval.

The criteria below will be applied to backbone storm drain systems. The Diridon Station Area ground generally slopes from west to east toward Guadalupe River at approximately 0.005 ft/ft. The storm drain system includes three pump stations at depressed roadway underpasses and has seven outfalls to the river. Backbone storm drain lines in the Diridon Station Area vary in size from 18 inches to 54 inches in diameter. Backbone line slopes generally follow the ground profile. Backbone facilities within the Diridon Station Area are shown in **Figure 3.4.1**. Other pipes and laterals are assumed to be upgraded if required as a condition of the adjacent development and are not included in this analysis.

The Diridon Station Area is included in the FEMA Flood Insurance Study for Santa Clara County dated February 19, 2014. There are four types of special hazard areas in the area (elevations in NAVD): Zone X, Zone A, Zone AO (1'), and Zone AH (EL 78). The special flood hazard areas are defined in **Table 3.4.1** and shown in **Figure 3.4.2**.

Zone	Definition
A	No Base Flood Elevations determined.
AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
AH	Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
X	Areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. Mandatory flood insurance purchase requirements and floodplain management standards do not apply.

Table 3.4.1: FEMA Special Hazard Area Definitions

3.4.1 Existing Facility Capacity Criteria

Existing potential capacity deficiencies are identified as defined by the City of San José's LOS criteria described below:

- During a 10-year event: hydraulic grade line (HGL) shall reside below street elevation
- During a 100-year event: prevent structure flooding

These criteria may be revised as the City progresses with the storm drain master planning process.

3.4.2 Conditions Assessment

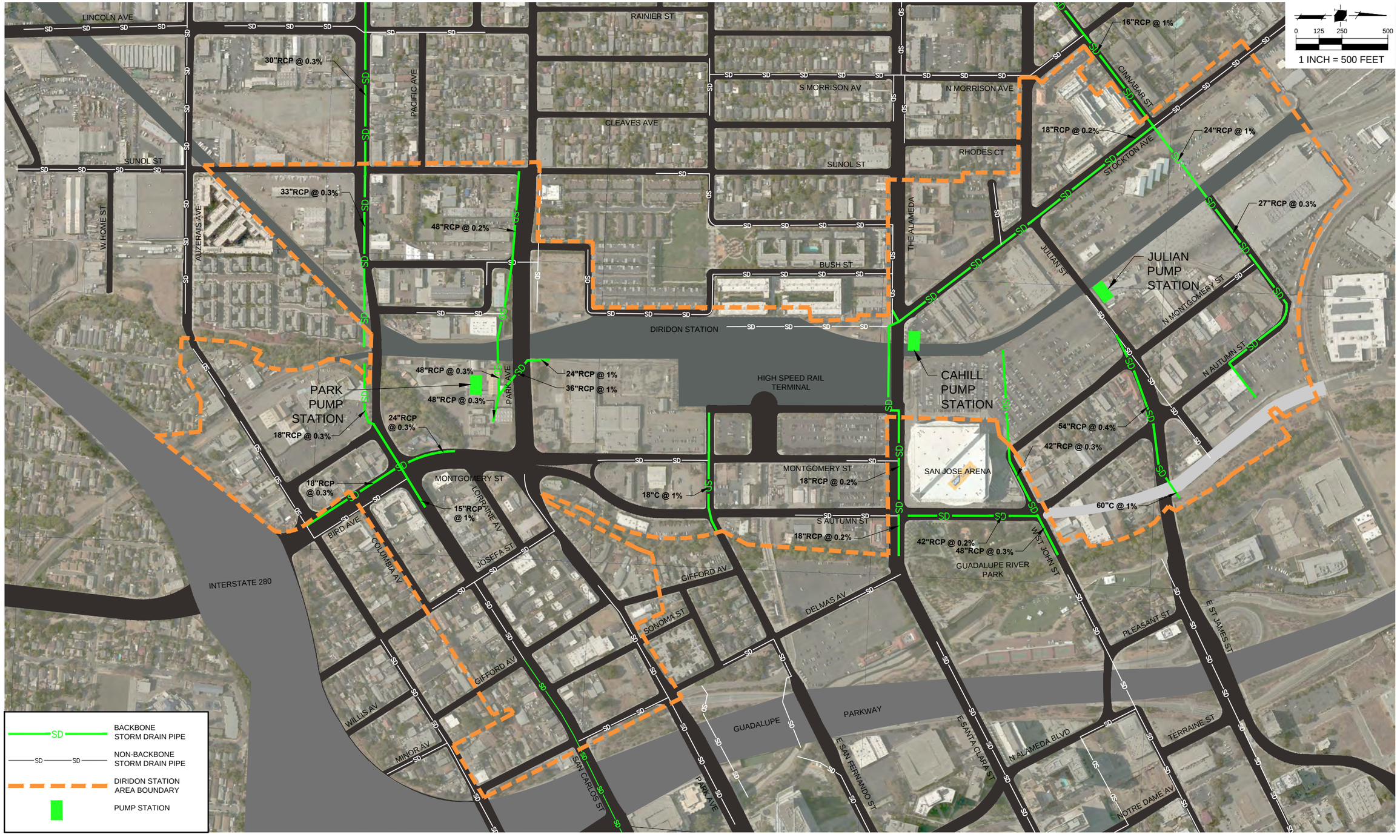
Currently the City of San José does not maintain an on-going storm drain assessment program to identify existing conditions of storm drain pipes. Given the inherent resilience of reinforced concrete pipe, no conditional deficiencies are anticipated or addressed in this analysis.

3.4.3 Design Criteria

The design criteria for proposed storm drain pipes are consistent with the Development Manual:

- The storm drain system shall be designed to convey the 10-year storm event with the HGL below street elevation.
- The minimum inside diameter for storm drain mains is 15 inches.
- The minimum inside diameter for storm drain laterals from inlets is 12 inches. Slopes of these laterals shall be one percent minimum.
- Manholes shall be installed at:
    - All connections of laterals from storm water inlets located in the public right-of-way
    - All changes in type of pipe material
    - All changes in direction
    - All changes in pipe size
    - At all intersections of mains
    - 400' maximum spacing
- Storm drain pipe materials shall be reinforced concrete pipe (RCP) unless alternate materials are specifically approved.
- Outfalls to Los Gatos Creek or Guadalupe River shall be constructed according to Santa Clara Valley Water District (SCVWD) requirements. All work performed within SCVWD Rights of Way are subject to approval and issuance of a permit by SCVWD and may be subject to requirements from additional agencies such as the Regional Water Quality Control Boards, U.S. Army Corps of Engineers, and California Fish and Wildlife.
- Construction within a FEMA special flood hazard area is subject to FEMA requirements which may include locating the lowest floor elevation of structures above the base flood elevation or flood proofing the structure.

FIGURE 3.4.1



DIRIDON STATION AREA

BACKBONE STORM DRAIN EXHIBIT

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

HMH
1570 Oakland Road
San Jose, CA 95131
(408) 487-2200
HMHca.com

[This Page Intentionally Left Blank]

FIGURE 3.4.2

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 10. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the USDA National Agriculture Imagery Program (NAIP). This information was photogrammetrically compiled at a scale of 1:24,000 from aerial photography dated 2005.

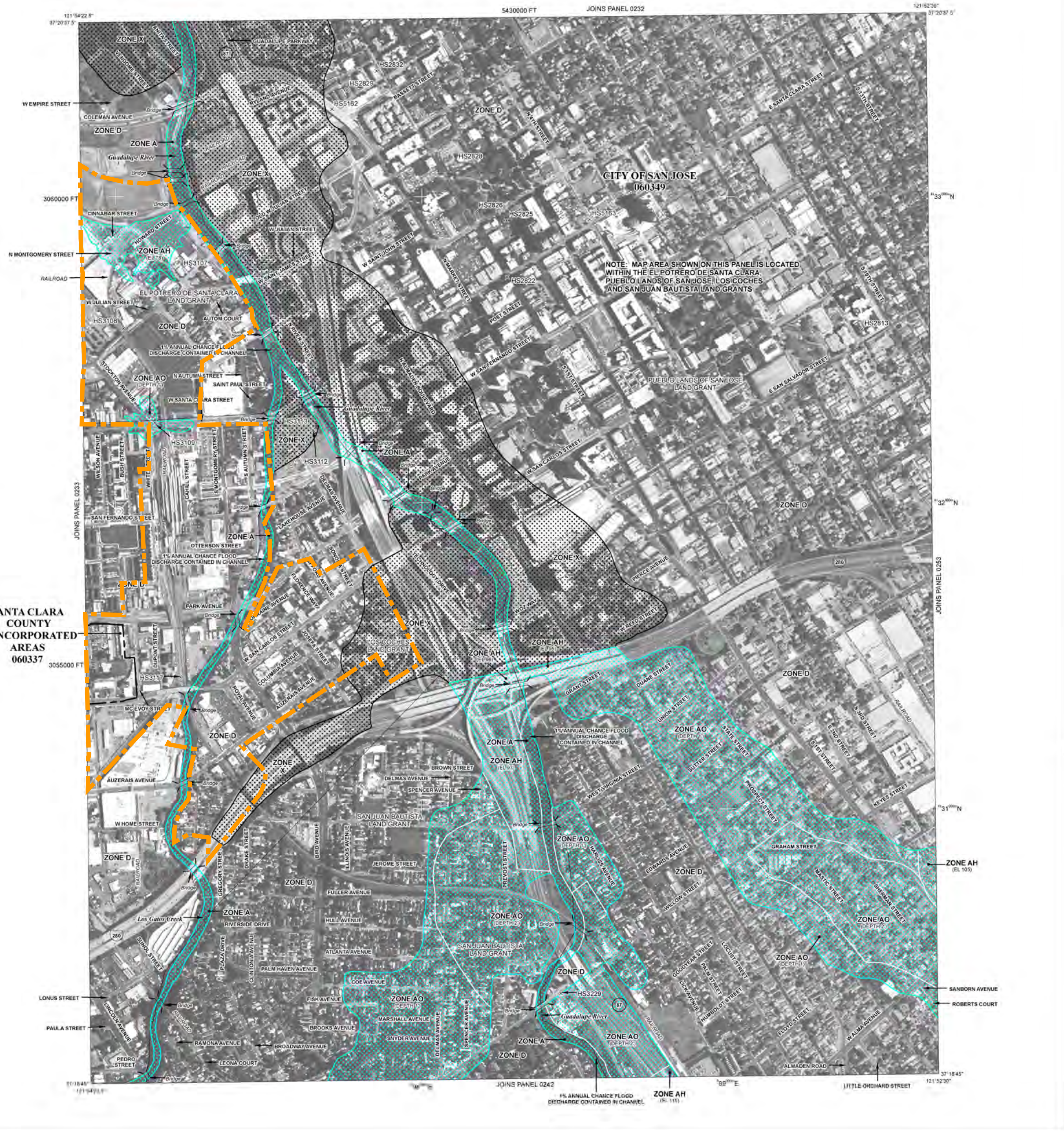
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A)———(A)	Cross section line
(23)- - - - -(23)	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
76 N	1000-meter Universal Transverse Mercator grid values, zone 10N
600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone III (FIPSZONE 0403), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
May 18, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0234H

FIRM

FLOOD INSURANCE RATE MAP

SANTA CLARA COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 234 OF 830

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN JOSE, CITY OF	060349	0234	H
SANTA CLARA COUNTY	060337	0234	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06085C0234H

EFFECTIVE DATE
MAY 18, 2009

Federal Emergency Management Agency

3.5 Potable Water

The potable water system in the Diridon Station Area is owned and maintained by the San José Water Company (SJWC) an investor-owned private company regulated by the California Public Utilities Commission (CPUC). SJWC operates a model that is used to identify flow and pressure conditions within the system. Pipes that are found to be deficient are subject to improvements that will meet current standard design guidelines prescribed in the SJWC Specifications and Standard Drawings along with State drinking water regulations.

As discussed in Chapter 3.2, backbone improvements are those that have broad benefit to large areas of the DSAP or add place-making value, and should be constructed in a comprehensive manner, rather than incrementally with each development. Individual developments will still be obligated to construct frontage improvements, potable water services and localized potable water improvements beyond those listed in this study consistent with City policies and as required by conditions of approval.

The criteria below will be applied to backbone water pipes which carry potable water through the Diridon Station Area. The Diridon Station Area has a network of water mains ranging in size from 6 inches to 16 inches in diameter. The static water pressures in the area range from 45 to 65 pounds per square inch (psi). Backbone facilities within the Diridon Station Area are shown in **Figure 3.5.1**.

3.5.1 Existing Facility Capacity

The SJWC owns and maintains a potable water model that is used to identify capacity and pressure issues and size needed improvements. Capacity deficiencies are identified when the pressure at any point in the system falls below 20 pounds per square inch (psi) either during an anticipated fire flow or during maximum daily demand. San José Water Company reports that based upon modeling for existing land use in the Diridon Station Area, there are no capacity issues or improvements planned.

3.5.2 Conditions Assessment

The SJWC keeps records of water main installation dates which are used, along with fire flow tests completed to calibrate the water model, to determine the condition of pipelines. San José Water Company reports that there are currently no identified condition-related improvements required in the Diridon Station Area. SJWC operates a program to replace deteriorated pipes through user rate fees and should not be included in this analysis.

3.5.3 Design Criteria

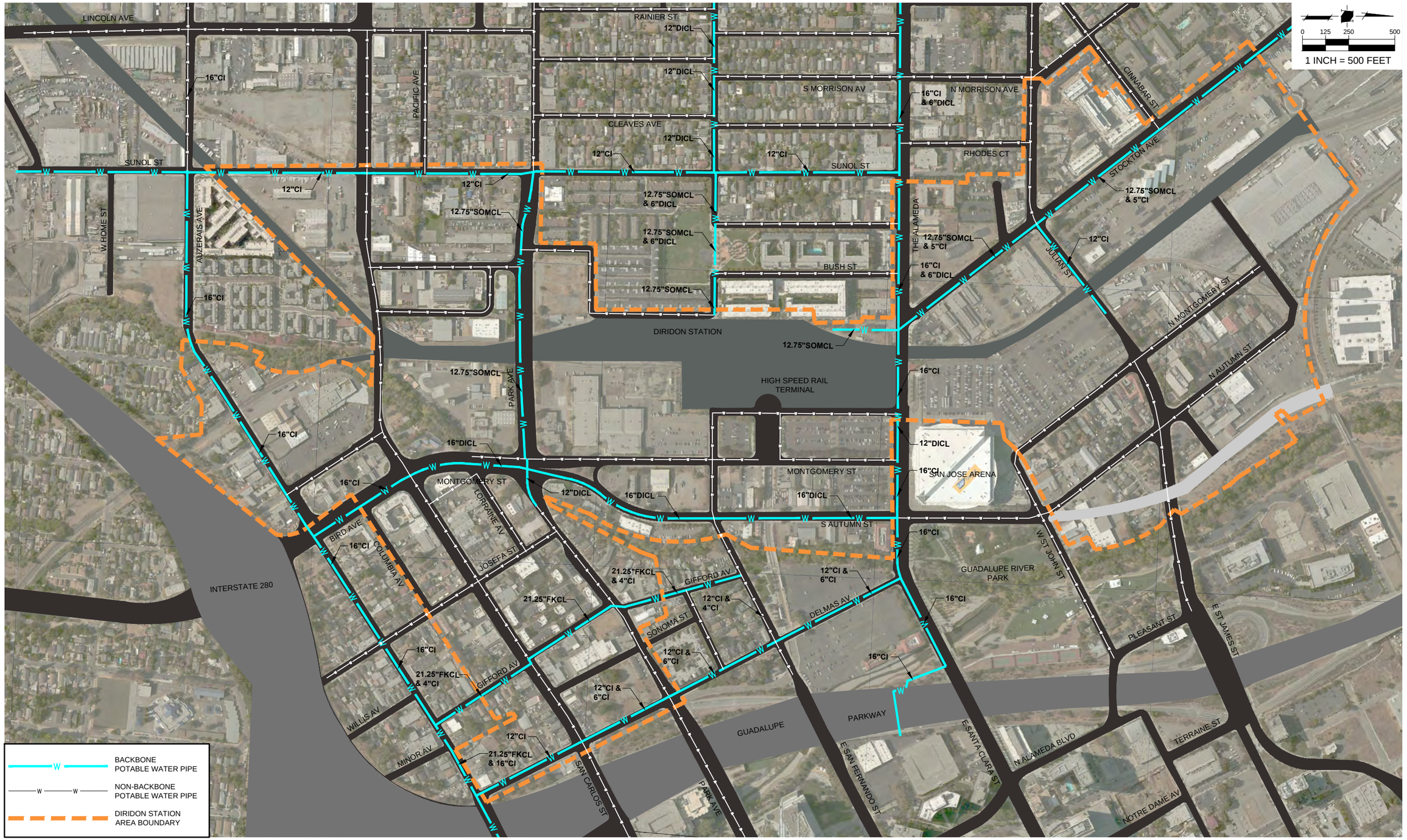
The design criteria for proposed potable water facilities are consistent with the San José Water Company Standard Plans and Specifications and the State Water Resources Control Board:

- Pipe separation between water mains and wastewater or secondary treated recycled water piping shall be in accordance with the latest Department of

Drinking Water Waterworks Standards and the California Public Utilities Commission General Order No. 103A.

- Required fire flow for new construction shall be determined by the City of San José Fire Department, but 4,500 gpm is used for the purposes of this study.
- Potable water main pipe shall be ductile iron or steel unless prior approval from SJWC has been received.

FIGURE 3.5.1



DIRIDON STATION AREA
BACKBONE POTABLE WATER EXHIBIT

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

HMH
1570 Oakland Road
San Jose, CA 95131
(408) 487-2200
HMHca.com

3.6 Recycled Water

The City of San José administers the South Bay Water Recycling (SBWR) Program, a long-term program for the cities of Milpitas, San José, and Santa Clara created to bring reliable, sustainable, and drought-proof supply of non-potable water to the South Bay Area.

Waste water from the sanitary sewer system that travels to the San José-Santa Clara Regional Wastewater Facility is treated to tertiary levels and distributed to the SBWR system. The finished product is certified by the State Department of Health Services and suitable for non-potable water uses including irrigation, industrial purposes, and others.

The Diridon Station Area is not serviced by the recycled water system and there are currently no improvements programmed to extend the system to the area. Recycled water can be used to irrigate food crops, parks, schools, golf courses, street medians, and commercial property landscaping. Extending the recycled water system to serve the Diridon Station Area would benefit potable water conservation and will provide a drought-proof water supply. Extension of the recycled water system is consistent with 2040 GP, the Diridon Station Area Plan Integrated Final Program EIR, and the goal to create sustainable development in the Diridon Station Area.

The Diridon Station Area is located in the San José Water Company (SJWC) service area. The closest recycled water main serves Columbus Park and portions of Guadalupe River Park and has been extended in Autumn Parkway south of Coleman Avenue to the UPRR tracks.

