North Bayshore Gateway Master Plan
Utility Impact Study

Prepared for
Raimi & Associates

and

City of Mountain View
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DRAFT

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Executive Summary

Schaaf & Wheeler has been retained by Raimi & Associates to determine impacts from the North Bayshore Gateway Master Plan, MV Gateway Development (Project) on the City of Mountain View's (City) water, sanitary sewer, recycled water, and storm drain systems. The Project is located within the North Bayshore Precise Plan Area and is bordered by Long Lonesome Road to the west, Plymouth Street to the north, North Shoreline Boulevard to the east, and US Highway 101 to the south. The Project includes multiple buildings with different types of land use which include residential, office, retail, entertainment, restaurants, retail, and hotel.

Project impacts to the water system are analyzed for both Existing (2010) and Future Cumulative (2030) Conditions. Hydraulic models simulating pre- and post-Project development scenarios are performed to examine hydraulic deficiencies. The Existing Condition is based on the updated models prepared during the North Bayshore Precise Plan II (NBPP II), (Schaaf & Wheeler, 2016), which is based on the *2010 Water Master Plan* (WMP; IEC, August 2010); the Future Cumulative Condition model is created from the *General Plan Update Utility Impact Study* (GPUUIS; IEC, October 2011), which was also updated as part of NBPP II. The Future Cumulative Condition model includes CIPs from the GP-UWSM and CIPs from the NBPP II, as well as recent City approved projects not accounted for or in exceedance of the 2030 GPUUIS projections.

Project impacts to the sewer system are also analyzed for Existing (2010) and Future Cumulative (2030) Conditions. Hydraulic models simulating pre- and post-Project development scenarios are performed to examine hydraulic deficiencies. The Existing Condition is based on the updated models prepared during the North Bayshore Precise Plan II Utility Impact Study (NBPP II), (Schaaf & Wheeler, 2016), which are based on the *2010 Sewer Master Plan* (SMP). The Future Cumulative Condition sewer model is created from the General Plan Update Utility Impact Study (GPUUIS) model, which was also updated as part of the NBPP II. The Future Cumulative Condition model includes all sewer system CIPs recommended in the GPUUIS and the NBPP II, as well as recent City-approved projects not accounted for or in exceedance of the 2030 GPUUIS projections.

The Project impacts to the recycled water system have been assessed using the hydraulic model developed as part of the Recycled Water Feasibility Study (Carollo, October 2012). Irrigation demands based on project landscaping were calculated to evaluate potential impacts from the Project development.

Impacts to the storm drain system resulting from Project development are assessed using the *2019 Storm Drain Master Plan* (SDMP; Schaaf & Wheeler, September 2019) hydrologic and hydraulic model. Impacts based on potential changes to the runoff characteristics of the site are summarized.

Water System Project Impacts

The Project development does not significantly impact the water system during Existing Condition or Future Cumulative Condition. The Future Cumulative Condition assumes all the recommended CIPs in the NBPP II have been constructed. The Project will add new in-tract water main piping that increases the looping and provides additional conveyance between N. Shoreline Blvd. and Plymouth Street. The anticipated Project-specific fire flow requirement of 3,500 gpm for the Project site is met during Existing Condition and Future Cumulative Condition. The Project fire flow requirement is based on the planning level fire flow from the NBPP II. The actual fire flow requirement may change as the planning process continues and Project-specific requirements are determined by the City Fire Marshal. If Project conditions require higher fire flow than what is analyzed, revised modeling should be conducted.

Sewer System Project Impacts

The sewer system has sufficient capacity in the Existing Condition pre-project, but does not have sufficient capacity with the estimated increase in incremental Project flow. In the Future Cumulative Condition, there is sufficient capacity for the system pre-Project with CIP projects identified in the NBPP II. Several pipes do not meet the d/D performance criteria post-Project along Joaquin Road and Charleston Road. CIP 104 is recommended in the NBPP II and must be additionally upsized from 12-inch diameter pipes(recommended in NBPP II), to 15-inch diameter pipes to meet d/D performance criteria post-Project.

There is an existing sewer main that bisects the Project site that serves parcels south of US-101. As part of the Project, a realignment of the existing sewer main to Long Lonesome Road is analyzed. Long Lonesome Road Project realignment is also included as part of the post-Project analyses (existing condition and future cumulative condition), with a 12-inch diameter pipe along Plymouth Street through Joaquin Road as shown on Figure B-11. The existing sewer can be rerouted within new in-tract streets if preferred, as long as the sewer terminates at Joaquin and Plymouth, the sewer analysis will remain valid.

Recycled Water Project Impacts

Based on the provided recycled water system model, there is sufficient capacity to supply the additional irrigation demands for the Project development. However, the City has indicated that the existing system operations may not match the modelled system. Previous modeling efforts by S&W indicate that changes to the system operations can provide enough storage to supply existing recycled water users without constructing costly CIPs identified in the Recycled Water Feasibility Study. However, operational changes can only provide enough supply for a small number of users, and additional storage and pumps identified in the Feasibility Study will need to be constructed to maintain pressures as more users are added.

It is recommended that the City investigate the ongoing operations of the recycled water system to determine if operational changes are feasible. It may be prudent for the City to begin planning the construction of Recycled Water CIPs to meet existing and new user demands.

As recycled water demands keep increasing, it may become necessary for the City to curtail the golf course pond (Shoreline Pond) supply to maintain pressures during peak hour demands. Without modifying the golf course demands, the City's existing issues will continue to worsen as more customers are added or until the capital improvements with storage and booster pump station are constructed.

Storm System Project Impacts

Based on the 2019 SDMP, there is no existing flooding near the Project Site during the 10-year design storm. The existing site imperviousness is assumed to be 84% impervious based on the land use used in the SDMP analysis. If the site impervious percentage is maintained or decreased, the impacts on the storm drain system are expected to be negligible.

There are no CIP projects adjacent to the Project site or necessary to increase the storm drain capacity. There are two CIPs identified in the vicinity: one CIP on Plymouth Street to add a flap gate at the Permanente Creek outfall, as well as another CIP to remove the Charleston Pump Station.

Chapter 1. Introduction

1.1. Project Description

The MV Gateway (Project) encompasses approximately thirty acres within five parcels located in North Bayshore. The Project is located between Long Lonesome Road, Plymouth Street, North Shoreline Boulevard, and US Highway 101. The Project location is identified in Figure B-1. The Project proposes removing nine existing office buildings and constructing 14 new buildings with mixed land uses, including: residential, office, hotel, and entertainment (retail/restaurant/theatre). The Project impacts are based on the new buildings having 2,800 multi-family residential units, 500,000 SF of office space, 300,000 SF of entertainment (split between 37,500 SF of restaurant and 262,500 SF of retail), and 200 Hotel rooms.

1.2. Water System Analysis Approach

Project impacts are analyzed using the City's water model for two conditions: Existing (2010) and Future Cumulative (2030). As a baseline for system performance, each condition is evaluated pre-Project for existing hydraulic deficiencies. The estimated incremental water demand resulting from Project development is added to the model and post-Project deficiencies are examined. In total, four model simulations of the water system are performed, as shown in Figure 1.

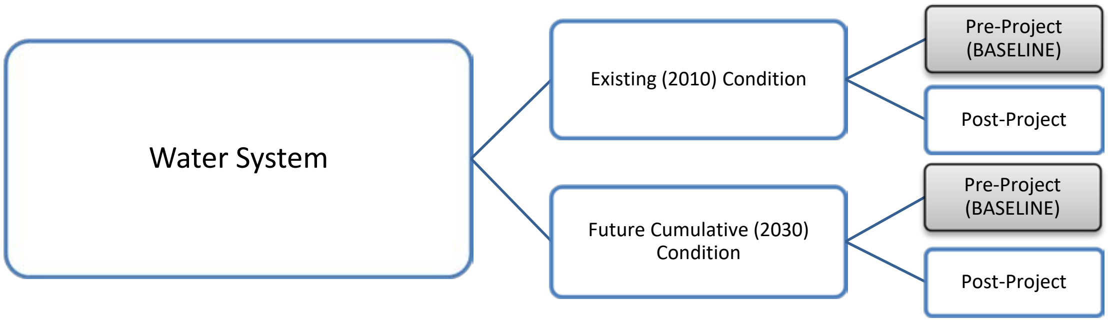

Figure 1. Water Model Simulations

The Existing Condition model consists of the existing distribution system and operating parameters along with water demands based on the 2010 Water Master Plan (WMP), further refined as part of the NBPP II. The Future Cumulative Condition water demand is based on WMP model with updates completed as part of the *2030 General Plan Update (GPU) – Updated Water System Modeling* (GP-UWSM; Schaaf & Wheeler, June 2014) and the NBPP II. The model has since been revised to include recent City approved projects not accounted for or in exceedance of the 2030 GPU projections. Table A-1 in Appendix A provides a list of the considered development projects for the Existing and Future Cumulative Conditions. The Future Cumulative Condition model assumes all of the recommended CIPs from the GPU and NBPP II studies have been constructed.

1.3. Sewer System Analysis Approach

Project impacts to the sewer system are analyzed using the City's sewer model for two conditions: Existing (2010) and Future Cumulative (2030). As a baseline for system performance, each condition is evaluated pre-Project for existing hydraulic deficiencies. The estimated incremental sewer flow resulting from Project development is added to the model and post-Project deficiencies are examined. In total, four model simulations of the sewer system are performed, as shown in Figure 2.

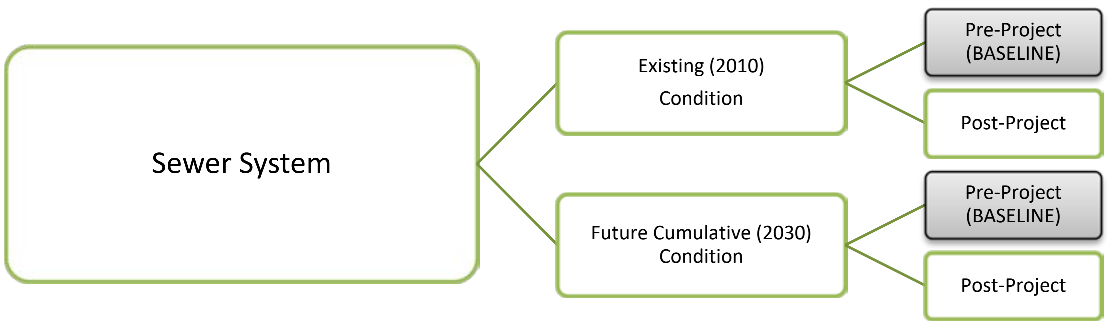

Figure 2. Sewer Model Simulations

The Existing Condition model consists of the existing distribution system and operating parameters along with water demands based on the 2010 Sewer Master Plan, further refined as part of the NBPP II. The Future Cumulative Condition water demand is based on the GPUUIS, with updates completed as part of NBPP II. The model has since been revised to include recent City approved projects not accounted for or in exceedance of the 2030 GPUUIS projections. Table A-1 in Appendix A provides a list of the considered development projects for the Existing and Future Cumulative Conditions. The Future Cumulative Condition model also assumes all of the recommended CIPs from the GPUUIS and NBPP II studies have been constructed.

1.4. Recycled Water System Analysis Approach

Project impacts were evaluated using the City's existing recycled water system model, developed as part of the *Recycled Water Feasibility Study* (RWFS), (Carollo, March 2014). Potential inconsistencies with the modelled system and the existing system operations are discussed. Recommendations are made to alleviate existing system deficiencies. It should also be noted that the City is currently working on updates to the RWFS, the updated model is anticipated to include updated storage configurations and operations.

1.5. Storm Drain System Analysis Approach

The storm drain system is evaluated for anticipated drainage pattern changes at the Project site after development. Pre-Project conditions are assumed to match the site conditions modeled as part of the *2019 Storm Drain Master Plan* (2019 SDMP; Schaaf & Wheeler, April 2019). Percent impervious area on the Project site after development is estimated and compared to the percent impervious area assumed in the 2019 SDMP. Project development potential impacts are summarized.

1.6. Report Organization

This report is organized into six following sections. Chapter 2 discusses the water demand estimates for the Project and Chapter 3 covers the impacts and capital improvement recommendations for the water system. Chapter 4 discusses the sewer flow estimates and Chapter 5 covers the capital improvements recommendations for the sewer system. Chapter 6 covers the Project impacts to the recycled water system, and Chapter 7 covers the storm drainage impacts.

Chapter 2. Water Demand Projections

This chapter discusses the estimated water demand and required fire flow for the Project development. Water demand from the existing buildings and proposed Project are estimated with water unit duty factors taken from previous technical studies to remain consistent with the City-wide demand projections used in the hydraulic models. The incremental difference in estimated demand between the proposed Project and the existing demand at the site is evaluated to determine Project impact on the system.

Water demand in this section represents Average Daily Demand (ADD). The ADD is an estimated daily average of water use patterns that varies by season and customer type.

2.1. Project Water Demand

Project water demand is estimated from the North Bayshore Gateway Master Plan Administrative Draft, (Raimi & Associates, December 11 2020). The duty factors applied were developed for the City as part of the North Bayshore Precise Plan Phase II from water meter records of recent developments throughout the City. Table 2-1 provides the demand estimation for the Project.

Table 2-1: Project Estimated Water Demand

Address	Land Use Type	Total Area (SF) / Units	Water Duty Factor (gpd / 1000 SF or gpd / Unit)	Water Demand (gpd)
MV Gateway	Residential	2,800	100	280,000
	Hotel	200	100	20,000
	High Intensity Office	500,000	130	65,000
	Restaurant	37,500	1,200	45,000
	Retail	262,500	130	34,125
Total				444,125

2.1.1. Project Required Fire Flow

The anticipated project-specific fire flow is typically based on building square footage and construction type. For this Project the construction type has not been provided. The planning level fire flow for the Project is assumed based on the NBPPII (Schaaf & Wheeler, 2016) requirements. The fire flow requirement for High Intensity Office is 3,500 and is assumed as the Project required fire flow.

Existing Condition (2010)

2.1.2. Pre-Project (Baseline) Land Use and Demand

The pre-Project (baseline) condition includes parcel-level demand adopted from the City's InfoWater model, developed as part of the 2010 WMP. The demand in the model is calibrated against water billings records from

2005 and 2006, as further explained in the 2010 WMP. Table 2-2 details the model demand at the parcels, which were zoned as P(3) North Shoreline Blvd.

Table 2-2: Baseline Demand for Existing Condition (Based on Model)

Address	APN	2010 Master Plan Land Use Designation	Acreage	Water Demand (gpd)
1435 Plymouth St	116-10-101	P(3) North Shoreline Blvd	1.0	1,872
1431 Plymouth St	116-10-088	P(3) North Shoreline Blvd	0.8	369
1555 Plymouth St	116-13-027	Limited Industrial	2.9	1,056
1600 N. Shoreline Blvd	116-10-070	P(3) North Shoreline Blvd	.7	645
1616 N. Shoreline Blvd	116-10-086	P(3) North Shoreline Blvd	.9	970
1500 N. Shoreline Blvd	116-13-030	P(3) North Shoreline Blvd	15.8	18,014
1400 N. Shoreline Blvd	116-13-024	Limited Industrial	7.0	9,662
Total	-	-	**29.1**	**32,588**

2.1.3. Post-Project Incremental Demand

Total Project demand is added to the hydraulic model as an incremental difference from the pre-Project estimated demand, as shown in Table 2-3. The Project is anticipated to incrementally increase water demand by *411,537* gpd above pre-Project demand.

Table 2-3: Incremental Project Demand for Existing Condition

	Water Demand (gpd)
Pre-Project Demand	32,588
Project Demand	444,125
Incremental Project Demand	***+ 411,537***

2.2. Future Cumulative Condition (2030)

2.2.1. Pre-Project (Baseline) Land Use and Demand

Future Cumulative (baseline) demand for the Project is adopted from the City's InfoWater model developed as part of the 2030 GPUUIS and updated as part of the NBPP II. In the updated model from NBPP II, water demands are based on the 2030 General Plan Update (GPU) land use with additional projects; these demands have since been updated to include projects from the NBPP II and additional projects not accounted for in the original GPUUIS. Table 2-4 presents the parcel level pre-project demand from the model.

Table 2-4: Baseline Demand for Future Cumulative Condition (Based on Model)

Address	APN	2010 Master Plan Land Use Designation	Acreage	Water Demand (gpd)
1435 Plymouth St	116-10-101	P(3) North Shoreline Blvd	1.0	8,359
1431 Plymouth St	116-10-088	P(3) North Shoreline Blvd	0.8	6,688
1555 Plymouth St	116-13-027	Limited Industrial	2.9	24,242
1600 N. Shoreline Blvd	116-10-070	P(3) North Shoreline Blvd	.7	5,852
1616 N. Shoreline Blvd	116-10-086	P(3) North Shoreline Blvd	.9	7,523
1500 N. Shoreline Blvd	116-13-030	P(3) North Shoreline Blvd	15.8	131,242
1400 N. Shoreline Blvd	116-13-024	Limited Industrial	7.0	58,515
Total	**-**	**-**	**29.1**	**242,421**

2.2.2. Post-Project Incremental Demand

Project demand is added to the model as an incremental difference from the pre-Project demand. The incremental Project demand in the Future Cumulative Condition is given in Table 2-5. The project exceeds the assumed future demand by an additional 201,704 gpd.

Table 2-5: Incremental Project Demand for Future Cumulative Condition

	Water Demand (gpd)
Pre-Project Demand	242,421
Project Demand	444,125
Incremental Project Demand	***+ 201,704***

The overall water demand within NBPP II is not increased above the precise plan cap. Therefore, other areas within the NBPP II with similar land use as the Project are adjusted to be consistent with approved NBPP II area allocations.

Chapter 3. Water System Impact

Project impacts to water supply, water storage, hydraulic conveyance, and fire flow requirements are evaluated in this chapter to ensure the Project demand can be adequately met. Hydraulic conveyance and available fire flow are assessed for both Existing (2010) and Future Cumulative (2030) Condition. Water supply and water storage are evaluated for the Future Cumulative Condition.

3.1. Demand Scenarios and Performance Criteria

Hydraulic deficiencies within the water system are evaluated under two demand scenarios: Peak Hour Demand (PHD) and Maximum Day Demand with Fire Flow (MDD + FF). The MDD and PHD peaking factors from the 2010 Water Mater Plan (WMP) are used for this analysis. As detailed in the 2010 WMP, MDD and PHD peaking factors are developed using SCADA data from peak usage months in 2006 and 2007. The peak hour occurred on the day with the largest daily demand, which was observed to be August 8, 2007. The calculated peaking factors, presented in Table 3-1, are applied to Average Day Demand (ADD).

Table 3-1: Peaking Factors

Category	Peaking Factor
Maximum Day	1.71
Peak Hour	2.79

Established design criteria used to evaluate the Project impact for all scenarios are summarized in Table 3-2.

Table 3-2: Water System Performance Criteria

Criteria	PHD	MDD + FF
Minimum Allowable Pressure (psi)	40	20

3.2. Water Supply Analysis

The increased water demand from Project development in the Future Cumulative Condition is compared with the City's supply turnouts and groundwater well capacities to ensure demand can be met. The Mountain View water system is divided into three pressure zones to maintain reasonable pressures throughout the City’s rising topography moving south, further from the Bay. The Project site is in Pressure Zone 1, which is at this time, supplied by only one San Francisco Public Utilities Commission (SFPUC) turnout (Turnout #5).

