# Middlefield Park Master Plan
# Utility Impact Study

Prepared for
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and

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# Executive Summary

Schaaf & Wheeler has been retained by David J. Powers & Associates to determine impacts from the Middlefield Park Master Plan Project (Project) on the City of Mountain View's (City) potable water, sanitary sewer, and recycled water systems. The Project is located within the East Whisman Precise Plan area on the eastern side of the City (Figure B-1). The Project proposes to remove multiple existing industrial/office buildings across the 14 parcels and construct five new office buildings totaling 1,317,000 square feet, six new residential buildings with 1,900 apartments/studios units, 30,000 square feet of retail, 20,000 square feet of community space and two parking garages.

The project proposes to connect to the City's utility system and as an option could install a Central Utility Plant (CUP) that would collect and treat onsite sewage generated by the project and create non-potable recycled water for outdoor use and indoor use throughout the project. The CUP would provide up to 250,000 gallons per day of non-potable water to the proposed development. Three scenarios are considered with respect to the CUP. Scenario 1 assumes the CUP is not constructed (No CUP). Scenario 2 considers the CUP and all supporting private utilities, sewer and recycled water lines, are constructed but the CUP is offline and all sewer flows are diverted to the City's system at the CUP and all non potable water demands are loaded at the CUP (CUP Offline). Scenario 3 considers the CUP and all supporting private utilities are constructed and the CUP is online operating with full efficiency, reducing sewer flows and water demands on the City's system (CUP Online). The water and sewer generations and loading locations are modified for each scenario accordingly.

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 and Future Cumulative Condition models are created from the models developed for the *East Whisman Precise Plan Utility Impact Study* (EWPP UIS; Schaaf & Wheeler, May 2019). In the EWPP UIS, the Existing Condition model is based on the *2010 Water Master Plan* (WMP) model and the Future Cumulative Condition is created from the *General Plan Update Utility Impact Study* (GPUUIS; IEC, October 2011) model, which has since been updated as part of the *2030 General Plan – Updated Water System Modeling* (GP-UWSM; Schaaf & Wheeler, June 2014). As part of the EWPP UIS, the Future Cumulative Condition has been further revised to include recent City approved projects not accounted for or in exceedance of the 2030 GPUUIS projections outside the East Whisman Precise Plan area. For this analysis, the Future Cumulative Condition model includes the water system CIPs from the EWPP UIS, which were based on CIPs recommended in the GP-UWSM.

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 and Future Cumulative Condition models are created from the models developed for the EWPP UIS. In the EWPP UIS, the Existing Condition is based on the *2010 Sewer Master Plan* (SMP) and the Future Cumulative Condition sewer model is created from the 2030 GPUUIS model. As part of the EWPP UIS, the Future Cumulative Condition has been revised to include recent City approved projects not accounted for or in exceedance of the 2030 GPUUIS projections outside of the East Whisman Precise Plan area. For this analysis, the Future Cumulative Condition model includes all sewer system CIPs from the EWPP UIS, which were based on CIPs recommended in the 2030 GPUUIS.

## Water System Project Impacts

The Project development does not significantly impact the water system during Existing Condition for all of the project scenarios. It also does not significantly impact the water system in the Future Cumulative Condition assuming all the recommended CIPs in the EWPP UIS have been constructed. The anticipated maximum Project-specific fire flow requirement of 3,000 gpm is met during Existing Condition and Future Cumulative Condition. The Project fire flow requirement used in this analysis assumes that a 50% reduction of the required fire flow will be approved by the City Fire Marshal based on the installation of an approved automatic sprinkler system. This is a conservative reduction assumption, as buildings have the potential for a 75% reduction of the required fire flow according to the California Fire Code (2019), if approved. 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 without the estimated increase in incremental Project flow. The sewer system does not have sufficient capacity in the Existing Condition with the estimated increase in incremental Project flow for Scenarios 1 and 2. Each scenario has one pipe that exceeds the maximum allowable depth over diameter (d/D) design criteria, both pipes are identified for upsizing from 10-inch and 12-inch pipes to 15-inch pipes as a part of the 2030 GPUUIS. The sewer system has sufficient capacity in the Existing Condition with the estimated increase in incremental Project flow for Scenario 3 assuming the CUP is treating sewage at its full capacity.

Under the Future Cumulative condition, the sewer system has sufficient capacity without and with the estimated increase in incremental Project flow, aside from Scenario 2 project conditions, assuming all of the CIPs from the 2030 GPUUIS and EWPP UIS are constructed. Scenario 2, considering the CUP is constructed but is offline, requires one additional CIP required to be upsized from a 12-inch to a 15-inch pipe that was not identified in previous studies. Two CIP projects from the GPUUIS are identified downstream of the project, and two CIPs from the EWPP UIS are also located downstream of the project. Project contributions to the recommended CIPs are determined and may be used to estimate development impacts for fair share cost analysis.

## Recycled Water Impacts

The City anticipates expansion of the existing recycled water system into NASA/Moffett Field and East Whisman area, known as the “Recommended Project” in the 2014 Recycled Water Feasibility Study (RWFS). Phase 1 of the expansion includes new customers with North Bayshore and serving a portion of NASA/Moffett. Phase 2 of the expansion completes serving the remaining customers within NASA/Moffett Field. Phase 3 of the expansion includes extending the distribution system into East Whisman. The RWFS anticipates recycled water demands comprised of outdoor irrigation and indoor dual-plumbed buildings, with irrigation making up most of the demands.

The Project's proposed private wastewater treatment plant and recycled water production has the potential to impact the City's planned expansion of the municipal recycled water system. The Project's non-potable demands make up a considerable amount of the RWFS's anticipated recycled water demand in the East Whisman area. The private recycled water supply has potential to impact the City's recycled water system. A positive impact of the private recycled water supply is it allows the City to serve additional customers in the East Whisman area given the municipal supply capacity constraints. A negative impact of the private recycled water supply is the potential for the expansion of the municipal recycled water system to have a cost impact with a major customer being removed from future revenue streams and there would be a significant decrease in source of recycle water for the City.

The City updated their feasibility study and conducted additional forecasting of recycled water demands and supply capacity. As of March 22, 2022, the City Council approved the RWFS update, including the list of recommendations. However, the findings from the updated RWFS were not included in this report as the study results and Council direction were not available at the time of preparation. The potential for a large customer producing their own private recycled water will need to be taken into account as the recycled water system expansion planning continues.

# Chapter 1. Introduction

## 1.1. Project Description

The proposed Middlefield Park Master Plan Project (Project) encompasses 14 parcels (Assessor's Parcel Numbers [APNs]: 160-58-001, 160-58-016, 160-58-017, 160-57-004, 160-57-006, 160-57-007, 160-57-008, 160-57-009, 160-57-010, 160-57-011, 160-57-012, 160-57-013, 160-59-005, and 160-59-006) of approximately 40 acres. The Project is bounded by the Mountain View City boundary on the east, Ellis Street on the west, Valley Transportation Authority (VTA) light rail tracks to the north, and Maude Avenue to the south and is located within the East Whisman Precise Plan area (Figure B-1). The Project proposes removing 23 office and light industrial buildings on site and constructing five new office buildings totaling 1,317,000 square feet, six new residential buildings/mixed use with a total of 1,900 units and up to 30,000 square feet of ground floor retail and 20,000 square feet of community/civic uses, two parking structures, and 10.15 acres of park/open space.

The Project is located within the East Whisman Precise Plan area and is proposing a denser development than was originally assumed for the Project parcels in the *East Whisman Precise Plan Utility Impact Study* (EWPP UIS; Schaaf & Wheeler, May 2019). The total development densities are higher for the Project parcels but are within the allowed densities outlined in the EWPP. The demands previously allocated within the EWPP area, but outside of the Project area are reduced in order to not increase the total future cumulative demand to above the previously studied EWPP study area demands.

The Project proposes a design alternative to install a Central Utility Plant (CUP) that would collect and treat onsite sewage generated by the project and create non-potable recycled water for outdoor use and indoor use throughout the project. Three scenarios are considered with respect to the CUP. Scenario 1 assumes the CUP is not constructed and the development is served by City utilities on a parcel by parcel basis (No CUP). Scenario 2 considers the CUP and all supporting private utilities, sewer and recycled water lines, are constructed but the CUP is offline and sewer flows and recycled water demand are diverted to the City's sewer and water system at the CUP (CUP Offline). Scenario 3 considers the CUP and all supporting utilities are constructed and the CUP is online operating with full efficiency (CUP Online). The water and sewer generations and loading locations are modified for each scenario accordingly and are discussed further in each systems' analysis section. The City does not have dedicated non-potable recycled water service in the project area and therefore the project's non-potable demands are applied to the City's water system in Scenarios 1 and 2 where the CUP is not constructed (No CUP) and where the CUP is offline (CUP Offline), respectively. In Scenario 1, No CUP, non-potable demands are loaded at the closest adjacent public water main to each building. In Scenario 2, CUP Offline, non-potable demands are loaded at the closest adjacent public water to the CUP.

## 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 for each different scenario is added to the model and post-Project deficiencies are examined. In total, eight model simulations of the water system are performed, as shown in Figure 1.

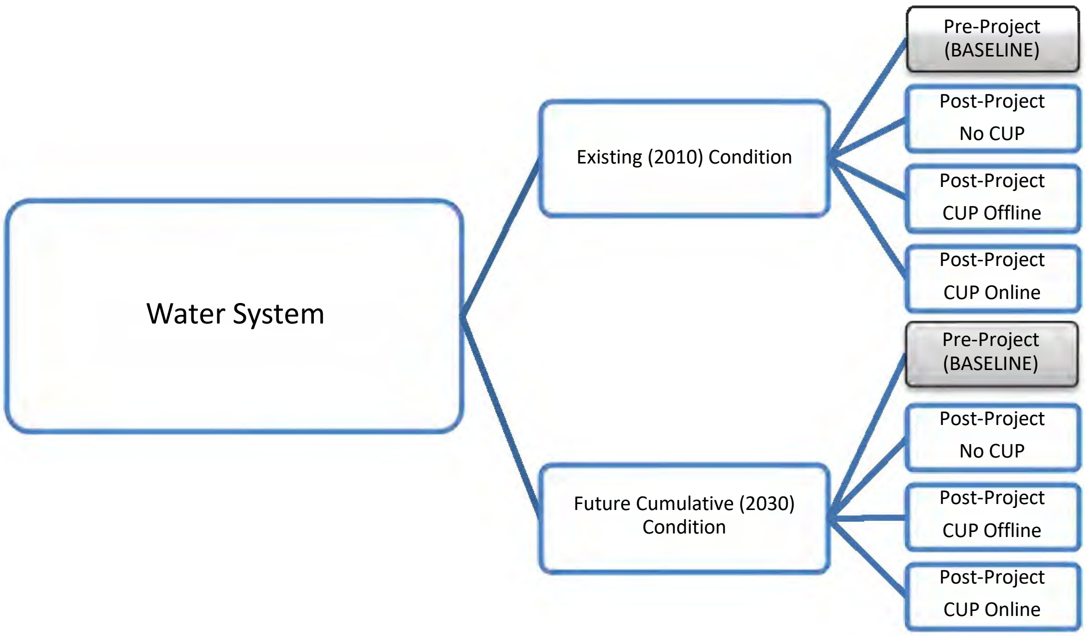



Figure 1. Water Model Simulations

The Existing Condition model consists of the existing distribution system and operating parameters along with water demands based on existing land use from the *2010 Water Master Plan* (WMP). The City is currently developing an updated Water Master Plan but will not be substantially complete to coincide with this study. Water demands within the East Whisman Precise Plan area have been updated to reflect current land use as part of the EWPP UIS. The Future Cumulative Condition water demand is based on the 2030 General Plan Update (GPU) land use and has since been revised to include recent City approved projects not accounted for or in exceedance of the 2030 GPU projections. Water demands in the Future Cumulative Condition have also been updated to reflect demands associated with the East Whisman Precise Plan per the EWPP UIS. The Future Cumulative Condition model includes the operating parameters from the *2030 General Plan Update (GPU) – Updated Water System Modeling* (GP-USWM; Schaaf & Wheeler, June 2014) model and assumes all of the recommended CIPs in the GP-UWSM have been constructed. Table A-1 in Appendix A provides a list of the considered development projects for the Future Cumulative Condition in addition to the East Whisman Precise Plan.