3.6.1 Design Criteria

The design criteria for proposed recycled water facilities are consistent with the San José Water Company, South Bay Water Recycling, and the State Water Resources Control Board:

- No cross-connections are allowed between the recycled water system and any other water system.
- Pipe separation between recycled water, potable water, and wastewater piping shall be in accordance with the latest State Department of Drinking Water Waterworks Standards and the California Public Utilities Commission General Order No. 103A.
- The use of purple colored pipe with continuous wording “RECYCLED WATER – DO NOT DRINK” printed on opposite sides of the pipe is the preferred method for identification of new buried recycled water piping.
- California State Water Resources Control Board, Department of Drinking Water approved uses include, but are not limited to:
    - Landscape irrigation
    - Agricultural irrigation
    - Construction water
    - Water for industrial purposes
    - Impoundments (fountains)
    - Indoor toilet and urinal flushing
    - Commercial laundries

    - Commercial car washes
- Developers may be required, as conditions of approval, to construct recycled water main extensions and laterals in order to connect to backbone recycled water systems proposed in this study.

3.7 Electric, Gas, and Telephone

The Diridon Station Area is served by many private utility companies. In general, it will be the obligation of the private utility company to provide adequate service for any planned developments. This analysis will identify major facilities within the area which may require more substantial planning and implementation than a conventional development.

In some portions of the Diridon Station Area, electrical and telecommunications facilities occupy overhead poles, it is assumed that these relocations will be undergrounded through a Rule 20B process which requires the developer to fund and coordinate the undergrounding process.

4.0 EXISTING CONDITIONS

4.1 Streets

4.1.1 Data Collection

Existing road and street information was collected from a variety of sources including City of San José record and as-built drawings and pavement condition indices.

4.1.2 Existing Facilities

The transportation system in the Diridon Station Area contains six streets which are defined as backbone streets in this analysis.

In conjunction with the DSAP, a traffic impact analysis was performed in 2011 to evaluate existing and forecast traffic conditions. The results of the level of service analysis under existing conditions indicate that all of the study intersections within the Diridon Station Area operate at an acceptable level of service (LOS D or better for local intersections, and LOS E or better for Congestion Management Plan intersections).

The traffic impact analysis also addressed traffic volumes and levels of service for freeway segments surrounding the DSAP. Nearly all peak direction freeway segments in the downtown area are currently operating under poor traffic conditions. The peak directions of travel are northbound during the AM peak hour and southbound during the PM peak hour. Poor levels of service on the downtown freeway segments are primarily attributable to traffic moving through the downtown area bound for destinations to the north or south. This traffic pattern is evident from intersection level of service calculations. Though the freeway segments are operating poorly, intersections generally operate at acceptable levels.

Some of the existing streets contain favorable multi-modal transportation features including bike racks, enhanced bike lanes, wide sidewalks, landscape strips and medians. **Table 4.1.1** describes various transportation features on existing backbone streets.

Numerous agencies and railroad companies own various aspects of the public right-of-way. As public infrastructure is built out in the Diridon Station Area, careful attention should be paid to the entities which own these facilities.

Street	Lane Configuration		Bike Lanes		Sidewalks		On-Street Parking	
	NB	SB	NB	SB	NB	SB	NB	SB
N Autumn St*	1	1	-	-	10’	8’	YES	YES
S Autumn St*	3	-	-	-	10’	10’	YES	-
Montgomery St	3	3	-	-	10’	10’	YES	YES
Bird Ave	3	3	-	-	-	-	-	
Street	**Lane Configuration**		**Bike Lanes**		**Sidewalks**		**On-Street Parking**	
	EB	WB	EB	WB	EB	WB	EB	WB
W Julian St**	1	1	6’	10’	10’	6’	YES	YES
E Julian St**	2	2	-	8’	8’	-	-	YES
San Fernando St	1	1	5’	6’	8’	5’	-	-
W Park Ave***	2	2	6’	8’	8’	6’	-	-
E Park Ave***	1	1	-	8’	8’	-	YES	YES
San Carlos St	2	2	-	8’	8’	-	YES	YES

* Autumn St bisected into North and South at the intersection of Santa Clara St

** Julian St bisected into East and West at the intersection of Autumn St

*** Park Ave bisected into East and West at the intersection of Montgomery St

Table 4.1.1: Existing Features – Backbone Streets

Existing street conditions of the Diridon Station Area are described by the PCI exhibit found in Chapter 3.2 and range from Excellent to Fair condition. **Table 4.1.2** summarizes the condition of existing backbone streets.

Street	PCI Status
Autumn St (St John St to Santa Clara St)	Excellent
Autumn St (Santa Clara St to Park Ave)	Fair
Montgomery St	Fair
Bird Ave	-
Julian St (Morrison Ave to Stockton Ave)	Excellent
Julian St (Morrison Ave to Montgomery St)	Good
Julian St (Montgomery St to Guadalupe River Park)	Good/Fair
The Alameda	Excellent
Santa Clara St	Excellent
San Fernando St	Excellent
Park Ave (McEvoy St to Autumn St)	Fair
Park Ave (Autumn St to Delmas Ave)	Excellent
San Carlos St (Sunol St to McEvoy St)	Poor/At Risk
San Carlos St (McEvoy St to Autumn St)	Fair
San Carlos St (Autumn St to Delmas Ave)	Excellent

Table 4.1.2: PCI Statuses – Backbone Streets

4.1.3 Other Off-Site Transportation Projects

There are a number of planned transportation improvements around Downtown San José that will affect the Diridon Station Area.

- **Coleman Avenue/Autumn Street Improvement Project**
  The Downtown Strategy 2000 EIR identified the extension of Autumn Street and widening of Coleman Avenue as mitigation for traffic impacts related to Downtown San José development. The project includes widening Coleman Avenue to six lanes between Hedding Street and Autumn Street and the extension, widening, and partial realignment of Autumn Street from Coleman Avenue to the north and Park Avenue to the south. Construction of the first phase of this project, the extension of Autumn Street from Coleman Avenue to the UPRR was completed in 2013.

- **Park Avenue Narrowing**
  The proposed ballpark project analyzed the narrowing of Park Avenue from four to two lanes between Sunol Street and the future Autumn Parkway. The City is developing the Park Avenue Multi-Modal Improvement Project, which includes the streetscape improvements along Park Avenue from Sunol Street to Montgomery Street. The project includes the addition of bike lanes and pedestrian amenities (such as sidewalk improvements, directional signage, lighting, landscaping, and street trees), improvements to vehicular movements, and reconstruction of the Park Avenue/Sunol Street intersection.

- **San Carlos Rail Overhead Structure Replacement**
  The San Carlos Street overhead structure over the UPRR rail tracks is outdated and has inadequate sight distance over the crest of the structure. It is expected to constrain future High-Speed Rail and other rail improvements. For these reasons, replacements of the structure will probably be needed in conjunction with High-Speed Rail.

- **The Alameda: A Plan for The Beautiful Way**
  The City received a Metropolitan Transportation Commission (MTC) grant for improvements to The Alameda consistent with the "Beautiful Way" Plan prepared in April 2010. The plan is related to the larger "Grand Boulevard Initiative" along the entire stretch of the El Camino Real in the Bay Area. Improvements include landscape median islands, signal modifications, enhanced crosswalks with median refuges, corner or sidewalk bulb-outs, and bus stop enhancements.

4.1.4 Parks and Plazas

Current land uses and development do not support the DSAP's goal to enhance and expand recreational opportunities. The neighborhoods within the Diridon Station Area are underserved with a need for a planned open space network. The Diridon Station Area has a lack of ample-sized gathering places that promote health and wellness for current and future residents.

4.2 Sanitary Sewer

The City of San José owns and operates over 2,000 miles of sanitary sewer pipeline from 6 inches to 90 inches in diameter. The sewer system serves residents and businesses within the City, and also conveys flows from the West Valley Sanitation District, portions of Cupertino Sanitary District, Burbank and County Sanitation District 2 and 3, and portions of the City of Santa Clara.

4.2.1 Data Collection

The City evaluated the existing sanitary sewer network in the Diridon Station Area using their comprehensive in-house hydraulic modeling system. The modeling system uses a systematic process that incorporates population estimates, land use assumptions, water use, and flow monitoring data.

The model analyzed the system under three different planning scenarios: existing, near-term, and long term. The City further analyzed the system under dry and wet weather conditions for all three planning scenarios. For wet weather conditions, a 10-year recurrence frequency design storm was used as the basis for estimating peak wet weather flows. The results of this analysis can be found in the appendix.

4.2.2 Existing Facilities

Over 450 sanitary sewer pipe segments (from manhole to manhole) exist within the Diridon Station Area which range in size from 6 inches to 42 inches in diameter. These systems generally flow south to north and cross Los Gatos and Coyote Creeks through a network of parallel inverted siphons.

4.2.3 Operational Deficiencies

The model outputs indicate that the existing sanitary sewer system in the Diridon Station Area is generally adequate for the existing land use upstream sanitary sewer sheds.

The models of existing conditions identified a single backbone line which was operating in excess of the existing capacity criteria defined in Chapter 3.3. The 36-inch RCP segment runs along St. John Street, 300 feet West of Pleasant Street.

4.2.4 Conditions Assessment

The effect of age on the sewer pipes is expected to deteriorate the condition and performance of the system. Within the Diridon Station Area, there are several line segments which exceed the conditions criteria for CCTV Quick Structural Ratings defined in Chapter 3.3 and are listed in **Table 4.2.1.**

Pipe Segment ID	Pipe Location	Pipe Size	Pipe Material	Pipe Length	Quick Structural Rating
Backbone Facilities					
15605	W Julian St	8”	VCP	351’	4331
15987	W Julian St	8”	VCP	304’	4121
Non-Backbone Facilities					
15461	Park Ave	8”	VCP	407’	4221
15467	W San Fernando St	8”	VCP	349’	5141
15989	N Montgomery St	6”	VCP	308’	4539
15990	N Montgomery St	6”	VCP	311’	4132
16003	W San Fernando St	10”	VCP	103’	5132
16029	W Old Julian St	8”	VCP	159’	4233
28164	S Montgomery St	8”	VCP	153’	4135
28253	Cahill St	10”	VCP	48’	4332
28254	W San Fernando St	10”	VCP	239’	4238
28259	S Montgomery St	8”	VCP	379’	4134
28260	S Montgomery St	6”	VCP	295’	4124
28290	McEvoy St	6”	VCP	390’	4112
28291	McEvoy St	6”	VCP	376’	4232
28293	Dupont St	6”	VCP	432’	5142
28340	Sonoma St	8”	VCP	342’	5121
28346	Sonoma St	8”	VCP	280’	4121
28344	Park Ave	8”	VCP	240’	5222
28353	Columbia Ave	8”	VCP	341’	4234
28356	Bird Ave	8”	VCP	304’	5241
28357	Royal Ave	8”	VCP	290’	5131
28401	Royal Ave	8”	VCP	188’	4139

28359	Auzerais Ave	8”	VCP	143’	4331
28360	Auzerais Ave	8”	VCP	162’	4132
28362	Auzerais Ave	6”	VCP	183’	4431
28366	Auzerais Ave	10”	VCP	293’	5141
28370	Joséfa St	8”	VCP	291’	4433
28402	Drake St	8”	VCP	272’	5231
28412	Hannah Ct	6”	VCP	224’	4100
28745	N Montgomery St	8”	VCP	433’	4131
28746	N Autumn St	8”	VCP	189’	4132
38908	W San Carlos St	6”	VCP	106’	4121
28914	Delmas Ave	10”	VCP	151’	4234
28917	Delmas Ave	8”	VCP	254’	4131
28918	N Almaden Blvd	8”	VCP	209’	5442
28968	Delmas Ave	8”	VCP	336’	4235
29108	Sunol St	6”	VCP	314’	4122
29114	Dupont St	8”	VCP	322’	4336
29224	Sunol St	8”	VCP	289’	5131
29225	Sunol St	8”	VCP	284’	5141
29230	Sunol St	8”	VCP	238’	5242
29231	Sunol St	8”	VCP	474’	5123
29359	S Montgomery St	8”	VCP	184’	5131
29418	Sunol St	8”	VCP	348’	5132
29429	Sunol St	8”	VCP	322’	4331
29546	The Alameda	6”	VCP	61’	4133
29587	Cinnabar Ave	6”	VCP	158’	5141
29718	Gregory St	6”	VCP	316’	4124
29726	Lorraine Ave	8”	VCP	262’	4133
29730	S Montgomery St	6”	VCP	218’	5121
29731	W San Fernando St	8”	VCP	225’	4323
29734	Delmas Ave	10”	VCP	186’	4333
42098	N Autumn St	6”	VCP	187’	5143
42103	N Autumn St	8”	VCP	187’	4336
42105	N Montgomery St	6”	VCP	144’	5141
42107	N Montgomery St	6”	VCP	289’	5121
53439	W San Carlos St	8”	VCP	72’	4100
80746	Bird Ave	8”	VCP	127’	4132
81706	W Old Julian St	8”	VCP	153’	4132
82225	W San Carlos St	8”	VCP	21’	4100
84008	Stockton Ave	6”	VCP	349’	5142
84011	Stockton Ave	6”	VCP	185’	4333

Table 4.2.1: Conditionally Deficient Sanitary Sewer Pipe Segments

4.3 Storm Drain and Flood Control

The storm drain system in the Diridon Station Area is owned and maintained by the City of San José. The system in the area drains to Los Gatos Creek and Guadalupe River which are under the jurisdiction of the Santa Clara Valley Water District (SCVWD). Los Gatos Creek is part of the Guadalupe River watershed with its confluence located in the Diridon Station Area north of Santa Clara Street.

Los Gatos Creek and Guadalupe River have 100-year discharge contained in a channel through the Diridon Station Area. SCVWD does not currently have any improvements planned that will impact water surface elevations in the area.

4.3.1 Existing Facilities

The Diridon Station Area is relatively flat with gradual slopes to the east toward Los Gatos Creek and Guadalupe River. It is served by 3.5 miles of backbone storm drain pipe 18 inch in diameter and larger. There are 7 total backbone outfalls to receiving waters, with 2 outfalls to Los Gatos Creek and 5 outfalls to Guadalupe River. There are 3 pump stations which drain the railway underpass at Julian Street, Santa Clara Street, and Park Avenue.

4.3.2 Operational Deficiencies

Though the storm drain model is still in development, preliminary results indicate that improvements are required in the Diridon Station Area in order to eliminate flooding within and to the west of the Diridon Station Area during a 10-year, 24-hour storm with the existing land use. The trunk line storm drain system in the Diridon Station Area conveys water generated in the larger watershed outside the area to Los Gatos Creek and the Guadalupe River. Improvements to mitigate flooding in the larger watershed may trigger the need to upsize trunk lines.

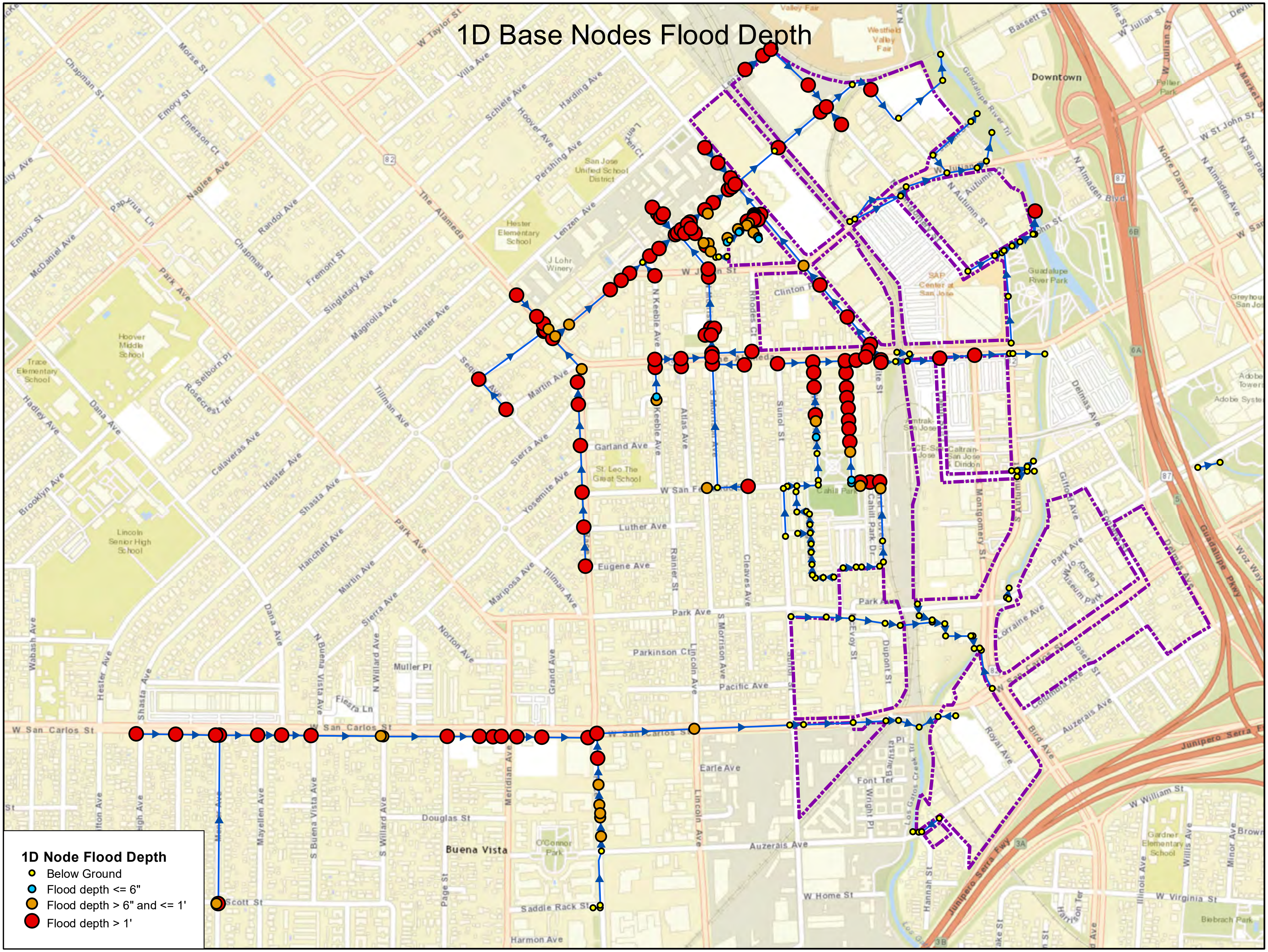
Areas within the Diridon Station Area that experience flooding during the 10-year 24-hour storm with existing land use include Stockton Avenue between Santa Clara Street and Lenzen Avenue, the intersection of Montgomery Street and Cinnabar Street, and along Santa Clara Street between Cahill Street and Autumn Street. Existing modeled flood locations are identified in **Figure 4.3.1**.