Water demand versus supply capacity by Pressure Zone is given in Table 3-3. Total capacity for Pressure Zone 1 includes peak hour turnout capacity from SFPUC Turnout #5 and additional supply supplemented from Wells #22 and #23. Demand in Pressure Zone 1 cannot be sufficiently supplied by the current supply operation; however, as discussed in the *2030 General Plan Update Utility Impact Study* (IEC, 2011), surplus supply in Pressure Zone 2 could be routed to Pressure Zone 1 to make up the supply deficiency in the Pressure Zone 1. A pressure reducing valve (PRV) moving water from Pressure Zone 2 to Pressure Zone 1 at North Whisman Road, between Walker Drive and Whisman Court, is included in the *North Bayshore Precise Plan II Utility Impact Study*

(NBPPII UIS; Schaaf & Wheeler, October 2016). The ability of the system to meet Project demand and the fire flow requirement at Future Cumulative Condition assumes this CIP has been constructed. If the CIP is not constructed, the City will have a considerable deficit of supply vs projected peak demand for Zone 1. The City will not be able to adequately supply Zone 1 demands in the Future Cumulative Condition. The additional Project demand does not impact the City's ability to meet total system demand.

Table 3-3: Future Cumulative Condition Demand Versus Supply

Pressure Zone	2030 Future Cumulative Demand			Total Capacity (mgd)*
	Pre-Project		Post-Project	
	ADD (mgd)	PHD (mgd)	PHD (mgd)	
1	7.98	22.26	22.26	16.56
2	8.41	23.46	23.46	30.53
3	1.62	4.52	4.52	5.10
Total	**18.01**	**50.25**	**50.25**	**52.19**

** Total Capacity from Table 3-8 in the General Plan Update Utility Impact Study (IEC, 2011)*

3.3. Water Storage Analysis

Project impact to water storage volume requirements is evaluated according to the State Water Resources Control Board Division of Drinking Water (DDW). DDW requires storage equal to 8 hours of Maximum Day Demand (MDD) plus fire flow storage in each pressure zone. The required storage versus active storage in the City is detailed in Table 3-4 pre- and post-Project. The maximum active storage in the City is 17 MG. However, the City currently operates with only the operational active storage of 14.3 MG.

The fire flow volume in Table 3-4 revises the requirement in the 2010 WMP and is estimated from the largest fire flow requirement in each pressure zone. Based on CFC requirements, the fire flow volume is calculated as 5,000 gpm for 4 hours. Pressure Zone 3 has the potential for a reduction in required fire flow volume since the controlling fire flow requirement is the hospital along Grant Road, which has a planning-level fire flow requirement of 3,500 for 4 hours.

Since the City has the storage volume available to meet DDW requirements in the Future Cumulative Condition pre- and post-Project, no additional storage improvements are recommended. In the future when City demand and storage requirements exceed the current operating storage, the City may need to alter reservoir operation schemes.

Table 3-4: DDW Storage Requirements

Pressure Zone	Maximum Active Storage* (MG)	Operational Active Storage (MG)	Fire Flow (MG)	Future Cumulative Condition Demand					
				Pre-Project			Post-Project		
				ADD (mgd)	8 Hours of MDD (MG)	DDW Requirement (MG)	ADD (mgd)	8 Hours of MDD (MG)	DDW Requirement (MG)
1	6.00	5.1	1.2	7.98	4.55	5.25	7.98	4.55	5.25
2	8.00	6.5	1.2	8.41	4.79	6.30	8.41	4.79	6.30
3	3.00	2.7	1.2	1.62	0.92	2.12	1.62	0.92	2.12
Total	**17.00**	**14.3**	**3.6**	**18.01**	**10.27**	**13.67**	**18.01**	**10.27**	**13.67**

** Maximum Active Storage from Table 4-2 in the General Plan Update Utility Impact Study (IEC, 2011)*

3.4. Existing Condition (2010) Results

3.4.1. Hydraulic Model Information

Existing water system performance is analyzed with the demands and land use type in the City's InfoWater model developed for the City's 2010 WMP. According to the North Bayshore Gateway Master Plan Draft (Raimi & Associates, December 11, 2020), the Project will install new 8-inch water mains within the project site to provide additional conveyance and looping of the City's public water system. These additional pipes were utilized in the post-Project hydraulic models.

The Existing Condition pre-Project fire flow requirement is taken from the 2010 WMP model. The existing (non-reduced) fire flow requirement for the pre-Project land use classification of the MV Gateway site, North Shoreline Blvd (P3) is 5,000 gpm. After Project development, the Project specific required fire flow at the site is anticipated to be 3,500 gpm based on the NBPP II planning level fire flow.

The fire flow requirements for Existing Condition are based on general landuse type and planning fire flow requirements used during the 2010 WMP. The existing deficient nodes are deficient based on the updated fire flow requirements and not the actual fire flows required for individual buildings at the time they were approved.

3.4.2. Peak Hour Demand (PHD) – Pre and Post Project

System pressures are evaluated under Peak Hour Demand (PHD) pre-Project (Figure B-2) and post-Project (Figure B-3). At Existing Condition the system meets performance criteria system-wide. The additional in-tract piping helps alleviate existing deficiencies on-site and near the site. The Project development does not negatively impact the system hydraulic performance under PHD.

3.4.3. Maximum Day Demand with Fire Flow (MDD+FF) – Pre and Post Project

The pre-Project required fire flow of 5,000 gpm is not met at multiple existing hydrant locations. After Project development, the anticipated project-specific fire flow requirement of 3,500 can be met.

The existing deficiencies in Pressure Zone 1 shown on Figures B-4 and B-5 are independent of the Project. These deficiencies may be due to higher planning level fire flow requirements and are considered to be conservative.

Table 3-5: Existing Condition Evaluated Project Fire Flow Nodes

Model Node ID	Location	Required Fire Flow Rate (gpm)	Available Flow Pre-Project (gpm)	Available Flow Post-Project (gpm)
J-2924	Project Location – Within Project Site	Pre-Project: 5,000 Post-Project: 3,500	**3,685**	5,818
J-2952	Project Location – Plymouth Street	Pre-Project: 5,000 Post-Project: 3,500	**4,258**	5,469
J-2946	Project Location – Plymouth	Pre-Project: 5,000 Post-Project: 3,500	**4,536**	4,612

3.4.4. Deficiencies – Pre and Post Project

With Existing Condition demand, the water system meets system design criteria at PHD and is able to adequately supply the increased Project demand. Existing fire flow deficient nodes are evaluated within the Project Pressure Zone (Zone 1) for Project impact. Available fire flow pre- and post-Project at selected deficient nodes is presented in Table 3-6. The Project reduces and in some cases eliminates existing fire flow deficiencies as a result of the in-tract looping, providing additional conveyance capacity.

Table 3-6: Selected Existing Condition Fire Flow Deficient Nodes Pre- and Post-Project

Node ID	Location	Required Fire Flow Rate (gpm)	Available Flow Pre-Project (gpm)	Available Flow Post-Project (gpm)
J-2974	Huff Avenue	5,000	3,655	3,747
J-1564	Charleston Road	5,000	4,450	4,490
J-2977	Joaquin Road	5,000	3,649	3705

3.5. Future Cumulative Condition (2030) Results

3.5.1. Hydraulic Model Information

The Future Cumulative Condition model is created using the NBPP II model. System performance is analyzed under the assumption that all recommended CIPs in the NBPP II have been constructed.

Domestic and fire services for the Project will connect to the existing 12-inch diameter water main in North Shoreline Boulevard, new 8-inch in-tract water lines, and existing 8-inch water lines in Plymouth Street.

The Future Cumulative Condition fire demands are based on the NBSPPPII UIS. The pre-Project fire flow requirement for the two project sites is 3,500 gpm. After Project development, the Project specific assumed required fire flow at the site is 3,500 gpm.

3.5.2. Peak Hour Demand (PHD) – Pre and Post Project

The system has adequate pressures pre-Project (Figure B-6) and is able to satisfy post-Project demands while meeting the design criteria at PHD (Figure B-7).

3.5.3. Maximum Day Demand with Fire Flow (MDD+FF) – Pre and Post Project

In the Future Cumulative Condition, the system has a deficient node within the project site. The addition of in-tract pipes provides additional looping and increases the available fire flow within the project site and at adjacent fire nodes. Within Pressure Zone 1, there are several deficient nodes; the nodes identified as deficient are deficient prior to the project, with no new nodes identified as deficient post-project. Pre-and post-Project conditions assume all NBPP II CIPs have been constructed, results are shown on Figures B-8 and B-9.

Table 3-7: Future Cumulative Condition Evaluated Project Fire Flow (FF) Nodes

Model Node ID	Location	Required Fire Flow Rate (gpm)	Available Flow Pre-Project (gpm)	Available Flow Post-Project (gpm)
J-2924	Project Location – Within Project Site	Pre-Project: 3,500 Post-Project: 3,500	**3,396**	5,574

3.5.4. Deficiencies – Pre and Post Project

The fire flow deficient nodes within Pressure Zone 1 are evaluated for Project impact. Table 3-8 compares the available fire flow before and after Project development and shows the fire flow deficiencies in Pressure Zone 1. Available Fire Flow increases due to in-tract piping providing additional conveyance capacity to the local water system. The nodes identified in Table 3-8 were identified as deficient pre-Project and two continue to be deficient post-project.

Table 3-8: Future Cumulative Condition Fire Flow Deficient Nodes Pre- and Post-Project

Node ID	Location	Required Fire Flow Rate (gpm)	Available Flow Pre-Project (gpm)	Available Flow Post-Project (gpm)
J-2974	Huff Ave	Pre-Project: 3,500 Post-Project: 3,500	**3,430**	**3,495**
J-2977	Joaquin Rd	Pre-Project: 3,500 Post-Project: 3,500	**3,486**	3,530
J-4216	Space Park Way	Pre-Project: 3,500 Post-Project: 3,500	**3,305**	**3,315**

Chapter 4. Sewer Flow Projections

This chapter discusses the sewer flow estimate for Project development and provides a comparison to pre-Project baseline condition. The incremental Project flow is determined for both Existing (2010) and Future Cumulative (2030) Condition, as discussed in the following sections. The sewer generation factor for estimating Project sewer flow is taken from previous technical studies (2010 WMP, 2030 GPUUIS, and NBPPII) to remain consistent with the City-wide flow projections used in the hydraulic models.

Three types of sewer flow loading are used to model the sewer system: base wastewater flow, groundwater infiltration (GWI), and rainfall-dependent infiltration/inflow (RDI/I). GWI includes base infiltration (BI) and pumped groundwater discharged to the sewer system. RDI/I is stormwater that enters the sewer system. GWI and RDI/I values are modeled as constant flows.

Base wastewater flow (BWF) is from residential, commercial, institutional, office, and industrial sources. As described in the 2010 Sewer Master Plan (SMP), BWF is developed on an individual parcel level using the 2005 and 2006 water billing records and applying a return-to-sewer (RTS) ratio calculated for land use type. Change in BWF throughout the day due to daily use patterns is known as diurnal variation and is accounted for by applying residential and non-residential diurnal curves. BWF and diurnal curves used in this analysis are taken from the 2010 SMP to remain consistent with previous City-wide modeling. The sewer flows discussed in this section are the BWF values representing average flows and are not peaked.

4.1. Project Sewer Flow

Project generated sewer flow is estimated from the square footage provided in the North Bayshore Gateway Master Plan Administrative Draft, December 11, 2020. A Return-to-Sewer (RTS) ratio of 0.75 is applied to all land use types based on the NBSPPII study. Table 4-1 provides the estimated Project sewer flow.

Table 4-1: Project Estimated Sewer Flow

Address	Land Use Type	Total Area (SF) / Units	Sewer Duty Factor (gpd / 1000 SF or gpd / Unit)	Project Sewer Flow (gpd)
MV Gateway	Residential	2,800	75	210,000
	Hotel	200	75	15,000
	High Intensity Office	500,000	100	50,000
	Restaurant	37,500	900	33,750
	Retail	262,500	100	26,250
Total				335,000

4.2. Existing Condition (2010)

4.2.1. Pre-Project (Baseline)

The pre-Project (baseline) condition includes parcel-level sewer flow adopted from the City's InfoSWMM model, developed as part of the 2010 SMP. Table 4-2 details the parcel-level sewer flow in the model, which was calculated with an RTS ratio of the Existing Condition water demand. The RTS ratios for office P(1)-Shoreline West, and P(2)-Charleston South Industrial were taken from the 2010 SMP (Table 3-2).

Table 4-2: Baseline Flow for Existing Condition (Based on Model)

Address	APN	2010 Master Plan Land Use Designation	Acreage	Water Demand (gpd)
1435 Plymouth St	116-10-101	P(3) North Shoreline Blvd	1.0	1,404
1431 Plymouth St	116-10-088	P(3) North Shoreline Blvd	0.8	277
1555 Plymouth St	116-13-027	Limited Industrial	2.9	792
1600 N. Shoreline Blvd	116-10-070	P(3) North Shoreline Blvd	.7	450
1616 N. Shoreline Blvd	116-10-086	P(3) North Shoreline Blvd	.9	680
1500 N. Shoreline Blvd	116-13-030	P(3) North Shoreline Blvd	15.8	13,511
1400 N. Shoreline Blvd	116-13-024	Limited Industrial	7.0	7,247
Total	**-**	**-**	**29.1**	**24,361**

4.2.2. Post-Project Incremental Demand

For the Project impact analysis in the Existing Condition, Project sewer flow is added to the Existing Condition model as an incremental difference from pre-Project flow. The Project incremental sewer flow is given in Table 4-3.

Table 4-3: Incremental Project Flow for Existing Condition

	Sewer Flow (gpd)
Pre-Project (Baseline) Flow	24,361
Project Flow	335,000
Incremental Project Flow	***+ 310,639***

4.3. Future Cumulative Condition (2030)

4.3.1. Pre-Project (Baseline)

Future Cumulative (baseline) flow for the Project is adopted from the City's InfoSWMM model, updated as part of the NBPP II. In the model, sewer flows are based on the 2030 General Plan Update (GPU) land use; these flows have since been updated to include recent City approved projects outlined in Table A-1 in Appendix A, which were not accounted for or were in exceedance of the 2030 GPU projections. Table 4-4 presents parcel-level pre-Project demand from the model.

Table 4-4: Baseline Flow for Future Cumulative Condition (Based on Model)

Address	APN	2010 Master Plan Land Use Designation	Acreage	Water Demand (gpd)
1435 Plymouth St	116-10-101	P(3) North Shoreline Blvd	1.0	6,457
1431 Plymouth St	116-10-088	P(3) North Shoreline Blvd	0.8	5,165
1555 Plymouth St	116-13-027	Limited Industrial	2.9	18,724
1600 N. Shoreline Blvd	116-10-070	P(3) North Shoreline Blvd	.7	4,520
1616 N. Shoreline Blvd	116-10-086	P(3) North Shoreline Blvd	.9	5811
1500 N. Shoreline Blvd	116-13-030	P(3) North Shoreline Blvd	15.8	101,368
1400 N. Shoreline Blvd	116-13-024	Limited Industrial	7.0	45,196
Total	-	-	**29.1**	**187,241**

4.3.2. Post-Project Incremental Demand

Project flow is added to the Future Cumulative Condition model as an incremental difference from pre-Project flow. The incremental Project flow is given in Table 4-5.

Table 4-5: Incremental Project Flow for Future Cumulative Condition

	Sewer Flow (gpd)
Pre-Project (Baseline) Flow	187,241
Project Flow	335,000
Incremental Project Flow	***+ 147,759***

The overall sewer generation within NBPP II is not increased above the precise plan cap. Therefore, other areas within the NBPP II with similar land use as the Project are adjusted to be consistent with approved NBPP II area allocations.

Chapter 5. Sewer System Impact

The impact of Project development on the sewer system is analyzed under both Existing (2010) and Future Cumulative (2030) Conditions. Two conveyance paths of the gravity system are evaluated for Project impact, the fist begins at Plymouth Street, north side of the site, and flows north along Joaquin Road, east along Charleston toward North Shoreline Blvd. The other begins at North Shoreline Boulevard just north of US Highway 101, both conveyance paths combine at North Shoreline Boulevard and Charleston Road. Post-Project conditions assume the sewer line through the Project site has been realigned through Long Lonesome Road as a 12-inch diameter pipe to maintain its existing diameter, through Long Lonesome Road, Plymouth Street, Joaquin Road, and to Charleston Road.

5.1. Scenarios and Performance Criteria

Sewer capacity is analyzed under Peak Wet Weather Flow (PWWF) and Average Dry Weather Flow (ADWF). PWWF is used to determine hydraulic deficiencies according to the performance criteria in Table 5-1. ADWF is used to determine adequacy of treatment capacity.

The ADWF scenario is developed in the model by adding BWF and GWI. Since the ADWF scenario models average daily flows, BWF and GWI are not peaked. The PWWF scenario applies the diurnal peaking curves for residential and non-residential flows and simulates system response to rainfall dependent inflow and infiltration. The diurnal peaking curves are adopted from the City's 2010 SMP. Groundwater Infiltration (GWI) and rainfall-dependent infiltration/inflow (RDI/I) are included but are not peaked.

Table 5-1: Sewer System Performance Criteria

Criteria	Pipe Diameter ≤ 12 inch	Pipe Diameter > 12 inch
Maximum Flow Depth/Pipe Diameter (d/D)	0.50	0.75

5.2. Sewer Treatment, Joint Interceptor, and San Antonio Interceptor Capacity

Sewage generated within the City is treated at the Regional Water Quality Control Plant (RWQCP) in Palo Alto. The sewer collection system is a gravity system with the majority of flow discharging into three main trunk lines that convey flow from the south to the north and terminate at the Shoreline Pump Station (SPS) located within the City's Shoreline Park. Flow is then pumped to the gravity Joint Interceptor Sewer that conveys flow to the RWQCP. The remaining flow not received at the SPS is discharged to the Los Altos' San Antonio Interceptor that also conveys flow into the Joint Interceptor.

The City entered into a joint agreement, referred to as the Basic Agreement, with the cities of Palo Alto and Los Altos in 1968 for the construction and maintenance of the joint sewer system addressing the need for conveyance, treatment, and disposal of wastewater to meet Regional Board requirements. In accordance with the Basic Agreement, Palo Alto owns the RWQCP and administers the Basic Agreement with the partnering agencies purchasing individual capacity rights in terms of an average annual flow that can be discharged to the RWQCP. Capacity rights of the three cities can be rented or purchased from other neighboring agencies and each partnering agency can sell their capacity to others. Contractual capacity is based upon the 1985 Addendum

No. 3 of the 1968 Joint Sewer System agreement that revised capacity rates in relationship to facility expansion and is based upon Average Annual Flow (defined as 1.05 times Average Dry Weather Flow). Separate service agreements with the RWQCP have since reallocated current capacity rights to include six partnering agencies. Table 5-2 presents the current capacity rights for each agency.

Table 5-2: RWQCP Joint Facilities Capacity Rights

Partner Agency	Treatment Capacity	72-inch Joint Interceptor Capacity
	Average Annual Flow (MGD)	Peak Wet Weather Flow (MGD)
Palo Alto	15.3	14.59
East Palo Alto Sanitary District	3.06	0
Los Altos Hills	0.63	3.41
Stanford University	2.11	0
Mountain View	15.1	50
Los Altos	3.8	12
Total	***40***	***80***

Source: Long Range Facilities Plan for the Regional Water Quality Control Plant (Carollo, May 2012)

The City's total capacity rights include flow leaving the City through the SPS and the amount of flow that the City discharges into the Los Altos' San Antonio Interceptor, per the 1970 Los Altos San Antonio Trunk Sewer Capacity Agreement between the two cities. The total system-wide contractual capacity for Mountain View is evaluated in the Existing and Future Cumulative Conditions with increased Project flow. Table 5-3 shows the City's projected flows compared to the RWQCP Joint Facilities capacity rights.