## 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, eight model simulations of the sewer system are performed, as shown in Figure 2.

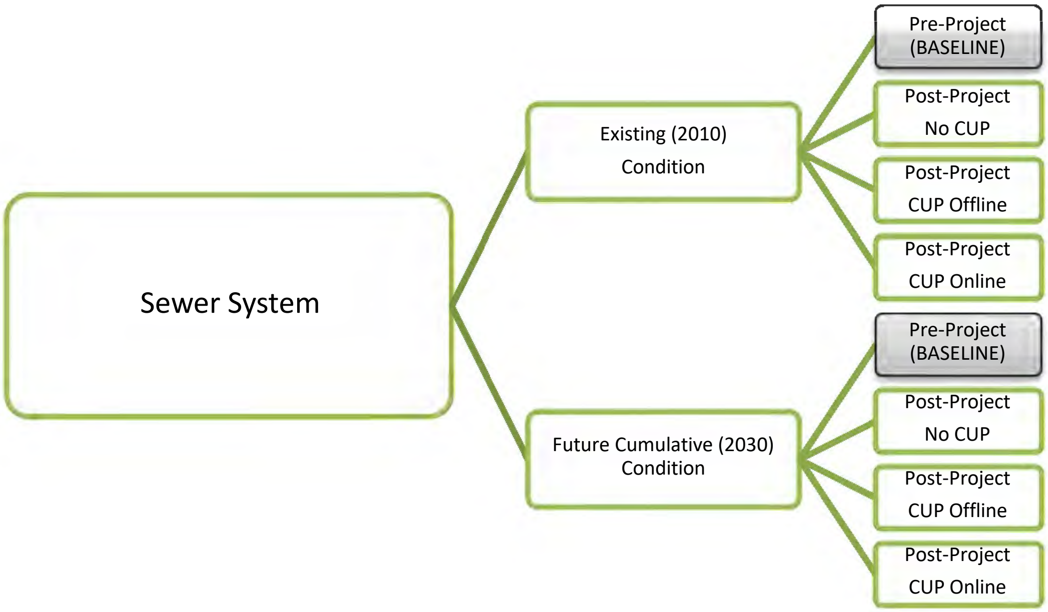



Figure 2. Sewer Model Simulations

The Existing Condition model consists of the existing collection system and operating parameters along with sewer flow based on existing land use from the *2010 Sewer Master Plan* (SMP). The City is currently developing an updated Sewer Master Plan but will not be substantially complete to coincide with this study. Sewer flows within the East Whisman Precise Plan area have been updated to reflect current land use as part of the EWPP UIS. The Future Cumulative Condition sewer flow is based on the 2030 General Plan Update (GPU) land use and 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 Future Cumulative Condition. In addition to the projects in Table A-1, sewer flows have also been updated to reflect development densities associated with the East Whisman Precise Plan. The Future Cumulative Condition model includes the operating parameters in the *2030 General Plan Update Utility Impact Study* (GPUUIS) model and assumes that all sewer system CIPs recommended in the 2030 GPUUIS and EWPP UIS have been constructed.

## 1.4. Report Organization

This report is organized into five following sections. Chapter 2 discusses the water demand estimates for the Project. 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 summary of the recycled water system.

# 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.

Each scenario is considered in developing the impacts to the City's water system. The construction and status of the CUP changes the demand location and loads as outlined herein. Domestic potable water and firefighting water services for the Project will connect to the existing 12-inch diameter water mains in Ellis Street, E Middlefield Rd, Logue Ave, Maude Ave, and Clyde Avenue according to the Project Plan figures dated June 3, 2021. Dedicated fire service lines are proposed to connect to the 12-inch water mains to feed on-site fire hydrants within the project area. The domestic potable water demands and fire flow analysis is conducted at the locations where the Project connects to the public water mains. On-site water and fire mains and fire hydrants are not evaluated as part of this analysis. Potable domestic water serving each building are loaded into the model at the adjacent main.

Non-potable water service and demands vary between the three scenarios outlined above. Scenario 1 (No CUP) loads the non-potable water demands at the same junction as the potable demands, at the public water main adjacent to each building. Scenario 2 (CUP Offline) loads the whole non-potable water demand for every building at the water public main adjacent to the CUP in Ellis Street where the backup connection is assumed to be located. Scenario 3 (CUP Online) loads the non-potable water demand at the public main adjacent to the CUP in Ellis Street considering the full CUP treatment capacity of 250,000 gallons per day is treated and supplies the project site and therefore, total water demand is reduced by the capacity of the CUP.

## 2.1. Project Water Demand

Water demand from proposed buildings is estimated from the proposed number of residential units and non-residential building square footages provided in the Project Description, and water unit duty factors developed for the City. Water unit duty factors used in this report were developed from water meter records of recent developments throughout the City (and developed as part of North Bayshore Precise Plan Phase II). The duty factors applied are representative of high-density multi-family residential buildings, of high intensity office buildings, and of retail, restaurant, and civic/community uses for the proposed mix use buildings. Table 2-1 provides the demand estimation for each building, the Project demand, and the total post-Project demand. The project proposes to utilize recycled water onsite including outdoor irrigation and non-potable water indoors. It is assumed that 50% of water is for indoor use and 50% of water is for outdoor use for all building use types. 100% of water for outdoor use will be recycled water. For non-residential buildings it is assumed 50% indoor water use will be non-potable recycled water and 50% will be potable water. For residential buildings it is assumed 25% of indoor water use will be non-potable recycled water and 75% will be potable water.

Table 2-1: Proposed Building Estimated Water Demand

| Building | Land Use Type | Dwelling Units (DU) | Building Area (sf) | Water Duty Factor (gpd/DU) / (gpd/1,000 sf) | Water Demand (gpd) | Demand Type | |
|---|---|---|---|---|---|---|---|
| | | | | | | Potable | Non-Potable |
| O1 | High Intensity Office | - | 441,939 | 130 | 57,452 | 14,363 | 43,089 |
| O2 | High Intensity Office | - | 190,000 | 130 | 24,700 | 6,175 | 18,525 |
| O3 | High Intensity Office | - | 310,000 | 130 | 40,300 | 10,075 | 30,225 |
| O4 | High Intensity Office | - | 292,212 | 130 | 37,988 | 9,497 | 28,491 |
| O5/P1 | High Intensity Office/ Parking | - | 82,849 | 130 | 10,770 | 2,693 | 8,078 |
| P2 | Parking/Civic | - | Civic: 4,000 | 165 | 660 | 165 | 495 |
| R1 | MFR – Mixed Use | 400 | Retail: 9,154<br>Rest: 9,154 | 100<br>130<br>1,200 | 52,175 | 18,044 | 34,131 |
| R2 | MFR – Mixed Use | 450 | Retail: 2,100<br>Rest: 2,100<br>Civic: 8,434 | 100<br>130<br>1,200<br>165 | 49,185 | 17,921 | 31,263 |
| R3 | MFR – Mixed Use | 270 | Retail: 1,439<br>Rest: 1,439<br>Civic: 1,666 | 100<br>130<br>1,200<br>165 | 29,188 | 10,672 | 18,516 |
| R4 - AFF | Affordable | 210 | - | 100<br>- | 21,000 | 7,875 | 13,125 |
| R4 - MAR | MFR – Mixed Use | 90 | Retail: 978<br>Rest: 978<br>Civic: 1,666 | 100<br>130<br>1,200<br>165 | 10,575 | 3,769 | 6,806 |
| R5 | MFR – Mixed Use | 310 | Retail: 1,330<br>Rest: 1,330<br>Civic: 3,234 | 100<br>130<br>1,200<br>165 | 33,303 | 12,201 | 21,102 |
| R6 - AFF | Affordable | 170 | - | 100 | 17,000 | 6,375 | 10,625 |
| Park Building | Civic/ Community | - | Civic: 1,000 | 165 | 165 | 41 | 124 |
| **Total** | - | **1,900** | **Retail: 15,000**<br>**Rest: 15,000**<br>**Civic: 20,000**<br>**Office: 1,317,000** | - | **384,460** | **119,865** | **264,595** |

### 2.1.1. Project Required Fire Flow

The anticipated project-specific fire flow requirement at the site is based on the 2019 California Fire Code (CFC) Appendix B, which gives the minimum fire flow requirement based on fire-flow area and building construction type. Building specific fire flow requirements based on the CFC are presented in Table 2-2.

Schaaf and Wheeler used fire-flow calculation data provided by the applicant and confirmed the calculations based on the California Fire Code. The Project plans and calculations indicate the building types are IA/IB. No weighted average is necessary due to different building types. The required fire flow based on construction type varies between 3,000 and 6,000 gpm.

A 50 percent reduction of the fire flow rate is used as the project-specific fire flow requirement in this evaluation. This is a conservative reduction estimate as up to a 75 percent reduction is allowed upon approval of an automatic sprinkler system according to CFC Section B105; the resulting fire flow requirement is 1,500 gpm (the minimum allowed). The actual fire flow requirement may change as the planning process continues and Project specific requirements are determined by the City Fire Marshal.

Table 2-2: Anticipated Project Fire Flow (FF) Requirement

| Building | Occupancy Use | Fire-Flow Calculation Area (Square Feet) | Building Construction Type | CFC Required FF (gpm) | FF with 50% Reduction (gpm) | FF with 75% Reduction (gpm) |
|---|---|---|---|---|---|---|
| O1 | Office | 333,000 | IA/IB | 6,000 | 3,000 | 1,500 |
| O2 | Office | 207,356 | IA/IB | 5,000 | 2,500 | 1,500 |
| O3 | Office | 336,960 | IA/IB | 6,000 | 3,000 | 1,500 |
| O4 | Office | 320,484 | IA/IB | 6,000 | 3,000 | 1,500 |
| O5/P1 | Office/ Parking | 307,202 | IA/IB | 6,000 | 3,000 | 1,500 |
| P2 | Parking | 81,926 | IA/IB | 3,000 | 1,500 | 1,500 |
| R1 | MFR – Mixed Use | 171,600 | IA/IB | 4,500 | 2,250 | 1,500 |
| R3 | MFR – Mixed Use | 165,508 | IA/IB | 4,500 | 2,250 | 1,500 |
| R4, R4 - AFF | MFR – Mixed Use/Affordable | 171,900 | IA/IB | 4,500 | 2,250 | 1,500 |
| R5 | MFR – Mixed Use | 171,905 | IA/IB | 4,500 | 2,250 | 1,500 |
| R6 - AFF | Affordable | 172,800 | IA/IB | 4,250 | 2,125 | 1,500 |

## 2.2. Existing Condition (2010)

### 2.2.1. 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 EWPP UIS. Outside of the East Whisman Precise Plan, the demand in the model is calibrated against water billings records from 2005 and 2006, as further explained in the 2010 WMP (the City is currently updating the Water Master Plan and is not yet available for use). Within the East Whisman Precise Plan area, demand is calculated using the water demand unit duty factors developed from the *North Bayshore Precise Plan Phase II Utility Impact Study* (NBPPII UIS; Schaaf & Wheeler, October 2016) and current land use densities analyzed as part of the EWPP UIS for the Existing Condition pre-project scenario. Table 2-3 details the model demand at the existing Project parcels with current land uses.