Localized flooding over one foot was recorded on San Carlos Street from Leigh Avenue to Race Street. This flooding is caused by insufficiently sized pipes downstream. Improvements to the downstream pipes will alleviate the flooding.

4.3.3 Conditions Assessment

The backbone facilities in the Diridon Station Area are predominantly reinforced concrete pipe (RCP). Although a condition assessment is not currently available, RCP is generally durable and no condition related improvements have been identified or are anticipated.

FIGURE 4.3.1


1D Base Nodes Flood Depth
1D Node Flood Depth
Below Ground
Flood depth <= 6"
Flood depth > 6" and <= 1'
Flood depth > 1'

4.4 Potable Water

The potable water system in the Diridon Station Area is owned and maintained by the San José Water Company (SJWC). SJWC is an investor owned public utility that was founded in 1866 and serves over one million people in the greater San José metropolitan area.

4.4.1 Existing Facilities

SJWC provides water from three major sources: groundwater, imported surface water, and local mountain surface water. Groundwater is pumped from over 100 wells that draw water from local aquifers that constitute the Santa Clara Groundwater Basin. Imported surface water is imported from the Sacramento-San Joaquin Delta and is purchased from the Santa Clara Valley Water District. Local mountain water is collected in the SJWC watershed in the Santa Cruz Mountains and is treated at SJWC's two water treatment plants. Groundwater accounts for 40%, imported surface water accounts for 50%, and local mountain surface water accounts for 10% of SJWC's supply.

The predominant source of water in the Diridon Station Area is groundwater; however, because sources are often blended together in the distribution system, the area may receive different sources as customer usage changes.

4.4.2 Operational Deficiencies

The distribution system in the Diridon Station Area includes water mains ranging in diameter from 4 inches to 21.25 inches. The static water pressure in the area averages between 45 to 65 pounds per square inch (psi), and under existing development conditions, the system has capacity to deliver water at a residual pressure of 20 psi during maximum-day demand coincident with a fire flow in the Diridon Station Area. Groundwater wells have recently been constructed in the surrounding area which augments the water pressure during high demand.

4.4.3 Conditions Assessment

Pipe materials in the Diridon Station Area include cast iron (CI), ductile iron cement lined (DICL), somastic coated cement lined (SOMCL), and fiberglass-kraft wrapped cement lined (FKCL). Installation dates range from 1886 to recent years. There are no identified condition deficiencies in the area, but SJWC is systematically replacing the oldest pipes and FKCL pipes.

4.5 Recycled Water

South Bay Water Recycling Program (SBWR), administered by the City of San José, has provided recycled water to Silicon Valley communities since 1997. SBWR delivered an average of 12.2 million gallons a day to its customers in 2015 with plans to double that amount over the next decade. SBWR is a wholesaler to the San José Water Company (SJWC) and distributes recycled water to its customers as the local water purveyor in the Diridon Station Area.

4.5.1 Existing Facilities

Recycled water is currently not available in the Diridon Station Area. The nearest pipe is located in Autumn Street on the north side of the UPRR tracks. A connection to this pipe will require a permit under UPRR and construction under the railroad tracks by bore and jack methods.

4.6 Electric, Gas, and Telephone

4.6.1 Data Collection

The project team requested an Underground Service Alert (USA) ticket to identify any and all utilities within the Study Area. The ticket revealed that the private utilities listed below operate private facilities within the Diridon Station Area.

- PG&E
- AT&T
- Comcast
- Verizon
- Level 3
- Sprint
- XO Communications

Utility companies were sent formal notice of the study and most provided existing record drawings of their facilities.

4.6.2 Existing Facilities

The data collection task identified a number of utility types and owners within the project area. Consistent with the Land Use defined in Chapter 3, the project anticipates needs for distribution of gas, electric and telecommunication services to the new developments. No high-capacity joint trench facilities are anticipated as a future need of the project.

The Diridon Station Area's joint trench network contains both overhead and underground facilities. A majority of the backbone streets currently operate with underground telecommunications and distribution electric facilities. Overhead wires are present on the backbone streets of W Julian Street, W San Fernando Street, and E Park Avenue.

PG&E operates a 6,000 square foot electrical substation north of Park Avenue and east of the existing Caltrain alignment. Overhead transmission lines extend north and south away from the site. A series of transmission towers extends south from the substation along the east side of the Caltrain tracks towards Willow Glen and another line runs easterly along W San Fernando Street and then northerly along the bank of the Los Gatos Creek.

In 2006, the City of San Jose's Redevelopment Agency (RDA) worked with PG&E to study opportunities and estimate cost of potential relocation or modifications to the

facility. The study evaluated two alternatives, Option A proposed to relocate the substation approximately 1000 feet south to the Fire Station Training site south of Park Avenue while Option B proposed to rearrange the existing site utilizing an additional 0.3 acre site immediately north of the facility. The study concluded that Options A and B would cost approximately $31 million and $22 million, respectively. Due to the premise of this exercise, the study did not include additional cost of right-of-way acquisition and was estimated based in 2006 dollars. Adjusting for right-of-way acquisition, inflation and other economic influences, the City has used preliminary costs of $50 million or more (2017) for planning purposes.

[This Page Intentionally Left Blank]

5.0 POTENTIAL IMPROVEMENTS

5.1 Streets

Through field reviews and consideration of the City's Pavement Condition Index (PCI), the current conditions for the Diridon Station Area's backbone streets were assessed. This section describes types of improvements recommended to pavement, median, curb and gutter, and sidewalks. The following improvements were based on the assumptions that the City of San José will not be improving these streets within the next ten years and new right-of-way will not be acquired for existing streets. Proposed street improvements generally maintain curb alignments and roadway widths; however limited right-of-way and transportation goals for pedestrians and bicyclists can prompt a change in curb alignment.

The City's PCI is used to determine the type of pavement improvements that should be implemented through the backbone streets in the area. Streets with that have a PCI rating of Excellent (80-100) or Good (70-79) are proposed to be improved with an asphalt concrete overlay if improvements are proposed for the curb and sidewalk. Streets that have a PCI status of Fair (60-69) or lower are recommended for full depth pavement reconstruction. **Table 5.1.1** describes the proposed road treatments for backbone streets based on the PCI.

To ensure a complete, balanced, multi-modal transportation network, as described in the 2040 General Plan, the DSAP proposes street typologies that serve as an expansion of functional classifications that consider street context and prioritize certain travel modes. This infrastructure analysis further develops these typologies to break down the potential widths and design elements of lanes, medians, and sidewalks for backbone streets in the DSA. These street cross-sections are consistent with the City of San José's Draft 2016 Complete Streets Design Guidelines and are identified and illustrated in Chapter 5.1.1.

As a part of the City's Capital Improvement Program, Autumn Street and Montgomery Street are proposed to be improved with an overlay in 2017/2018. Improvements to the streets proposed by this analysis are based on the City's Autumn Parkway Extension Project, DSAP street typologies, and Draft Complete Streets Design Guidelines.

Street Segment	Cross Section	Road Treatment
Julian St – Morrison St to Stockton St	Local Connector Street	No Road Treatment
Julian St – 135' East of Stockton St and 195' West of Montgomery St	Local Connector Street	Full Depth Reconstruction
Julian St – Stockton St to Montgomery St (Undercrossing portion only)	Local Connector Street	No Road Treatment
Julian St – Montgomery St to Guadalupe River Park	City Connector Street	Overlay North Side Full Depth Reconstruction South Side
The Alameda – Sunol St to Stockton St	Grand Boulevard - Transit	No Road Treatment
Santa Clara St – Stockton St to Delmas Ave	Grand Boulevard - Transit	No Road Treatment
San Fernando St – Diridon Station to Autumn St	On-Street Primary Bicycle Facility	No Road Treatment
Park Ave – Sunol St to Autumn St	On-Street Primary Bicycle Facility	Full Depth Reconstruction South Side (40') Roadway Excavation North Side (80')
Park Ave – Joséfa St to Gifford St	On-Street Primary Bicycle Facility	Overlay
Park Ave – Gifford St to Delmas Ave	Main Street	Overlay
San Carlos St – Sunol St to Bird Ave	Grand Boulevard - Transit	Full Depth Reconstruction
San Carlos St – Bird Ave to Delmas Ave	Grand Boulevard - Transit	Overlay
Autumn St – Julian St to St John St	City Connector Street	New Construction
Autumn St – St John St to Santa Clara St	City Connector Street	No Road Treatment
Autumn St – Santa Clara St to San Fernando St	City Connector Street	Full Depth Reconstruction West Side
Autumn St – San Fernando St to Park Ave	City Connector Street	Full Depth Reconstruction West Side
Montgomery St – Park Ave to San Carlos St	City Connector Street	No Road Treatment
Bird Ave – San Carlos St to I-280	City Connector Street	Overlay

Table 5.1.1: Backbone Streets – Proposed Road Improvements

5.1.1 Street Cross Sections

- **Grand Boulevard – Transit**

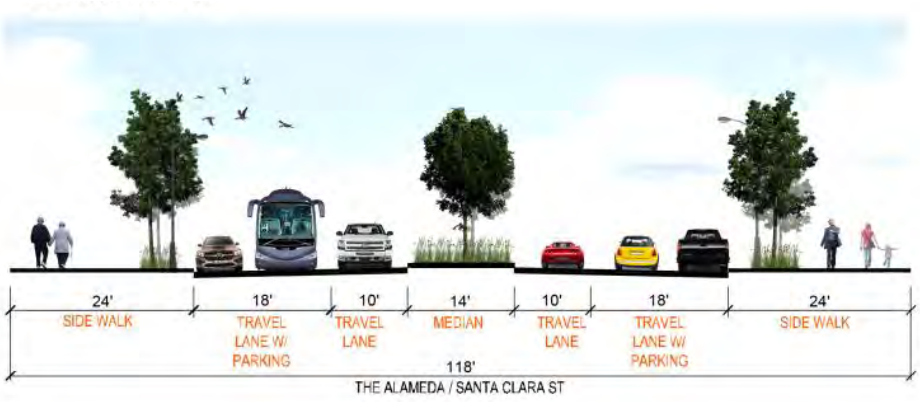


Figure 5.1.2: Grand Boulevard – Transit

Figure 5.1.2 above cross section depicts the current dimensions and transportation features of The Alameda. The recent improvements to this area are consistent with the City's goals, plans, and design guidelines. Proposed improvements to this cross section are not recommended in this analysis.

Figure 5.1.3: Grand Boulevard – Transit

Curb and sidewalk improvements and bicycle facilities are proposed for San Carlos Street on both the east and west sides and on the San Carlos Street Overhead Structure shown in **Figure 5.1.3** above.

- **On-Street Primary Bicycle Facility**

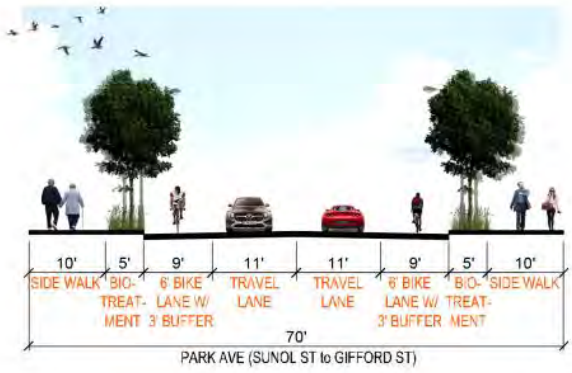


Figure 5.1.4: On-Street Primary Bicycle Facility

The above also depicts the proposed cross section for Park Avenue from Sunol Street to Gifford Street. The current 130 foot right-of-way will be narrowed to a two-lane facility to allow for relinquishment of existing right-of-way to adjoining developments.

Narrowed street, sidewalk improvements, median improvements, bicycle facilities, and landscaping are proposed for this cross section shown in **Figure 5.1.4** above.

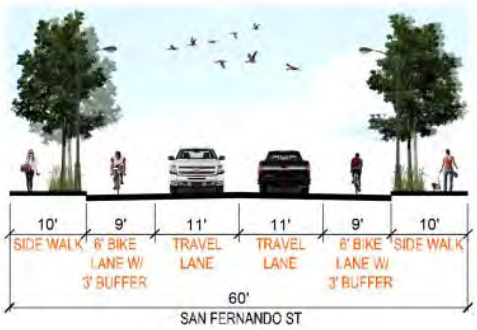


Figure 5.1.5: On-Street Primary Bicycle Facility

Figure 5.1.5 above depicts the current dimensions and transportation features of San Fernando Street from the Diridon Station to Autumn Street. The recent improvements to this area are consistent with the City's goals, plans, and design guidelines. Proposed improvements to San Fernando Street are not recommended in this analysis.

- **Main Street**

Figure 5.1.6: Main Street

Curb and sidewalk improvements are proposed for Park Avenue from Gifford Street to Delmas Avenue shown in **Figure 5.1.6** above.

- **City Connector Street**

Figure 5.1.7: City Connector Street

Sidewalk improvements, median improvements, and bicycle facilities are proposed for Bird Avenue and Montgomery Street from I-280 to Park Avenue shown in **Figure 5.1.7** above.

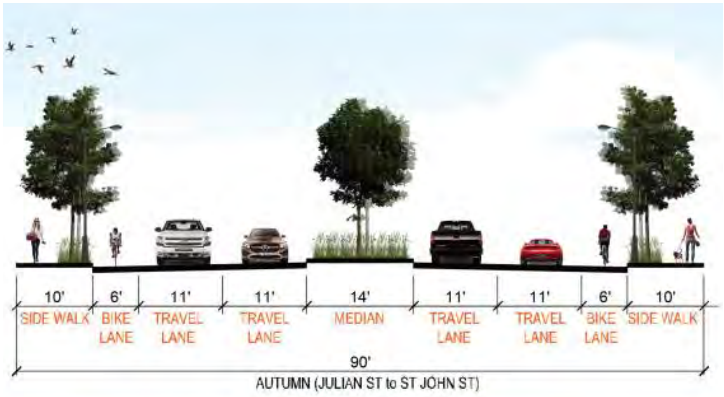


Figure 5.1.8: City Connector Street

Figure 5.1.8 above is a new segment of Autumn Street that is proposed from St. John Street to Julian Street per the City's Autumn Parkway Extension Plan. Layout and right-of-way widths are consistent with the Autumn Street Extension Plan; however the cross section above proposes street features and sidewalk and lane widths based on the City's Complete Streets Design Guidelines.

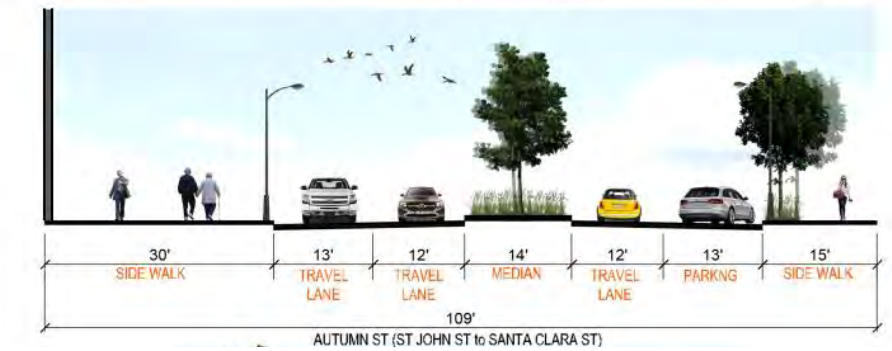


Figure 5.1.9: City Connector Street

Figure 5.1.9 above depicts the current sidewalk features of Autumn Street adjacent to the eastern side of the SAP Center (shown above as the wall in the west side of the figure). This area will be improved by the addition of a median.

Figure 5.1.10: City Connector Street

Figure 5.1.11: City Connector Street

Depicted in **Figure 5.1.10** and **Figure 5.1.11**, between Santa Clara Street and Park Avenue, Autumn Street is proposed to transform from a one-way street to a two-way street per the City's Autumn Street Extension Plan. Layout and right-of-way widths are consistent with the Autumn Street Extension Plan; however the cross sections above will be further developed from information generated by the Diridon Station Facilities Master Plan and access planning work.

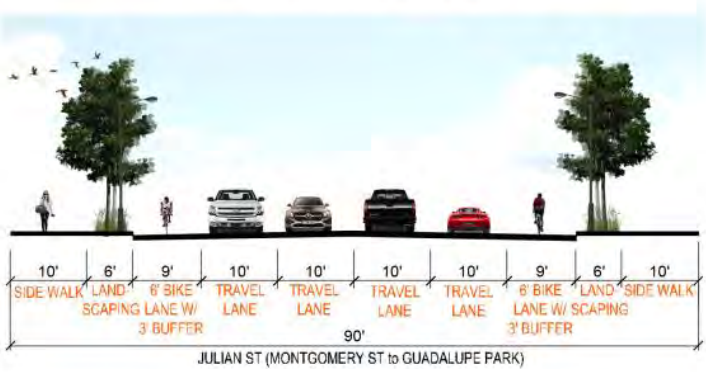


Figure 5.1.12: City Connector Street

Sidewalk improvements and bicycle facilities are proposed for Julian Street from Montgomery Street to Guadalupe River Park shown in **Figure 5.1.12**.

- **Local Connector Street**

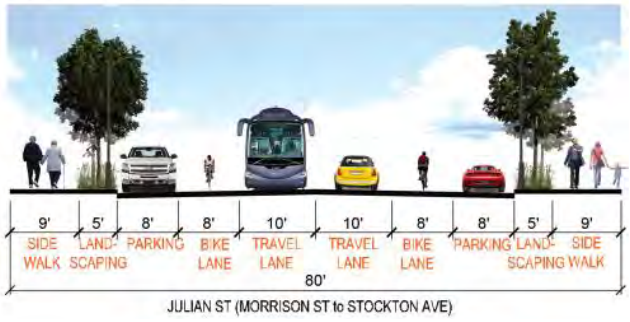


Figure 5.1.13: City Connector Street

Figure 5.1.13 above depicts the current dimensions and transportation features of Julian Street from Morrison Street to Stockton Avenue. The recent improvements to this area are consistent with the City's goals, plans, and design guidelines. Proposed improvements to this cross section are not recommended in this analysis.

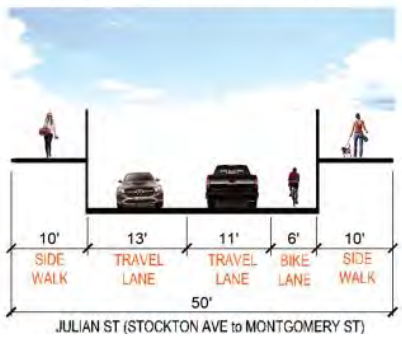


Figure 5.1.14: City Connector Street

Figure 5.1.14 above depicts the Julian Street underpass's current dimensions and transportation features between Stockton Avenue to Montgomery. The underpass's short span and vertical abutment walls constrain improvements. No improvements are proposed for this segment.