Per the Basic Agreement, the partnering agencies agree to conduct an engineering study when their respective service area reaches 80% of their contractual capacity rights. The Future Cumulative Condition estimates that the projected demand pre-Project and post-Project will exceed the 80% capacity threshold. The required engineering study when the City reaches 80% of their capacity shall redefine the anticipated future needs of the treatment plant.

Table 5-3: Capacity Rights Comparison

RWQCP Joint Facility	Mountain View Contractual Capacity (MGD)	Pre-Project		Post-Project	
		2010 Existing (MGD)	2030 Future Cumulative (MGD)	2010 Existing (MGD)	2030 Future Cumulative (MGD)
Treatment	15.1	10.16	14.15	10.51	14.15
Joint Interceptor	50.0	16.98	21.91	17.31	21.91

* *Treatment = Average Annual Flow (AAF), Joint Interceptor = PWWF*

5.3. Existing Condition (2010) Results

5.3.1. Hydraulic Model Information

The Existing Condition sewer system is modeled using the City's InfoSWMM model developed as part of the *2010 Sewer Master Plan* (SMP). Project sewer flow is assumed to discharge to two sewer mains, a new 12-inch line within Joaquin Road and to the existing 12-inch diameter sewer main within North Shoreline Blvd. The new 12-inch diameter sewer main within Joaquin Road is assumed to be completed as part of this Project and is identified as the Long Lonesome Road Sewer Realignment.

5.3.1.1. Long Lonesome Road Sewer Realignment

As part of the post-Project condition, it is assumed the 12-inch sewer crossing through the Project site is realigned west and then north along Long Lonesome Road. The inverts along this conveyance pathway appear to provide adequate slopes. Additional difficulties with maintaining the existing sewer alignment, or providing a new sewer alignment to the N Shoreline Blvd including crossing the proposed bike path bridge footings while maintaining appropriate sewer slopes are eliminated with the Long Lonesome Road Realignment.

The revised alignment would also utilize the existing alignment of sewer mains from Plymouth through Joaquin, a portion of which would require upsizing to meet Project sewer flow demands. The realignment is shown on Figure B-11.

The existing sewer can be rerouted within new in-tract streets if preferred, as long as the sewer terminates at Joaquin and Plymouth, the sewer analysis will remain valid.

5.3.2. Peak Wet Weather Flow (PWWF) Scenario – Pre and Post Project

The sewer system has sufficient capacity downstream of the Project with the pre-Project condition but does not have capacity for the post-Project flows in the Existing Condition as shown in Figures B-10 and B-11. The post-Project condition assumes the 12-inch Long Lonesome Road Sewer Realignment has been completed. A portion of the 12-inch diameter sewer mains on Joaquin Road and Charleston Road do not meet the d/D criteria post-Project.

5.3.3. Deficiencies – Pre and Post Project

Existing Condition model results comparing pre- and post-Project d/D are presented in Table 5-4. In the pre-Project condition, the existing pipes meet d/D performance criteria downstream of the project. Post-Project, 3 pipes do not meet d/D performance criteria downstream of project. The pipes are flowing between 65% and 89% full during PWWF. The three pipes overlap with pipes identified for upsizing as part of NBPP II CIP# 103 and CIP# 104

5.4. Future Cumulative Condition (2030) Results

5.4.1. Hydraulic Model Information

The Future Cumulative Condition model is created using sewer flows based on the NBPP II model. System performance is analyzed under the assumption that all recommended CIPs in the 2030 GPUUIS, as well as those from the NBPP II, have been constructed. Project sewer flow from the Project are assumed to discharge into the 12-inch sewer at the intersection of Plymouth and Joaquin and to the 18- inch sanitary sewer line within North Shoreline Blvd.

Six recommended CIPs identified in the NBPP II are downstream of the Project as shown on Figure B-12. CIP NB-1 includes upsizing 435 feet of 21-inch diameter pipe to 27-inch diameter pipe along N Shoreline Blvd. CIP # 100 includes upsizing 2,700 feet of 18-inch diameter pipe to 21-inch diameter pipe. CIP # 101 includes upsizing 95-feet of 12-inch diameter pipe to 15-inch diameter pipe along N Shoreline Blvd, from La Avenida to Charleston Rd. CIP # 103 includes upsizing 337 feet of 12-inch diameter pipe to 18-inch diameter pipe, 688 feet of 15-inch diameter pipe to 15-inch diameter pipe, 51-feet of 21-inch diameter pipe to 27-inch diameter pipe, and 336 feet of 12-inch diameter pipe to 21-inch diameter pipe. CIP 103 spans from Huff Avenue to the parking lot entrance east of N Shoreline Blvd. CIP #104 includes upsizing 367 feet of 8-inch diameter pipe to 12-inch diameter pipe along Joaquin Road, this CIP is revised as part of the Lonesome Road improvement as part of the realignment. CIP #108 includes upsizing 241 feet of 21-inch diameter pipe to 24-inch diameter pipe along N. Shoreline Blvd. north of Crittenden Ln.

5.4.2. Peak Wet Weather Flow (PWWF) Scenario – Pre and Post Project

The system near the Project site meets d/D performance criteria in the Future Cumulative Condition pre-Project, but one pipe on Joaquin Road does not meet d/D performance criteria post-Project. The 12-inch diameter pipe along Joaquin Avenue (identified as CIP # 104 in the NBPP II) experiences a d/D greater than 50% as shown in Figures B-13. This pipe should be upsized to a 15-inch diameter pipe.

With the post-Project flows, Pipe 193 it is flowing 57% full during PWWF. To meet d/D performance criteria for all pipes downstream of the Project, it is recommended that Pipe Model ID 193 be further upsized to a 15-inch diameter pipe. Following this improvement, the system meets d/D performance criteria downstream of the Project in the Future Cumulative Condition post-Project.

5.4.3. Deficiencies – Pre and Post Project

Table 5-5 presents the comparison of d/D criteria pre- and post-Project for pipes downstream of the Project development. The system meets d/D performance criteria downstream of the Project in the pre-Project condition. In the post-Project condition, one pipe does not meet d/D performance criteria. The NBPP II recommended CIP pipe diameter is indicated by bold green font. The Schaaf & Wheeler recommended pipe diameter for Pipe ID 193 is 15-inches. The d/D performance criteria is indicated by bold blue font in Table 5-5. The Long Lonesome Road Realignment Project pipes are indicated with purple font.

5.5. Project Contribution to Deficient Sewer Pipes

Pipe ID 193 should be upsized from an 12-inch pipe to a 15-inch pipe to convey new sewer flows from the Project. With this improvement, along with the recommended NBPP II CIPs, the system meets the performance criteria post-Project in the Future Cumulative Condition. The Long Lonesome Road sewer realignment project is not included in the NBPP II and is primarily benefiting the Project development by removing conflicts with building layouts. As such, the Project should be fully responsible for the costs associated with the Long Lonesome Road CIP realignment or the realignment within in-tract streets if the Project pipes directing flows from south of US-101 require relocation.

Table 5-6 provides a comparison of ADWF to determine the Project contribution for the recommended pipe improvement projects. Flow contribution is based upon Future Cumulative Condition ADWF. Percentage of Project contribution to the recommended CIPs is provided and can be used to determine impact fees for fair share impact to the sewer system.

Table 5-4: Existing Condition Model Results – Pre and Post Project

						ADWF				PWWF				
						Pre-Project		Post-Project		Pre-Project		Post-Project		
Sewer Main ID	Upstream MH ID	Downstream MH ID	Existing Diameter (in)	Length (ft)	Slope (%)	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Pipe Capacity Remaining (% of Allowed d/D)
227	D4-030	D4-028	8	366	0.439	0.059	0.2267	0.349	0.3130	0.099	0.2950	0.581	0.4237	15
289	D4-017	D4-015	8	225	0.441	0.001	0.0935	0.011	0.2709	0.001	0.1214	0.017	0.3338	33
282	D4-019	D4-015	8	360	0.736	0.002	0.1025	0.006	0.2548	0.004	0.1313	0.009	0.3244	35
177	D4-006	C4-021	30	420	0.100	1.944	0.3173	2.257	0.3426	3.134	0.4072	3.545	0.4352	42
144	C4-017	C4-016	30	244	0.113	1.945	0.3201	2.258	0.3471	3.136	0.4221	3.546	0.4538	39
156	C4-021	C4-017	30	396	0.135	1.944	0.3103	2.257	0.3357	3.135	0.4024	3.545	0.4314	42
103	C4-010	C4-008	30	59	0.340	2.124	0.3493	2.437	0.3788	3.392	0.4618	3.803	0.4945	34
113	C4-012	C4-010	30	323	0.031	2.123	0.3567	2.436	0.3853	3.391	0.4662	3.803	0.4985	34
118	C4-016	C4-012	30	160	0.182	2.123	0.3621	2.436	0.3898	3.390	0.4687	3.802	0.5009	33
72	B4-017	B4-007	21	216	0.760	2.164	0.3345	2.477	0.3593	3.460	0.4312	3.870	0.4594	39
83	B4-019	B4-017	21	445	0.438	2.150	0.3674	2.463	0.3954	3.437	0.4769	3.848	0.5095	32
88	C4-004	B4-019	30	323	0.029	2.142	0.3660	2.455	0.3904	3.425	0.4600	3.836	0.4876	35
96	C4-008	C4-004	30	292	0.098	2.142	0.4198	2.455	0.4482	3.424	0.5274	3.835	0.5584	26
50	B4-024	B4-022	27	75	1.036	2.166	0.2671	2.479	0.2871	3.480	0.3472	3.891	0.3706	51
52	B4-026	B4-022	8	120	0.147	0.000	0.0002	0.000	0.0002	0.004	0.1844	0.004	0.1844	63
56	B4-001	B4-024	27	347	0.115	2.166	0.3140	2.479	0.3355	3.477	0.3976	3.888	0.4211	44
58	B4-003	B4-001	27	64	1.256	2.166	0.3089	2.479	0.3299	3.473	0.3908	3.884	0.4139	45
19	B4-016	B4-014	42	556	0.189	4.880	0.2725	5.198	0.2814	8.477	0.3623	8.874	0.3712	51
21	B4-014	B4-012	42	368	0.272	4.880	0.2719	5.198	0.2807	8.481	0.3616	8.877	0.3704	51

Table 5-4: Existing Condition Model Results – Pre and Post Project Cont.

						ADWF				PWWF				
						Pre-Project		Post-Project		Pre-Project		Post-Project		
Sewer Main ID	Upstream MH ID	Downstream MH ID	Existing Diameter (in)	Length (ft)	Slope (%)	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Pipe Capacity Remaining (% of Allowed d/D)
22	B4-012	B4-010	42	450	0.222	4.880	0.2292	5.198	0.2366	8.484	0.3035	8.881	0.3107	59
20	B4-010	B4-003	42	86	1.388	4.880	0.1955	5.198	0.2017	8.488	0.2579	8.885	0.2639	65
24	B4-003	B4-001	42	200	0.500	4.880	0.2309	5.198	0.2379	8.491	0.3017	8.888	0.3085	59
25	B4-001	B4-006	42	338	0.444	4.880	0.2088	5.198	0.2165	8.495	0.2867	8.892	0.2944	61
45	B4-022	B4-016	21	432	0.398	2.166	0.3918	2.479	0.4216	3.487	0.5104	3.898	0.5446	27
60	B4-005	B4-003	21	98	0.001	2.166	0.4094	2.479	0.4372	3.470	0.5182	3.881	0.5497	27
64	B4-007	B4-005	21	143	0.782	2.166	0.4409	2.479	0.4717	3.466	0.5618	3.877	0.5973	20
209	D4-068	JCT-14	18	509	0.440	1.445	0.4130	1.468	0.4164	2.471	0.5519	2.424	0.5461	27
241	D4-050	D4-068	18	364	0.434	1.442	0.3901	1.465	0.3934	2.466	0.5296	2.420	0.5236	30
260	D4-021	D4-050	18	341	0.429	1.438	0.3909	1.461	0.3943	2.460	0.5309	2.413	0.5248	30
290	D4-033	JCT-12	21	296	0.422	1.421	0.3344	1.444	0.3372	2.443	0.4469	2.398	0.4423	41
306	D4-035	D4-033	18	166	0.423	1.419	0.3806	1.394	0.3796	2.439	0.5143	2.351	0.5054	33
331	E4-002	D4-035	18	375	0.377	1.405	0.3982	1.371	0.3929	2.417	0.5441	2.321	0.5309	29
CDT-17	JCT-14	JCT-16	18	40	0.083	1.445	0.4063	1.468	0.4096	2.471	0.5366	2.424	0.5313	29
CDT-13	JCT-12	D4-021	21	121	0.277	1.436	0.3451	1.459	0.3480	2.456	0.4649	2.410	0.4598	39
173	D4-002	D4-034	12/**15**	356	0.100	0.177	0.3839	0.467	0.4544/	0.284	0.4879	0.765	**0.8984**/**0.5940**	0/**21**
176	D4-034	D4-004	12/**15**	332	0.066	0.180	0.3242	0.470	0.3820/	0.290	0.4093	0.770	**0.6814**/**0.4874**	**0**/**35**
178	D4-004	JCT-16	21	12	0.646	0.180	0.2788	0.470	0.3071	0.291	0.4120	0.772	0.4595	39
CDT-19	JCT-16	D4-006	21	15	0.650	1.625	0.3873	1.938	0.4204	2.747	0.5201	3.154	0.5646	25
193	D4-028	D4-002	**12**/**15**	5	0.490	0.060	0.3632	0.350	0.3222/	0.101	0.4710	0.582	**0.6547**/**0.5558**	**0**/**26**
277	D4-011	D4-013	**12**	248	0.260	0.011	0.1121	0.193	0.2821	0.015	0.1374	0.319	0.3670	51
281	D4-013	D4-015	**12**	237	0.210	0.010	0.1400	0.194	0.2920	0.016	0.1666	0.320	0.3806	49

*Note: Model diameter in bold **green** represents NBPP II CIP upsized pipe utilized to accommodate post-Project flows, model diameter in bold **purple** represents the Long Lonesome Road Sewer Realignment Pipe diameters, d/D values in bold **red** text represents City performance criteria that is not met*

Table 5-4: Existing Condition Model Results – Pre and Post Project Cont.

Sewer Main ID	Upstream MH ID	Downstream MH ID	Existing Diameter (in)	Length (ft)	Slope (%)	ADWF				PWWF				
						Pre-Project		Post-Project		Pre-Project		Post-Project		
						Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Pipe Capacity Remaining (% of Allowed d/D)
249	D4-032	D4-030	**12**	381	0.258	0.053	0.2444	0.343	0.3613	0.089	0.3170	0.570	0.4758	37
280	D4-015	D4-032	**12**	354	0.557	0.034	0.2108	0.324	0.3413	0.054	0.2700	0.536	0.4515	40
LLR-1	E4-006	E4-004	**12**	148	0.347			0.092	0.1844			0.154	0.2376	52
LLR-2	E4-008	E4-006	**12**	282	0.227			0.091	0.1562			0.152	0.1991	60
LLR-3	E4-010	E4-008	**12**	223	0.126			0.091	0.2233			0.151	0.2873	43
LLR-4	E4-046	E4-010	**12**	312	0.110			0.090	0.2312			0.150	0.2993	40
LLR-5	E4-004	E4-002	**12**	95	0.317			0.003	0.2437			0.003	0.4524	10

*Note: Model diameter in bold **green** represents NBPP II CIP upsized pipe utilized to accommodate post-Project flows, model diameter in bold **purple** represents the Long Lonesome Road Sewer Realignment Pipe diameters, d/D values in bold **red** text represents City performance criteria that is not met*

Table 5-5: Future Cumulative Condition Model Results – Pre and Post Project

Sewer Main ID	Upstream MH ID	Downstream MH ID	Model Diameter (in)	Length (ft)	Slope (%)	ADWF				PWWF				
						Pre-Project		Post-Project		Pre-Project		Post-Project		
						Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Pipe Capacity Remaining (% of Allowed d/D)
227	D4-030	D4-028	12	366	0.439	0.252	0.2725	0.358	0.3266	0.287	0.2912	0.581	0.4236	15
289	D4-017	D4-015	8	225	0.441	0.005	0.1924	0.005	0.2364	0.001	0.1667	0.013	0.3219	36
282	D4-019	D4-015	8	360	0.736	0.003	0.1810	0.003	0.2250	0.001	0.1610	0.006	0.2943	41
177	D4-006	C4-021	30	420	0.100	3.298	0.4185	3.228	0.4137	5.103	0.5355	5.220	0.5430	28
144	C4-017	C4-016	30	244	0.105	3.299	0.4306	3.229	0.4252	4.918	0.5517	5.028	0.5598	25
156	C4-021	C4-017	30	396	0.135	3.299	0.4157	3.229	0.4107	4.931	0.5280	5.041	0.5355	29
103	C4-010	C4-008	30	59	0.340	3.503	0.4723	3.433	0.4667	5.111	0.5952	5.220	0.6033	20
113	C4-012	C4-010	30	323	0.031	3.503	0.4760	3.433	0.4705	5.111	0.5989	5.219	0.6071	19
118	C4-016	C4-012	30	160	0.182	3.502	0.4779	3.432	0.4724	5.111	0.6010	5.219	0.6093	19
72	B4-017	B4-007	21	216	0.760	3.649	0.4358	3.579	0.4311	5.305	0.5414	5.413	0.5481	27
83	B4-019	B4-017	21	445	0.438	3.573	0.4928	3.503	0.4872	5.188	0.6250	5.296	0.6340	15
88	C4-004	B4-019	30	323	0.029	3.557	0.4678	3.487	0.4631	5.164	0.5748	5.272	0.5822	22
96	C4-008	C4-004	30	292	0.098	3.557	0.5373	3.487	0.5320	5.163	0.6534	5.271	0.6611	12
50	B4-024	B4-022	27	75	1.036	3.650	0.3283	3.580	0.3250	5.326	0.4031	5.434	0.4077	46
52	B4-026	B4-022	8	120	0.147	0.000	0.0002	0.000	0.0002	0.004	0.1844	0.004	0.1972	61
56	B4-001	B4-024	27	347	0.115	3.650	0.4076	3.580	0.4036	5.323	0.4979	5.431	0.5035	33
58	B4-003	B4-001	27	64	1.256	3.650	0.4007	3.580	0.3968	5.319	0.4892	5.427	0.4946	34
19	B4-016	B4-014	42	556	0.189	7.638	0.3430	7.568	0.3414	11.777	0.4326	11.885	0.4348	42
21	B4-014	B4-012	42	368	0.272	7.638	0.3422	7.568	0.3406	11.780	0.4311	11.888	0.4333	42

Table 5-5: Future Cumulative Condition Model Results – Pre and Post Project Cont.