Table 2-3: Baseline Demand for Existing Condition (Based on Model)

| Address | APN | Land Use Type | Building Area (sf) | Water Demand** (gpd) |
|---|---|---|---|---|
| 433 Clyde Ave | 160-57-004 | Industrial/Office | - | 1,614 |
| 485 Clyde Ave | 160-57-006 | Industrial/Office | - | 690 |
| 495 Clyde Ave | 160-57-007 | Industrial/Office | - | 454 |
| 500 Logue Ave | 160-57-008 | Industrial/Office | - | 6,660 |
| 440 Clyde Ave | 160-57-009 | Industrial/Office | - | 7,626 |
| 420 Clyde Ave | 160-57-010 | Industrial/Office | - | 5,203 |
| 880 Maude Ave | 160-57-011 | Industrial/Office | - | 1,560 |
| 800 Maude Ave | 160-57-012 | Industrial/Office | - | 9,984 |
| 441 Logue Ave | 160-57-013 | Industrial/Office | - | 3,232 |
| 440 Logue Ave | 160-58-001 | Industrial/Office | - | 1,739 |
| 500 E Middlefield Rd | 160-58-016 | Industrial/Office | - | 11,376 |
| 401 Ellis St | 160-58-017 | Industrial/Office | - | 5,017 |
| 885 Maude Ave | 160-59-005 | Industrial/Office | - | 4,612 |
| 891 Maude Ave | 160-59-006 | Industrial/Office | - | 1,969 |
| ***Total*** | **-** | **-** | ***684,646**** | ***61,736***** |

**Square footage provided by developer **Water demands allocated in the Existing Condition Water Model*

### 2.2.2. 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 2-4. The Project is anticipated to incrementally increase water demand by 322,697 gpd above pre-Project demand. The incremental demand assumes all water demand is allocated to the City water system. For the project design option that includes installing the CUP, while the CUP is operational (as modeled in Scenario 3), non-potable demands are offset by 250,000 gpd that are anticipated to be generated from the CUP, and therefore the net incremental demand while the CUP is operational is 72,697 gallons per day.

Table 2-4: Incremental Project Demand for Existing Condition

| | Water Demand (gpd) | |
|---|---|---|
| | Scenario 1 & 2 | Scenario 3 |
| Pre-Project Demand | 61,763 | 61,763 |
| Project Demand | 384,460 | 134,460 |
| ***Incremental Project Demand*** | ***+ 322,697*** | ***+ 72,697*** |

## 2.3. Future Cumulative Condition (2030)

### 2.3.1. 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 EWPP UIS. In the EWPP UIS model, water demands are based on the 2030 General Plan Update (GPU) land use for areas outside of the East Whisman Precise Plan; these demands 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. Within the East Whisman Precise Plan, demands are based on future land use densities analyzed as part of the EWPP UIS. Table 2-5 presents the pre-project demand from the model.

Table 2-5: Baseline Demand for Future Cumulative Condition (Based on Model)

| Address | APN | Land Use Type | Building Area* (sf) | Water Demand* (gpd) |
|---|---|---|---|---|
| 433 Clyde Ave | 160-57-004 | Industrial | 18,042 | 3,012 |
| 485 Clyde Ave | 160-57-006 | R&D | 47,482 | 17,155 |
| 495 Clyde Ave | 160-57-007 | R&D | *47,482* | 17,155 |
| 500 Logue Ave | 160-57-008 | R&D | 135,00 | 48,779 |
| 440 Clyde Ave | 160-57-009 | R&D | 46,488 | 16,797 |
| 420 Clyde Ave | 160-57-010 | Industrial | 16,758 | 2,793 |
| 880 Maude Ave | 160-57-011 | R&D | 20,114 | 7,268 |

| Address | APN | Land Use Type | Building Area* (sf) | Water Demand* (gpd) |
|---|---|---|---|---|
| 800 Maude Ave | 160-57-012 | R&D | 70,905 | 25,618 |
| 441 Logue Ave | 160-57-013 | Industrial | 11,480 | 1,916 |
| 440 Logue Ave | 160-58-001 | R&D | 12,960 | 4,681 |
| 500 E Middlefield Rd | 160-58-016 | Office | 100,842 | 34,112 |
| 401 Ellis St | 160-58-017 | Office | 136,377 | 25,224 |
| 885 Maude Ave | 160-59-005 | R&D | 16,000 | 5,781 |
| 891 Maude Ave | 160-59-006 | R&D | 9,570 | 3,459 |
| ***Total*** | - | - | ***642,018*** | ***213,751*** |

**Square footage and Water demands allocated in the Future Cumulative Condition Water Model from the EWPP*

### 2.3.2. 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 2-6. The incremental demand assumes all water demand is allocated to the City water system. Demands previously allocated to future projects within the EWPP area are reduced in order to not increase the total future cumulative demand to above the previously studied EWPP study area demands. For the project design option that includes installing the CUP, while the CUP is operational (as modeled in Scenario 3), 250,000 gpd are anticipated to be generated from the CUP, and therefore the net incremental demand while the CUP is operational is -79,291 gallons per day. Negative demand indicates there would be less total demand than is projected in the Future Cumulative Condition.

Table 2-6: Incremental Project Demand for
Future Cumulative Condition

| | Water Demand (gpd) | |
|---|---|---|
| | Scenario 1 & 2 | Scenario 3 |
| Pre-Project Demand | 213,751 | 213,751 |
| Project Demand | 384,460 | 134,460 |
| ***Incremental Project Demand*** | ***+ 170,709*** | ***-79,291*** |

# 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. Water supply and water storage are evaluated for the Future Cumulative Condition and only consider the highest net increase in demands from the three scenarios. Hydraulic conveyance and available fire flow are assessed for both Existing (2010) and Future Cumulative (2030) Condition for each scenario.

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

Table 3-1: Peaking Factors

| Category | Peaking Factor |
|---|---|
| Maximum Day | 1.71 |
| Peak Hour | 2.79 |

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 City's 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 is located in Pressure Zone 2, which is supplied by two San Francisco Public Utilities Commission (SFPUC) turnouts.

Water demand versus supply capacity by Pressure Zone is given in Table 3-3. Demand in Pressure Zone 2 can be sufficiently supplied by SFPUC Turnouts #7 and #14 based on the supply capacity provided in Table 3-8 of the *2030 General Plan Update Utility Impact Study* (IEC, 2011). However, total capacity for Pressure Zone 2 includes peak hour turnout capacity from SFPUC Turnouts #7 and #14 and can be supplemented with additional supply from Wells #19 and #20, if needed. Demand in Pressure Zone 2 can be sufficiently supplied by the turnouts. As discussed in the *2030 General Plan Update Utility Impact Study* (IEC, 2011) surplus supply in Pressure Zone 2 will need to be routed to Pressure Zone 1 to make-up the supply deficiency in the lower zone. The additional Project demand does not impact the City's ability to meet total system demand.

Increase in project demands is offset by removing future allocated demands for other parcels assumed as part of the EWPP. The net increase in future demand within EWPP area is zero.

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** | **50.24** | **50.24** | **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 El Camino Hospital at 2500 Grant Road, which has a planning-level fire flow requirement of 3,500 gpm 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 types in the City's InfoWater model developed for the City's *East Whisman Precise Plan Utility Impact Study* (EWPP UIS; Schaaf & Wheeler, May 2019). 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 Existing Condition pre-Project fire flow requirement is taken from the EWPP UIS model and vary between 2,500 and 3,500 gpm as outlined in Table 3-5. After Project development, the Project-specific required fire flow at the site is anticipated to be 3,000 gpm with an applied 50% reduction for the assumed approval of an automatic sprinkler system.

### 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 for each scenario (Figure B-3). At Existing Condition, the system meets performance criteria system-wide.

Scenarios 1, 2, & 3 for the project development do not 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 3,500 gpm is met at the existing hydrant locations. After Project development, the anticipated project-specific fire flow requirement ranges, between 1,500 to 3,000 gpm, can still be met at the connecting node. The evaluated fire flow is detailed in Table 3-5. The existing deficiencies in Pressure Zone 2 shown on Figures B-4 and B-5 are independent of the Project.

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) | | |
|---|---|---|---|---|---|---|
| | | | | Scenario 1 | Scenario 2 | Scenario 3 |
| J-4405 | Project Location – Maude Ave | Pre-Project: 3,500<br>Post-Project: 1,500 | 10,429 | 10,166 | 10,194 | 10,371 |
| J-4407 | Project Location – E Middlefield Rd | Pre-Project: 3,500<br>Post-Project: 2,250 | 11,728 | 11,518 | 11,452 | 11,682 |
| J-4412 | Project Location – E Middlefield Rd | Pre-Project: N/A<br>Post-Project: 2,125 | 10,217 | 9,981 | 9,996 | 10,168 |
| J-4416 | Project Location – E Middlefield Rd | Pre-Project: 3,500<br>Post-Project: 2,250 | 10,204 | 9,992 | 9,989 | 10,161 |
| J-4428 | Project Location – Clyde Ave | Pre-Project: N/A<br>Post-Project: 1,500 | 9,950 | 9,703 | 9,728 | 9,892 |

| Model Node ID | Location | Required Fire Flow Rate (gpm) | Available Flow Pre-Project (gpm) | Available Flow Post-Project (gpm) | | |
|---|---|---|---|---|---|---|
| | | | | Scenario 1 | Scenario 2 | Scenario 3 |
| J-4431 | Project Location – Clyde Ave | Pre-Project: 3,500<br>Post-Project: 2,500 | 10,148 | 9,913 | 9,927 | 10,098 |
| J-4432 | Project Location – Logue Ave | Pre-Project: 3,500<br>Post-Project: 2,500 | 10,770 | 10,511 | 10,521 | 10,712 |
| J-4433 | Project Location – Ellis Ave | Pre-Project: N/A<br>Post-Project: 3,000 | 10,725 | 10,522 | 10,689 | 10,689 |
| J-4438 | Project Location – SFPUC Right of Way | Pre-Project: N/A<br>Post-Project: 3,000 | 11,280 | 11,060 | 11,015 | 11,229 |

### 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 2) for Project impact. Available fire flow pre- and post-Project at selected deficient nodes is presented in Table 3-6, showing minimal impact (<1%) due to Project development for each scenario.