5.1.2 Coleman Avenue Widening

Coleman Avenue is two tenths of a mile north of the Diridon Station Area and is a major thoroughfare that feeds the Diridon Station Area. The I-880 Coleman Avenue interchange project widened the street to a six-lane roadway from Interstate 880 to Hedding Street. The widening of Coleman Avenue from a four-lane roadway to a six-lane roadway between Hedding Street and Taylor Street was submitted to the VTA for potential Envision 2040 sales tax funding based upon a cost estimate of $17 million. It may be appropriate to consider a "fair share" contribution from DSAP and a preliminary allowance of a 10% contribution is included in the cost estimate in Chapter 6 of this analysis. The remaining improvements between Taylor Street and Autumn Street have been built on the south side by recent developments. In order to implement these improvements on the north side of Coleman Avenue, right-of-way dedication is required and these improvements should be built with local development.

5.1.3 Autumn Street Improvements

As described in Chapter 4.1.3, the Autumn Street improvements from Coleman Avenue to UPRR have already been constructed and the City plans to complete the extension from UPRR to Julian Street with City Capital Funds in 2017-18. Improvements to Autumn Street from Julian Street to Santa Clara Street and from Santa Clara Street to south of Park Avenue are included in this analysis. The 2017-21 City Capital Improvement Program includes $6.2 million for design and partial right-of-way acquisition but no construction funds for the Julian Street to Santa Clara Street segment. An additional $8 million is included in the CIP reserve.

5.1.4 San Carlos Street Overhead

The existing grade separation structure spans 850 feet between Sunol Street and Bird Avenue. It reaches a height of about 24 feet above grade and crosses over two Caltrain tracks. The extension of California High-Speed Rail to the Diridon Station Area may require the overhead to be rebuilt. Pending at-grade or above-grade High-Speed Rail alignments will dictate the type of improvements required for the overhead structure. The City submitted this project to VTA's Envision 2040 process for potential funding from the Measure B Sales Tax passed by voters in November 2016, with an estimated cost of $37.1 million. It may be appropriate to consider including a "fair share" contribution from the DSAP. A preliminary allowance of a 10% contribution is included in the cost estimate in Chapter 6 of this analysis.

5.1.5 The Alameda

As a part of the City's "Beautiful Way" Plan, road improvements were constructed on The Alameda from Stockton Street to the north to Interstate 880. Improvements include landscape median islands, signal modifications, enhanced crosswalks with median refuges, corner or sidewalk bulb-outs, bus stop enhancements, and pavement overlays. Funding for further improvement to The Alameda is not recommended in this analysis.

5.1.6 Julian Street Underpass

The Julian Street Underpass depresses Julian Street for about 530 feet between Stockton Avenue and Montgomery Street. The underpass is below three Caltrain Tracks. The undercrossing maintains a width consistent with the street typology for Julian Street but the short span and vertical abutment walls constrain improvements. Funding for improvement to this underpass is not recommended in this analysis.

5.1.7 Los Gatos Creek Trail

The City has a planned project to extend the Los Gatos Creek Trail from Auzerais Avenue to Santa Clara Street along the west side of Los Gatos Creek. This portion of the trail is defined as Reach 5 and was master planned in 2008. The proposed improvements provide a north-south bicycle and pedestrian trail connecting existing trails to the north and south. The project was estimated to cost approximately $6 million. It may be appropriate to consider including funding from the Diridon Station Area.

5.1.8 Parks and Plazas

To satisfy the overall vision for the Diridon Station Area Plan in regards to parks and open spaces, an 8-acre community park on the existing Fire Department Training Facility site in the southern portion for the Diridon Station Area and a plaza in the development core area adjacent to the Diridon Station are included. Implementation of this park will require relocation of the Fire Department Training Facility.

The large 8-acre community park on the Fire Department Site south of Park Avenue and west of Montgomery Street will provide existing residents, new residents, and

the surrounding Downtown neighborhoods with a place for community gathering and a broad range of outdoor recreation activities. The park will be designed with zones for passive and active programs and park features. The following programs and features should be developed through a process inclusive of community input:

- Day-lighting of Los Gatos Creek as a natural amenity
- Amphitheater
- Perimeter waking path circuit
- Picnic pavilion visible from the street
- Children's play areas
- Restrooms
- Open and multi-use lawn with soccer or baseball accommodations
- Courts for basketball, baseball, etc.

The new High-Speed Rail terminal at the Diridon Station presents itself as an opportunity to create an iconic gateway that acts as a transitional space from the station to the City. The DSAP developed several concepts for a grand plaza approaching the Diridon Station entrance. This report assumed the construction of an approximately one-acre, square, public plaza. This area will serve as a gathering and celebratory space for the central core area and create a highly active and lively pedestrian environment with connectivity to transit. Key features of the plaza include:

- Central, large multi-use space open for flexible set ups and large public gatherings
- Built-in audio/ visual infrastructure for events
- Restrooms
- Smaller, quieter, subzones with trees, shade and seating
- Integrated bicycles an pedestrian circulation through the plaza, connecting with adjacent bicycle and pedestrian routes

5.2 Sanitary Sewer

For this analysis, sanitary sewer pipes that are found to be deficient will be removed and replaced with the same size pipe or an upsized pipe depending on the type of deficiency. Alternative sanitary sewer improvement methods include trenchless construction, pipe bursting, parallel piping, and pipe diversion; however removal and replacement of deficient pipes yield to the most conservative cost outcome.

The CCTV Quick Structural Ratings listed in Chapter 4.2 identified all of the deficient pipe segments in the Diridon area. **Table 5.2.1** below summarizes only the conditionally deficient backbone pipes that are proposed to be removed and replaced.

Pipe Segment ID	Pipe Location	Ex Pipe	Ex Pipe Length	Quick Structural Rating
15605	Julian St, W Montgomery St	8" VCP	351'	4331
15987	Julian St, E Montgomery St	8" VCP	304'	4121

Table 5.2.1: Conditionally Deficient Backbone Sanitary Sewer Pipes

For the sanitary sewer analysis, the City input revised the Diridon Station Area land uses defined in Chapter 3 along with planned CIP improvements to generate long term demands for the area. With revised inputs, the hydraulic model generated results that indicate nine backbone pipe segments are deficient by the capacity criteria described in Chapter 3.2. **Table 5.2.2** and **Figure 5.2.1** summarize and identify the operationally deficient pipes that are proposed to be removed and replaced.

Generally, it is not good practice to upsize only one or two pipes that are in the middle of a stretch of pipes of the same diameter. Some or all of the pipes listed in Table 5.2.2 may result in the downstream pipe being a smaller diameter. Alternative solutions will need to be considered at a later time when development is more defined

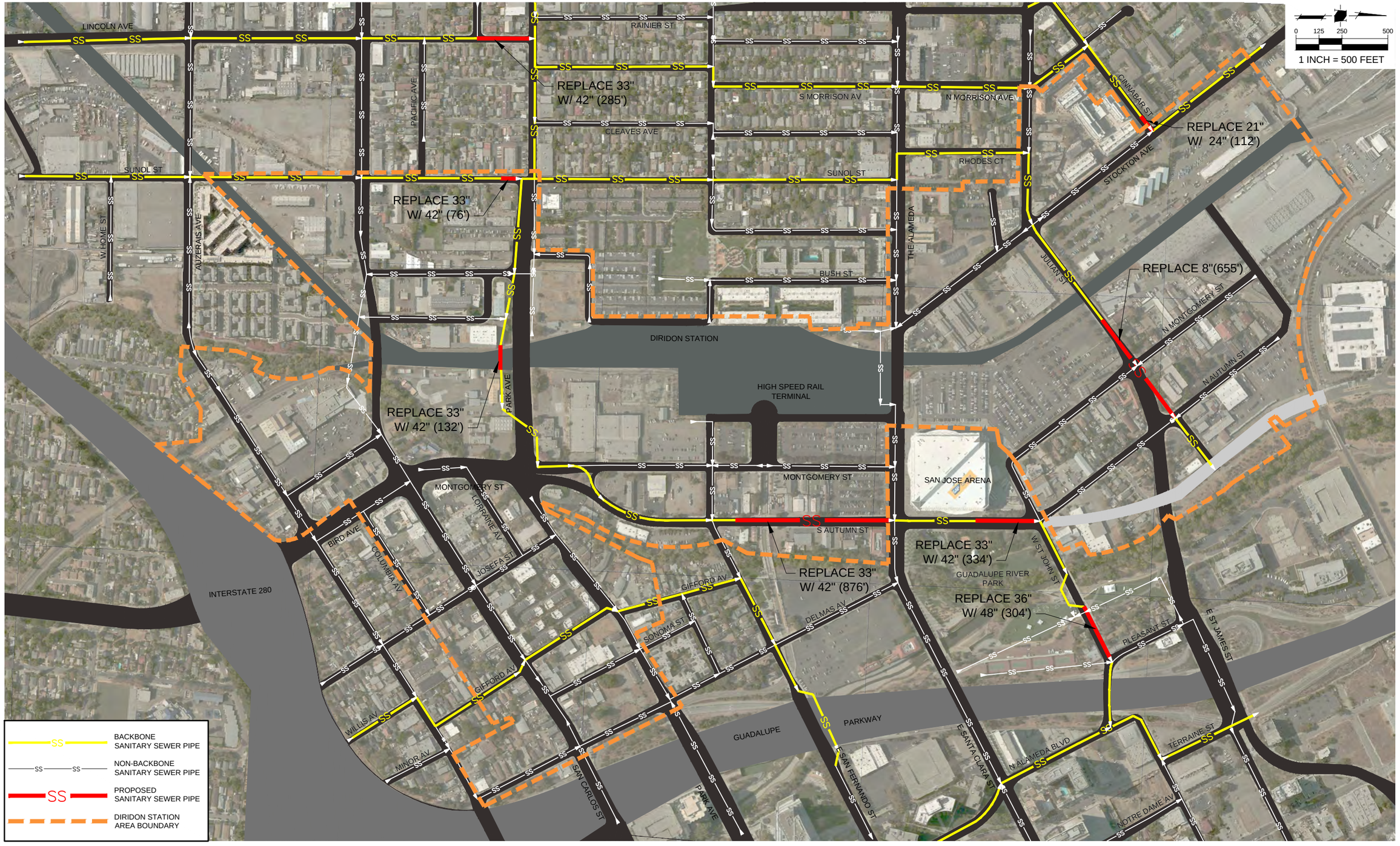
Pipe Segment ID	Pipe Location	Ex Pipe	Ex Pipe Length	q_{PDWF}/Q	q_{PWWF}/Q	US d/D*	DS d/D*	Proposed Pipe
81721	St John St, W of Pleasant St	36" RCP	304'	6.04	8.91	1.08	0.77	48" VCP
28137	Cinnabar St, W of Stockton Ave	21" VCP	91'	1.07	1.41	1.77	1.70	24" VCP
28170	Cinnabar St, W of Stockton Ave	21" VCP	21'	1.47	1.93	1.82	1.79	24" VCP
28206	Autumn St, S of St John St	33" CPL	334'	0.88	1.30	1.06	0.80	42" VCP
28209	Autumn St, S of Santa Clara St	33" CPL	294'	0.74	1.13	1.30	1.21	42" VCP
28995	Autumn St, S of Santa Clara St	33" CPL	582'	0.77	1.16	1.19	0.98	42" VCP
29112	Park Ave, W of Autumn St	33" HDPE	132'	1.00	1.53	0.82	0.67	42" VCP
29120	Sunol St, S of Park Ave	33" HDPE	76'	0.90	1.40	1.23	1.18	42" VCP
29601	Lincoln Ave, S of Park Ave	33" HDPE	285'	0.94	1.45	1.14	0.95	42" VCP

q_{PDWF} : Peak Dry Weather Flow (MGD)
q_{PWWF} : Peak Wet Weather Flow (MGD)
Q : Capacity (MGD)
d: Depth of water surface in relation to pipe invert (ft)
D: Diameter of pipe (ft)

Table 5.2.2: Capacity Deficient Backbone Sanitary Sewer Pipes

[This Page Intentionally Left Blank]

FIGURE 5.2.1



DIRIDON STATION AREA

BACKBONE SANITARY SEWER IMPROVEMENTS EXHIBIT

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

HMH
1570 Oakland Road
San Jose, CA 95131
(408) 487-2200
HMHca.com

5.3 Storm Drain and Flood Control

In order to identify improvements needed for the proposed build out of the Diridon Station Area, the city provided unconstrained, 10-year flows for the Diridon Station Area backbone pipe systems. These flows represent the 10-year peak unconstrained flow of the upstream tributaries which are capable of passing the 10-year storm under normal conditions. Embedded in this model output are factors for percent impervious based on land use. These factors represent the existing condition and were compared to percent impervious factors for the proposed land uses to identify any increased flows expected as a result in increased impervious areas. Proposed percent impervious factors used for this comparison were provided by the City of San José. This comparison is shown in **Table 5.3.1.**

Block ID	Area (ac)	DSAP Designation	% Imp	Existing Designation	% Imp	Delta
A1-7	8.7	Transit Employment Center	0.9	Medium Density Residential/Commercial	0.85	0.05
B1-20	26.9	Transit Employment Center	0.9	Industrial	0.8	0.10
C1-4	7.0	Urban Village	0.7	Industrial	0.8	-0.10
C5-12	13.3	Transit Employment Center	0.9	Industrial	0.8	0.10
C13-18	9.1	Urban Village	0.7	Commercial	0.9	-0.20
C19,20	3.6	Urban Residential	0.7	High Density Residential/Industrial	0.8	-0.10
D1-8	16.0	Transit Residential	0.7	Industrial	0.8	-0.10
D1-8	3.8	Urban Residential	0.7	Industrial	0.8	-0.10
D9-11	6.0	Transit Residential	0.7	Industrial	0.8	-0.10
E1-8, 11-15	19.8	Combined Industrial/Commercial	0.8	Commercial/Industrial	0.8	0
E9,10	0.5	Residential Neighborhood	0.35	Commercial/Industrial	0.8	-0.45
F1-8	16.1	Downtown	0.7	Residential/Industrial	0.7	0
F9-18	5.9	Downtown	0.7	Residential/Industrial	0.7	0
F9-18	1.8	Residential Neighborhood	0.35	Medium Density Residential	0.35	0
H1-6	8.9	Commercial Downtown	0.9	Parking Lot/Industrial	0.9	0
H7	13.7	Commercial Downtown	0.9	Industrial	0.8	0.10
H8	2.3	Commercial Downtown	0.9	Industrial	0.8	0.10
H9	3.2	Commercial Downtown	0.9	Industrial	0.8	0.10

Table 5.3.1: Land Use Impervious Area Comparison

While the table indicates minor variations in percent impervious, the revised land uses do not substantially alter the percent impervious of the existing land use and thus will not significantly increase runoff of the storm drainage system. However, the trunk line system does not have capacity to convey existing flows and improvements are required to mitigate flooding in the Diridon Station Area and larger watershed.

Improvements to backbone facilities were determined by applying a hydraulic gradient of 0.005 ft/ft along the pipe system assuming a slope roughly approximating the existing ground elevations. Pipe systems were then sized based on the unconstrained Q and

rounded upwards to the next manufactured pipe size. This analysis yielded the improvements shown in **Figure 5.3.2**.

Upsizing and constructing new pipes in Stockton Avenue, Cinnabar Street, and Autumn Street will mitigate flooding along Stockton Street and the larger watershed which connects to this system at Santa Clara Street. This improvement is aligned along Cinnabar Street instead of Julian Street in order to avoid construction a siphon or upgrading the pump station that serves the railroad undercrossing. The pipe in Autumn Street will connect to an appropriately sized existing outfall in Julian Street which eliminates the need to construct a new outfall to Guadalupe River.

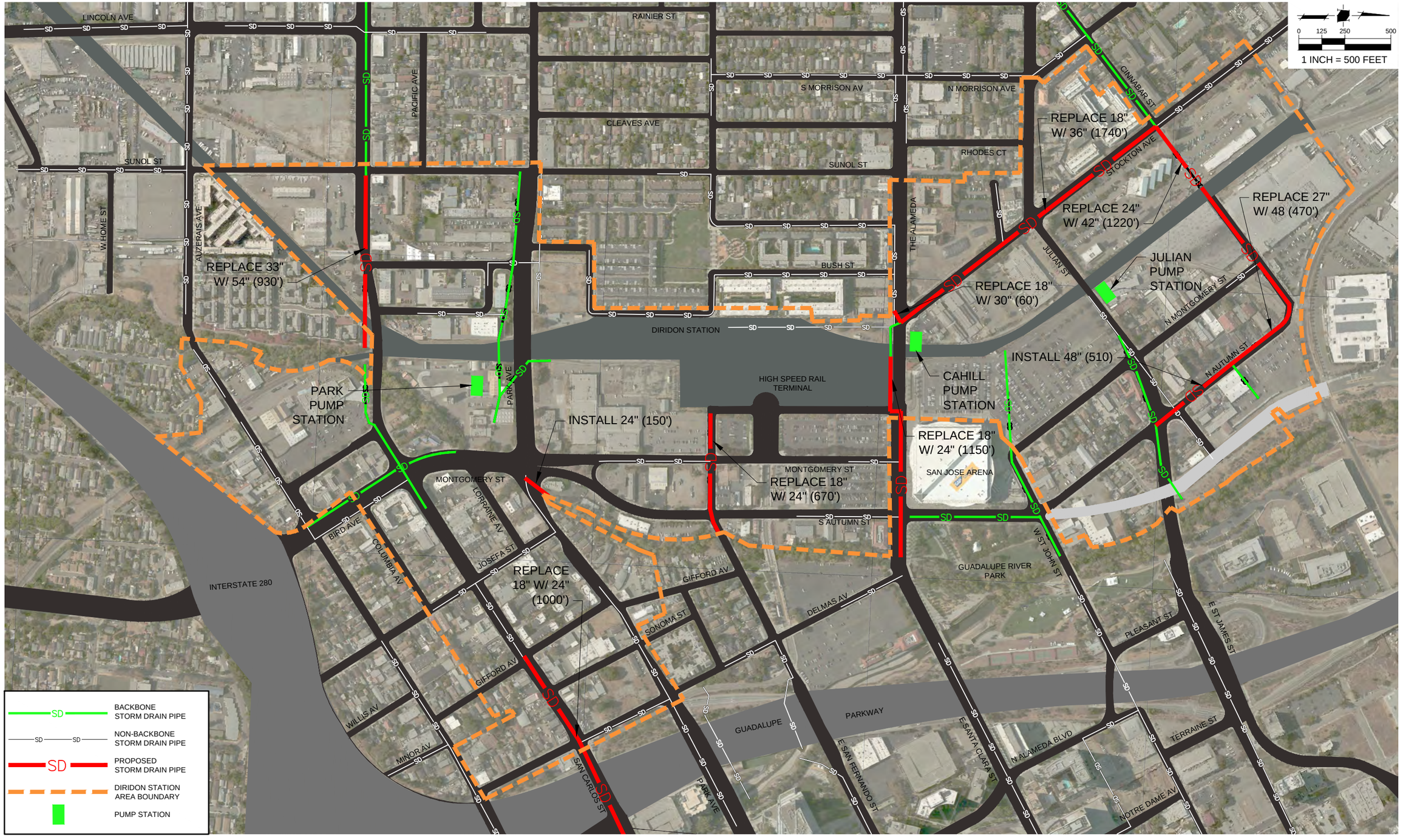
The proposed larger pipes in Santa Clara Street, San Fernando Street and at the intersection of Park Avenue and Montgomery Street will eliminate flooding in the respective tributary areas. These projects will add new outfalls to Los Gatos Creek and will require flap gates to control exit conditions.