						ADWF				PWWF				
						Pre-Project		Post-Project		Pre-Project		Post-Project		
Sewer Main ID	Upstream MH ID	Downstream MH ID	Model Diameter (in)	Length (ft)	Slope (%)	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Max Flow (MGD)	d/D	Pipe Capacity Remaining (% of Allowed d/D)
22	B4-012	B4-010	42	450	0.222	7.638	0.2875	7.568	0.2861	11.783	0.3603	11.891	0.3621	52
20	B4-010	B4-003	42	86	1.388	7.638	0.2445	7.568	0.2433	11.787	0.3052	11.895	0.3067	59
24	B4-003	B4-001	42	200	0.500	7.638	0.2864	7.568	0.2852	11.790	0.3551	11.899	0.3568	52
25	B4-001	B4-006	42	338	0.444	7.638	0.2696	7.568	0.2682	11.794	0.3472	11.902	0.3490	53
45	B4-022	B4-016	**27**	432	0.398	3.650	0.3650	3.580	0.3612	5.333	0.4480	5.441	0.4529	40
60	B4-005	B4-003	**24**	98	0.001	3.650	0.4465	3.580	0.4422	5.315	0.5417	5.424	0.5476	27
64	B4-007	B4-005	**24**	143	0.782	3.650	0.4748	3.580	0.4702	5.312	0.5786	5.420	0.5851	22
209	D4-068	JCT-14	**21**	509	0.340	2.260	0.4131	2.154	0.4024	3.574	0.5352	3.511	0.5297	29
241	D4-050	D4-068	**21**	364	0.434	2.256	0.4180	2.150	0.4070	3.593	0.5479	3.530	0.5419	28
260	D4-021	D4-050	**21**	341	0.429	2.180	0.3952	2.073	0.3848	3.476	0.5150	3.414	0.5095	32
290	D4-033	JCT-12	**21**	296	0.299	2.180	0.4401	2.074	0.4282	3.475	0.5764	3.414	0.5702	24
306	D4-035	D4-033	**21**	166	0.423	2.160	0.4124	2.054	0.4012	3.459	0.5408	3.371	0.5338	29
331	E4-002	D4-035	**21**	375	0.377	2.080	0.3943	1.974	0.3835	3.394	0.5191	3.287	0.5099	32
CDT-17	JCT-14	JCT-16	**21**	24	0.250	2.260	0.4133	2.154	0.4031	3.574	0.5263	3.511	0.5215	30
CDT-13	JCT-12	D4-021	**21**	121	0.277	2.180	0.4195	2.074	0.4083	3.475	0.5466	3.414	0.5408	28
173	D4-002	D4-034	**15**	356	0.100	0.467	0.3853	0.513	0.4043	0.603	0.4395	0.791	0.5085	32
176	D4-034	D4-004	**15**	332	0.274	0.476	0.3014	0.522	0.3163	0.611	0.3432	0.799	0.3960	47
178	D4-004	JCT-16	**21**	12	0.646	0.476	0.4346	0.523	0.4271	0.672	0.6476	0.851	0.6591	12
CDT-19	JCT-16	D4-006	**27**	40	0.650	2.737	0.4198	2.677	0.4142	4.427	0.5712	4.533	0.5808	23
193	D4-028	D4-002	**12/15**	367	0.490	0.253	0.4062	0.359	0.4462	0.288	0.4540	0.582	**0.5674/0.4391**	**0/24**
277	D4-011	D4-013	**12**	248	0.260	0.042	0.1296	0.146	0.2447	0.005	0.0526	0.272	0.3376	55
281	D4-013	D4-015	**12**	237	0.210	0.040	0.1727	0.146	0.2610	0.125	0.1246	0.274	0.3526	53

*Note: Model diameter in bold **green** represents NBPP II CIP upsized pipe utilized to accommodate post-Project flows, model diameter in bold **purple** represents the Long Lonesome Road Sewer Realignment Pipe diameters, d/D values in bold **red** text represents City performance criteria that is not met*

Table 5-5: Future Cumulative Condition Model Results – Pre and Post Project Cont.

Sewer Main ID	Upstream MH ID	Downstream MH ID	Model Diameter (in)	Length (ft)	Slope (%)	ADWF Pre-Project Max Flow (MGD)	ADWF Pre-Project d/D	ADWF Post-Project Max Flow (MGD)	ADWF Post-Project d/D	PWWF Pre-Project Max Flow (MGD)	PWWF Pre-Project d/D	PWWF Post-Project Max Flow (MGD)	PWWF Post-Project d/D	PWWF Post-Project Pipe Capacity Remaining (% of Allowed d/D)
249	D4-032	D4-030	**12**	381	0.258	0.170	0.2675	0.276	0.3317	0.148	0.2684	0.473	0.4399	41
280	D4-015	D4-032	**12**	354	0.557	0.169	0.2348	0.275	0.3007	0.147	0.2191	0.471	0.4028	46
342	E4-006	E4-004	**12**	148	0.347	0.106		0.106		0.171	0.3304	0.171	0.1855	63
355	E4-008	E4-006	**12**	282	0.227	0.095		0.095		0.158	0.2524	0.158	0.2249	55
365	E4-010	E4-008	**12**	223	0.126	0.095		0.094		0.157	0.2882	0.157	0.2032	59
366	E4-046	E4-010	**12**	312	0.110	0.094		0.094		0.155	0.3086	0.155	0.1892	62
334	E4-004	E4-002	**12**	95	0.317	0.106		0.106		0.174	0.4586	0.173	0.1242	83

*Note: Model diameter in bold **green** represents NBPP II CIP upsized pipe utilized to accommodate post-Project flows, model diameter in bold **purple** represents the Long Lonesome Road Sewer Realignment Pipe diameters, d/D values in bold **red** text represents City performance criteria that is not met*

Table 5-6: Pipes Recommended for Upsizing and Percentage of Contributed Flow

Sewer Main ID	CIP #	Upstream MH ID	Downstream MH ID	Existing Diameter (in)	Proposed Diameter (in)	Total Future Cumulative ADWF Flow With Project (MGD)	Project Incremental Contribution		City of Mountain View Contribution	
							ADWF Flow (MGD)	Percentage of Total Flow (%)	ADWF Flow (MGD)	Percentage of Total Flow (%)
173	103	D4-002	D4-034	12	**15**	0.5134	0.0461	9	0.4674	91
176	103	D4-034	D4-004	12	**15**	0.5221	0.0461	9	0.4760	91
193	104/LLR	D4-028	D4-002	8	**15**	0.3588	0.1061	30	0.2528	70
277	LLR	D4-011	D4-013	8	**12**	0.1457	0.1035	71	0.0423	29
281	LLR	D4-013	D4-015	8	**12**	0.1464	0.1061	72	0.0404	28
249	LLR	D4-032	D4-030	8	**12**	0.2761	0.1061	38	0.1700	62
280	LLR	D4-015	D4-032	8	**12**	0.2753	0.1061	39	0.1692	61

Note: NBPP II recommended pipe is bold ***green****, Long Lonesome Road CIP recommended pipe is bold* ***purple***

Chapter 6. Recycled Water

The Project site is within the service area of the existing recycled water system. The Project may connect to the existing recycled water pipelines within Plymouth Street. Recycled water may be used for irrigation of landscaping as well as for non-potable uses in non-residential buildings. Non-residential buildings within North Bayshore are required to be dual plumbed to utilizes recycled water for non-potable uses.

The existing recycled water system configuration, limitations, and potential Project impacts on the recycled water system are described herein.

6.1. Existing System

The existing Palo Alto Recycled Water Quality Control Plant receives and treats sanitary sewer water from the City of Mountain View, as well Los Altos, Los Altos Hills, Palo Alto, Stanford University, and East Palo Alto Sanitation District. The Palo Alto Water Quality Control Plant (RWQCP) and the City of Mountain View have entered an agreement wherein the RWQCP supplies up to 3 MGD (2083 gpm) of recycled water per day, to the City of Mountain View, for use in irrigation or other non-potable applications such as toilets in buildings that are dual-plumbed. The RWQCP provides recycled water to the City of Mountain View with a single pump utilizing a VFD, intended maintains pressures through the recycled water network.

The existing recycled water system configuration and operations were discussed as part of the *Sub-Alternatives Development Memorandum*, (Carollo, November 2013). The existing system configuration is intended to function as two separate pressure zones, one being the Primary Recycled Water System or Primary Zone, and the other being the Shoreline Irrigation System. The existing system including the two pressure zones are shown in Figure B-14. The Primary Zone is supplied directly from the RWQCP, and the Shoreline Irrigation System is supplied from the Shoreline Irrigation Pump Station, which supplies irrigation water to the golf course from water stored in the golf course pond (Shoreline Pond).

The existing Mountain View recycled water system has 177 recycled water meters in place (Mountain View Recycled Water Feasibilty Study, Carollo), with 59 inactive meters corresponding to sites under development or sites which have not yet converted from potable water to recycled water. New developments are required to provide dual plumbing to toilets and to connect to the recycled water system for irrigation. There are currently 58 active meters as part of the existing recycled water system.

6.1.1. Existing Model

The recycled water model consists of two scenarios, Average Day Demand (ADD) and Maximum Day Demand (MDD). The ADD scenario is based on water meter records collected from 2009, through 2012. The annual demands were estimated based on 2011 meter data due to completeness of available records. The demands are from active accounts and do not identify if the usage is for irrigation or usage from dual-plumbed buildings. The ADD and MDD from the recycled water model are shown in Table 6-1. The system also utilizes a diurnal curve based on water usage records to distribute the recycled water demands. The existing modeled recycled water system performance is shown on Figure B-14.

Table 6-1: Existing Average Day Demand and Maximum Day Demand

	Recycled Water Demand (mgd)
Average Day Demand (ADD)	0.46
Maximum Day Demand (MDD)	1.06

The Primary Zone and the Shoreline Irrigation System operate on two similar, but different diurnal curves, the diurnal curves for the two zones are shown on Figure 3.

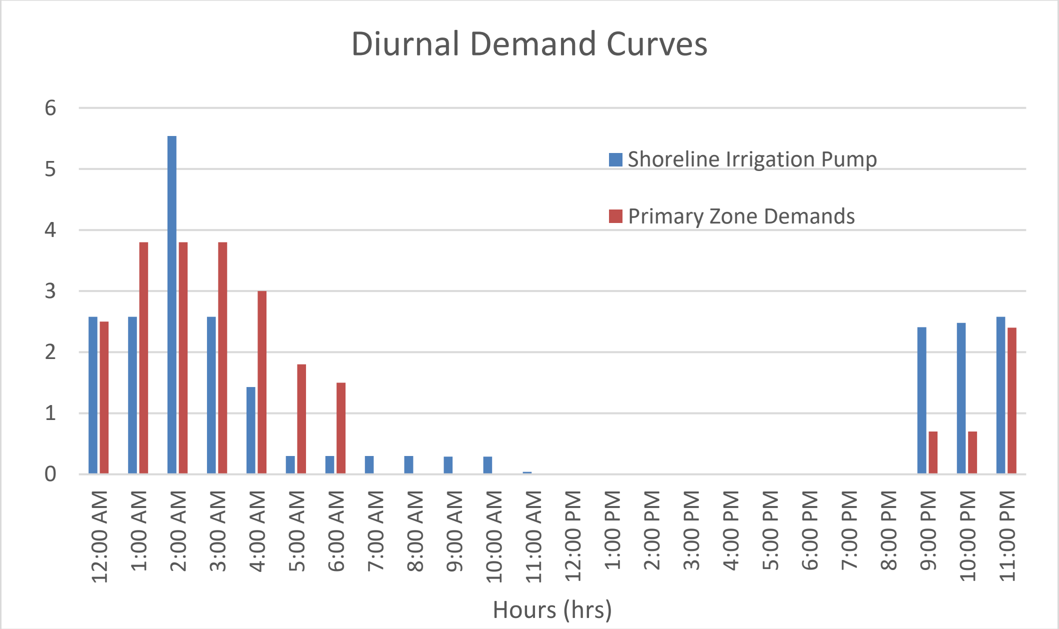

Figure 3: Recycled Water Diurnal Curves

In the existing model the Shoreline Pond is filled at a constant rate of 600 gpm through a connection from the Primary Zone. The additional storage within the Shoreline Pond is intended to offset the peak hour demand (PHD) in the system. The relationship between available supply, Shoreline Irrigation flows, Primary Zone flows, and Shoreline Pond inflow is shown in Figure 4.

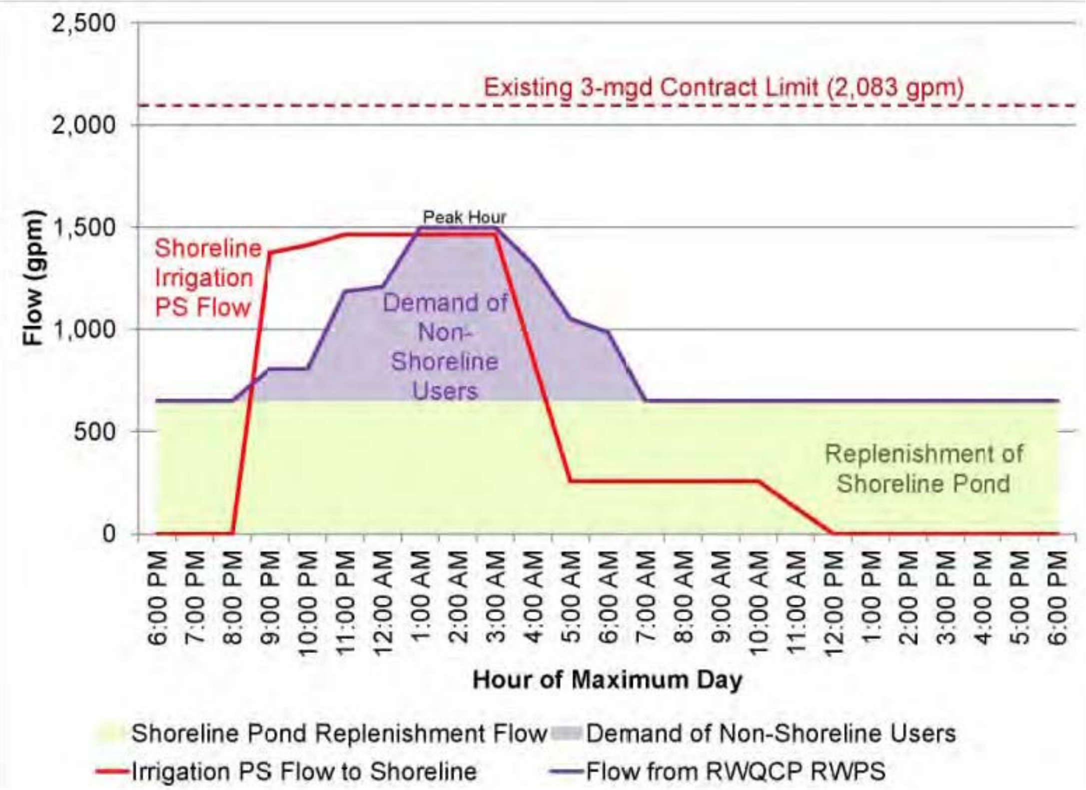

Figure 4: Recycled Water Usage

Based on the model data and modelled system operations, the recycled water system can adequately supply water to users throughout the service area. However, this assumes that storage from the Shoreline Pond is used as a buffer to supply water to the golf course irrigation system during the Peak Hour Demand (PHD). If the Shoreline Pond cannot be used as storage to buffer demands, the system demands exceed the total available demand from the RWQCP, as shown on Figure 5.

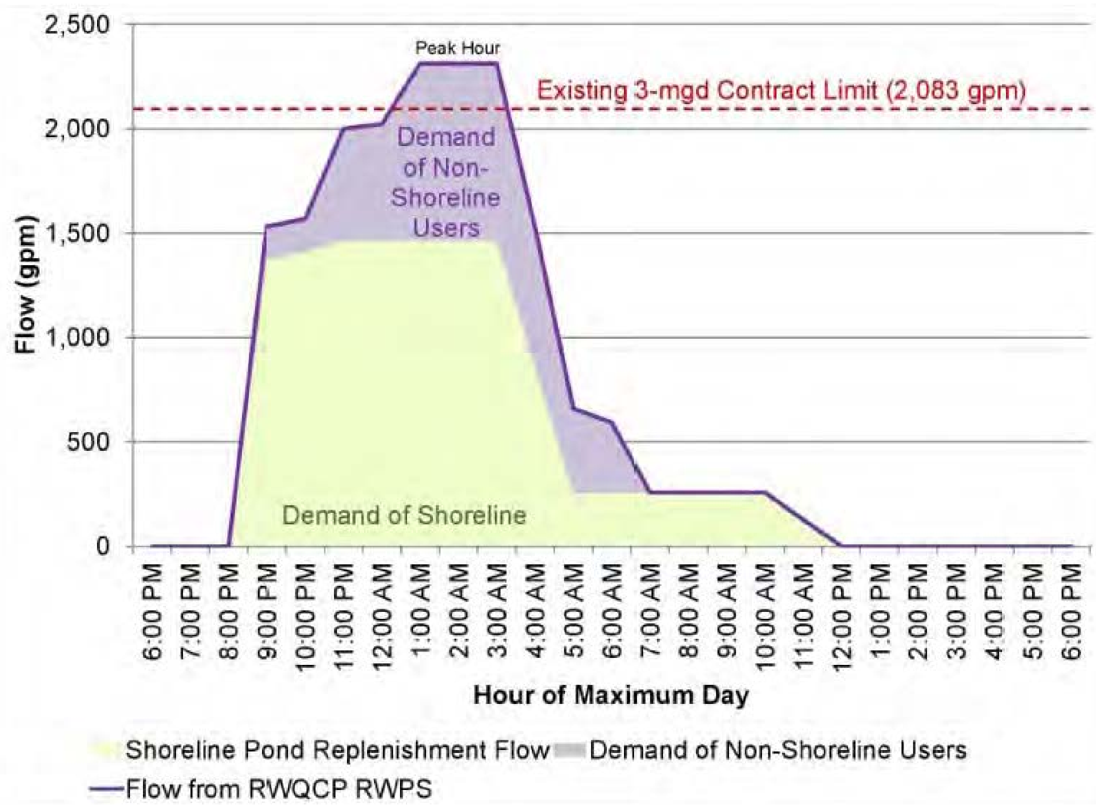

Figure 5: Recycled Water Usage – Without Shoreline Pond Storage

Without the Shoreline Ponds buffering the PHD, the system experiences low pressures throughout the recycled water system. The deficient system nodes without utilizing the Shoreline Pond storage is shown on Figure B-14. City staff has noted that the system experiences variable pressures, including low pressures that disrupt service to users throughout the service area. The City should verify that current operations match the modelled system.

The RWQCP pump provides the recycled water supply and maintains pressures throughout the Primary Zone, this is done with a pump utilizing a VFD to adjust its speed to meet demand and maintain pressures. This configuration inherently lends itself to the limitations of the pump and its ability to speed up and slow down to maintain pressures in the system. Utilizing pumps instead of a static water level in a storage tank to maintain pressure leaves opportunities for pressure fluctuations as the pumps try to accommodate changes in user demand. It is recommended that the City incorporate system storage as outlined in the Recycled Water Feasibility Study to reduce the frequency of pressure fluctuations throughout the system.

6.1.2. Project Impacts

The Project irrigation demands have been estimated using the MAWA methodology and the total irrigation demand for the Project site is based on the "open space" identified in the MV Gateway Master Plan Administrative Draft and are summarized in Table 6-2.

Table 6-2: Project Irrigation Demands

Project Site	Total Open Space Area (sf)	Irrigation Demand (gpm)
MV Gateway	65,000*	0.22

**Estimated from open space square footage*

6.2. Project Contribution to Existing Deficiencies

As currently modelled, the existing Recycled water system does not exhibit deficiencies, and the Project site can be supplied with recycled water; however, this is dependent on using Shoreline Ponds to supply water to the shoreline irrigation network. Without utilizing storage in the Shoreline Pond to buffer the golf course demands, the system experiences deficient pressures across the system. City staff has indicated that the existing system pressures vary significantly throughout the service area. This may be due to the shoreline pond not operating as modelled, or due to the RWQCP not being able to adapt to changes in system pressure fast enough. Based on the existing modeled system configuration, the Project site irrigation demands should not have any impacts on the City system. Based on discussions with City staff, the existing system experiences deficiencies with only the current active users; therefore, the Project would only exacerbate the existing system deficiencies.

6.2.1. Recommended Improvements

City staff has indicated that the existing system experiencing low pressures, it is recommended that the City begin implementing improvements recommended in the Recycled Water Feasibility Study. Expanding the existing storage capacity for the recycled water system should take priority. Additional system storage will provide a buffer during the PHD, when system demand exceeds the RWQCP capacity. The addition of system storage will help alleviate pressure fluctuations currently experienced. Additional pipe improvements may be needed to implement the Charleston Park Storage Tank, the City should begin efforts to start the planning process associated with implementing the CIP. Additional recycled water CIPs identified as part of the Recycled Water Feasibility Study are included in Figure B-15. Improvements include adding loops to the system to add redundancy and increase reliability of the system, as well as system build-out projects to expand the service area and provide storage for the system.