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) | | |
|---|---|---|---|---|---|---|
| | | | | Scenario 1 | Scenario 2 | Scenario 3 |
| J-3715 | Near Ada Avenue | 2,500 | 2,480 | 2,461 | 2,461 | 2,476 |
| J-4381 | Near Whisman Reservoir | 3,500 | 3,193 | 3,193 | 3,193 | 3,193 |
| J-4276 | Near Bernardo Ave & E Evelyn Ave | 3,500 | 3,160 | 3,137 | 3,139 | 3,156 |
| J-3582 | Near the Junction of Highway 85 & Highway 237 | 3,500 | 3,221 | 3,202 | 3,202 | 3,217 |

## 3.5. Future Cumulative Condition (2030) Results

### 3.5.1. Hydraulic Model Information

The Future Cumulative Condition model is created using water demand based on the 2030 General Plan Update (GPU) land use and includes the additional projects listed in Table A-1 in Appendix A, which were not accounted for or were in exceedance of the 2030 GPU projections, as well as the East Whisman Precise Plan. System performance is analyzed under the assumption that all recommended CIPs in the *2030 General Plan – Updated Water System Modeling* (GP-UWSM; Schaaf & Wheeler, June 2014) and EWPP UIS have been constructed.

The Future Cumulative Condition pre-Project fire flow requirement is taken from the EWPP UIS model. The planning level (non-reduced) fire flow requirement for the pre-Project land use classification of multi-family residential is 2,500 gpm. After Project development, the Project specific required fire flow at the site is anticipated to be 3,000 gpm with an applied 50% reduction for the assumed approval of an automatic fire sprinkler system.

### 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) for each scenario.

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

In the Future Cumulative Condition, the system is able to meet the fire flow requirements at the site pre- and post-Project for all scenarios as shown on Figures B-8 and B-9 assuming all GP-UWSM recommended CIPs are constructed. Within Pressure Zone 2, there are several deficient nodes, but they are far from and independent of the Project. Multiple model junctions, show an apparent increase in available fire flow in the different scenarios; this is a result of re-allocating demand from the East Whisman Precise Plan proposed development densities based on the proposed Project design.

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) | | |
|---|---|---|---|---|---|---|
| | | | | Scenario 1 | Scenario 2 | Scenario 3 |
| J-4405 | Project Location – Maude Ave | Pre-Project: 3,500<br>Post-Project: 1,500 | 9,870 | 9,852 | 9,837 | 10,014 |
| J-4407 | Project Location – E Middlefield Rd | Pre-Project: 3,500<br>Post-Project: 2,250 | 11,207 | 11,242 | 11,141 | 11,371 |
| J-4412 | Project Location – E Middlefield Rd | Pre-Project: 3,500<br>Post-Project: 2,125 | 9,684 | 9,685 | 9,654 | 9,827 |
| J-4416 | Project Location – E Middlefield Rd | Pre-Project: 3,500<br>Post-Project: 2,250 | 9,687 | 9,694 | 9,691 | 9,864 |
| J-4428 | Project Location – Clyde Ave | Pre-Project: 3,500<br>Post-Project: 1,500 | 9,456 | 9,422 | 9,412 | 9,577 |
| J-4431 | Project Location – Clyde Ave | Pre-Project: 3,500<br>Post-Project: 2,500 | 9,635 | 9,627 | 9,606 | 9,778 |
| J-4432 | Project Location – Logue Ave | Pre-Project: 3,500<br>Post-Project: 2,500 | 10,226 | 10,207 | 10,177 | 10,369 |
| J-4433 | Project Location – Ellis Ave | Pre-Project: 3,500<br>Post-Project: 3,000 | 10,197 | 10,237 | 10,375 | 10,375 |

| Model Node ID | Location | Required Fire Flow Rate (gpm) | Available Flow Pre-Project (gpm) | Available Flow Post-Project (gpm) | | |
|---|---|---|---|---|---|---|
| | | | | Scenario 1 | Scenario 2 | Scenario 3 |
| J-4438 | Project Location – SFPUC Right of Way | Pre-Project: 3,500<br>Post-Project: 3,000 | 10,741 | 10,763 | 10,669 | 10,883 |

### 3.5.4. Deficiencies – Pre and Post Project

The fire flow deficient nodes within Pressure Zone 2 are evaluated for Project impact. Table 3-8 compares the available fire flow before and after Project development showing no impact to the fire flow deficiencies in Pressure Zone 2.

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) | | |
|---|---|---|---|---|---|---|
| | | | | Scenario 1 | Scenario 2 | Scenario 3 |
| J-4381 | Near Whisman Reservoir | 3,500 | 3,120 | 3,120 | 3,120 | 3,121 |

# 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 SMP, 2030 GPUUIS, NBPPII, and EWPP) 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 for parcels outside of the East Whisman Precise Plan Area. Within the East Whisman Precise Plan area, BWF is developed based on current land use and applicable water duty factors and RTS ratios from the *East Whisman Precise Plan Utility Impact Study* (EWPP UIS; Schaaf & Wheeler, May 2019). 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 number of residential units and building square footages of the different uses provided in the Project Description. A Return-to-Sewer (RTS) ratio is applied to water duty factor from Table 2-1 to estimate sewer flow. An RTS ratio of approximately 0.75 is used based on the 2010 SMP RTS ratio for the different land uses. Table 4-1 provides the estimated Project sewer flow.

The Project scenarios have different sewer generation and loading locations. Scenario 1 has loading at the closest adjacent public sewer to each building along Ellis Street, E Middlefield Rd, Logue Ave, Maude Ave, and Clyde Avenue. Scenario 2 and 3 has loading to the public sewer adjacent to the CUP in Ellis Street. Scenario 1 and Scenario 2 consider that the full sewer generation is present without any reduction from the CUP treatment capacity of 250,000 gallons per day. Scenario 3 generation considers the full CUP treatment capacity of 250,000 gallons per day and therefore, total sewer generation is reduced by the capacity of the CUP. Private on-site piping is not studied in this analysis.

Table 4-1: Project Estimated Sewer Flow

| Building | Land Use Type | Dwelling Units (DU) | Building Area (sf) | Sewer Duty Factor (gpd/DU) / (gpd/1,00sf) | | Sewer Demand (gpd) |
|---|---|---|---|---|---|---|
| O1 | Office | - | 441,939 | 100 | | 44,194 |
| O2 | Office | - | 190,000 | 100 | | 19,000 |
| O3 | Office | - | 310,000 | 100 | | 31,000 |
| O4 | Office | - | 292,212 | 100 | | 29,221 |
| O5/P1 | Office/ Parking | - | 82,849 | 100 | | 8,285 |
| P2 | Parking/Civic | - | Civic: 4,000 | 125 | | 500 |
| R1 | MFR – Mixed Use | 400 | Retail: 9,154<br>Restaurant: 9,154 | 75 | 100<br>900 | 39,154 |
| R2 | MFR – Mixed Use | 450 | Retail: 2,100<br>Restaurant: 2,100<br>Civic: 8,434 | 75 | 100<br>900<br>125 | 36,904 |
| R3 | MFR – Mixed Use | 270 | Retail: 1,439<br>Restaurant: 1,439<br>Civic: 1,666 | 75 | 100<br>900<br>125 | 21,897 |
| R4 – AFF | Affordable | 210 | - | 75 | - | 15,750 |
| R4 – MAR | MFR – Mixed Use | 90 | Retail: 978<br>Restaurant: 978<br>Civic: 1,666 | 75 | 100<br>900<br>125 | 7,936 |
| R5 | MFR – Mixed Use | 310 | Retail: 1,330<br>Restaurant: 1,330<br>Civic: 3,234 | 75 | 100<br>900<br>125 | 24,984 |
| R6 – AFF | Affordable | 170 | - | 75 | | 12,750 |
| Park Building | Civic/ Community | - | Civic: 1,000 | 125 | | 125 |
| **Total** | **-** | **1,900** | **Retail: 15,000**<br>**Restaurant: 15,000**<br>**Civic: 20,000**<br>**Office: 1,317,000** | **-** | | **291,700** |

## 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 EWPP UIS. Table 4-2 details the parcel-level sewer flow in the model, which was calculated based on current land use densities and sewer duty factors.

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

| Address | APN | Land Use Type | Building Area (sf) | Sewer Demand** (gpd) |
|---|---|---|---|---|
| 433 Clyde Ave | 160-57-004 | Industrial/Office | - | 1,582 |
| 485 Clyde Ave | 160-57-006 | Industrial/Office | - | 676 |
| 495 Clyde Ave | 160-57-007 | Industrial/Office | - | 445 |
| 500 Logue Ave | 160-57-008 | Industrial/Office | - | 6,530 |
| 440 Clyde Ave | 160-57-009 | Industrial/Office | - | 7,477 |
| 420 Clyde Ave | 160-57-010 | Industrial/Office | - | 5,102 |
| 880 Maude Ave | 160-57-011 | Industrial/Office | - | 1,530 |
| 800 Maude Ave | 160-57-012 | Industrial/Office | - | 9,789 |
| 441 Logue Ave | 160-57-013 | Industrial/Office | - | 3,169 |
| 440 Logue Ave | 160-58-001 | Industrial/Office | - | 1,705 |
| 500 E Middlefield Rd | 160-58-016 | Industrial/Office | - | 11,153 |
| 401 Ellis St | 160-58-017 | Industrial/Office | - | 4,919 |
| 885 Maude Ave | 160-59-005 | Industrial/Office | - | 4,522 |
| 891 Maude Ave | 160-59-006 | Industrial/Office | - | 1,931 |
| ***Total*** | **-** | **-** | ***684,646**** | ***60,530***** |

** Square footage provided by developer **Sewer Flow generation in the Existing Condition Model*

### 4.2.2. Post-Project Incremental Flow

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 demand. The Project incremental sewer flow is given in

Table 4-3. The incremental demand assumes all sewer generation is allocated to the City sewer system. For the project design option that includes installing the CUP, while the CUP is operational (as modeled in Scenario 3), 250,000 gpd are anticipated to be treated and recycled at the CUP, and therefore the net incremental demand while the CUP is operational is -18,830 gallons per day. Negative demand indicates there would be less total demand than is projected in the Existing Condition.

Table 4-3: Incremental Project Flow for Existing Condition

| | Sewer Flow (gpd) | |
|---|---|---|
| | Scenarios 1 & 2 | Scenario 3 |
| Pre-Project (Baseline) Flow | 60,530 | 60,530 |
| Project Flow | 291,700 | 41,700 |
| ***Incremental Project Flow*** | ***+ 231,170*** | ***-18,830*** |

## 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 developed as part of the EWPP UIS. In the EWPP UIS model, sewer flows outside of the East Whisman Precise Plan area are based on the 2030 General Plan Update (GPU) land use; these flows have 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. Sewer flows within the East Whisman Precise Plan area have been further revised to reflect future development densities as analyzed in the EWPP UIS. 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 | Land Use Type | Building Area (sf) | Sewer Demand (gpd) |
|---|---|---|---|---|
| 433 Clyde Ave | 160-57-004 | Industrial | 18,042 | 3,974 |
| 485 Clyde Ave | 160-57-006 | R&D | 47,482 | 10,460 |
| 495 Clyde Ave | 160-57-007 | R&D | *47,482* | *10,460* |
| 500 Logue Ave | 160-57-008 | R&D | 135,000 | 29,738 |
| 440 Clyde Ave | 160-57-009 | R&D | 46,488 | 10,241 |
| 420 Clyde Ave | 160-57-010 | Industrial | 16,758 | 3,692 |
| 880 Maude Ave | 160-57-011 | R&D | 20,114 | 4,431 |

| Address | APN | Land Use Type | Building Area (sf) | Sewer Demand (gpd) |
|---|---|---|---|---|
| 800 Maude Ave | 160-57-012 | R&D | 70,905 | 15,619 |
| 441 Logue Ave | 160-57-013 | Industrial | 11,480 | 2,592 |
| 440 Logue Ave | 160-58-001 | R&D | 12,960 | 2,855 |
| 500 E Middlefield Rd | 160-58-016 | Office | 100,842 | 22,214 |
| 401 Ellis St | 160-58-017 | Office | 136,377 | 30,042 |
| 885 Maude Ave | 160-59-005 | R&D | 16,000 | 3,525 |
| 891 Maude Ave | 160-59-006 | R&D | 9,570 | 2,108 |
| ***Total*** | - | - | ***642,018*** | ***141,427*** |

**Square footage and Water demands allocated in the Future Cumulative Condition Water Model from the EWPP*

### 4.3.2. Post-Project Incremental Flow

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. The incremental demand assumes all sewer generation is allocated to the City sewer system. Demands previously allocated to future projects within the EWPP area are reduced in order to not increase the total future cumulative demand to above the previously studied EWPP study area demands. For the project alternative that includes installing the CUP, while the CUP is operational (as modeled in scenario 3), 250,000 gpd are anticipated to be treated and recycled at the CUP, and therefore the net incremental demand while the CUP is operational is -99,727 gallons per day. Negative demand indicates there would be less total demand than is projected in the Future Cumulative Condition.