The proposed larger pipe in San Carlos Street will eliminate flooding upstream in the larger watershed. Flap gates are required at all new and upsized outfalls.

Pipe Location	Ex Pipe	Pipe Length	Proposed Pipe
Santa Clara St - Diridon Station to Guadalupe River	18" RCP	1,150'	24" RCP
Autumn St @ Park Ave	-	150'	24" RCP
San Carlos St – Gifford Ave to Woz Way	18" RCP	1,000'	24" RCP
San Fernando St - Diridon Station to Guadalupe River	18" RCP	670'	24" RCP
The Alameda @ Stockton Ave	18" RCP	60'	30" RCP
Stockton Ave - The Alameda to Cinnabar St	18" RCP	1740'	36" RCP
Cinnbar St - Stockton Ave to Autumn St	24" RCP	1220'	42" RCP
Autumn St - Cinnabar to Julian St	27" RCP	980'	48" RCP
San Carlos St - Sunol St to Los Gatos Creek	33" RCP	930'	54" RCP

Table 5.3.2: Proposed Storm Drain Improvements

FIGURE 5.3.1



DIRIDON STATION AREA

BACKBONE STORM DRAIN IMPROVEMENTS EXHIBIT

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

HMH
1570 Oakland Road
San Jose, CA 95131
(408) 487-2200
HMHca.com

5.4 Potable Water

The potable water system improvements recommended for implementation of the Diridon Station Area Plan are sized to provide a minimum system residual pressure of 20 psi while limiting water main velocities to 10 ft/s during maximum day demand plus fire flow. It is assumed that all proposed land use designations, with the exception of residential neighborhood, will require a fire flow of 4,500 gpm. The residential neighborhood is assumed to require a maximum fire flow of 2,000 gpm.

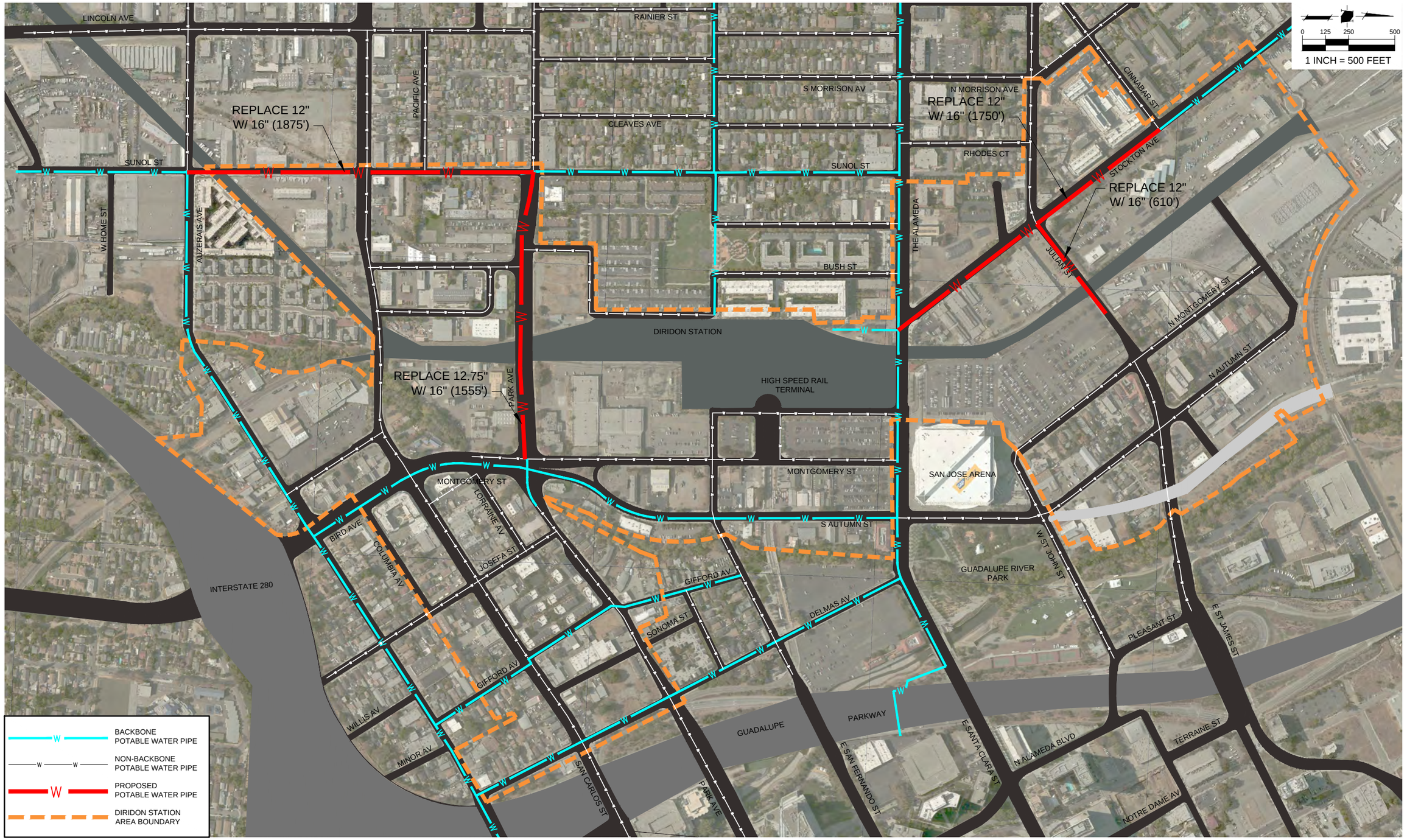
The existing potable water trunk lines are well placed to service the Diridon Station Area and no backbone extensions are recommended. Several backbone lines are recommended to be upsized and are show in **Table 5.4.1**.

Pipe Location	Ex Pipe	Ex Pipe Length	Proposed Pipe
Stockton Ave between Cinnabar St and The Alameda	12" DIP	1750'	16" DIP
Julian Street between Stockton Ave and Montgomery St	12" DIP	610'	16" DIP
Sunol St between Park Ave and Auzerais Ave	12" DIP	1875'	16" DIP
Park Ave between Sunol St and Montgomery St	12.75" DIP	1555'	16" DIP

Table 5.4.1: Proposed Potable Water Improvements

[This Page Intentionally Left Blank]

FIGURE 5.4.1



DIRIDON STATION AREA

BACKBONE POTABLE WATER IMPROVEMENTS EXHIBIT

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

HMH
1570 Oakland Road
San Jose, CA 95131
(408) 487-2200
HMHca.com

5.5 Recycled Water

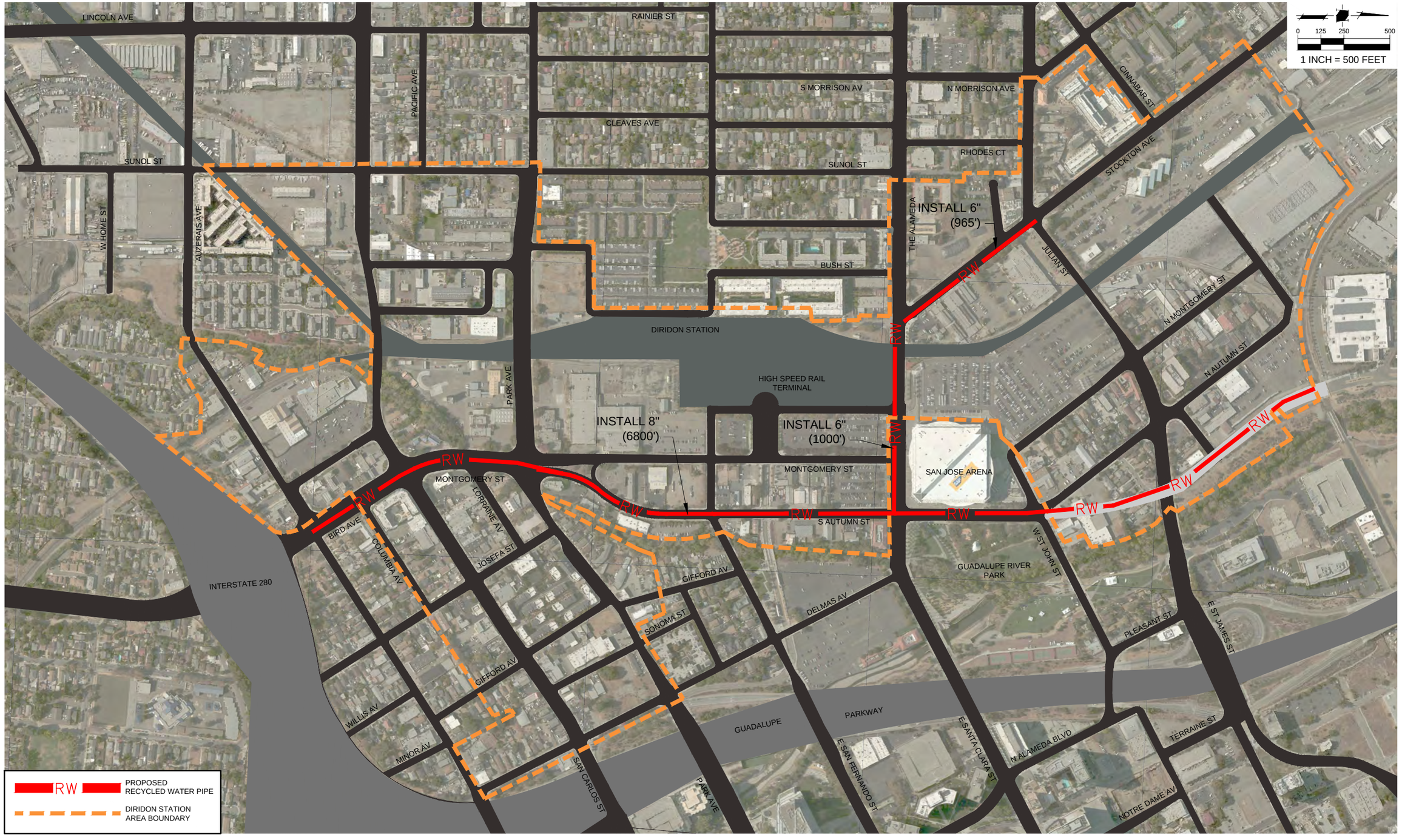
The demand for recycled water through the Diridon Station Area will largely be driven by the decisions of private developers and evolving regulations pertaining to water usage. However, consistent with the goals of the DSAP, it is proposed that recycled water system be extended with sufficient capacity to serve the potential uses throughout the Diridon Station Area. The pipes were sized consistent with the existing tie-in facility in Autumn Street. Branches off of the Autumn Street alignment were downsized nominally. The recommended improvements to the recycled water system are defined in **Table 5.5.1 and Figure 5.5.1**.

Location	Pipe Length	Diameter
Autumn St	6800’	8”
The Alameda	1000’	6”
Stockton Ave	965’	6”

Table 5.5.1: Proposed Recycled Water Improvements

[This Page Intentionally Left Blank]

FIGURE 5.5.1



DIRIDON STATION AREA

BACKBONE RECYCLED WATER IMPROVEMENTS EXHIBIT

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

HMH
1570 Oakland Road
San Jose, CA 95131
(408) 487-2200
HMHca.com

5.6 Electric, Gas, and Telephone

Consistent with the aesthetic and place-making goals of the Diridon Station Area Plan and City of San José policy, it is assumed that all overhead distribution facilities, including electric and telecommunication, will be undergrounded in conjunction with the development of the Diridon Station Area.

For cost effectiveness, it is recommended that overhead utilities along backbone streets be undergrounded during the construction of proposed roadway improvements. Approximate length and location of backbone streets with underground work is shown in **Table 5.6.1**.

Street	Length of Undergrounding
N Montgomery St	1690’
N Autumn St	1460’
W Julian St	1650’
S Montgomery St	2210’
Park Ave	1150’

Table 5.6.1: Backbone Roadway Utility Undergrounding

Existing overhead utilities along other streets constructed as frontage improvements or in-tract work of the developer will also be undergrounded. The remainder of the overhead systems in the Diridon Station Area is shown in **Table 5.6.2**.

The study includes land use changes equivalent to Commercial Downtown uses on the area occupied by the PG&E substation on Otterson Street, south of the Diridon Station. These office and commercial uses could be applied to increase densities on other sites, if the substation is to remain. If it is decided to redevelop the site, the PG&E substation and portions of the associated overhead transmission system would need to be relocated to another suitable and available property. When planning the relocation of this facility, special consideration should be given to the interface and potential demands of HSR, Caltrain, BART and other major users.

Street	Length of Undergrounding	Street	Length of Undergrounding
Lenzen Ave	180’	Auzerais Ave	1250’
Stockton Ave	1860’	Lorraine Ave	550’
Cinnabar St	750’	Joséfa St	1330’
Clinton Place	260’	Columbia Ave	450’
Sunol St	2550’	Gifford Ave	830’
McEvoy St	800’	Sonoma St	540’
Royal Ave	620’	Delmas Ave	1200’

Table 5.6.2: Non-Backbone Roadway Utility Undergrounding

[This Page Intentionally Left Blank]

6.0 COST ESTIMATES

In order to plan funding mechanisms, cost estimates were prepared for improvements recommended in this analysis.

Estimated costs are based on 2017 dollars and do not account for inflation or other market changes. Unit cost assumptions are made from projects of similar size and scale. Allowances of 40% for engineering, inspection, and construction management and 30% contingency for scope refinements and unforeseen changes are included.

Utility improvements assume that existing facilities will be removed and replaced. This analysis has not investigated alternative methods including parallel pipe systems, trenchless construction like pipe bursting, micro-tunneling, flow diversion, or other design and construction methods which may change the overall cost of construction. These estimates are approximate and represent a Class 4 cost estimate as defined by the Association for the Advancement of Cost Engineering (AACE) Cost Estimate Classification System. Class 4 estimates are considered to have an expected accuracy ranging from +30/-15% to +120/-60%.

6.1 Streets

Improvements to the backbone streets in the Diridon Station Area include street extensions, widening, pedestrian and bicycle accommodations, and various pavement treatments. Unit prices for street improvements are defined in **Table 6.1.1**. Street costs include costs for signals, streetlights, conduits, and for joint trench at locations where overhead utilities exist. An allowance of 5% is also included for special features such as special signage, benches and other street furniture to enhance the character of the Diridon Station Area.

Street Improvement Unit Price Summary		
Roadway Items	**Unit**	**Price**
Roadway Excavation	CY	$25.00
Roadway Pavement Reconstruction	SF	$8.50
Roadway Pavement Overlay	SF	$3.00
Curb & Gutter	LF	$40.00
Sidewalk	SF	$10.00
Median Curb	LF	$30.00
Median Island Planting or Surfacing	SF	$8.00
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00
Roadway Drainage Collector (incl. laterals + inlets)	EA	$20,000.00
Landscaped Parkway/Stormwater Treatment	SF	$15.00
Signalized Intersection	EA	$300,000.00
Minor Items (15% of Roadway Items Subtotal)	LS	15%
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)	LS	5%
Mobilization (10% of Roadway Items Subtotal)	LS	10%
Contingencies (30% of Roadway Items Subtotal)	LS	30%
Other Costs		
Engineering , Inspection & Construction Management (40% of Roadway Items Subtotal)	LS	40%
Joint Trench Allowance	LF	$400.00

Table 6.1.1: Street Improvement Unit Price Summary

In total, approximately 2.4 miles of roadway in the Diridon Station Area are proposed to be improved. The improvements within the Diridon Station Area are estimated to be approximately $38.6 million plus $5.4 million in potential "fair share" contributions to two "off-site" facilities.

Street	Estimated Cost
Julian Street	$3,710,000
Park Avenue	$8,330,000
San Carlos Street	$7,810,000
Autumn Street	$15,120,000
Montgomery Street	$1,180,000
Bird Avenue	$1,640,000
Contribution to Coleman Avenue	$1,700,000
Contribution to San Carlos Underpass	$3,700,000
Total:	**$43,190,000**

Table 6.1.2: Roadway Cost Estimates

6.2 Sanitary Sewer

Unit prices listed in the estimate tables below for sanitary sewer pipes, manholes, lateral connections, and pipe removal are based on typical unit prices and experience on recent projects. Miscellaneous sewer items like manholes and laterals were spread per lineal foot of pipe. This value was then added to the unit cost per length of pipe to arrive at a "Total Construction Cost." Percentages for contingency, engineering, inspection and construction management were factored into the "Total Construction Cost" to arrive at a "Fully Burdened Unit Cost" per unit length of various pipe sizes. This comprehensive cost is used to calculate the "Total Cost" for proposed sanitary sewer pipe replacement.

Approximately 2,700 feet of sanitary sewer pipe is proposed to be improved with the same size or upsized pipe segments. The improvements are estimated to cost $6.4 million.

Sanitary Sewer Improvements Estimate

SANITARY SEWER PIPES		Quantity	Unit	Fully Burdened Unit Cost	Total Cost
8" VCP	Julian St, E of Montgomery St	300	LF	$840	**$252,000**
8" VCP	Julian St, W of Montgomery St	350	LF	$840	**$294,000**
24" VCP	Cinnabar St, W of Stockton Ave	110	LF	$1,690	**$185,900**
42" VCP	Autumn St, S of St John St	330	LF	$2,880	**$950,400**
42" VCP	Autumn St, S of Santa Clara St	290	LF	$2,880	**$835,200**
42" VCP	Autumn St, S of Santa Clara St	530	LF	$2,880	**$1,526,400**
42" VCP	Park Ave, W of Autumn St	130	LF	$2,880	**$374,400**
42" VCP	Sunol St, S of Park Ave	80	LF	$2,880	**$230,400**
42" VCP	Lincoln Ave, S of Park Ave	290	LF	$2,880	**$835,200**
48" VCP	St John St, W of Pleasant St	300	LF	$3,220	**$966,000**
				Sanitary Sewer Impr. Grand Total:	**$6,400,000**

Table 6.2.1: Sanitary Sewer Cost Estimates

6.3 Storm Drain and Flood Control

Unit prices listed in the estimate tables below for storm drain pipes, manholes, lateral connections, and pipe removal are based on unit prices from experience on recent projects. Manholes and other miscellaneous storm drain items were spread per lineal foot of pipe. This value was then added to the unit cost per length of pipe to arrive at a "Total Construction Cost." Percentages of contingency and engineering, inspection and construction management were factored into the "Total Construction Cost" to arrive at a "Fully Burdened Unit Cost" per unit length of pipe various pipe sizes. This comprehensive cost is used to calculate the "Total Cost" for proposed potable water pipe replacement.