The City is currently working on updating the RWFS with Carollo Engineering Consultants. The updated study may have different results for existing system performance and may have revised recommended system improvements.

Chapter 7. Storm System Impact

The storm drain system analysis for Project impact is based on the MIKE URBAN (MU) model developed as part of the *2019 Storm Drain Master Plan* (Schaaf & Wheeler, 2019). The Project site drainage flows in two main directions, north to the Plymouth St storm drain line and east to the N Shoreline Blvd storm drain line. Plymouth St storm drain flows by gravity to Permanente Creek, and the N Shoreline Blvd storm drain flows north to the Charleston Rd Pump Station, which pumps storm drain flows into Stevens Creek. The Project will maintain approximately the same drainage patterns, draining to the north and east, connecting to the 30-inch storm drain within Plymouth St. and the 48-inch diameter storm drain within N Shoreline Blvd.

7.1. Stormwater Runoff Analysis

The Project impervious percentage is currently unknown, to complete this analysis the proposed site should be incorporated into the SDMP model with any site drainage patterns and impervious percent changes incorporated into the catchment runoff (hydrology) calculation. The pipe hydraulic calculation will indicate if any changes in the configuration affect the storm drain performance. In general, if the impervious percentage is maintained equal to the existing site or reduced, the impact should be negligible. SDMP is compared to stormwater runoff under the Project impervious area conditions.

7.1.1. Existing Site

The Project site is classified as "High Intensity Office" and has a corresponding overall assumed percent impervious area of 84.2% (Table 2-3, 2019 SDMP). Catchment delineation for the 2019 SDMP was performed in GIS and used 1-foot elevation contour data, aerial imagery, street and pipe network layouts, and catch basin locations. The site is split into 7 catchments, with three catchments draining to the Plymouth St storm drain line and four draining to the N Shoreline Blvd storm drain line.

7.1.2. Proposed Project Impact

The estimated impervious area is not provided, however, impacts to the existing system should be negligible so long as the impervious percentage of the site does not the existing site impervious (approximately 84%). The proposed Project site drainage configuration should be incorporated into the SDMP model to verify.

7.2. Project Contribution to Existing Deficiencies

Model results from the 2019 SDMP show no flooding near the Project site. There are no capacity Capital Improvement Projects (CIPs) identified in the 2019 SDMP near the Project site. One project is located between the Project and the outfall at Stevens Creek. The downstream CIP is along Shoreline Boulevard, this CIP is a high priority project and would re-direct flows to the Crittenden Pump Station from the Charleston Pump Station. The Charleston Pump Station is nearing the end of its useful life and this CIP project would eliminate the need to rehabilitate or replace the existing pump station at the Charleston Pond. An additional CIP is located at the outfall of Plymouth St, at Permanente Creek. This project includes adding a new flap gate to reduce backflow into the system, which in turn reduces the run-time for the Charleston Pump Station because the systems are interconnected. The Project is not anticipated to contribute flows greater than the existing site and is not anticipated to result in deficiencies downstream of the Project.

The Project site, existing modelled 10-year deficiencies, and SDMP CIPs within the NBPPII study are shown on Figure 16.

7.3. Additional Considerations

Site dewatering operations during construction are dependent on the volume of water to be removed, conditions of the site, and contractor methods. If the contractor intends to discharge to the storm drain system or the sanitary sewer system, a hydraulic analysis is recommended to ensure the system has sufficient capacity for the time of year of anticipated construction. The City should determine what restrictions to impose on construction site dewatering during rainy periods to avoid exacerbating the existing system deficiencies.

APPENDIX A:

Additional Considered Projects

Table A-1: Additional Considered Projects

	Project	Change Area/Planning Area	Address	Status*
1	Mountain View Co-Housing Community	Central Neighborhood	445 Calderon Ave	Completed
2	Hope Street Investors	Downtown/Evelyn Corridor	231-235 Hope St	Approved
3	Downtown Mixed Use Building	Downtown/Evelyn Corridor	605 Castro St	Completed
4	Residential Condominium Project	Downtown/Evelyn Corridor	325, 333, 339 Franklin St	Under Review
5	St Joseph's Church	Downtown/Evelyn Corridor	599 Castro St	Completed
6	Fairmont Mixed Use	Downtown/Evelyn Corridor	881 Castro Street	Completed
7	Bryant/Dana Office	Downtown/Evelyn Corridor	250 Bryant St	Completed
8	Quad/Lovewell	East Whisman	369 N Whisman Rd	Approved but Inactive
9	Renault & Handley	East Whisman	625-685 Clyde Ave	Completed
10	Symantec	East Whisman	575 E Middlefield Rd	On Hold
11	LinkedIn	East Whisman	700 E Middlefield Rd	Under Construction
12	National Avenue Partners	East Whisman	600 National Ave	Completed
13	2700 West El Camino Real	El Camino Real	2700 El Camino Real W	Under Construction
14	SummerHill Apt	El Camino Real	2650 El Camino Real W	Completed
15	Hotel Expansion	El Camino Real	2300 W El Camino Real	Completed
16	Lennar Multi-Family Communities	El Camino Real	2268 El Camino Real W	Completed
17	UDR	El Camino Real	1984 El Camino Real W	Completed
18	Residence Inn Gatehouse	El Camino Real	1854 El Camino Real W	Completed
19	Residence Inn	El Camino Real	1740 El Camino Real W	Completed
20	Tropicana Lodge - Prometheus	El Camino Real	1720 El Camino Real W	Completed
21	Austin’s - Prometheus	El Camino Real	1616 El Camino Real W	Completed
22	1701 W El Camino Real	El Camino Real	1701 El Camino Real W	Completed
23	First Community Housing	El Camino Real	1585 El Camino Real W	Completed
24	Harv's Car Wash - Regis House	El Camino Real	1101 El Camino Real W	Completed
25	Greystar	El Camino Real	801 El Camino Real W	Completed
26	Medical Building	El Camino Real	412 El Camino Real W	Completed
27	Lennar Apartments	El Camino Real	865 El Camino Real E	Completed

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, November 2020)*

Table A-1: Additional Considered Projects (Continued)

	Project	Change Area/Planning Area	Address	Status*
28	Wonder Years Preschool	El Camino Real	86 El Camino Real	Completed
29	Evelyn Family Apartments	Grant/Sylvan	779 East Evelyn Ave	Completed
30	344 Bryant Ave	Grant/Sylvan	344 Bryant Ave	Under Building Review
31	Adachi Project	Grant/Sylvan	1991 Sun Mor Ave	Completed
32	840 E El Camino Real	Grant/Sylvan	840 El Camino Real E	Approved
33	Loop Convenience Store	Grant/Sylvan	790 El Camino Real E	Completed
34	El Camino Real Hospital Campus	Miramonte/Springer	2500 Grant Ave	Completed
35	City Sports	Miramonte/Springer	1040 Grant Ave	Completed
36	Prometheus	Moffett/Whisman	100 Moffett Blvd	Completed
37	Hampton Inn Addition	Moffett/Whisman	390 Moffett Blvd	Completed
38	Calvano Development	Moffett/Whisman	1075 Terra Bella Avenue	Under Construction
39	Moffett Gateway	Moffett/Whisman	750 Moffett Blvd	Under Construction
40	Holiday Inn Express	Moffett/Whisman	870 Leong Dr	Approved
41	Warmington Residential	Moffett/Whisman	660 Tyrella Avenue	Completed
42	Dividend Homes	Moffett/Whisman	111 and 123 Fairchild Dr	Completed
43	133-149 Fairchild Dr	Moffett/Whisman	133-149 Fairchild Dr	Completed
44	Warmington Residential	Moffett/Whisman	277 Fairchild Dr	Under Construction
45	Hetch-Hetchy Property	Moffett/Whisman	450 N Whisman Dr	Completed
46	DeNardi Homes	Moffett/Whisman	186 East Middlefield Road	Under Construction
47	Tripointe Homes	Moffett/Whisman	135 Ada Ave	Completed
48	Tripointe Homes	Moffett/Whisman	129 Ada Ave	Completed
49	Robson Homes	Moffett/Whisman	137 Easy St	Completed
50	167 N Whisman Rd	Moffett/Whisman	167 N Whisman Rd	Completed
51	Antenna Farm (Pacific Dr)	Moffett/Whisman	Pacific Dr	Completed
52	Pulte Homes	Moffett/Whisman	100, 420-430 Ferguson Dr	Completed
53	EFL Development	Moffett/Whisman	500 Ferguson Dr	Completed
54	Shenandoah Square Precise Plan	Moffett/Whisman	500 Moffett Blvd	On Hold

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, November 2020)*

Table A-1: Additional Considered Projects (Continued)

	Project	Change Area/Planning Area	Address	Status*
55	1185 Terra Bella Ave	Moffett/Whisman	1185 Terra Bella Ave	Approved
56	Linde Hydrogen Fueling Station	Moffett/Whisman	830 Leong Dr	Completed
57	Windsor Academy	Monta Loma/Farley/Rock	908 N Rengstorff Ave	Completed
58	D.R. Horton	Monta Loma/Farley/Rock	827 N Rengstorff Ave	Completed
59	ROEM/Eden	Monta Loma/Farley/Rock	819 N Rengstorff Ave	Completed
60	Paul Ryan	Monta Loma/Farley/Rock	858 Sierra Vista Ave	Under Construction
61	William Lyon Homes	Monta Loma/Farley/Rock	1951 Colony St	Completed
62	Dividend Homes	Monta Loma/Farley/Rock	1958 Rock St	Completed
63	Paul Ryan	Monta Loma/Farley/Rock	2392 Rock St	Completed
64	San Antonio Station	Monta Loma/Farley/Rock	100 & 250 Mayfield Ave	Completed
65	Northpark Apartments	Monta Loma/Farley/Rock	111 N Rengstorff Ave	Completed
66	333 N Rengstorff Ave	Monta Loma/Farley/Rock	333 N Rengstorff Ave	Under Construction
67	Classic Communities	Monta Loma/Farley/Rock	1946 San Luis Ave	Completed
68	1998-2024 Montecitio Ave	Monta Loma/Farley/Rock	1998-2024 Montecito Ave	Under Construction
69	Classic Communities	Monta Loma/Farley/Rock	647 Sierra Vista Ave	Completed
70	Dividend Homes	Monta Loma/Farley/Rock	1968 Hackett Ave & 208-210 Sierra Vista Ave	Completed
71	California Communities	Monta Loma/Farley/Rock	2025 & 2065 San Luis Ave	Completed
72	2044 and 2054 Montecito Ave	Monta Loma/Farley/Rock	2044 & 2054 Montecito Ave	Under Construction
73	Shorebreeze Apartments	Monta Loma/Farley/Rock	460 North Shoreline Blvd	Under Construction
74	Intuit	North Bayshore	2600 Marine Way	Completed
75	Sobrato Organization	North Bayshore	1255 Pear Ave	Approved
76	Charleston East	North Bayshore	2000 North Shoreline Blvd	Under Construction
77	LinkedIn and Sywest	North Bayshore	1400 North Shoreline Blvd	On Hold
78	Broadreach	North Bayshore	1625 Plymouth Street	Completed
79	Microsoft	North Bayshore	1045-1085 La Avenida St	Under Construction
80	Shashi Hotel	North Bayshore	1625 North Shoreline Blvd	Under Construction

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, November 2020)*

Table A-1: Additional Considered Projects (Continued)

	Project	Change Area/Planning Area	Address	Status*
81	Community School of Music and Art	San Antonio	250 San Antonio Circle	Approved
82	Prometheus	San Antonio	400 San Antonio Rd	Completed
83	Octane Fayette	San Antonio	2645 & 2655 Fayette Dr	Under Review
84	Merlone Geier Partners (MGP)	San Antonio	405 San Antonio Rd	Completed
85	Anton Calega	San Antonio/Rengstorff/ Del Medio	394 Ortega Ave	Completed
86	Barry Swenson Builder	San Antonio/Rengstorff/ Del Medio	1958 Latham St	Approved
87	2296 Mora Drive	San Antonio/Rengstorff/ Del Medio	2296 Mora Dr	Completed
88	St Francis High School	Miramonte/Springer	1885 Miramonte Ave	Under Review
89	Franklin	Central/Downtown	325 Franklin Street	Under Review
90	California	Central/Downtown	756 California Street	Under Review
91	North Shorelin	Moffett/Whisman	1001 North Shorelin Boulevard	Under Review
92	555 West Middlefield Road	Moffett/Whisman	555 West Middlefield Road	Under Review
93	Mountain View Academy	Central/Downtown	360 South Shoreline Boulevard	Under Review
94	DeNardini	San Antonio	1933 Gamel Way, 574 Escuela Ave	Under Review
95	Tyrella	Moffett/Whisman	294-296 Tyrella Avenue	Under Review
96	Logue	Moffett/Whisman	400 Logue Avenue	Under Review
97	Sobrato	Moffett/Whisman	465 Fairchild Drive	Under Review
98	Google Landings	North Bayshore	1860-2159 Landings Dr., 1014-1058 Huff Ave, 900 Alta Avenue, 2000 North Shoreline	Under Review
99	Phan	Moffett/Whisman	198 Easy Street	Under Review

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, November 2020)*

Table A-1: Additional Considered Projects (Continued)

	Project	Change Area/Planning Area	Address	Status*
100	Cosma	El Camino Real	1510 West El Camino Real	Under Review
101	Dana Street	Downtown	676 West Dana Street	Under Review
102	Summer Hill	Monta Loma/Farley/Rock	1555 West Middlefield Road	Under Review
103	Ambrosio	El Camino Real	855-1023 West El Camino Real	Under Review
104	BPR	El Camino Real	2300 West El Camino Real	Under Review
105	Dutchints	San Antonio	570 South Rengstorff Avenue	Under Review
106	GPRV	Central/Downtown	881 Castro Street	Under Review
107	Ambra	Monta Loma/Farley/Rock	901-987 N. Rengstorff Avenue	Under Review
108	Hylan	Monta Loma/Farley/Rock	410-414 Sierra Vista Avenue	Under Review
109	Maston	Miramonte/Springer	982 Bonita Avenue	Under Review
110	McKim	Monta Loma/Farley/Rock	2019 Leghorn Street	Under Review
111	Sand Hill	Moffett/Whisman	1989 North Bernardo Avenue	Under Review
112	Maston	El Camino Real	1313 and 1347 West El Camino Real	Under Review
113	Anderson	El Camino Real	601 Escuela Ave and 1873 Latham Street	Under Review
114	SummerHill	Moffett/Whisman	355-418 E Middlefield Road	Approved
115	Prometheus	Monta Loma/Farley/Rock	1950 Montecito Avenue	Under Construction
116	Dividend Homes	Monta Loma/Farley/Rock	2310 Rock Street	Under Construction
117	Insight Realty	Downtown	701 W. Evelyn Avenue	Approved
118	Prometheus	Downtown	1720 Villa Street	Under Construction
119	Fortbay	Moffett/Whisman	777 West Middlefield Road	Approved

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, November 2020)*

Table A-1: Additional Considered Projects (Continued)

	Project	Change Area/Planning Area	Address	Status*
120	Buddhist Temple	Moffett/Whisman	759 W. Middlefield Road	Approved
121	Green Company	Downtown	Hope Street Lots 4 & 8	Approved
122	Dividend Homes	Monta Loma/Farley/Rock	2005 Rock Street	Under Construction
123	Classic Communities	Monta Loma/Farley/Rock	315 & 319 Sierra Vista	Under Construction
124	SummerHill	Downtown	257-279 Calderon Ave	Under Construction
125	SummerHill	Moffett/Whisman	535 and 555 Walker Drive	Under Construction
126	Google	-	Nasa Research Park	Under Construction
127	Renault & Handly	Moffett/Whisman	580-620 Clyde Avenue	Under Construction

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, November 2020)*

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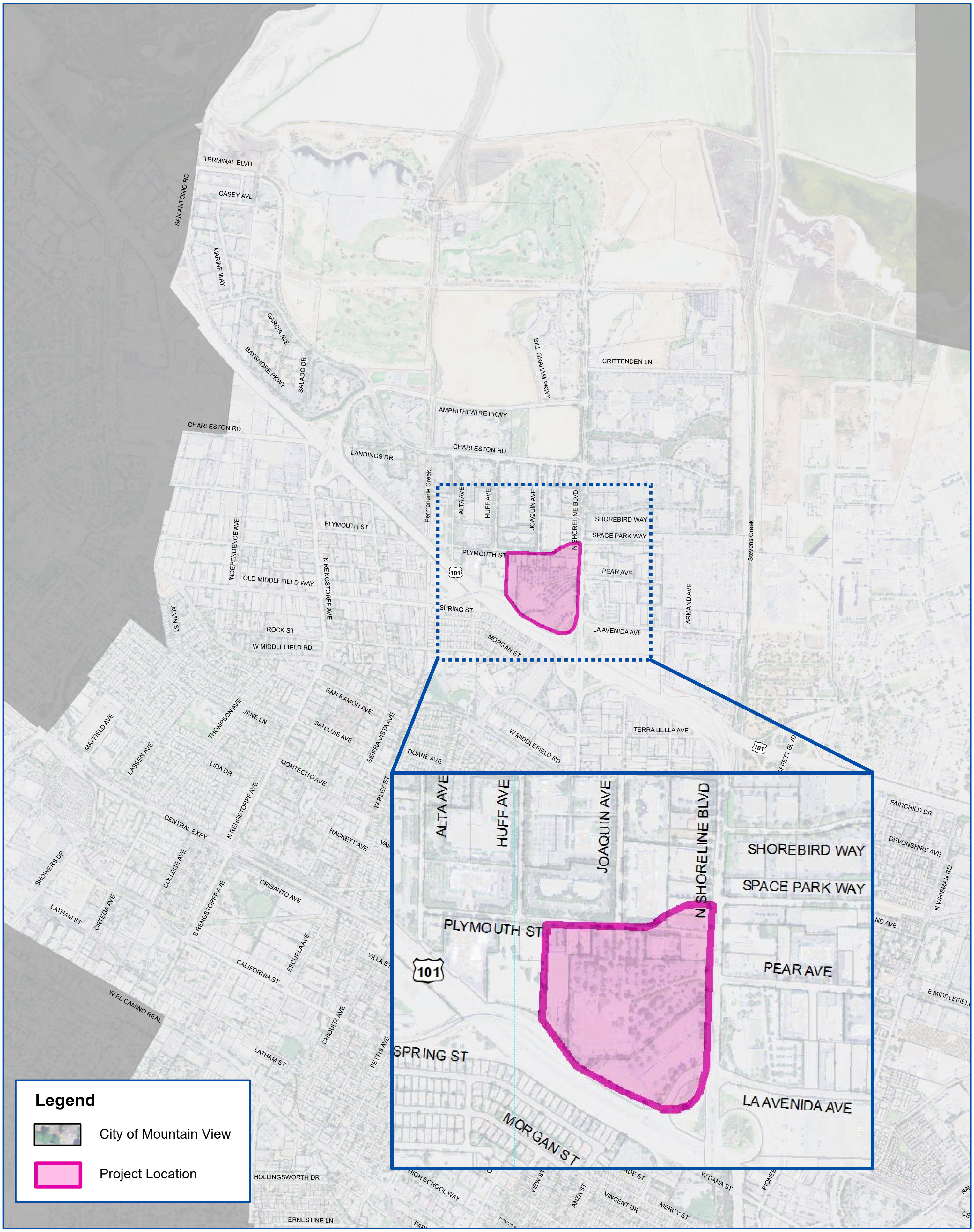
APPENDIX B:

Figures



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0 260 520 Feet
N

FIGURE B-1: **Project Location**

Gateway Master Plan Utility Impact Study | February 2021

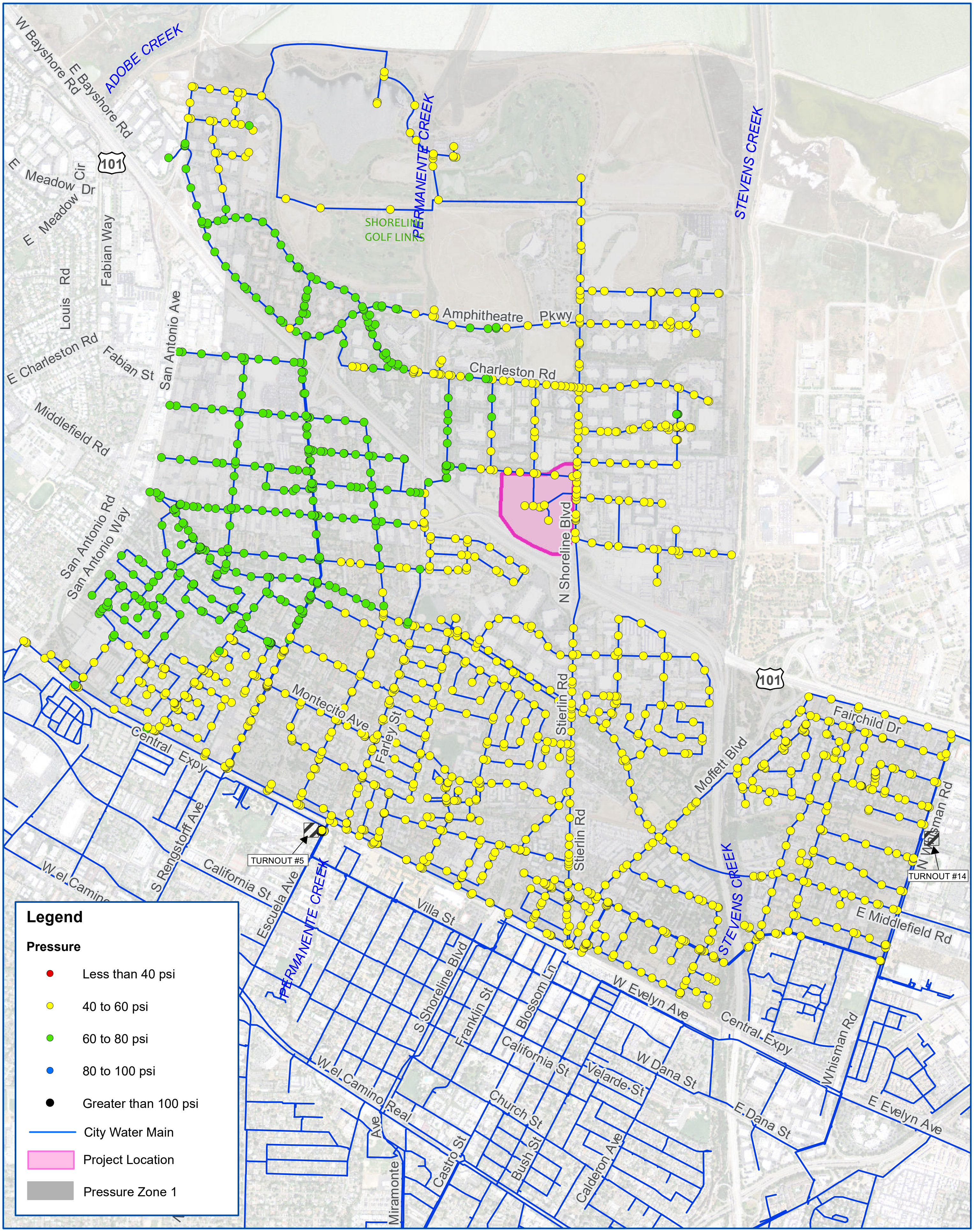

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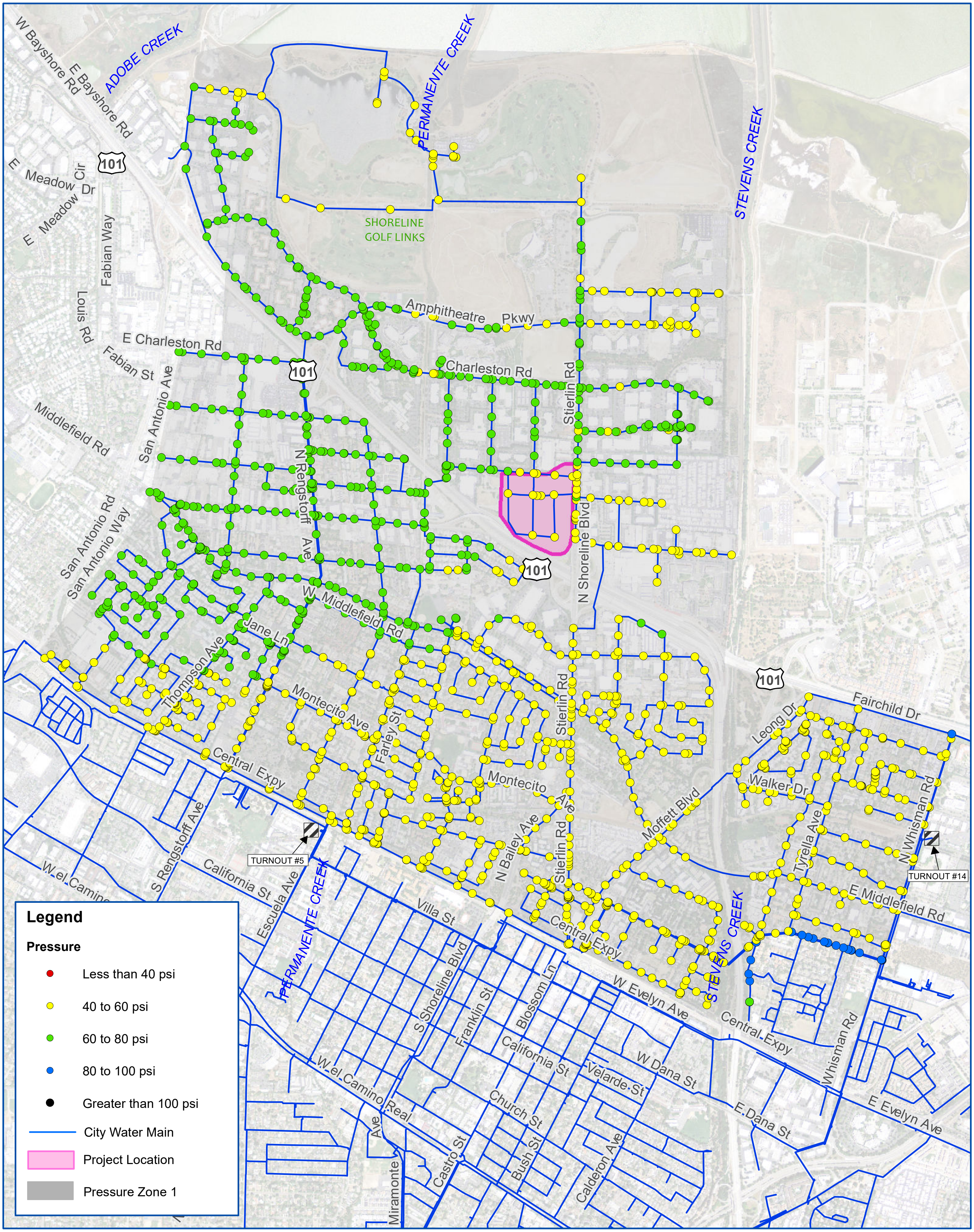
FIGURE B-2: **Peak Hour Demand (PHD) - Without Project**

Water System Model - Existing Condition

Gateway Master Plan Utility Impact Study | February 2021



Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

0 1,000 2,000 Feet

N

Figure B-3

Peak Hour Demand (PHD) - With Project

Water System Model - Existing Condition

Gateway Master Plan Utility Impact Study | February 2021

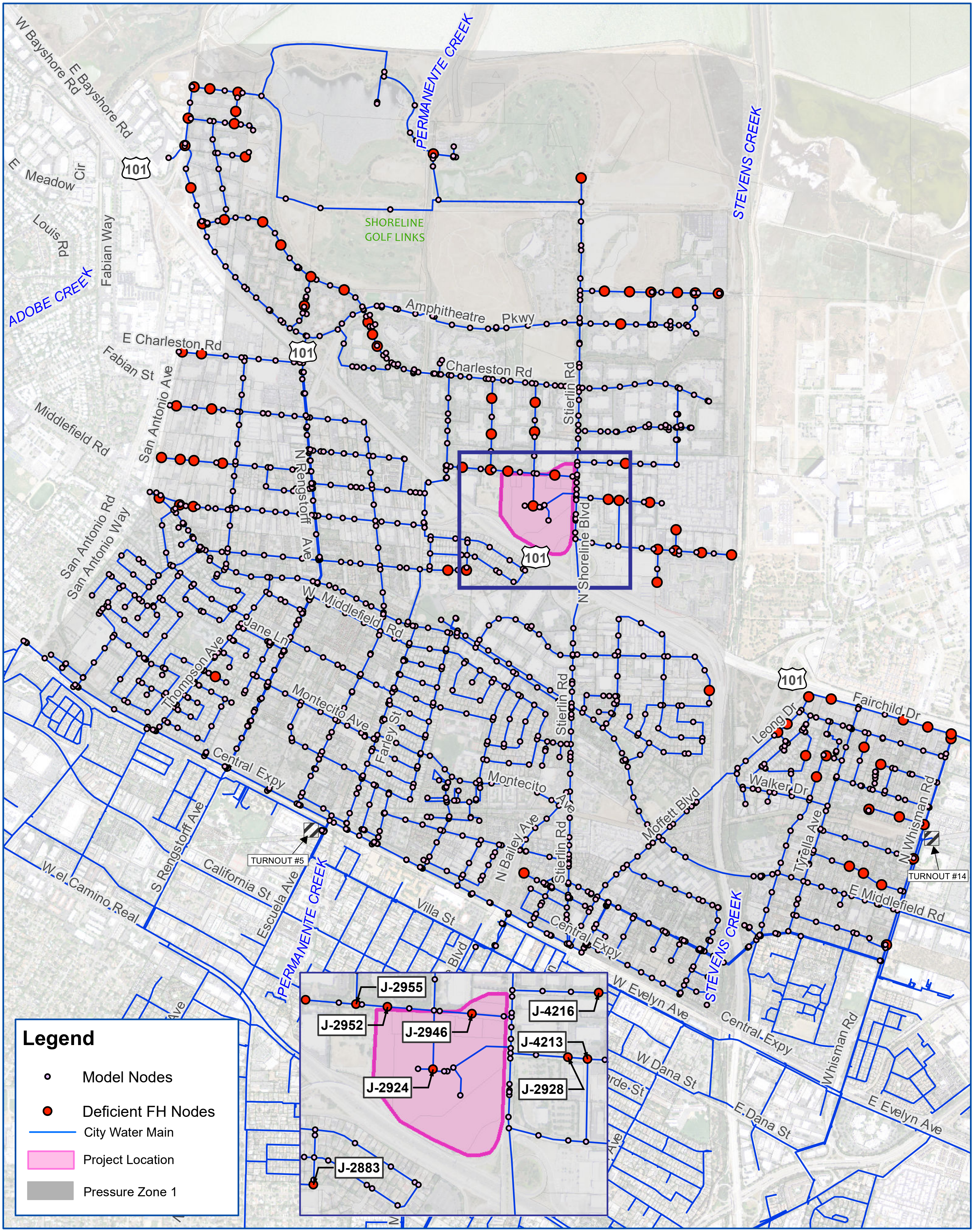


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FIGURE B-4: **Fire Flow Analysis - Without Project**

Water System Model - Existing Condition

Gateway Master Plan Utility Impact Study | February 2021

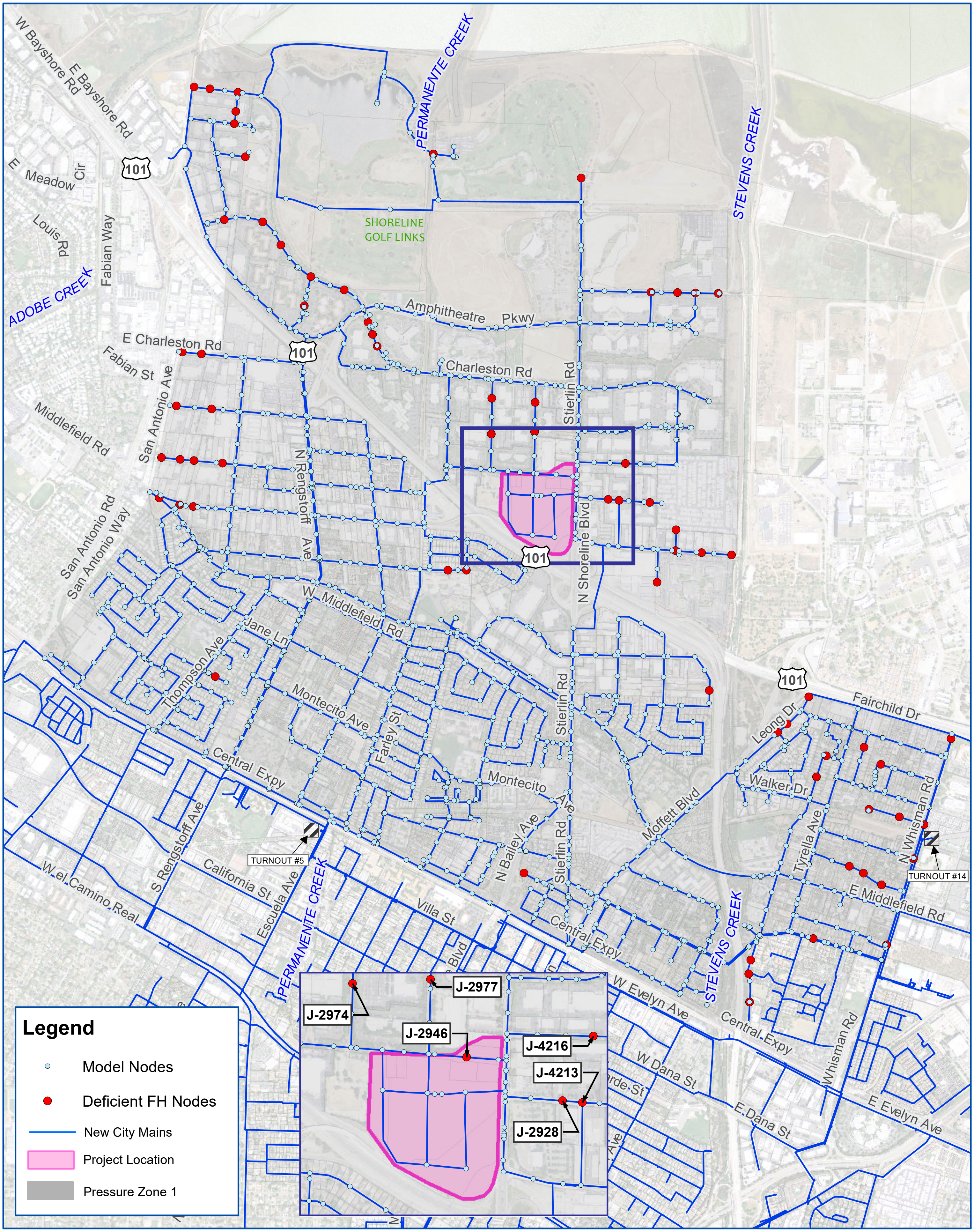

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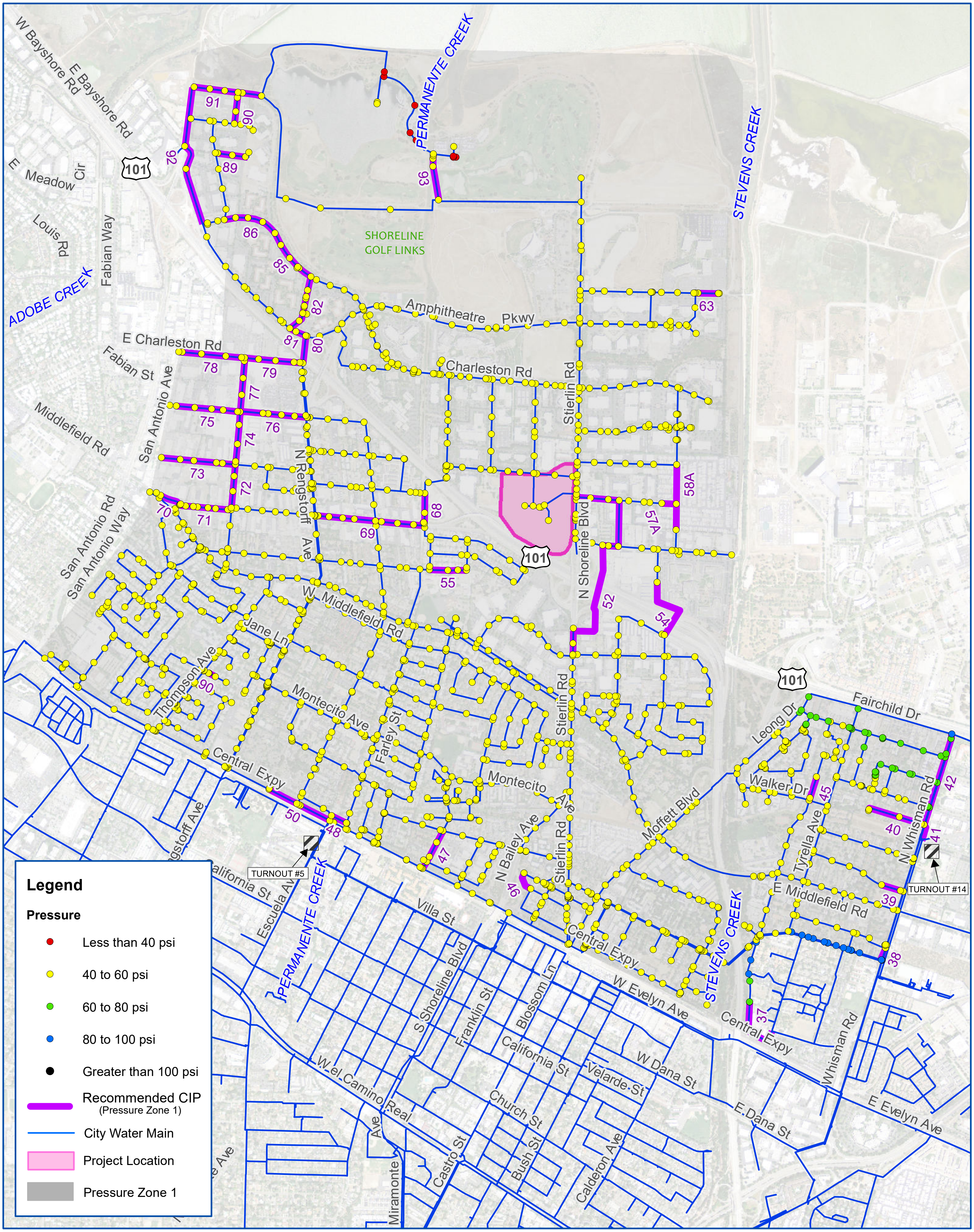
FIGURE B-5:

Fire Flow Analysis - With Project

Water System Model - Existing Condition

Gateway Master Plan Utility Impact Study | February 2021



Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

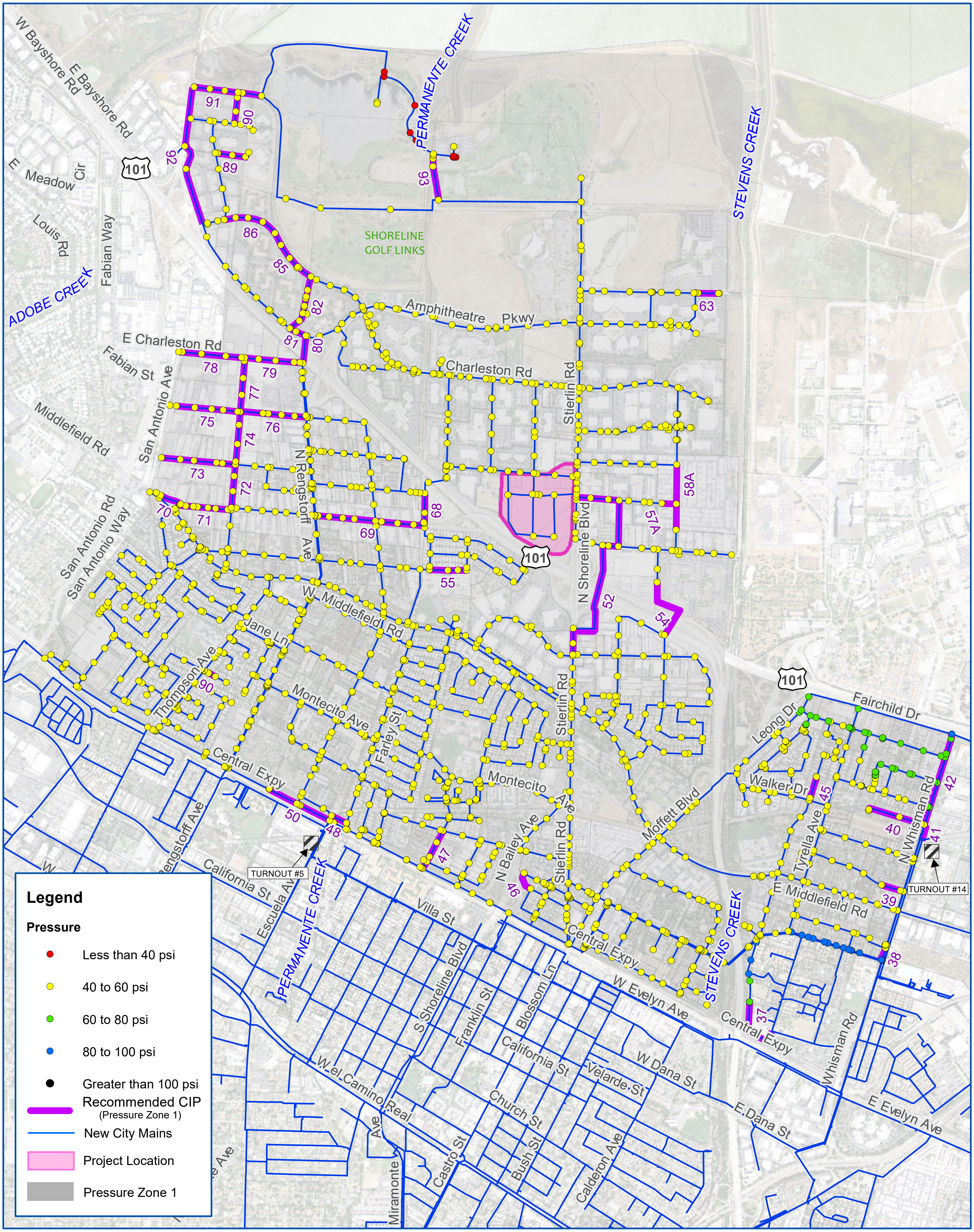
0 1,000 2,000 Feet

N

FIGURE B-6: **Peak Hour Demand (PHD) - Without Project**

Water System Model - Future Cumulative Condition

Gateway Master Plan Utility Impact Study | February 2021



Schaaf & Wheeler
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0 1,000 2,000 Feet

N

FIGURE B-7: **Peak Hour Demand (PHD) - With Project**

Water System Model - Future Cumulative Condition

Gateway Master Plan Utility Impact Study | February 2021

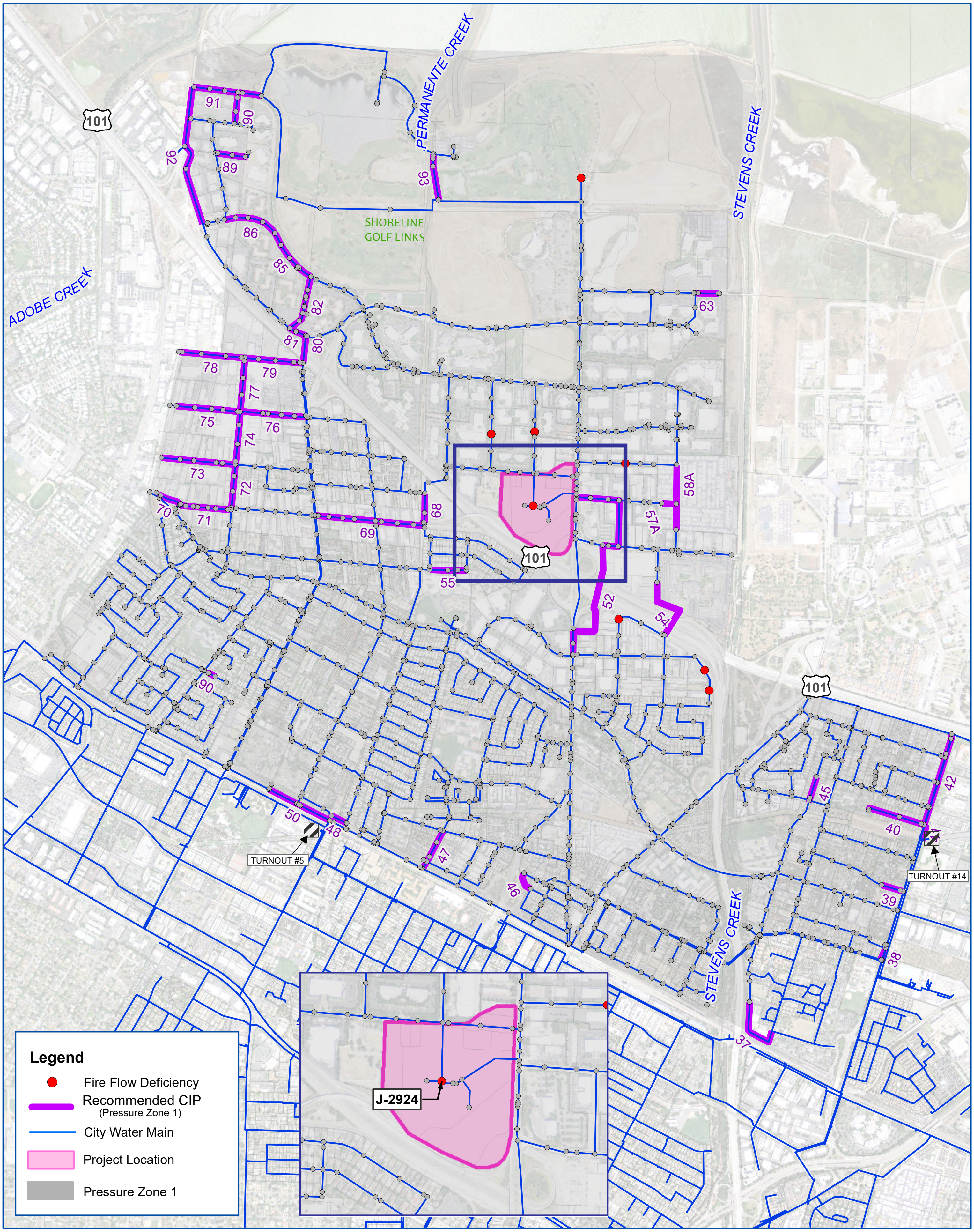

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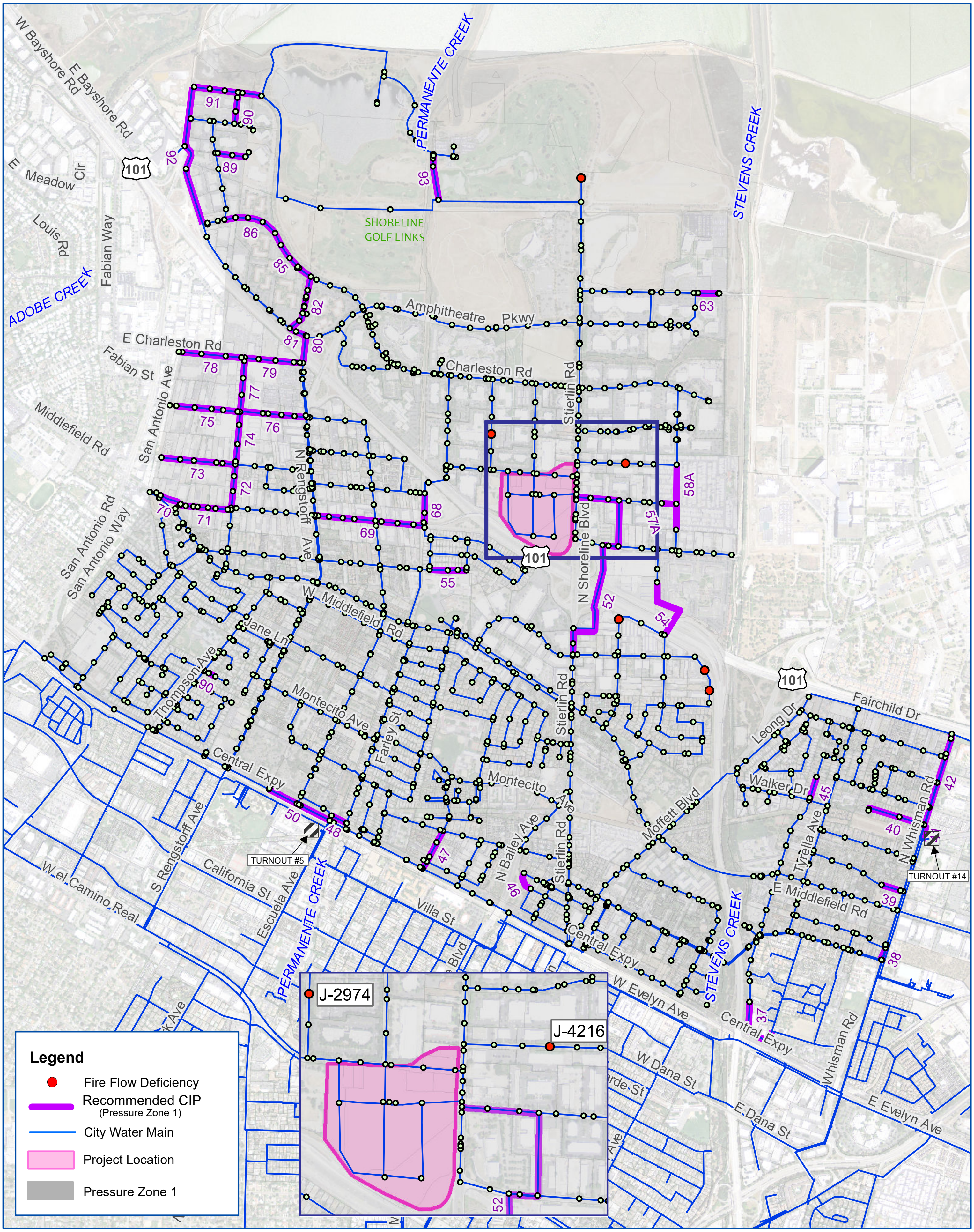
FIGURE B-8:

Fire Flow Analysis - Without Project

Water System Model - Future Cumulative Condition

Gateway Master Plan Utility Impact Study | February 2021



Schaaf & Wheeler
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0 1,000 2,000 Feet

N

FIGURE B-9: **Fire Flow Analysis - With Project**

Water System Model - Future Cumulative Condition

Gateway Master Plan Utility Impact Study | February 2021

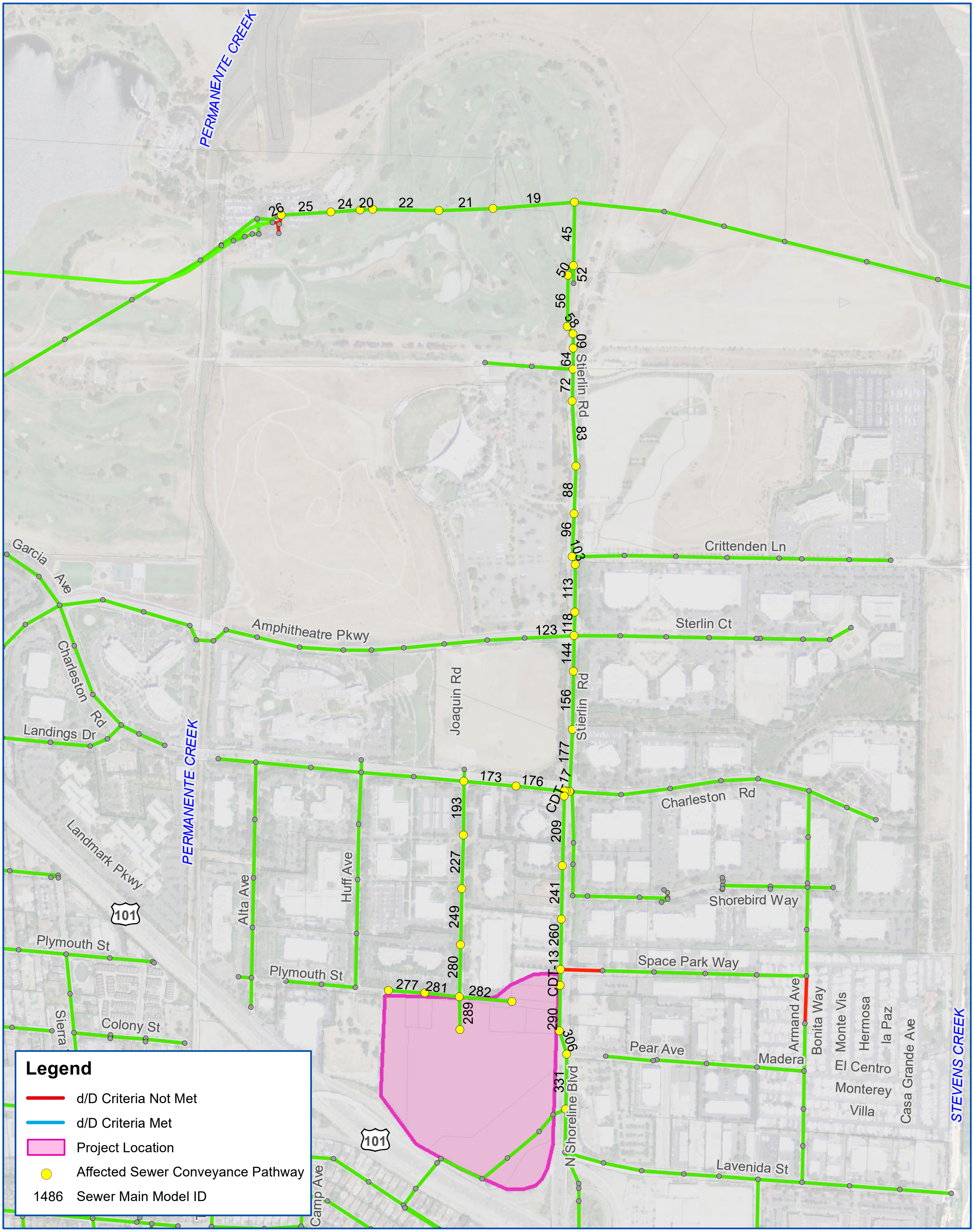

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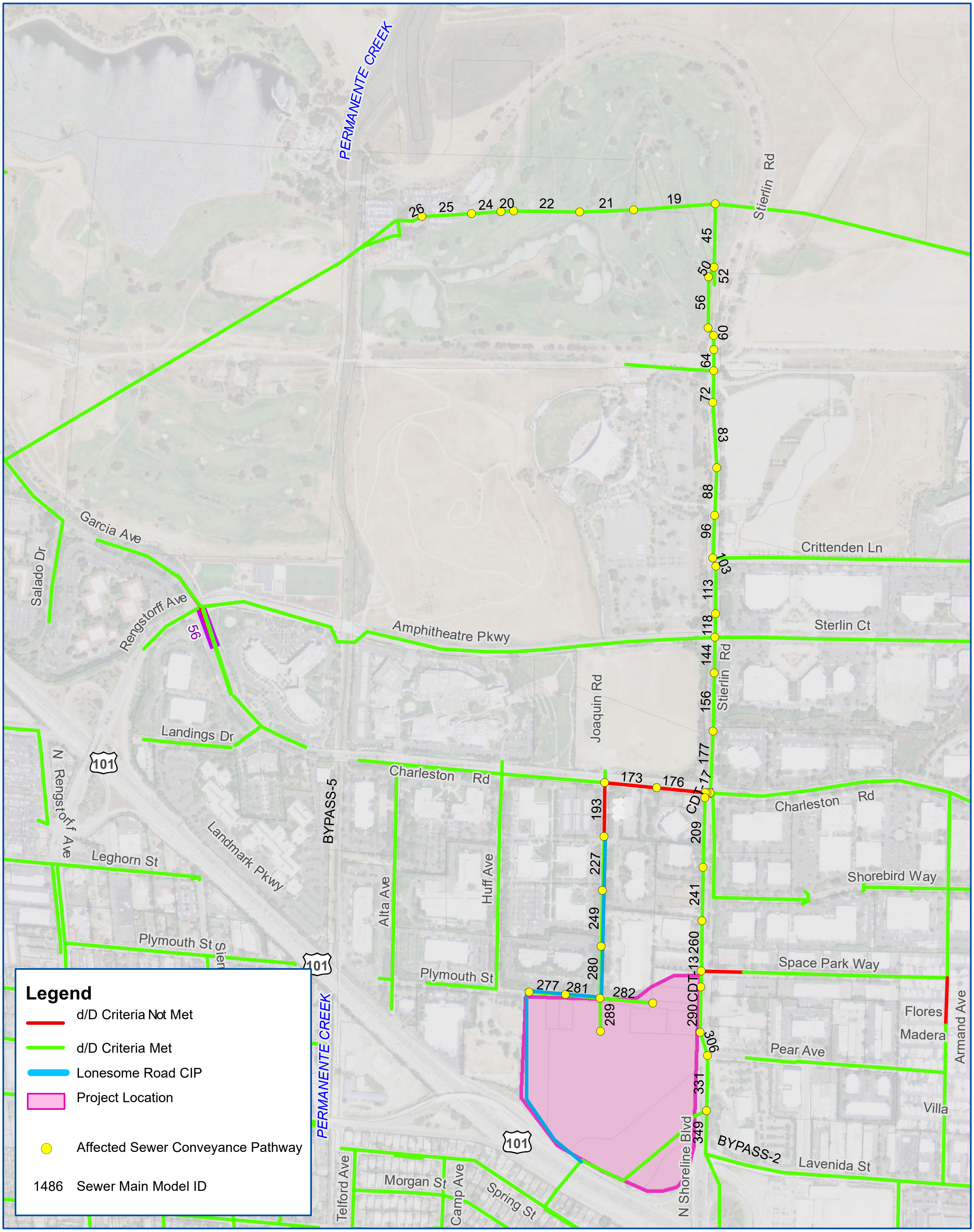
FIGURE B-10:

PWWF - Without Project

Sewer System Model - Existing Condition

Gateway Master Plan Utility Impact Study | February 2021



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Colony St

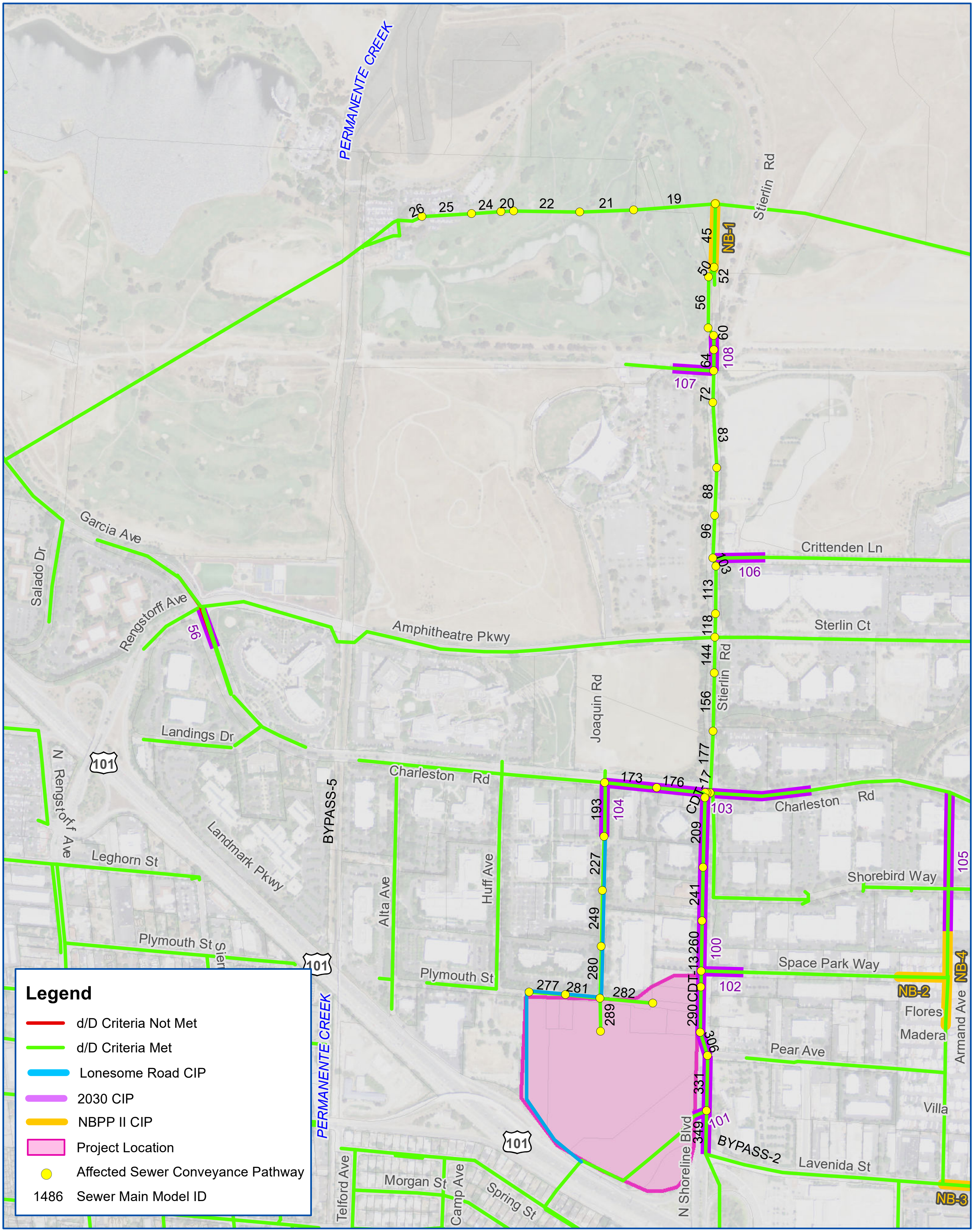
0 415 830 Feet

N

FIGURE B-11: **PWWF - With Project**

Sewer System Model - Existing Condition

Gateway Master Plan Utility Impact Study | February 2021



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0 415 830 Feet

N

FIGURE B-12:

PWWF - Without Project

Sewer System Model - Existing Condition

Gateway Master Plan Utility Impact Study | February 2021

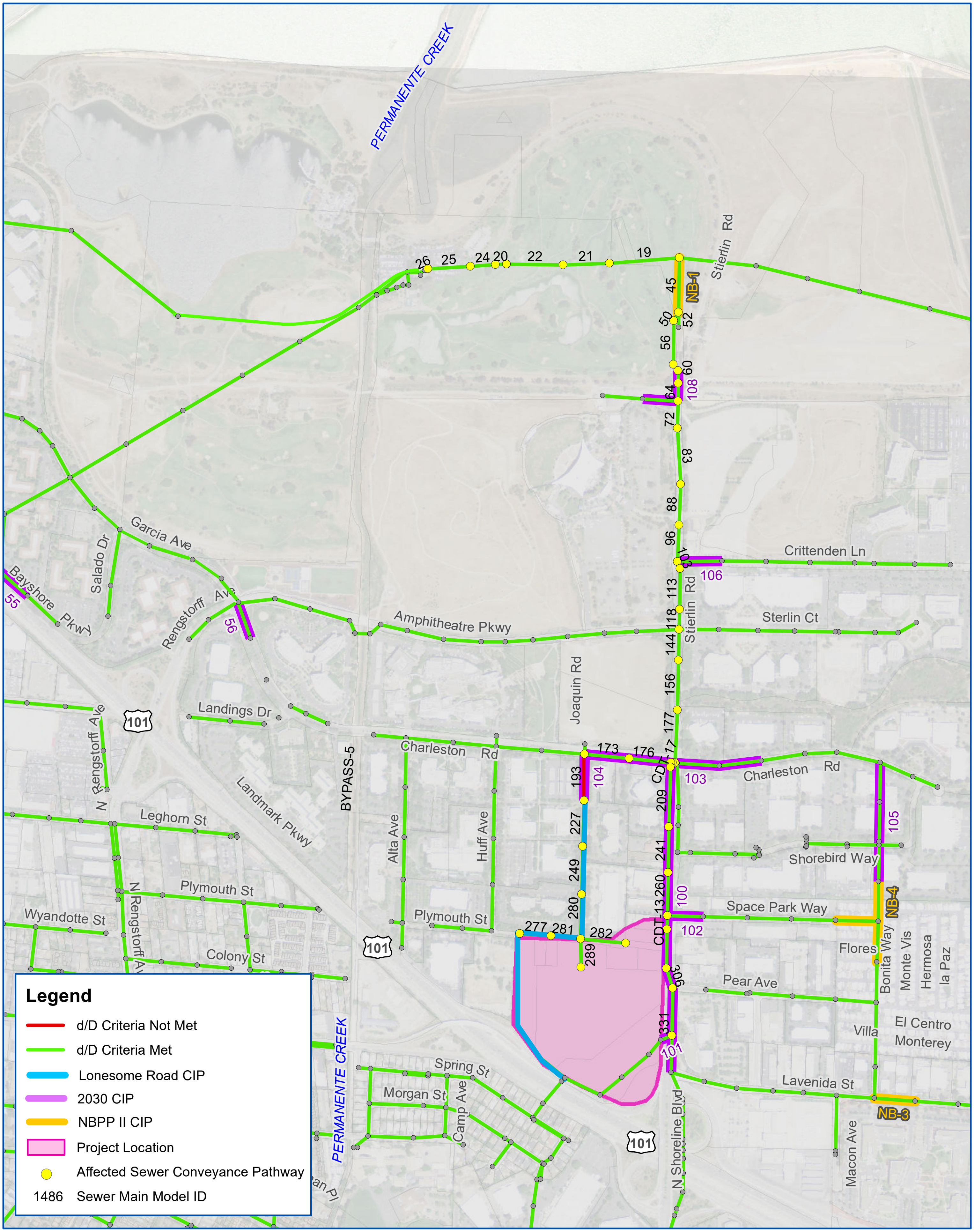

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FIGURE B-13: **PWWF - With Project**

Sewer System Model - Future Cumulative Condition

Google Landings Utility Impact Study | February 2021

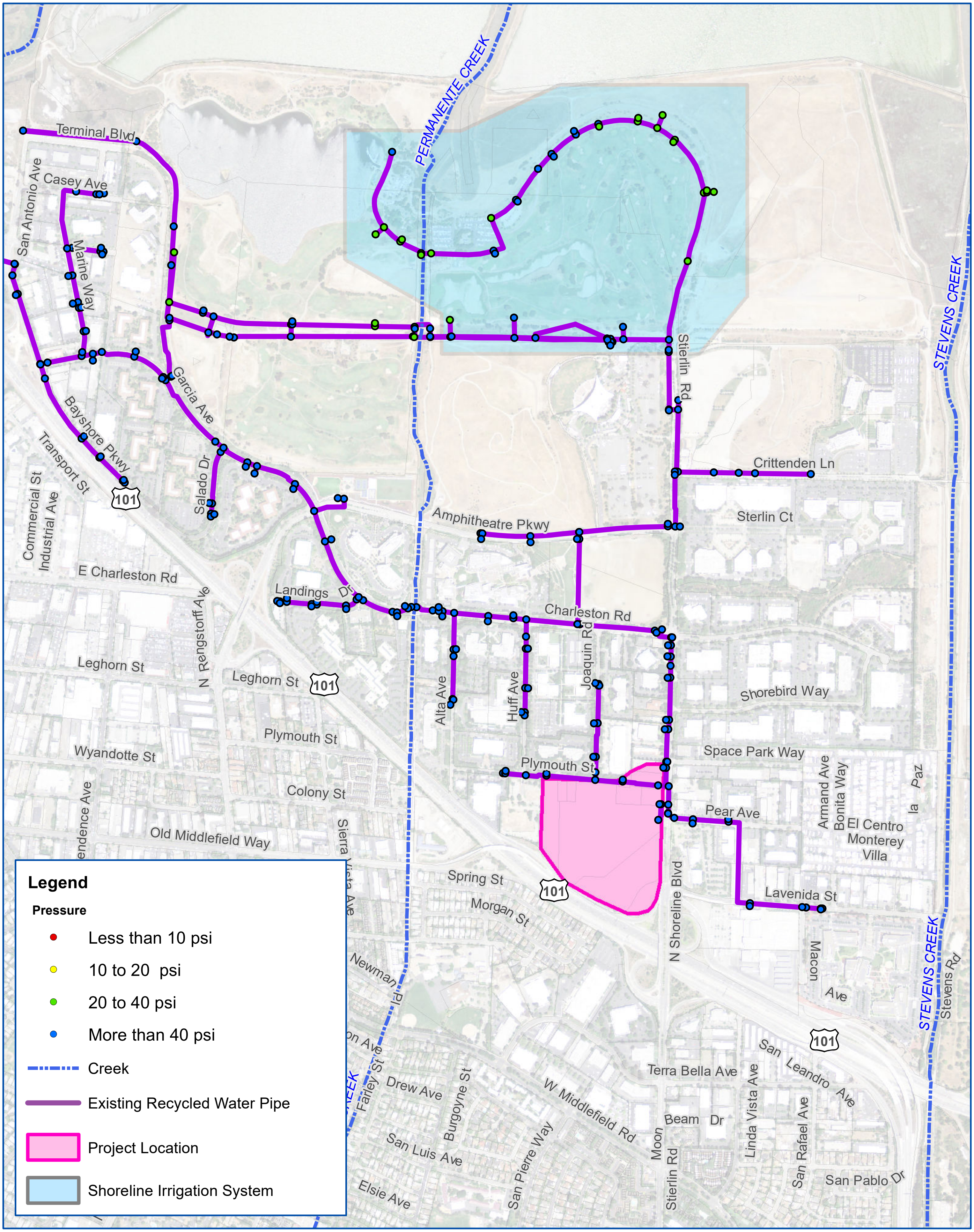

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FIGURE B-14: **Existing Recycled Water Pressure**

Recycled Water Feasibility Model - With Shoreline Pond Storage

Gateway Master Plan Utility Impact Study | February 2021

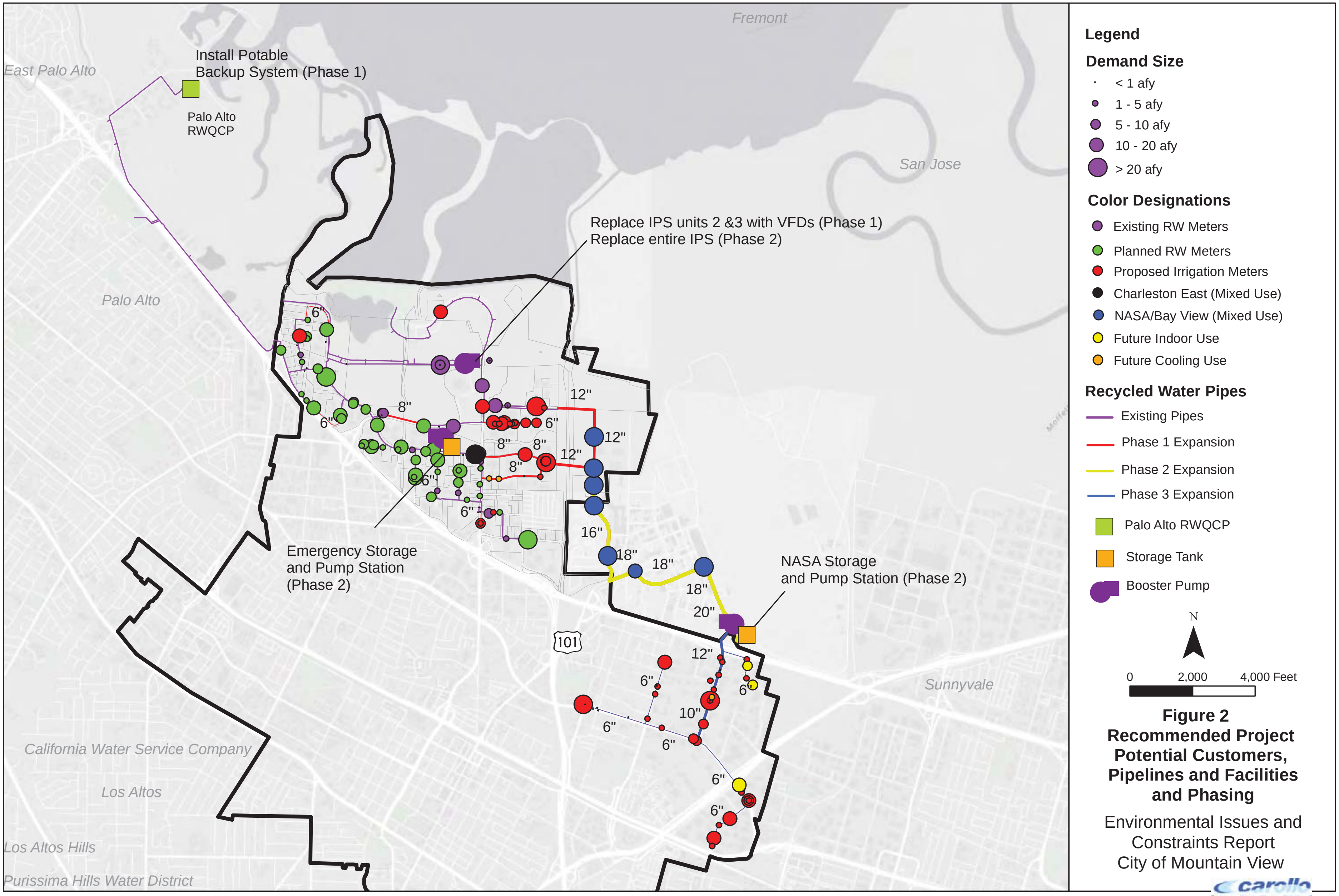
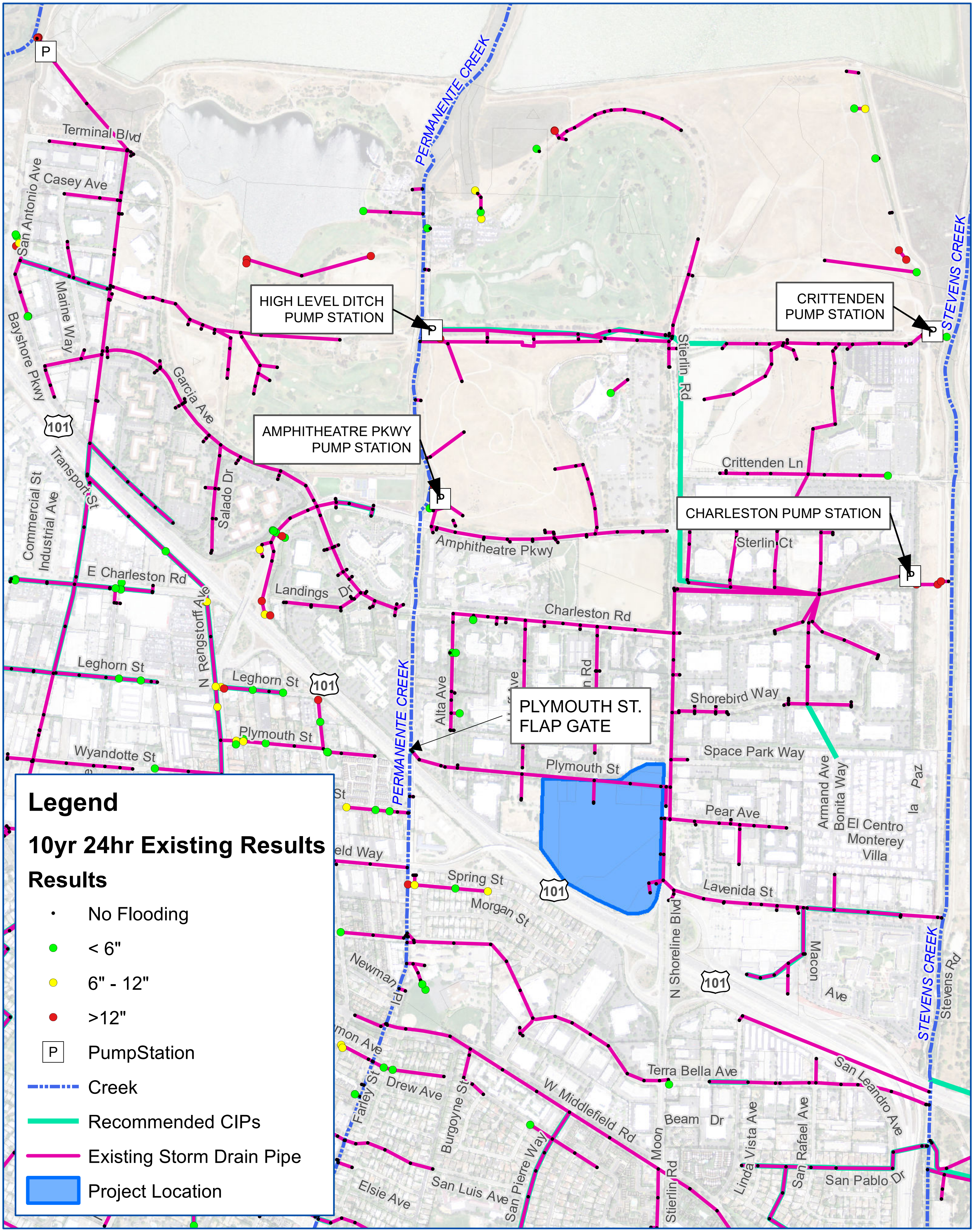


Figure B-15: Recycled Water Feasibility Study Recommended Projects (Carollo, 2012)



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0 550 1,100 Feet

FIGURE B-16: **Storm Drain Existing 10yr Results**

CIPs From 2019 Storm Drain Master Plan

Gateway Master Plan Utility Impact Study | February 2021