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

| | Sewer Flow (gpd) | |
|---|---|---|
| | Scenarios 1 & 2 | Scenario 3 |
| Pre-Project (Baseline) Flow | 141,427 | 141,427 |
| Project Flow | 291,700 | 41,700 |
| ***Incremental Project Flow*** | ***+ 150,273*** | ***-99,727*** |

# 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. The specific affected area of the gravity system evaluated for Project impact begins at Ellis Street, Logue Avenue, and Clyde Avenue adjacent to the site and flows north and west to the Shoreline Sewage Pump Station via the East Trunk.

## 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<br>Average Annual Flow (MGD) | 72-inch Joint Interceptor Capacity<br>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.

Increase in future demands is offset by removing future allocated demands assumed as part of the EWPP. The net increase in future demand is zero. Capacity rights comparison assumes all project sewer generation flows to the City's system.

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 | 10.39 | 14.15 |
| Joint Interceptor | 50.0 | 16.98 | 21.91 | 17.18 | 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 *East Whisman Precise Plan Utility Impact Study* (EWPP UIS; Schaaf & Wheeler, May 2019). Hydraulic deficiencies within the sewer system are evaluated under peak wet weather flow conditions and project contributions to the capacity of the sewer are evaluated under average dry weather flow conditions.

Each project scenario was analyzed separately with sewer generation and loading as described in the report above. In addition to each project scenario being analyzed, phasing of the master plan implementation was considered. The proposed phasing considers different portions of the project constructed in four phases. Phase 1 includes the construction of residential buildings, R1, R2, and R6 - Affordable. Phase 2 includes the construction of office buildings, O1 and O2. Phase 3 includes the construction of the remaining residential buildings, R3, R4 – Affordable, R4 - Market, and R5. Phase 4 includes construction of the remaining office buildings and parking structures. Sewer loads are included at the closest adjacent public sewer main similar to loading for Scenario 1. Phases 1 through 3 are considered to determine at which point recommended CIPs are required to be upgraded. Phase 4 is equivalent to Scenario 1 analysis and therefore is not investigated separately. Results of Phase 4 can be found in the Scenario 1 discussion.

### 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 flows in the Existing Condition as shown in Figures B-10a, B-10b.

**Scenario 1**

The sewer system does not have sufficient capacity downstream of the Project with the post-Project flows for Scenario 1 in the Existing Condition as shown in Figures B-11a and B-11b. One pipe, Conduit ID 1363, exceeds the maximum d/D. This pipe is recommended for upsizing in the 2030 GPUUIS and EWPP UIS as discussed in the following sections.

**Project Phasing**

The sewer system has sufficient capacity downstream of the Project with the post-Project flows for Phases 1 and 2. The sewer system has one pipe, Conduit ID 1363, that does not have sufficient capacity downstream of the Project with the post-Project flows for Phase 3.

**Scenario 2**

The sewer system does not have capacity downstream of the Project with the post-Project flows for Scenario 2 in the Existing Condition as shown in Figures B-12a, B-12b. One pipe, Conduit ID 1498, exceeds the maximum d/D. This pipe is recommended for upsizing in the 2030 GPUUIS as discussed in the following sections.

**Scenario 3**

The sewer system has sufficient capacity downstream of the Project with the post-Project flows for Scenario 3 in the Existing Condition as shown in Figures B-13a, B-13b.

### 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, all pipes meet d/D performance criteria. For Project Scenario 1 one pipe did not meet d/D requirements, Conduit ID 1363. For Project Scenario 2 one pipe did not meet d/D requirements, Conduit ID 1498. These pipes are recommended for upsizing in the 2030 GPUUIS as discussed in the following sections. Project Scenario 3 did not have any deficiencies.

## 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 2030 General Plan Update (GPU) land use and includes additional projects listed in Table A-1 in Appendix A, which were not accounted for or were in exceedance of the 2030 GPU projections, as well as the East Whisman Precise Plan. System performance is analyzed under the assumption that all recommended CIPs in the 2030 GPUUIS and EWPP UIS have been constructed.

Two CIPs from the 2030 GPUUIS are recommended downstream of the project. The first project recommends upsizing 396 feet of 12-inch diameter pipe to 15-inch diameter pipe. The second project recommends upsizing 504 feet of 10-inch diameter pipe to 15-inch diameter pipe. In conjunction, a CIP from the EWPP UIS is recommended immediately upstream to upsize 342 feet of 10-inch diameter pipe to 15-inch diameter pipe. One additional CIP from the EWPP UIS is downstream of the Project, upsizing 1,225 feet of 18-inch diameter pipe to 21-inch diameter pipe along Fairchild Drive between Ellis Street and North Whisman Road. All of the recommended CIPs are shown on Figure B-14a, B-14b, B-15a, and B-15b .

One additional CIP (SW-1) is required as part of Scenario 2 in order to accommodate flows in the event the CUP is non-operational. This CIP includes upsizing 488 LF of 12-inch diameter pipe, to 15-diameter pipe.

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

The system meets d/D performance criteria downstream of the Project in the Future Cumulative Condition under pre-Project conditions as shown in Figures B-14a & B-14b.

**Scenario 1**

The system meets d/D performance criteria downstream of the Project in the Future Cumulative Condition under post-Project Scenario 1 conditions as shown in Figures B-15a, and B-15b.

**Scenario 2**

The system does not meet d/D performance criteria downstream of the Project in the Future Cumulative Condition under post-Project Scenario 2 conditions as shown in Figures B-16a, and B-16b. One pipe, Conduit ID

1429, exceeds the maximum d/D. Two previously identified CIPs are no longer required, GPUUIS CIP #81 and the EWPP UIS identified CIP between Logue Avenue and Ellis Street, because flow from the project is collected and discharged at the CUP.

**Scenario 3**

The system meets d/D performance criteria downstream of the Project in the Future Cumulative Condition under post-Project Scenario 3 conditions as shown in Figures B-17a, and B-17b. Two previously identified CIPs are no longer required, GPUUIS CIP #81 and the EWPP UIS identified CIP between Logue Avenue and Ellis Street, because flow from the project is collected and discharged at the CUP.

### 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 all pipes downstream of the Project under pre-Project and post-Project conditions. Table 5-5 present the recommended CIP diameters. The EWPP UIS recommended diameters are shown in bold blue font, the GPUUIS diameters are shown in bold green font, and project specific diameter are shown in bold purple font.

For Scenario 2 and 3, two previously identified CIPs are no longer required, GPUUIS CIP #81 and the EWPP UIS identified CIP between Logue Avenue and Ellis Street, because flow from the project is collected and discharged at the CUP.

## 5.5. Project Contribution to Deficient Sewer Pipes

Approximately 1,225 feet of 18-inch diameter pipe along Fairchild Drive is recommended to be upsized to 21-inch diameter pipe, as well as 342 feet of 10-inch to 15-inch between Ellis Street and Logue Avenue, as part of the EWPP UIS. An additional 342 feet of 10-inch diameter pipe along Ellis Street west of the project site and 504 feet of 10-inch diameter pipe between Ellis Street and Logue Avenue, north of the Project site, are recommended to be upsized as part of the 2030 GPUUIS. Scenario 2 loading creates an additional CIP of 488 feet of 12-inch pipe along Ellis Street that requires upsizing to 15-inch that is not recommended in previous reports. Table 5-6 through 5-8 provide a comparison of ADWF in order to determine the Project contribution for the recommended pipe improvement projects based on each scenarios loading and flow path.

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

| Sewer Main Model ID | Upstream MH ID | Downstream MH ID | Existing Diameter (in) | Length (ft) | Slope (%) | PWWF Pre-Project Max Flow (MGD) | PWWF Pre-Project d/D | Scenario 1 Max Flow (MGD) | Scenario 1 d/D | Scenario 1 Pipe Capacity Remaining (% of Allowed d/D) | Scenario 2 Max Flow (MGD) | Scenario 2 d/D | Scenario 2 Pipe Capacity Remaining (% of Allowed d/D) | Scenario 3 Max Flow (MGD) | Scenario 3 d/D | Scenario 3 Pipe Capacity Remaining (% of Allowed d/D) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1623 | H6-010 | G6-039 | 15 | 308 | 0.361 | 0.575 | 0.3794 | 0.659 | 0.4053 | 46 | - | - | - | - | - | - |
| 1557 | G6-039 | G6-021 | 15 | 379 | 0.145 | 0.593 | 0.4157 | 0.674 | 0.4525 | 40 | - | - | - | - | - | - |
| 1498 | G6-021 | G6-019 | 12 | 396 | 0.383 | 0.627 | 0.4063 | 0.765 | 0.4546 | 9 | 1.046 | 0.5540 | 26 | 0.797 | 0.4654 | 38 |
| 1429 | G6-019 | G6-040 | 12 | 488 | 1.664 | 0.638 | 0.3147 | 0.776 | 0.3488 | 30 | 1.058 | 0.4123 | 45 | 0.808 | 0.3564 | 52 |
| 1339 | G6-040 | G6-016 | 15 | 344 | 0.371 | 0.882 | 0.4045 | 1.165 | 0.4725 | 37 | 1.255 | 0.4933 | 34 | 1.005 | 0.4347 | 42 |
| 1287 | G6-016 | G6-014 | 15 | 367 | 0.404 | 0.896 | 0.4252 | 1.178 | 0.4965 | 34 | 1.269 | 0.5183 | 31 | 1.019 | 0.4568 | 39 |
| 1226 | G6-014 | F6-039 | 15 | 424 | 0.404 | 0.905 | 0.3347 | 1.187 | 0.3886 | 48 | 1.278 | 0.4050 | 46 | 1.028 | 0.3587 | 52 |
| 1129 | F6-039 | F6-037 | 15 | 93 | 4.309 | 0.914 | 0.3365 | 1.196 | 0.3842 | 49 | 1.287 | 0.3991 | 47 | 1.037 | 0.3582 | 52 |
| 1106 | F6-037 | F6-035 | 18 | 216 | 0.255 | 1.042 | 0.3784 | 1.325 | 0.4315 | 42 | 1.419 | 0.4486 | 40 | 1.169 | 0.4027 | 46 |
| 1065 | F6-035 | F6-033 | 18 | 246 | 0.255 | 1.046 | 0.4293 | 1.328 | 0.4957 | 34 | 1.422 | 0.5175 | 31 | 1.172 | 0.4594 | 39 |
| 1033 | F6-033 | F6-031 | 18 | 227 | 0.119 | 1.048 | 0.5034 | 1.331 | 0.5823 | 22 | 1.425 | 0.6089 | 19 | 1.175 | 0.5390 | 28 |
| 1011 | F6-031 | F6-029 | 18 | 384 | 0.087 | 1.097 | 0.5159 | 1.378 | 0.5934 | 21 | 1.474 | 0.6191 | 17 | 1.224 | 0.5510 | 27 |
| 971 | F6-029 | F6-027 | 18 | 259 | 0.128 | 1.099 | 0.5421 | 1.381 | 0.6147 | 18 | 1.476 | 0.6383 | 15 | 1.226 | 0.5752 | 23 |
| 954 | F6-027 | F6-025 | 18 | 212 | 0.023 | 1.102 | 0.5240 | 1.384 | 0.5885 | 22 | 1.478 | 0.6094 | 19 | 1.229 | 0.5535 | 26 |
| 939 | F6-025 | F6-023 | 18 | 350 | 0.174 | 1.105 | 0.3554 | 1.387 | 0.4001 | 47 | 1.482 | 0.4145 | 45 | 1.232 | 0.3759 | 50 |
| 904 | F6-023 | F6-019 | 21 | 73 | 1.325 | 1.113 | 0.3794 | 1.394 | 0.4117 | 45 | 1.489 | 0.4199 | 44 | 1.239 | 0.3918 | 48 |
| 893 | F6-019 | F6-010 | 24 | 306 | 0.116 | 2.336 | 0.4922 | 2.619 | 0.5272 | 30 | 2.694 | 0.5362 | 29 | 2.443 | 0.5055 | 33 |
| 870 | F6-010 | F6-008 | 24 | 25 | 0.111 | 2.344 | 0.5108 | 2.627 | 0.5453 | 27 | 2.701 | 0.5543 | 26 | 2.451 | 0.5240 | 30 |
| 855 | F6-008 | F6-006 | 24 | 244 | 0.094 | 2.348 | 0.4841 | 2.631 | 0.5160 | 31 | 2.705 | 0.5242 | 30 | 2.455 | 0.4962 | 34 |
| 808 | F6-006 | F6-002 | 24 | 75 | 0.153 | 2.362 | 0.4548 | 2.646 | 0.4805 | 36 | 2.720 | 0.4872 | 35 | 2.469 | 0.4646 | 38 |