Approximately 6,900 feet of storm drain pipe is proposed to be removed and replaced with upsized pipe segments. The improvements are estimated to cost $9.2 million.

Storm Sewer Drain Improvements Estimate							
STORM DRAIN PIPES		Quantity	Unit	Fully Burdened Unit Cost	Outfall Cost	Total Cost
24" RCP	Santa Clara St - Diridon Station to Guadalupe River	1,150	LF	$810	$40,000	**$971,500**
24" RCP	San Carlos St - Gifford Ave to Woz Way	1,000	LF	$810	-	**$810,000**
24" RCP	Autumn St @ Park Ave	150	LF	$810	$40,000	**$161,500**
24" RCP	San Fernando St - Diridon Station to Guadalupe River	670	LF	$810	$40,000	**$582,700**
30" RCP	The Alameda @ Stockton Ave	60	LF	$1,020	-	**$61,200**
36" RCP	Stockton Ave - The Alameda to Cinnabar St	1,740	LF	$1,180	-	**$2,053,200**
42" RCP	Cinnbar St - Stockton Ave to Autumn St	1,220	LF	$1,310	-	**$1,598,200**
48" RCP	Autumn St - Cinnabar to Julian St	980	LF	$1,460	-	**$1,430,800**
54" RCP	San Carlos St - Sunol St to Los Gatos Creek	930	LF	$1,600	$40,000	**$1,528,000**
					Storm Drain Impr. Grand Total:	**$9,200,000**

Table 6.3.1: Storm Drain Cost Estimates

6.4 Potable Water

Unit prices listed in the estimate tables below for potable water pipes, valves, lateral connections, and pipe removal are based on unit prices from experience on recent projects. Miscellaneous potable water items like valves and services were spread per lineal foot of pipe. This value was then added to the unit cost per length of pipe to arrive at a "Total Construction Cost." Percentages of contingency and engineering, inspection and construction management were factored into the "Total Construction Cost" to arrive at a "Fully Burdened Unit Cost" per unit length of pipe various pipe sizes. This comprehensive cost is used to calculate the "Total Cost" for proposed potable water pipe replacement.

Approximately 5,800 feet of potable water pipe is proposed to be removed and replaced with upsized pipe segments. The improvements are estimated to cost $3.9 million.

Potable Water Imporvements Estimate					
POTABLE WATER PIPES		Quantity	Unit	Fully Burdened Unit Cost	Total Cost
16" DIP	Sunol St - Auzerais Ave to Park Ave	1,880	LF	$680	**$1,278,400**
16" DIP	Park Ave - Sunol St to Autumn St	1,560	LF	$680	**$1,060,800**
16" DIP	Stockton St - The Alameda to Cinnabar St	1,750	LF	$680	**$1,190,000**
16" DIP	Julian St - 610' East of Stockton Ave	610	LF	$680	**$414,800**
				Potable Water Impr. Grand Total:	**$3,900,000**

Table 6.4.1: Potable Water Cost Estimates

6.5 Recycled Water

Unit prices listed in the estimate tables below for recycled water pipes, valves, and lateral connections are based unit prices from experience on recent projects. Miscellaneous recycled water items were spread per lineal foot of pipe. This value was then added to the unit cost per length of pipe to arrive at a "Total Construction Cost." Percentages of contingency and engineering, inspection and construction management were factored into the "Total Construction Cost" to arrive at a "Fully Burdened Unit Cost" per unit length of pipe various pipe sizes. This comprehensive cost is used to calculate the "Total Cost" for proposed recycled water pipe replacement.

Approximately 8,800 feet of recycled water pipe is proposed to be installed. The improvements are estimated to cost $2.9 million.

Recycled Water Imporvements Estimate					
RECYCLED WATER PIPES		Quantity	Unit	Fully Burdened Unit Cost	Total Cost
6" DIP	Santa Clara St/The Alameda - Autumn St to Stockton Ave	1,000	LF	$300	**$300,000**
6" DIP	Stockton St - The Alameda to Juilan St	970	LF	$300	**$291,000**
8" DIP	Bird Ave, Montgomery St, Autumn St	6,800	LF	$340	**$2,312,000**
				Recycled Water Impr. Grand Total:	**$2,900,000**

Table 6.5.1: Recycled Water Cost Estimates

6.6 Electrical, Gas, and Telephone

The City San José operates an in-lieu program for utility undergrounding. The program allows developers to pay a fee in lieu of undergrounding the frontage of their site. In some instances, even if there are no existing overhead utilities, developers may still be required to pay in-lieu fees. This program could serve as means for the City to aggregate developer fees to fund joint trench work constructed with roadway construction. Use of this program could reduce costs for design and construction.

Included within the backbone roadway cost estimates are costs for joint trench undergrounding work. A unit cost of $400.00 was used for undergrounding efforts when constructed within a larger roadway project. This unit cost is intended to cover all costs associated with the design and construction of conduits, conductors, vaults, pull boxes, transformers, switches, capacitors, and other appurtenances associated with the operation of these facilities.

Street	Length of Undergrounding	Estimated Cost
N Montgomery St	1690’	$680,000
N Autumn St	1460’	$580,000
W Julian St	1650’	$660,000
S Montgomery St	2210’	$880,000
Park Ave	1150’	$460,000
	Total:	**$3,300,000**

Table 6.6.1: Backbone Roadway Utility Undergrounding Cost Estimates

Undergrounding of electrical distribution for the remainder of the Diridon Station Area will be the responsibility of the adjacent developer. There exist substantial reaches of overhead utilities which will be undergrounded. Undergrounding of transmission lines is not included. To estimate these unit costs a unit price of $451.00 per lineal foot of joint trench was used. Similar to the unit costs within backbone roadway, this cost is intended to cover design and construction of all utility substructures and appurtenances with the addition of trenching, backfill and pavement restoration. Estimated costs by non-backbone facilities are shown in **Table 6.6.2** below.

Street	Length of Undergrounding	Estimated Cost
Lenzen Ave	180’	$80,000
Stockton Ave	1860’	$840,000
Cinnabar St	750’	$340,000
Clinton Place	260’	$120,000
Sunol St	2550’	$1,150,000
McEvoy St	800’	$360,000
Royal Ave	620’	$280,000
Auzerais Ave	1250’	$560,000
Lorraine Ave	550’	$250,000
Joséfa St	1330’	$600,000
Columbia Ave	450’	$200,000
Gifford Ave	830’	$370,000
Sonoma St	540’	$240,000
Delmas Ave	1200’	$540,000
	Total:	**$5,900,000**

Table 6.6.2: Backbone Roadway Utility Undergrounding Costs Estimates

The costs of relocating the PG&E substation, preliminarily estimated at $50 million or more, are not included in this report. Funding for this work should be evaluated in partnership with PG&E, HSR, Caltrain, BART and other major users.

6.7 Parks, Plazas, and Trails

Improvements to create open spaces for connectivity and recreation come through the construction of an 8-acre park on the Fire Department Site at Park Avenue and Montgomery Street, 1-acre plaza near the Diridon Station, and Reach 5 of the Los Gatos Creek Trail.

This City operates a program that requires residential developers to dedicate land or pay a park and trail impact fee of $17,000 per dwelling unit in lieu of dedication. In the Diridon Station Area, assuming all developers maximize their on-site recreation credits (50%) by building recreational amenities, each residential unit can be expected to contribute $8,500, half of the $17,000/unit. With over 2,800 units proposed in the area, the City's park contributions would be roughly $23.8 million. We have also included the Los Gatos Creek Trail (approximated at $6 million in 2008) in these potential park fee projects. Park and trail impact fees projected to be collected from the residential developers in the Diridon Station Area will directly fund the estimated $8 million park and the $6 million segment of the Los Gatos Creek Trail.

Since the residential properties that pay park fees are not likely to benefit directly from the plaza, it is not considered appropriate to use the impact fees for parks to fund the construction of the proposed plaza. The plaza is estimated to be approximately $1.2 million. It may be appropriate to consider that all developers in the Diridon Station Area shall contribute to the cost of the plaza since its central location and functionality will provide broad benefit the Diridon Station Area.

Category	Scale	Estimated Cost
Streets	2.4 Miles	$43.2 M
Parks, Plazas, and Trails	1 Acre	$1.2 M
Sanitary Sewer	2,700 LF	$6.4 M
Storm Drain and Flood Control	7,900 LF	$9.2 M
Potable Water	5,800 LF	$3.9 M
Recycled Water	8,800 LF	$2.9 M
	GRAND TOTAL	**$66.8 M**

Table 6.7.1: Estimated Cost Summary

Table 6.7.1 above summarizes the total estimated costs of backbone improvements in the Diridon Station Area.

[This Page Intentionally Left Blank]

7.0 PHASING AND FUNDING CONSIDERATIONS

The build-out of the Diridon Station Area is dependent on many factors including market vitality, timing of the arrival of major transit systems, and availability of real estate on which to implement development. For these reasons, this report has identified near-term, mid-term and long-term infrastructure phasing scenarios, loosely structured around major transit milestones. It is assumed that developments in the Diridon Station Area will be simulated by these major milestones and achievements in the completion of these projects. Major Transit milestones include:

- Caltrain Modernization (CalMod), expected 2020
- BART – Silicon Valley Phase II, expected 2025
- California High Speed Rail, expected 2025

The phases listed below are not all inclusive and will vary significantly depending on the geographic implementation of developments. However, these improvements identify major elements and priorities for phasing considerations. Projects not explicitly described below could be implemented with related developments or other place-making factors.

7.1 Near-Term Phase (5-10 years), Completion of CalMod

It is expected that the CalMod Program will be completed within this near-term horizon. This series of projects is estimated to cost approximately $1.5 billion and will increase the efficiency and ridership of the Caltrain system. Users will begin to see the benefits of these improvements and attraction to the Caltrain facilities at Diridon may provide early stimulus for development, particularly of housing projects.

Given the current demand for housing in the regional market and the increase in residential construction near downtown San José, it is reasonable to project that residential projects of the Diridon Station Area will be early drivers for infrastructure.

In order to facilitate early developments, the projects listed below should be prioritized for early funding and implementation. If a street is identified for implementation, it is recommended that utility improvements within said street be constructed simultaneously.

Autumn Street Extension

The extension and widening of Autumn Street is a critical aspect necessary for transportation demand associated with the early build-out of the Diridon Station Area. It is recommended that during the roadway work, improvements to upsize the sanitary sewer system and extend the reclaimed water system be implemented. The sanitary sewer replacement along West St John Street at Pleasant Street would likely be performed in conjunction with this work.

Stockton Avenue Storm Drain Improvements

Mitigating the existing flooding identified in The Alameda and Stockton Avenue areas is considered a high-priority City project and should be constructed as early work to promote walk-ability, and establish place-making elements for the Diridon Station Area. This work

should include storm drain improvements along Stockton Avenue, Cinnabar Street and the existing alignment of N Autumn Street.

The Diridon Station Area Near-Term phasing costs are estimated to range from $25-$35 million dollars.

7.2 Mid-Term Phase (5-15 years), Arrival of BART and HSR

With the passing of VTA's 2016 Measure B Sales Tax, the $4.7 billion Phase II extension of BART to the Diridon Station Area is now substantially funded and gaining momentum. Completion of construction is anticipated by 2025. With construction in the Central Valley underway and a draft environmental document for the San José-Merced segment planned for release in 2017, HSR is expected to arrive at Diridon in a similar timeframe. The arrival of these transit systems is expected to prompt significant developer activity and the Diridon Station Area is likely to be substantially built-out at this time. Improvement projects likely to occur within this timeframe include:

Off-Site Improvements

Prior to operation of HSR and BART in the mid-term timeframe, it is anticipated that off-site improvements should be implemented to facilitate access to the Diridon Station Area. These projects would include the widening of Coleman Ave north of Market Street, the replacement of the San Carlos Overhead structure and construction of the Los Gatos Creek Trail – Reach 5. This work should also include roadway and storm drain improvements along San Carlos Street.

Station Core Build-out

While not the first infrastructure priority, the core area fronting the station from Park Avenue to Santa Clara Street could be substantially built out in the mid-term timeframe. This work should include improvements to east-west backbone streets including Park Avenue, East San Fernando Street and East Santa Clara Street/The Alameda. Utility work in this area include the Park Avenue sanitary sewer work, Park Avenue and Sunol Street water main improvements, storm drain improvements along Park Avenue, East San Fernando Street and East Santa Clara Street, and the recycled water main extensions along East Santa Clara Street/The Alameda.

The Diridon Station Area Mid-Term phasing costs are estimated to range from $20-$30 million dollars.

7.3 Long-Term Phase (>15 years), Completion of the Diridon Station Area

The remainder of the Diridon Station Area build-out will continue through the long-term timeframe. Improvements remaining in this timeframe are likely to be localized and will not include major or longitudinal facilities. It is inherently more difficult to predict these projects and the projects below may be constructed during the near-term or mid-term timeframes should adjacent developments require such work.

Julian Street Improvements

If not yet constructed, the Julian Street work, including sanitary sewer replacement, would be constructed. This work may also include improvements to the water and recycled water systems along Julian and Stockton. This work package is largely dependent on the build-out of the Julian/Stockton area and will be closely tied to the timing of the area's development.

The Diridon Station Area Long-Term phasing costs are estimated to range from $10-$20 million dollars.

7.4 Funding

As discussed throughout this analysis, the infrastructure cost estimates are for backbone improvements, which provide broad benefit to the whole Diridon Station Area Plan. A key element of implementation will be how to equitably spread the backbone infrastructure costs among all of the development properties, such that neither the first development project nor the last project will be obligated to pay more than its fair share.

Since it is also likely that infrastructure construction will be required prior to development, funding mechanisms may need to include a financing element to provide funding earlier than would be required on a pay-as-you-go basis. The ability to sell bonds or otherwise advance capital ahead of fee collection or revenue is a strong factor in selecting a funding mechanism.

Consideration of funding and financing mechanisms is one of the next steps to be addressed in an ongoing economic analysis by another consultant team. A variety of options should be considered, including some or all of the following:

- Area Development Impact Fees, applied on a square footage or per unit basis to each type of development implemented through an Area Development Policy or City Ordinance,
- A Benefit Assessment District, which establishes assessments on the property tax rolls using the Municipal Bond Improvement of 1913 or the Improvement Act of 1915,
- Mello Roos Community Facilities District (CFD) based upon the Mello Roos Community Facilities Act of 1982,
- Infrastructure Financing Districts and Enhanced Infrastructure Financing Districts established by Senate Bill 628 (Beall) in 2014, to allow limited tax increment financing.
- Public-private-partnerships and other private financing mechanisms,
- Other innovative or less formal cost-sharing systems.

[This Page Intentionally Left Blank]

8.0 CONCLUSIONS

The City of San José along with its partners at VTA, Caltrain, BART, and California High-Speed Rail has laid the framework for an iconic, multi-modal transit hub at the Diridon Station. This hub will serve users from across the state and region with the arrival of HSR, BART and the upgraded services of Caltrain and VTA operations. With this new transit centerpiece, the Diridon Station Area is expected to undergo tremendous redevelopment into a model for high density transit-oriented development. In order to facilitate this development, this study identified necessary improvements and established cost estimates for use in developing funding mechanisms to construct infrastructure needed for the planned build-out.

The report studied the existing infrastructure's ability to handle the area redevelopment with respect to backbone streets, trails, sanitary sewer, storm drain, potable water, recycled water and joint trench facilities within the Diridon Station Area. It is anticipated that street frontages and utility systems affected by development projects will be required to be improved or replaced through the conditions of approval of the development. However, there are numerous improvements within the Diridon Station Area which will provide broad benefit to the whole area. These substantial improvements should be constructed in larger phases, not parcel-by-parcel as may occur if they are constructed as development frontages. Certain facilities also have place-making value that establishes the quality and character of the Area. These facilities have been identified as backbone facilities and warrant construction early in the build-out of the area or serve large groups of properties toward which a funding mechanism can be established.

The results were then cost estimated and assigned a phasing strategy dependent on respective benefits and potential development timelines. The infrastructure improvements identified in this report are estimated to cost $67 million in 2017 as shown in **Table 8.1.1** below.

Category	Scale	Estimated Cost
Streets	2.4 Miles	$43.2 M
Parks, Plazas, and Trails	1 Acre	$1.2 M
Sanitary Sewer	2,700 LF	$6.4 M
Storm Drain and Flood Control	7,900 LF	$9.2 M
Potable Water	5,800 LF	$3.9 M
Recycled Water	8,800 LF	$2.9 M
GRAND TOTAL		**$66.8 M**

Table 8.1.1: Estimated Cost Summary

While this report includes land use changes equivalent to Commercial Downtown uses on the area occupied by the PG&E substation located south of the Diridon Station, the costs of relocating the substation, preliminarily estimated at approximately $50 million or more, are not included in the total estimated infrastructure costs listed above.

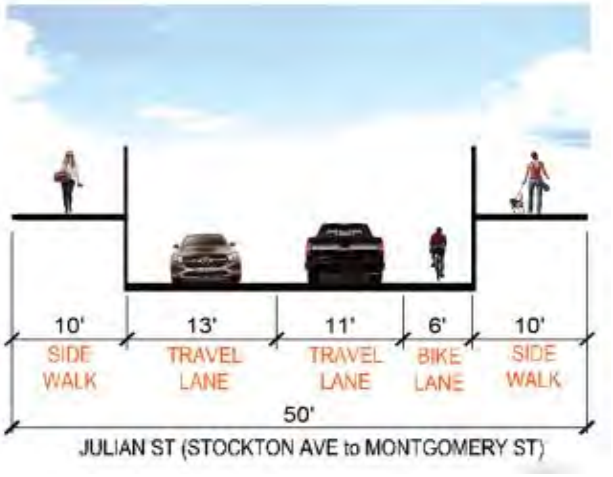
This study provides a comprehensive look at infrastructure requirements for the Diridon Station Area using the currently projected build out scenario. As planned developments are initiated, the City should continue to evaluate the infrastructure needs and implementation strategies to create an optimum and equitable build-out of this iconic location.

[This Page Intentionally Left Blank]

Appendix A - Cost Estimates

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE JULIAN STREET (STOCKTON ST. TO MONTGOMERY ST.)



ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	50	2	$93
Roadway Pavement Reconstruction	SF	$8.50	--	--	30	--	$255
Roadway Pavement Overlay	SF	$3.00	--	--	0	--	$0
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	0	--	--	--	$0
Median Island Planting or Surfacing	SF	$8.00	--	--	0	--	$0
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	300	--	--	$67
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0
						Roadway Items Subtotal	**$800**
Minor Items (15% of Roadway Items Subtotal)				800 x	15%	$120	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				800 x	5%	$40	
						Subtotal	**$160**
Mobilization (10% of Roadway Items Subtotal)				800 x	10%	$80	
Contingencies (30% of Roadway Items Subtotal)				800 x	30%	$240	
						Subtotal	**$300**
					Construction Subtotal		**$1,260**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				1,260 x	40%	$504	
						Subtotal	**$500**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**

TOTAL ROADWAY IMPROVEMENTS COST/LF **$1,800**

Total Length of Roadway Improvements 330 **LF**

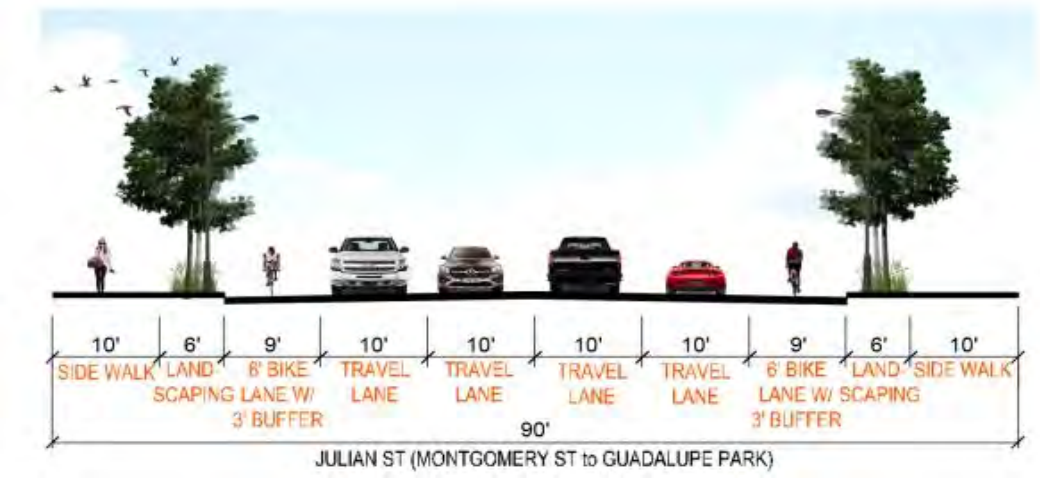
	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	2	$600,000
TOTAL PROJECT COSTS				**$1,190,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE JULIAN STREET (MONTGOMERY ST. TO GUADALUPE RIVER PARK)



ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	61	2	$113
Roadway Pavement Reconstruction	SF	$8.50	--	--	29	--	$247
Roadway Pavement Overlay	SF	$3.00	--	--	29	--	$87
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	0	--	--	--	$0
Median Island Planting or Surfacing	SF	$8.00	--	--	0	--	$0
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	300	--	--	$67
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	12	--	$180
						Roadway Items Subtotal	**$1,100**
Minor Items (15% of Roadway Items Subtotal)				1,100 x	15%	$165	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				1,100 x	5%	$55	
						Subtotal	**$220**
Mobilization (10% of Roadway Items Subtotal)				1,100 x	10%	$110	
Contingencies (30% of Roadway Items Subtotal)				1,100 x	30%	$330	
						Subtotal	**$400**
						Construction Subtotal	**$1,720**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				1,720 x	40%	$688	
						Subtotal	**$700**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**

TOTAL ROADWAY IMPROVEMENTS COST/LF **$2,400**

Total Length of Roadway Improvements 800 **LF**

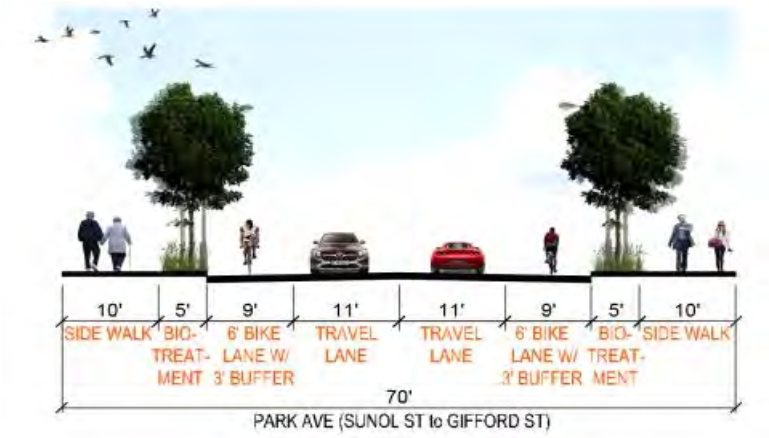
	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	2	$600,000
TOTAL PROJECT COSTS				**$2,520,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE PARK AVENUE (SUNOL ST. TO GIFFORD AVE.)



ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	130	2	$241
Roadway Pavement Reconstruction	SF	$8.50	--	--	40	--	$340
Roadway Pavement Overlay	SF	$3.00	--	--	0	--	$0
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	0	--	--	--	$0
Median Island Planting or Surfacing	SF	$8.00	--	--	0	--	$0
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	300	--	--	$67
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	10	--	$150
						Roadway Items Subtotal	**$1,200**
Minor Items (15% of Roadway Items Subtotal)				1,200 x	15%	$180	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				1,200 x	5%	$60	
						Subtotal	**$240**
Mobilization (10% of Roadway Items Subtotal)				1,200 x	10%	$120	
Contingencies (30% of Roadway Items Subtotal)				1,200 x	30%	$360	
						Subtotal	**$500**
						Construction Subtotal	**$1,940**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				1,940 x	40%	$776	
						Subtotal	**$800**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties		$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**

TOTAL ROADWAY IMPROVEMENTS COST/LF **$2,700**

Total Length of Roadway Improvements 2,550 **LF**

	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	1	$300,000
TOTAL PROJECT COSTS				**$7,190,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE PARK AVENUE (GIFFORD ST. TO DELMAS AVE.)

ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	20	2	$37
Roadway Pavement Reconstruction	SF	$8.50	--	--	0	--	$0
Roadway Pavement Overlay	SF	$3.00	--	--	40	--	$120
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	0	--	--	--	$0
Median Island Planting or Surfacing	SF	$8.00	--	--	0	--	$0
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	0	--	--	$0
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0

				Roadway Items Subtotal		**$500**
Minor Items (15% of Roadway Items Subtotal)	500	x	15%	$75		
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)	500	x	5%	$25		
				Subtotal		**$100**
Mobilization (10% of Roadway Items Subtotal)	500	x	10%	$50		
Contingencies (30% of Roadway Items Subtotal)	500	x	30%	$150		
				Subtotal		**$200**
				Construction Subtotal		**$800**

OTHER COSTS

Engineering and Inspection & Construction Management (40% of Construction Subtotal)	800	x	40%	$320		
				Subtotal		**$300**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	1	$400
						Subtotal	**$400**

TOTAL ROADWAY IMPROVEMENTS COST/LF **$1,500**

Total Length of Roadway Improvements 560 **LF**

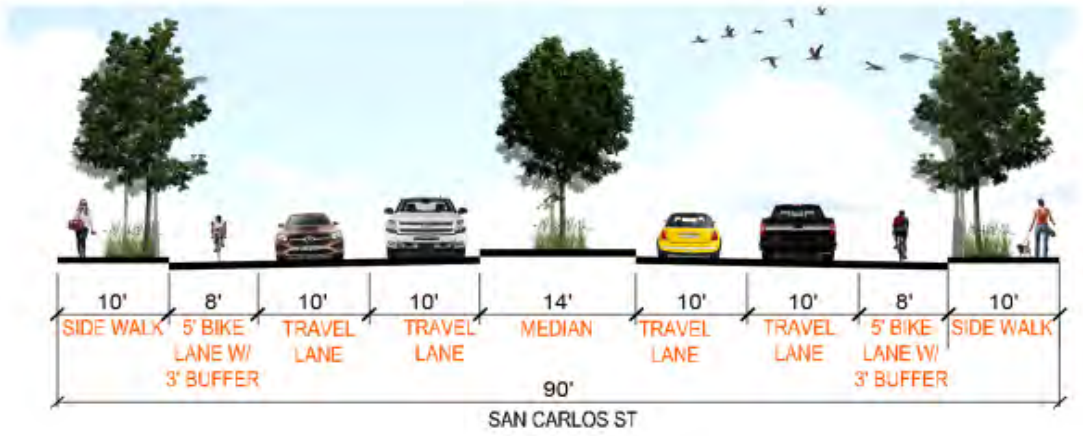
	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	1	$300,000
TOTAL PROJECT COSTS				**$1,140,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE SAN CARLOS STREET (SUNOL ST. TO BIRD AVE.)



ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	90	2	$167
Roadway Pavement Reconstruction	SF	$8.50	--	--	56	--	$476
Roadway Pavement Overlay	SF	$3.00	--	--	0	--	$0
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	2	--	--	--	$60
Median Island Planting or Surfacing	SF	$8.00	--	--	14	--	$112
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	300	--	--	$67
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0
						Roadway Items Subtotal	**$1,300**
Minor Items (15% of Roadway Items Subtotal)				1,300 x	15%	$195	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				1,300 x	5%	$65	
						Subtotal	**$260**
Mobilization (10% of Roadway Items Subtotal)				1,300 x	10%	$130	
Contingencies (30% of Roadway Items Subtotal)				1,300 x	30%	$390	
						Subtotal	**$500**
						Construction Subtotal	**$2,060**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				2,060 x	40%	$824	
						Subtotal	**$800**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**

TOTAL ROADWAY IMPROVEMENTS COST/LF **$2,900**

Total Length of Roadway Improvements 1,700 **LF**

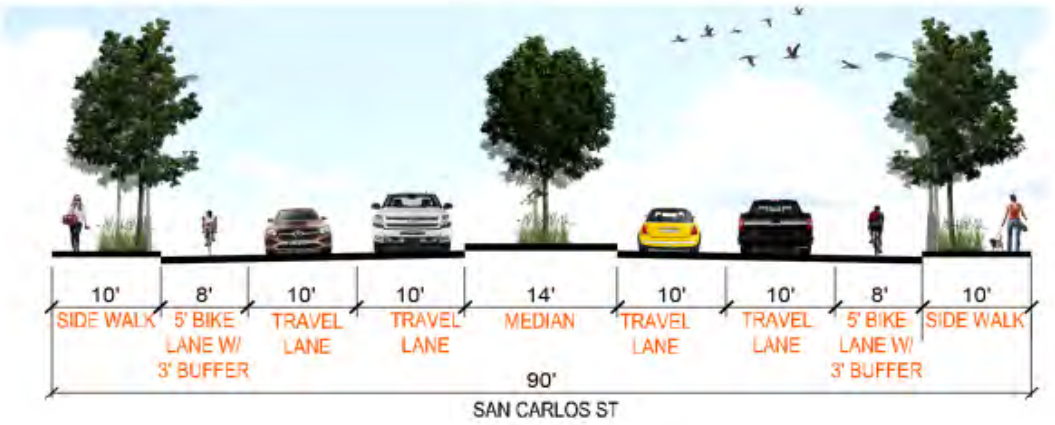
	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	1	$300,000
TOTAL PROJECT COSTS				**$5,230,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE SAN CARLOS STREET (BIRD AVE. TO DELMAS ST.)



ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	20	2	$37
Roadway Pavement Reconstruction	SF	$8.50	--	--	0	--	$0
Roadway Pavement Overlay	SF	$3.00	--	--	56	--	$168
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	0	--	--	--	$0
Median Island Planting or Surfacing	SF	$8.00	--	--	0	--	$0
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	0	--	--	$0
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0
						Roadway Items Subtotal	**$600**
Minor Items (15% of Roadway Items Subtotal)				600 x	15%	$90	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				600 x	5%	$30	
						Subtotal	**$120**
Mobilization (10% of Roadway Items Subtotal)				600 x	10%	$60	
Contingencies (30% of Roadway Items Subtotal)				600 x	30%	$180	
						Subtotal	**$200**
						Construction Subtotal	**$920**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				920 x	40%	$368	
						Subtotal	**$400**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**

TOTAL ROADWAY IMPROVEMENTS COST/LF **$1,300**

Total Length of Roadway Improvements 1,750 **LF**

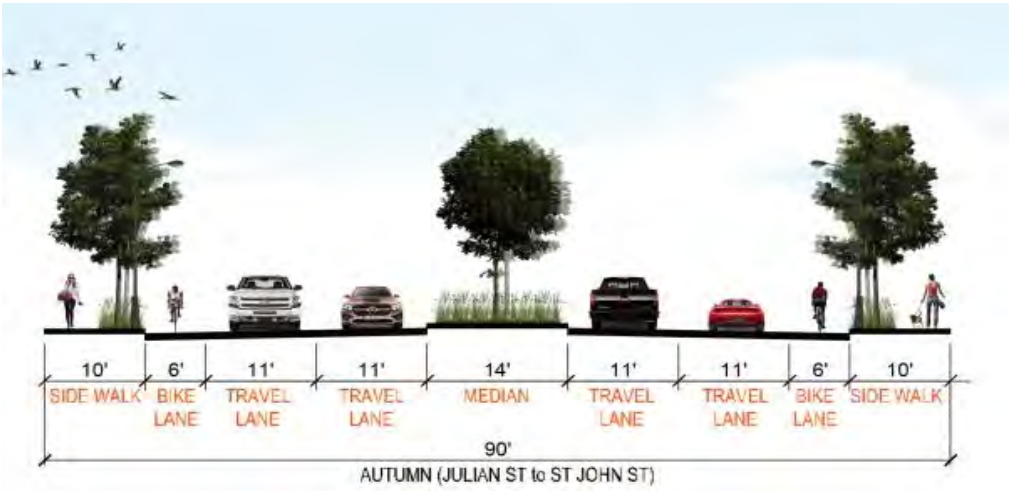
	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	1	$300,000
TOTAL PROJECT COSTS				**$2,580,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE AUTUMN STREET (JULIAN ST. TO ST JOHN ST.)



ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	90	2	$167
Roadway Pavement Reconstruction	SF	$8.50	--	--	56	--	$476
Roadway Pavement Overlay	SF	$3.00	--	--	0	--	$0
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	2	--	--	--	$60
Median Island Planting or Surfacing	SF	$8.00	--	--	14	--	$112
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	300	--	--	$67
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0
						Roadway Items Subtotal	**$1,300**
Minor Items (15% of Roadway Items Subtotal)				1,300 x	15%	$195	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				1,300 x	5%	$65	
						Subtotal	**$260**
Mobilization (10% of Roadway Items Subtotal)				1,300 x	10%	$130	
Contingencies (30% of Roadway Items Subtotal)				1,300 x	30%	$390	
						Subtotal	**$500**
						Construction Subtotal	**$2,060**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				2,060 x	40%	$824	
						Subtotal	**$800**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	90	--	--	--	$9,450
Joint Trench Allowance	LF	$400.00	--	--	--	1	$400
						Subtotal	**$9,850**
						TOTAL ROADWAY IMPROVEMENTS COST/LF	**$12,700**

Total Length of Roadway Improvements 730 **LF**

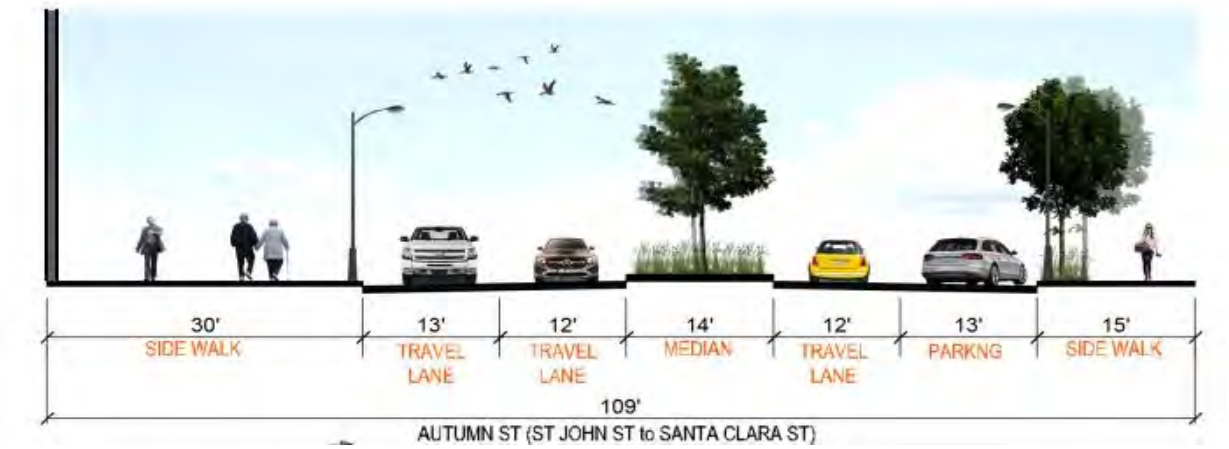
	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	2	$600,000
TOTAL PROJECT COSTS				**$9,870,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE AUTUMN STREET (ST JOHN ST. TO SANTA CLARA ST.)



ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	14	2	$26
Roadway Pavement Reconstruction	SF	$8.50	--	--	0	--	$0
Roadway Pavement Overlay	SF	$3.00	--	--	0	--	$0
Curb & Gutter	LF	$40.00	0	--	--	--	$0
Sidewalk	SF	$10.00	--	--	0	--	$0
Median Curb	LF	$30.00	2	--	--	--	$60
Median Island Planting or Surfacing	SF	$8.00	--	--	14	--	$112
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	0	90	--	--	$0
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	0	--	--	$0
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0

				Roadway Items Subtotal		**$200**
Minor Items (15% of Roadway Items Subtotal)	200	x	15%	$30		
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)	200	x	5%	$10		
				Subtotal		**$40**
Mobilization (10% of Roadway Items Subtotal)	200	x	10%	$20		
Contingencies (30% of Roadway Items Subtotal)	200	x	30%	$60		
				Subtotal		**$100**
				Construction Subtotal		**$340**

OTHER COSTS

Engineering and Inspection & Construction Management (40% of Construction Subtotal)	340	x	40%	$136		
				Subtotal		**$100**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**

TOTAL ROADWAY IMPROVEMENTS COST/LF **$400**

Total Length of Roadway Improvements 760 **LF**

	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	1	$300,000
TOTAL PROJECT COSTS				**$600,000**

Schaaf & Wheeler

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE AUTUMN STREET (SANTA CLARA ST. TO SAN FERNANDO ST.)

ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	46	2	$85
Roadway Pavement Reconstruction	SF	$8.50	--	--	26	--	$221
Roadway Pavement Overlay	SF	$3.00	--	--	0	--	$0
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	0	--	--	--	$0
Median Island Planting or Surfacing	SF	$8.00	--	--	0	--	$0
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	300	--	--	$67
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0
						Roadway Items Subtotal	**$800**
Minor Items (15% of Roadway Items Subtotal)				800 x	15%	$120	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				800 x	5%	$40	
						Subtotal	**$160**
Mobilization (10% of Roadway Items Subtotal)				800 x	10%	$80	
Contingencies (30% of Roadway Items Subtotal)				800 x	30%	$240	
						Subtotal	**$300**
						Construction Subtotal	**$1,260**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				1,260 x	40%	$504	
						Subtotal	**$500**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**

TOTAL ROADWAY IMPROVEMENTS COST/LF **$1,800**

Total Length of Roadway Improvements 1,020 **LF**

	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	2	$600,000
TOTAL PROJECT COSTS				**$2,440,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE AUTUMN STREET (SAN FERNANDO ST. TO PARK AVE.)

ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	54	2	$100
Roadway Pavement Reconstruction	SF	$8.50	--	--	34	--	$289
Roadway Pavement Overlay	SF	$3.00	--	--	0	--	$0
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	0	--	--	--	$0
Median Island Planting or Surfacing	SF	$8.00	--	--	0	--	$0
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	300	--	--	$67
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0
						Roadway Items Subtotal	**$800**
Minor Items (15% of Roadway Items Subtotal)				800 x	15%	$120	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				800 x	5%	$40	
						Subtotal	**$160**
Mobilization (10% of Roadway Items Subtotal)				800 x	10%	$80	
Contingencies (30% of Roadway Items Subtotal)				800 x	30%	$240	
						Subtotal	**$300**
						Construction Subtotal	**$1,260**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				1,260 x	40%	$504	
						Subtotal	**$500**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**
						TOTAL ROADWAY IMPROVEMENTS COST/LF	**$1,800**

Total Length of Roadway Improvements 1,060 **LF**

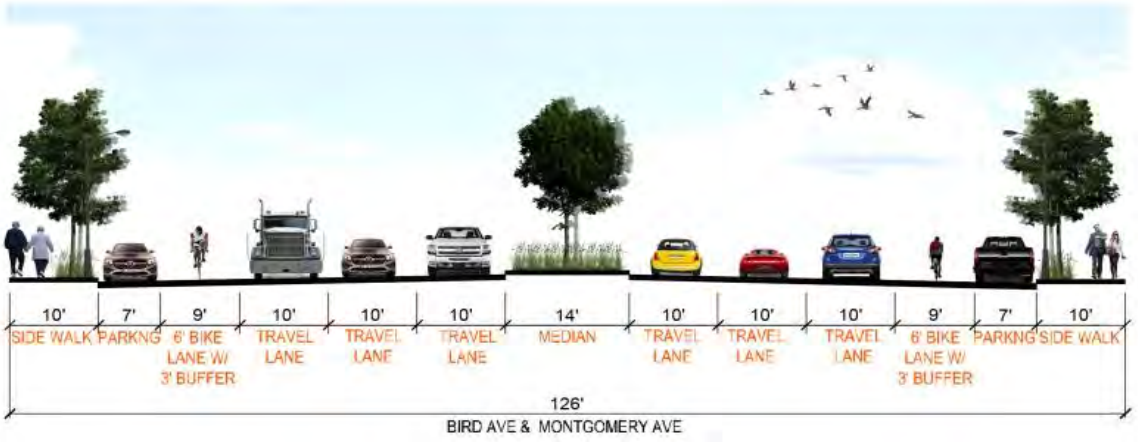
	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	1	$300,000
TOTAL PROJECT COSTS				**$2,210,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE MONTGOMERY STREET (PARK AVE. TO SAN CARLOS ST.)



ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	34	2	$63
Roadway Pavement Reconstruction	SF	$8.50	--	--	0	--	$0
Roadway Pavement Overlay	SF	$3.00	--	--	0	--	$0
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	2	--	--	--	$60
Median Island Planting or Surfacing	SF	$8.00	--	--	14	--	$112
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	0	--	--	$0
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0
						Roadway Items Subtotal	**$600**
Minor Items (15% of Roadway Items Subtotal)				600 x	15%	$90	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				600 x	5%	$30	
						Subtotal	**$120**
Mobilization (10% of Roadway Items Subtotal)				600 x	10%	$60	
Contingencies (30% of Roadway Items Subtotal)				600 x	30%	$180	
						Subtotal	**$200**
						Construction Subtotal	**$920**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				920 x	40%	$368	
						Subtotal	**$400**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**

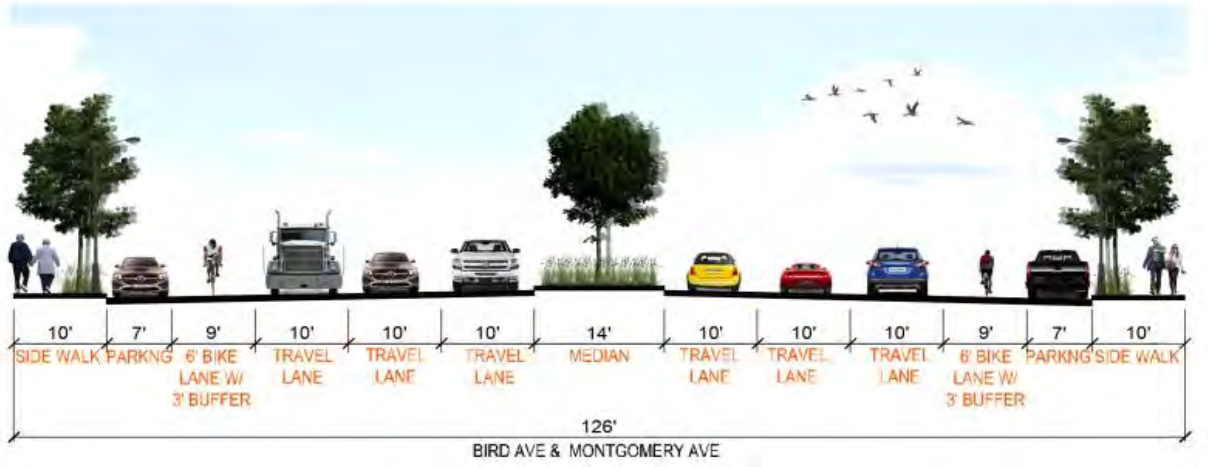
TOTAL ROADWAY IMPROVEMENTS COST/LF **$1,300**

Total Length of Roadway Improvements 680 **LF**

	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	1	$300,000
TOTAL PROJECT COSTS				**$1,180,000**

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

PRELIMINARY COST ESTIMATE BIRD AVENUE (SAN CARLOS ST. TO I-280)



ROADWAY ITEMS	Unit	Unit Price	# of Items per Section	Spacing (FT)	Width (FT)	Depth (FT)	Unit Cost $/LF
Roadway Excavation	CY	$25.00	--	--	34	2	$63
Roadway Pavement Reconstruction	SF	$8.50	--	--	0	--	$0
Roadway Pavement Overlay	SF	$3.00	--	--	0	--	$0
Curb & Gutter	LF	$40.00	2	--	--	--	$80
Sidewalk	SF	$10.00	--	--	20	--	$200
Median Curb	LF	$30.00	2	--	--	--	$60
Median Island Planting or Surfacing	SF	$8.00	--	--	14	--	$112
Street Lights (incl. PB, conduit + conductor)	EA	$4,500.00	2	90	--	--	$100
Roadway Drainage Collector (incl. Laterals + Inlets)	EA	$20,000.00	--	0	--	--	$0
Landscaped Parkway/Stormwater Treatment	SF	$15.00	--	--	0	--	$0
						Roadway Items Subtotal	**$600**
Minor Items (15% of Roadway Items Subtotal)				600 x	15%	$90	
Allowance for Special DSAP Features (5% of Roadway Items Subtotal)				600 x	5%	$30	
						Subtotal	**$120**
Mobilization (10% of Roadway Items Subtotal)				600 x	10%	$60	
Contingencies (30% of Roadway Items Subtotal)				600 x	30%	$180	
						Subtotal	**$200**
						Construction Subtotal	**$920**
OTHER COSTS							
Engineering and Inspection & Construction Management (40% of Construction Subtotal)				920 x	40%	$368	
						Subtotal	**$400**

RIGHT-OF-WAY & UTILITIES	Unit	Unit Price	Width (FT)	Risk Level	%	Length (FT)	$/LF
Various Real Properties	SF	$105.00	0	--	--	--	$0
Joint Trench Allowance	LF	$400.00	--	--	--	0	$0
						Subtotal	**$0**

TOTAL ROADWAY IMPROVEMENTS COST/LF **$1,300**

Total Length of Roadway Improvements 800 **LF**

	Unit	Unit Price	Quantity	Cost
Signals	EA	$300,000.00	2	$600,000
TOTAL PROJECT COSTS				**$1,640,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Sanitary Sewer Unit Price Summary

MISCELLANEOUS SANITARY SEWER ITEMS	Unit	Unit Cost	Assumed Spacing (ft)	LF Equiv.
Remove Existing Pipe	LF	$30	-	$30
Manhole	EA	$15,000	400	$40
Reconnect Lateral Connection	EA	$2,000	100	$20
			Misc. Items Total:	**$90 /LF**

SANITARY SEWER PIPES	Unit	Unit Cost	Addit. Misc. Items	Total Contr. Cost	Contingency (30%)	Engr., Insp., & CM (40%)	Fully Burdened Unit Cost
8" Vitrified Clay Pipe	LF	$400	$90	**$490**	$150	$200	**$840**
10" Vitrified Clay Pipe	LF	$480	$90	**$570**	$170	$230	**$970**
12" Vitrified Clay Pipe	LF	$560	$90	**$650**	$200	$260	**$1,110**
15" Vitrified Clay Pipe	LF	$640	$90	**$730**	$220	$290	**$1,240**
18" Vitrified Clay Pipe	LF	$720	$90	**$810**	$240	$320	**$1,370**
21" Vitrified Clay Pipe	LF	$800	$90	**$890**	$270	$360	**$1,520**
24" Vitrified Clay Pipe	LF	$900	$90	**$990**	$300	$400	**$1,690**
27" Vitrified Clay Pipe	LF	$1,000	$90	**$1,090**	$330	$440	**$1,860**
30" Vitrified Clay Pipe	LF	$1,100	$90	**$1,190**	$360	$480	**$2,030**
33" Vitrified Clay Pipe	LF	$1,250	$90	**$1,340**	$400	$540	**$2,280**
36" Vitrified Clay Pipe	LF	$1,400	$90	**$1,490**	$450	$600	**$2,540**
42" Vitrified Clay Pipe	LF	$1,600	$90	**$1,690**	$510	$680	**$2,880**
48" Vitrified Clay Pipe	LF	$1,800	$90	**$1,890**	$570	$760	**$3,220**

Sanitary Sewer Improvements Estimate

SANITARY SEWER PIPES		Quantity	Unit	Fully Burdened Unit Cost	Total Cost
8" VCP	Julian St, E of Montgomery St	300	LF	$840	**$252,000**
8" VCP	Julian St, W of Montgomery St	350	LF	$840	**$294,000**
24" VCP	Cinnabar St, W of Stockton Ave	110	LF	$1,690	**$185,900**
42" VCP	Autumn St, S of St John St	330	LF	$2,880	**$950,400**
42" VCP	Autumn St, S of Santa Clara St	290	LF	$2,880	**$835,200**
42" VCP	Autumn St, S of Santa Clara St	530	LF	$2,880	**$1,526,400**
42" VCP	Park Ave, W of Autumn St	130	LF	$2,880	**$374,400**
42" VCP	Sunol St, S of Park Ave	80	LF	$2,880	**$230,400**
42" VCP	Lincoln Ave, S of Park Ave	290	LF	$2,880	**$835,200**
48" VCP	St John St, W of Pleasant St	300	LF	$3,220	**$966,000**
				Sanitary Sewer Impr. Grand Total:	**$6,400,000**

Schaaf & Wheeler

HMH

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

Storm Drain Unit Price Summary

MISCELLANEOUS STORM DRAIN ITEMS	Unit	Unit Cost	Assumed Spacing (ft)	LF Equiv.
Remove Existing Pipe	LF	$30	-	$30
Manhole	EA	$10,000	400	$25
Reconnect Lateral Connection	EA	$1,000	100	$10
			Misc. Items Total:	**$65/LF**

STORM DRAIN PIPES	Unit	Unit Cost	Addit. Misc. Items	Total Contr. Cost	Contingency (30%)	Engr., Insp., & CM (40%)	Fully Burdened Unit Cost
18" Reinforced Concrete Pipe	LF	$330	$65	**$400**	$120	$160	**$680**
21" Reinforced Concrete Pipe	LF	$350	$65	**$420**	$130	$170	**$720**
24" Reinforced Concrete Pipe	LF	$410	$65	**$480**	$140	$190	**$810**
27" Reinforced Concrete Pipe	LF	$470	$65	**$540**	$160	$220	**$920**
30" Reinforced Concrete Pipe	LF	$530	$65	**$600**	$180	$240	**$1,020**
33" Reinforced Concrete Pipe	LF	$570	$65	**$640**	$190	$260	**$1,090**
36" Reinforced Concrete Pipe	LF	$620	$65	**$690**	$210	$280	**$1,180**
42" Reinforced Concrete Pipe	LF	$700	$65	**$770**	$230	$310	**$1,310**
48" Reinforced Concrete Pipe	LF	$790	$65	**$860**	$260	$340	**$1,460**
54"Reinforced Concrete Pipe	LF	$870	$65	**$940**	$280	$380	**$1,600**

Storm Sewer Drain Estimate

STORM DRAIN PIPES		Quantity	Unit	Fully Burdened Unit Cost	Outfall Cost	Total Cost
24" RCP	Santa Clara St - Diridon Station to Guadalupe River	1,150	LF	$810	$40,000	**$971,500**
24" RCP	San Carlos St - Gifford Ave to Woz Way	1,000	LF	$810	-	**$810,000**
24" RCP	Autumn St @ Park Ave	150	LF	$810	$40,000	**$161,500**
24" RCP	San Fernando St - Diridon Station to Guadalupe River	670	LF	$810	$40,000	**$582,700**
30" RCP	The Alameda @ Stockton Ave	60	LF	$1,020	-	**$61,200**
36" RCP	Stockton Ave - The Alameda to Cinnabar St	1,740	LF	$1,180	-	**$2,053,200**
42" RCP	Cinnbar St - Stockton Ave to Autumn St	1,220	LF	$1,310	-	**$1,598,200**
48" RCP	Autumn St - Cinnabar to Julian St	980	LF	$1,460	-	**$1,430,800**
54" RCP	San Carlos St - Sunol St to Los Gatos Creek	930	LF	$1,600	$40,000	**$1,528,000**
				Storm Sewer Impr. Grand Total:		**$9,200,000**

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

Potable Water Unit Price Summary

MISCELLANEOUS POTABLE WATER ITEMS	Unit	Unit Cost	Unit Cost	Spacing (ft)	LF Equiv.
Remove Existing Pipe	LF	$30	$30	-	$30
Potable Water Valve	EA	$5,600	$5,600	500	$10
Reconnect Lateral Connection	EA	$500	$500	100	$5
				Misc. Items Total:	**$45/LF**

POTABLE WATER PIPES	Unit	Unit Cost	Addit. Misc. Items	Total Contr. Cost	Contingency (30%)	Engr., Insp., & CM (40%)	Fully Burdened Unit Cost
8" Ductile Iron Pipe	LF	$180	$45	**$230**	$70	$90	**$390**
10" Ductile Iron Pipe	LF	$210	$45	**$260**	$80	$100	**$440**
12" Ductile Iron Pipe	LF	$250	$45	**$300**	$90	$120	**$510**
14" Ductile Iron Pipe	LF	$300	$45	**$350**	$110	$140	**$600**
16" Ductile Iron Pipe	LF	$350	$45	**$400**	$120	$160	**$680**
18" Ductile Iron Pipe	LF	$400	$45	**$450**	$140	$180	**$770**

Potable Water Imporvements Estimate

POTABLE WATER PIPES		Quantity	Unit	Fully Burdened Unit Cost	Total Cost
16" DIP	Sunol St - Auzerais Ave to Park Ave	1,880	LF	$680	**$1,278,400**
16" DIP	Park Ave - Sunol St to Autumn St	1,560	LF	$680	**$1,060,800**
16" DIP	Stockton St - The Alameda to Cinnabar St	1,750	LF	$680	**$1,190,000**
16" DIP	Julian St - 610' East of Stockton Ave	610	LF	$680	**$414,800**
				Potable Water Impr. Grand Total:	**$3,900,000**

DIRIDON AREA INFRASTRUCTURE ANALYSIS COST ESTIMATE
1/31/2017

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Recycled Water Unit Price Summary

MISCELLANEOUS RECYCLED WATER ITEMS	Unit	Unit Cost	Spacing (ft)	LF Equiv.
Recycled Water Valve	EA	$5,600	500	$0
Lateral Connection	EA	$500	100	$0
			Misc. Items Total:	**$15/LF**

RECYCLED WATER P	Unit	Unit Cost	Addit. Misc. Items	Total Contr. Cost	Contingency (30%)	Engr., Insp., & CM (40%)	Fully Burdened Unit Cost
6" Ductile Iron Pipe	LF	$160	$15	**$180**	$50	$70	**$300**
8" Ductile Iron Pipe	LF	$180	$15	**$200**	$60	$80	**$340**
10" Ductile Iron Pipe	LF	$210	$15	**$230**	$70	$90	**$440**
12" Ductile Iron Pipe	LF	$250	$15	**$270**	$80	$110	**$460**
14" Ductile Iron Pipe	LF	$300	$15	**$320**	$100	$130	**$550**
16" Ductile Iron Pipe	LF	$350	$15	**$370**	$110	$150	**$630**
18" Ductile Iron Pipe	LF	$400	$15	**$420**	$130	$170	**$720**

Recycled Water Imporvements Estimate

RECYCLED WATER PIPES		Quantity	Unit	Fully Burdened Unit Cost	Total Cost
6" DIP	Santa Clara St/The Alameda - Autumn St to Stockton Ave	1,000	LF	$300	**$300,000**
6" DIP	Stockton St - The Alameda to Juilan St	970	LF	$300	**$291,000**
8" DIP	Bird Ave, Montgomery St, Autumn St	6,800	LF	$340	**$2,312,000**
				Recycled Water Impr. Grand Total:	**$2,900,000**

Schaaf & Wheeler

HMH