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

| Sewer Main Model ID | Upstream MH ID | Downstream MH ID | Existing Diameter (in) | Length (ft) | Slope (%) | PWWF | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Pre-Project | | Scenario 1 | | | Scenario 2 | | | Scenario 3 | | | |
| | | | | | | Max Flow (MGD) | d/D | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) |
| 775 | F6-002 | F5-038 | 27 | 180 | 0.240 | 3.279 | 0.3768 | 3.546 | 0.3930 | 48 | 3.586 | 0.3954 | 47 | 3.336 | 0.3803 | 49 |
| 738 | F5-038 | F5-036 | 27 | 410 | 0.433 | 3.282 | 0.3681 | 3.549 | 0.3817 | 49 | 3.590 | 0.3803 | 49 | 3.339 | 0.3676 | 51 |
| 709 | F5-036 | F5-012 | 27 | 145 | 0.454 | 4.465 | 0.4201 | 4.732 | 0.4340 | 42 | 4.650 | 0.4297 | 43 | 4.400 | 0.4168 | 44 |
| 662 | F5-012 | E5-005 | 27 | 244 | 0.320 | 4.468 | 0.4263 | 4.735 | 0.4403 | 41 | 4.653 | 0.4360 | 42 | 4.404 | 0.4228 | 44 |
| 571 | E5-005 | E5-003 | 27 | 278 | 0.410 | 4.472 | 0.4068 | 4.739 | 0.4199 | 44 | 4.656 | 0.4158 | 45 | 4.407 | 0.4036 | 46 |
| 513 | E5-003 | E5-001 | 27 | 123 | 0.432 | 4.541 | 0.4054 | 4.808 | 0.4182 | 44 | 4.750 | 0.4155 | 45 | 4.500 | 0.4033 | 46 |
| 486 | E5-001 | E5-016 | 27 | 254 | 0.432 | 4.545 | 0.4125 | 4.812 | 0.4257 | 43 | 4.754 | 0.4229 | 44 | 4.503 | 0.4104 | 45 |
| 414 | E5-016 | E5-014 | 27 | 192 | 0.410 | 4.548 | 0.3978 | 4.815 | 0.4105 | 45 | 4.757 | 0.4078 | 46 | 4.507 | 0.3959 | 47 |
| 351 | E5-014 | D5-015 | 27 | 489 | 0.571 | 4.552 | 0.3837 | 4.819 | 0.3957 | 47 | 4.761 | 0.3931 | 48 | 4.510 | 0.3818 | 49 |
| CDT-11 | D5-015 | D5-027 | 27 | 121 | 0.293 | 4.555 | 0.4410 | 4.822 | 0.4550 | 39 | 4.764 | 0.4520 | 40 | 4.514 | 0.4388 | 41 |
| 298 | D5-027 | D5-025 | 27 | 213 | 0.235 | 4.562 | 0.4428 | 4.829 | 0.4569 | 39 | 4.771 | 0.4539 | 39 | 4.521 | 0.4406 | 41 |
| 284 | D5-025 | D5-029 | 27 | 208 | 0.480 | 4.566 | 0.4256 | 4.833 | 0.4394 | 41 | 4.775 | 0.4364 | 42 | 4.525 | 0.4235 | 44 |
| 279 | D5-029 | D5-008 | 27 | 349 | 0.286 | 4.570 | 0.4987 | 4.837 | 0.5154 | 31 | 4.779 | 0.5118 | 32 | 4.528 | 0.4961 | 34 |
| 248 | D5-008 | SW-1 | 27 | 459 | 0.176 | 4.573 | 0.4958 | 4.840 | 0.5120 | 32 | 4.782 | 0.5085 | 32 | 4.532 | 0.4933 | 34 |
| 212 | SW-1 | D5-014 | 33 | 550 | 0.213 | 4.576 | 0.3750 | 4.843 | 0.3867 | 48 | 4.786 | 0.3842 | 49 | 4.535 | 0.3732 | 50 |
| 180 | D5-014 | C5-013 | 33 | 404 | 0.188 | 4.580 | 0.3815 | 4.847 | 0.3934 | 48 | 4.789 | 0.3909 | 48 | 4.539 | 0.3797 | 49 |
| 158 | C5-013 | C5-011 | 33 | 447 | 0.188 | 4.583 | 0.3879 | 4.850 | 0.4000 | 47 | 4.793 | 0.3974 | 47 | 4.542 | 0.3860 | 49 |
| 142 | C5-011 | SW-2 | 33 | 503 | 0.168 | 4.594 | 0.4067 | 4.860 | 0.4193 | 44 | 4.803 | 0.4166 | 44 | 4.553 | 0.4048 | 46 |
| 108 | SW-2 | SW-3 | 33 | 546 | 0.146 | 4.597 | 0.3940 | 4.864 | 0.4061 | 46 | 4.807 | 0.4035 | 46 | 4.556 | 0.3921 | 48 |
| 89 | SW-3 | B5-009 | 33 | 158 | 0.216 | 4.600 | 0.3818 | 4.867 | 0.3936 | 48 | 4.810 | 0.3911 | 48 | 4.560 | 0.3800 | 49 |
| 80 | B5-009 | B5-005 | 33 | 74 | 0.176 | 4.604 | 0.3801 | 4.871 | 0.3916 | 48 | 4.814 | 0.3892 | 48 | 4.563 | 0.3783 | 50 |

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

| Sewer Main Model ID | Upstream MH ID | Downstream MH ID | Existing Diameter (in) | Length (ft) | Slope (%) | PWWF Pre-Project Max Flow (MGD) | PWWF Pre-Project d/D | Scenario 1 Max Flow (MGD) | Scenario 1 d/D | Scenario 1 Pipe Capacity Remaining (% of Allowed d/D) | Scenario 2 Max Flow (MGD) | Scenario 2 d/D | Scenario 2 Pipe Capacity Remaining (% of Allowed d/D) | Scenario 3 Max Flow (MGD) | Scenario 3 d/D | Scenario 3 Pipe Capacity Remaining (% of Allowed d/D) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78 | B5-005 | B5-003 | 36 | 198 | 0.196 | 4.607 | 0.3369 | 4.874 | 0.3470 | 54 | 4.817 | 0.3449 | 54 | 4.567 | 0.3353 | 55 |
| 74 | B5-003 | B5-011 | 36 | 261 | 0.186 | 4.611 | 0.3392 | 4.877 | 0.3494 | 53 | 4.821 | 0.3473 | 54 | 4.571 | 0.3376 | 55 |
| 67 | B5-011 | B5-001 | 36 | 292 | 0.186 | 4.614 | 0.3393 | 4.881 | 0.3495 | 53 | 4.824 | 0.3474 | 54 | 4.574 | 0.3378 | 55 |
| 55 | B5-001 | B5-008 | 36 | 466 | 0.186 | 4.618 | 0.3517 | 4.884 | 0.3618 | 52 | 4.828 | 0.3597 | 52 | 4.578 | 0.3501 | 53 |
| 53 | B5-008 | B5-006 | 36 | 110 | 0.186 | 4.911 | 0.3310 | 5.178 | 0.3402 | 55 | 5.121 | 0.3382 | 55 | 4.871 | 0.3296 | 56 |
| 51 | B5-006 | B5-004 | 36 | 168 | 0.351 | 4.941 | 0.4259 | 5.208 | 0.4365 | 42 | 5.146 | 0.4341 | 42 | 4.896 | 0.4240 | 43 |
| 43 | B5-004 | B5-002 | 36 | 334 | 0.012 | 4.945 | 0.4341 | 5.211 | 0.4450 | 41 | 5.150 | 0.4425 | 41 | 4.899 | 0.4322 | 42 |
| 36 | B5-002 | B4-020 | 39 | 425 | 0.254 | 4.948 | 0.3111 | 5.215 | 0.3198 | 57 | 5.153 | 0.3178 | 58 | 4.903 | 0.3096 | 59 |
| 30 | B4-020 | B4-018 | 39 | 420 | 0.152 | 4.952 | 0.3319 | 5.218 | 0.3412 | 55 | 5.157 | 0.3391 | 55 | 4.906 | 0.3303 | 56 |
| 23 | B4-018 | B4-016 | 39 | 613 | 0.152 | 4.955 | 0.3691 | 5.221 | 0.3773 | 50 | 5.160 | 0.3743 | 50 | 4.910 | 0.3666 | 51 |
| 19 | B4-016 | B4-014 | 42 | 556 | 0.189 | 8.218 | 0.3564 | 8.488 | 0.3626 | 52 | 8.378 | 0.3601 | 52 | 8.123 | 0.3543 | 53 |
| 21 | B4-014 | B4-012 | 42 | 368 | 0.272 | 8.221 | 0.3557 | 8.492 | 0.3618 | 52 | 8.382 | 0.3593 | 52 | 8.127 | 0.3536 | 53 |
| 22 | B4-012 | B4-010 | 42 | 450 | 0.222 | 8.225 | 0.2987 | 8.495 | 0.3037 | 60 | 8.385 | 0.3017 | 60 | 8.130 | 0.2969 | 60 |
| 20 | B4-010 | B4-003 | 42 | 86 | 1.388 | 8.228 | 0.2539 | 8.499 | 0.2581 | 66 | 8.389 | 0.2564 | 66 | 8.134 | 0.2524 | 66 |
| 24 | B4-003 | B4-001 | 42 | 200 | 0.500 | 8.232 | 0.2972 | 8.503 | 0.3019 | 60 | 8.392 | 0.3000 | 60 | 8.138 | 0.2955 | 61 |
| 25 | B4-001 | B4-006 | 42 | 338 | 0.444 | 8.236 | 0.2816 | 8.506 | 0.2869 | 62 | 8.396 | 0.2847 | 62 | 8.141 | 0.2797 | 63 |

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

| Sewer Main Model ID | Upstream MH ID | Downstream MH ID | Existing Diameter (in) | Length (ft) | Slope (%) | PWWF | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Pre-Project | | Scenario 1 | | | Scenario 2 | | | Scenario 3 | | |
| | | | | | | Max Flow (MGD) | d/D | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) |
| 1545 | G7-015 | G7-007 | 8 | 301 | 0.487 | 0.018 | 0.1586 | 0.036 | 0.2026 | 59 | - | - | - | - | - | - |
| 1497 | G7-007 | G7-005 | 8 | 235 | 0.240 | 0.027 | 0.1779 | 0.039 | 0.2094 | 58 | - | - | - | - | - | - |
| 1459 | G7-005 | G7-003 | 8 | 234 | 0.644 | 0.037 | 0.1898 | 0.051 | 0.2204 | 56 | - | - | - | - | - | - |
| 1411 | G7-003 | G7-026 | 10 | 404 | 0.232 | 0.044 | 0.1747 | 0.059 | 0.1994 | 60 | - | - | - | - | - | - |
| 1394 | G7-026 | G7-024 | 10 | 366 | 0.264 | 0.050 | 0.2736 | 0.064 | 0.3441 | 31 | - | - | - | - | - | - |
| 1377 | G7-024 | G7-022 | 10 | 342 | 0.336 | 0.221 | 0.3424 | 0.363 | 0.4484 | 10 | - | - | - | - | - | - |
| 1363 | G7-022 | G6-040 | 10 | 504 | 0.555 | 0.226 | 0.4624 | 0.368 | 0.5618 | 0 | - | - | - | - | - | - |
| 1685 | H7-012 | H7-010 | 10 | 296 | 0.896 | 0.085 | 0.2038 | 0.095 | 0.2150 | 57 | - | - | - | - | - | - |
| 1636 | H7-010 | H7-006 | 10 | 225 | 0.278 | 0.092 | 0.2756 | 0.102 | 0.2852 | 43 | - | - | - | - | - | - |
| 1598 | H7-006 | G7-011 | 10 | 331 | 0.160 | 0.099 | 0.2734 | 0.109 | 0.2898 | 42 | - | - | - | - | - | - |
| 1554 | G7-011 | G7-009 | 10 | 326 | 0.449 | 0.112 | 0.2371 | 0.140 | 0.2616 | 48 | - | - | - | - | - | - |
| 1522 | G7-009 | G7-001 | 10 | 446 | 0.658 | 0.147 | 0.2457 | 0.174 | 0.2984 | 40 | - | - | - | - | - | - |
| 1444 | G7-001 | G7-024 | 10 | 352 | 0.761 | 0.169 | 0.3099 | 0.298 | 0.4115 | 18 | - | - | - | - | - | - |

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

| Sewer Main Model ID | CIP ID | Model Diameter (in) | Length (ft) | Slope (%) | PWWF | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Pre-Project | | Scenario 1 | | | Scenario 2 | | | Scenario 3 | | |
| | | | | | Max Flow (MGD) | d/D | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) |
| 1623 | | 15 | 308 | 0.361 | 1.0352 | 0.537 | 1.1657 | 0.575 | 23 | - | - | - | - | - | - |
| 1557 | | 15 | 379 | 0.145 | 1.0567 | 0.552 | 1.1806 | 0.590 | 21 | - | - | - | - | - | - |
| 1498 | GPUUIS #80 | 12/15 | 396 | 0.383 | 1.0926 | 0.410 | 1.2232 | 0.437 | 42 | 1.4583 | 0.469 | 37 | 1.2083 | 0.434 | 42 |
| 1429 | Scenario 2 | 12/15 | 488 | 1.664 | 1.1354 | 0.463 | 1.2647 | 0.499 | 33 | 1.4913 | 0.53/0.404 | 0/46 | 1.2413 | 0.468 | 38 |
| 1339 | | 15 | 344 | 0.371 | 1.6963 | 0.595 | 1.8455 | 0.628 | 16 | 1.8906 | 0.638 | 15 | 1.6405 | 0.581 | 22 |
| 1287 | | 15 | 367 | 0.404 | 1.7316 | 0.632 | 1.8693 | 0.664 | 12 | 1.9143 | 0.675 | 10 | 1.6643 | 0.614 | 18 |
| 1226 | | 15 | 424 | 0.404 | 1.7703 | 0.491 | 1.8952 | 0.513 | 32 | 1.9402 | 0.521 | 31 | 1.6902 | 0.477 | 36 |
| 1129 | | 15 | 93 | 4.309 | 1.7791 | 0.481 | 1.9040 | 0.500 | 33 | 1.9490 | 0.506 | 33 | 1.6990 | 0.470 | 37 |
| 1106 | | 18 | 216 | 0.255 | 1.9855 | 0.547 | 2.1104 | 0.568 | 24 | 2.1554 | 0.576 | 23 | 1.9054 | 0.533 | 29 |
| 1065 | | 18 | 246 | 0.255 | 1.9969 | 0.602 | 2.1218 | 0.625 | 17 | 2.1668 | 0.634 | 15 | 1.9168 | 0.586 | 22 |
| 1033 | EWPP CIP | 18/21 | 227 | 0.119 | 1.9995 | 0.584 | 2.1244 | 0.604 | 20 | 2.1693 | 0.612 | 18 | 1.9194 | 0.566 | 25 |
| 1011 | EWPP CIP | 18/21 | 384 | 0.087 | 2.0903 | 0.593 | 2.1916 | 0.610 | 19 | 2.2365 | 0.618 | 18 | 1.9866 | 0.574 | 23 |
| 971 | EWPP CIP | 18/21 | 259 | 0.128 | 2.0928 | 0.606 | 2.1941 | 0.623 | 17 | 2.2391 | 0.630 | 16 | 1.9892 | 0.590 | 21 |
| 954 | EWPP CIP | 18/21 | 212 | 0.023 | 2.0955 | 0.577 | 2.1968 | 0.591 | 21 | 2.2417 | 0.598 | 20 | 1.9918 | 0.562 | 25 |
| 939 | EWPP CIP | 18/21 | 350 | 0.174 | 2.0991 | 0.404 | 2.2004 | 0.414 | 45 | 2.2453 | 0.419 | 44 | 1.9954 | 0.393 | 48 |
| 904 | | 21 | 73 | 1.325 | 2.1063 | 0.504 | 2.2076 | 0.510 | 32 | 2.2526 | 0.514 | 31 | 2.0027 | 0.488 | 35 |
| 893 | | 24 | 306 | 0.116 | 3.5615 | 0.642 | 3.5860 | 0.645 | 14 | 3.6308 | 0.650 | 13 | 3.3809 | 0.620 | 17 |
| 870 | | 24 | 25 | 0.111 | 3.5687 | 0.657 | 3.5932 | 0.659 | 12 | 3.6380 | 0.665 | 11 | 3.3881 | 0.635 | 15 |
| 855 | | 24 | 244 | 0.094 | 3.5726 | 0.618 | 3.5971 | 0.621 | 17 | 3.6418 | 0.626 | 17 | 3.3920 | 0.599 | 20 |
| 808 | | 24 | 75 | 0.153 | 3.5850 | 0.579 | 3.6094 | 0.583 | 22 | 3.6541 | 0.581 | 23 | 3.4044 | 0.559 | 25 |

*Note: Model Diameter in green text represents a 2030 GPUUIS CIP; model diameter in blue font represents a recommended upsized pipe from the EWPP UIS; model diameter in purple font represents a recommended upsized pipe specific to the proposed project.*

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

| Sewer Main Model ID | CIP ID | Model Diameter (in) | Length (ft) | Slope (%) | PWWF | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Pre-Project | | Scenario 1 | | | Scenario 2 | | | Scenario 3 | | |
| | | | | | Max Flow (MGD) | d/D | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) |
| 775 | | 27 | 180 | 0.240 | 4.9922 | 0.475 | 5.0242 | 0.477 | 36 | 4.8799 | 0.469 | 37 | 4.6294 | 0.455 | 39 |
| 738 | | 27 | 410 | 0.433 | 4.9954 | 0.452 | 5.0277 | 0.454 | 39 | 4.8832 | 0.447 | 40 | 4.6327 | 0.435 | 42 |
| 709 | | 27 | 145 | 0.454 | 6.2368 | 0.509 | 6.2689 | 0.510 | 32 | 6.1199 | 0.503 | 33 | 5.8692 | 0.491 | 35 |
| 662 | | 27 | 244 | 0.320 | 6.2404 | 0.517 | 6.2724 | 0.518 | 31 | 6.1234 | 0.511 | 32 | 5.8727 | 0.499 | 34 |
| 571 | | 27 | 278 | 0.410 | 6.2440 | 0.491 | 6.2759 | 0.492 | 34 | 6.1268 | 0.486 | 35 | 5.8761 | 0.474 | 37 |
| 513 | | 27 | 123 | 0.432 | 6.3199 | 0.489 | 6.3518 | 0.490 | 35 | 6.2026 | 0.483 | 36 | 5.9519 | 0.472 | 37 |
| 486 | | 27 | 254 | 0.432 | 6.3235 | 0.497 | 6.3553 | 0.499 | 34 | 6.2061 | 0.492 | 34 | 5.9554 | 0.480 | 36 |
| 414 | | 27 | 192 | 0.410 | 6.3270 | 0.480 | 6.3587 | 0.482 | 36 | 6.2095 | 0.475 | 37 | 5.9588 | 0.464 | 38 |
| 351 | | 27 | 489 | 0.571 | 6.4289 | 0.465 | 6.4606 | 0.466 | 38 | 6.3114 | 0.460 | 39 | 6.0607 | 0.450 | 40 |
| CDT-11 | | 27 | 121 | 0.293 | 6.4324 | 0.536 | 6.4641 | 0.538 | 28 | 6.3147 | 0.530 | 29 | 6.0641 | 0.518 | 31 |
| 298 | | 27 | 213 | 0.235 | 6.4396 | 0.538 | 6.4712 | 0.540 | 28 | 6.3218 | 0.533 | 29 | 6.0712 | 0.520 | 31 |
| 284 | | 27 | 208 | 0.480 | 6.4432 | 0.519 | 6.4748 | 0.521 | 31 | 6.3254 | 0.514 | 32 | 6.0747 | 0.501 | 33 |
| 279 | | 27 | 349 | 0.286 | 6.4468 | 0.613 | 6.4783 | 0.615 | 18 | 6.3289 | 0.606 | 19 | 6.0783 | 0.591 | 21 |
| 248 | | 27 | 459 | 0.176 | 6.4502 | 0.606 | 6.4817 | 0.608 | 19 | 6.3323 | 0.599 | 20 | 6.0817 | 0.585 | 22 |
| 212 | | 33 | 550 | 0.213 | 6.4536 | 0.453 | 6.4849 | 0.455 | 39 | 6.3356 | 0.449 | 40 | 6.0849 | 0.439 | 42 |
| 180 | | 33 | 404 | 0.188 | 6.4569 | 0.462 | 6.4881 | 0.463 | 38 | 6.3388 | 0.457 | 39 | 6.0881 | 0.446 | 40 |
| 158 | | 33 | 447 | 0.188 | 6.4602 | 0.475 | 6.4914 | 0.476 | 37 | 6.3421 | 0.470 | 37 | 6.0914 | 0.460 | 39 |
| 142 | | 33 | 503 | 0.168 | 6.7072 | 0.502 | 6.7383 | 0.503 | 33 | 6.6695 | 0.500 | 33 | 6.4193 | 0.489 | 35 |
| 108 | | 33 | 546 | 0.146 | 6.7106 | 0.485 | 6.7416 | 0.486 | 35 | 6.6719 | 0.483 | 36 | 6.4216 | 0.473 | 37 |
| 89 | | 33 | 158 | 0.216 | 6.7138 | 0.470 | 6.7447 | 0.471 | 37 | 6.6746 | 0.469 | 38 | 6.4243 | 0.459 | 39 |
| 80 | | 33 | 74 | 0.176 | 6.7173 | 0.467 | 6.7481 | 0.468 | 38 | 6.6777 | 0.465 | 38 | 6.4274 | 0.455 | 39 |

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

| Sewer Main Model ID | CIP ID | Model Diameter (in) | Length (ft) | Slope (%) | PWWF | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Pre-Project | | Scenario 1 | | | Scenario 2 | | | Scenario 3 | | |
| | | | | | Max Flow (MGD) | d/D | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) |
| 78 | | 36 | 198 | 0.196 | 6.7206 | 0.413 | 6.7514 | 0.414 | 45 | 6.6808 | 0.411 | 45 | 6.4306 | 0.403 | 46 |
| 74 | | 36 | 261 | 0.186 | 6.7241 | 0.416 | 6.7548 | 0.417 | 44 | 6.6842 | 0.414 | 45 | 6.4340 | 0.406 | 46 |
| 67 | | 36 | 292 | 0.186 | 6.7276 | 0.416 | 6.7583 | 0.417 | 44 | 6.6875 | 0.414 | 45 | 6.4373 | 0.406 | 46 |
| 55 | | 36 | 466 | 0.186 | 6.7307 | 0.428 | 6.7613 | 0.429 | 43 | 6.6905 | 0.426 | 43 | 6.4402 | 0.418 | 44 |
| 53 | | 36 | 110 | 0.186 | 7.0241 | 0.399 | 7.0546 | 0.400 | 47 | 6.9838 | 0.398 | 47 | 6.7335 | 0.390 | 48 |
| 51 | | 36 | 168 | 0.351 | 7.0573 | 0.505 | 7.0878 | 0.506 | 33 | 7.0087 | 0.503 | 33 | 6.7584 | 0.494 | 34 |
| 43 | | 36 | 334 | 0.012 | 7.0610 | 0.514 | 7.0913 | 0.515 | 31 | 7.0127 | 0.513 | 32 | 6.7624 | 0.504 | 33 |
| 36 | | 39 | 425 | 0.254 | 7.0642 | 0.376 | 7.0945 | 0.376 | 50 | 7.0160 | 0.374 | 50 | 6.7657 | 0.367 | 51 |
| 30 | | 39 | 420 | 0.152 | 7.0675 | 0.402 | 7.0977 | 0.402 | 46 | 7.0193 | 0.400 | 47 | 6.7690 | 0.392 | 48 |
| 23 | | 39 | 613 | 0.152 | 7.0705 | 0.468 | 7.1006 | 0.469 | 37 | 7.0225 | 0.465 | 38 | 6.7722 | 0.459 | 39 |
| 19 | | 42 | 556 | 0.189 | 13.6054 | 0.469 | 13.6295 | 0.469 | 37 | 13.4844 | 0.467 | 38 | 13.2390 | 0.462 | 38 |
| 21 | | 42 | 368 | 0.272 | 13.6087 | 0.467 | 13.6326 | 0.467 | 38 | 13.4872 | 0.465 | 38 | 13.2419 | 0.460 | 39 |
| 22 | | 42 | 450 | 0.222 | 13.6121 | 0.389 | 13.6359 | 0.390 | 48 | 13.4903 | 0.387 | 48 | 13.2451 | 0.384 | 49 |
| 20 | | 42 | 86 | 1.388 | 13.6158 | 0.329 | 13.6395 | 0.329 | 56 | 13.4939 | 0.328 | 56 | 13.2486 | 0.324 | 57 |
| 24 | | 42 | 200 | 0.500 | 13.6194 | 0.382 | 13.6431 | 0.383 | 49 | 13.4975 | 0.381 | 49 | 13.2522 | 0.377 | 50 |
| 25 | | 42 | 338 | 0.444 | 13.6231 | 0.378 | 13.6468 | 0.378 | 50 | 13.5011 | 0.376 | 50 | 13.2559 | 0.372 | 50 |

*Note: Model Diameter in green text represents a 2030 GPUUIS CIP; model diameter in blue font represents a recommended upsized pipe from the EWPP UIS; model diameter in purple font represents a recommended upsized pipe specific to the proposed project.*

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

| Sewer Main Model ID | CIP ID | Model Diameter (in) | Length (ft) | Slope (%) | PWWF | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Pre-Project | | Scenario 1 | | | Scenario 2 | | | Scenario 3 | | |
| | | | | | Max Flow (MGD) | d/D | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) | Max Flow (MGD) | d/D | Pipe Capacity Remaining (% of Allowed d/D) |
| 1545 | | 8 | 301 | 0.487 | 0.0327 | 0.220 | 0.0789 | 0.300 | 40 | - | - | - | - | - | - |
| 1497 | | 8 | 235 | 0.240 | 0.0552 | 0.249 | 0.0819 | 0.300 | 40 | - | - | - | - | - | - |
| 1459 | | 8 | 234 | 0.644 | 0.0668 | 0.249 | 0.0910 | 0.289 | 42 | - | - | - | - | - | - |
| 1411 | | 10 | 404 | 0.232 | 0.0743 | 0.223 | 0.0972 | 0.255 | 49 | - | - | - | - | - | - |
| 1394 | | 10 | 366 | 0.264 | 0.0797 | 0.356 | 0.1024 | 0.386 | 23 | - | - | - | - | - | - |
| 1377 | EWPP CIP | 10/**15** | 342 | 0.336 | 0.5163 | 0.301 | 0.5853 | 0.321 | 57 | - | - | - | - | - | - |
| 1363 | GPUUIS CIP #81 | 10/**15** | 504 | 0.555 | 0.5217 | 0.439 | 0.5907 | 0.466 | 38 | - | - | - | - | - | - |
| 1685 | | 10 | 296 | 0.896 | 0.1774 | 0.294 | 0.1821 | 0.298 | 40 | - | - | - | - | - | - |
| 1636 | | 10 | 225 | 0.278 | 0.1878 | 0.395 | 0.1925 | 0.400 | 20 | - | - | - | - | - | - |
| 1598 | | 10 | 331 | 0.160 | 0.2010 | 0.397 | 0.2057 | 0.401 | 20 | - | - | - | - | - | - |
| 1554 | | 10 | 326 | 0.449 | 0.2465 | 0.368 | 0.2488 | 0.370 | 26 | - | - | - | - | - | - |
| 1522 | | 10 | 446 | 0.658 | 0.3676 | 0.399 | 0.3708 | 0.412 | 18 | - | - | - | - | - | - |
| 1444 | | 10 | 352 | 0.761 | 0.4339 | 0.448 | 0.4819 | 0.477 | 5 | - | - | - | - | - | - |

*Note: Model Diameter in green text represents a 2030 GPUUIS CIP; model diameter in blue font represents a recommended upsized pipe from the EWPP UIS; model diameter in purple font represents a recommended upsized pipe specific to the proposed project.*

Table 5-6: Pipes Recommended for Upsizing and Percentage of Contributed Flow – Scenario 1

| Sewer Main Model ID | CIP # | 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 (%) |
| 1498 | GPUUIS #80 | 12 | 15 | 1.2232 | 0.131 | 10.7 | 1.093 | 89.3 |
| 1033 | EWPP (No Number) | 18 | 21 | 2.1244 | 0.125 | 5.9 | 1.999 | 94.1 |
| 1011 | | 18 | 21 | 2.1916 | 0.101 | 4.6 | 2.090 | 95.4 |
| 971 | | 18 | 21 | 2.1941 | 0.101 | 4.6 | 2.093 | 95.4 |
| 954 | | 18 | 21 | 2.1968 | 0.101 | 4.6 | 2.095 | 95.4 |
| 939 | | 18 | 21 | 2.2004 | 0.101 | 4.6 | 2.099 | 95.4 |
| 1377 | EWPP (No Number) | 10 | 15 | 0.5853 | 0.069 | 11.8 | 0.516 | 88.2 |
| 1363 | GPUUIS CIP #81 | 10 | 15 | 0.5907 | 0.069 | 11.7 | 0.522 | 88.3 |

Table 5-7: Pipes Recommended for Upsizing and Percentage of Contributed Flow – Scenario 2

| Sewer Main Model ID | CIP # | 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 (%) |
| 1498 | GPUUIS #80 | 12 | 15 | 1.458 | 0.366 | 25.1 | 1.093 | 74.9 |
| 1429 | Project Specific | 12 | 15 | 1.491 | 0.356 | 23.9 | 1.135 | 76.1 |
| 1033 | EWPP (No Number) | 18 | 21 | 2.169 | 0.170 | 7.8 | 1.999 | 92.2 |
| 1011 | | 18 | 21 | 2.237 | 0.146 | 6.5 | 2.090 | 93.5 |
| 971 | | 18 | 21 | 2.239 | 0.146 | 6.5 | 2.093 | 93.5 |
| 954 | | 18 | 21 | 2.242 | 0.146 | 6.5 | 2.095 | 93.5 |
| 939 | | 18 | 21 | 2.245 | 0.146 | 6.5 | 2.099 | 93.5 |

Table 5-8: Pipes Recommended for Upsizing and Percentage of Contributed Flow – Scenario 3

| Sewer Main Model ID | CIP # | 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 (%) |
| 1498 | GPUUIS #80 | 12 | 15 | 1.208 | 0.116 | 9.6 | 1.093 | 90.4 |
| 1033 | EWPP | 18 | 21 | 1.919 | 0 | 0 | 1.919 | 100 |
| 1011 | EWPP | 18 | 21 | 1.987 | 0 | 0 | 1.987 | 100 |
| 971 | EWPP | 18 | 21 | 1.989 | 0 | 0 | 1.989 | 100 |
| 954 | EWPP | 18 | 21 | 1.992 | 0 | 0 | 1.992 | 100 |
| 939 | EWPP | 18 | 21 | 1.995 | 0 | 0 | 1.995 | 100 |

# Chapter 6. Recycled Water

The City of Mountain View currently operates a recycled water distribution system that primarily serves the North Bayshore area of the City. Title 22 recycled water is produced at the RWQCP in Palo Alto and the City has an agreement with Palo Alto that allows a maximum of 3.0 MGD of recycled water supply to Mountain View. The RWQCP operates a booster pump station that supplies the City's distribution system, there is currently no in-system water storage, therefore the pump station must provide flow to meet instantaneous peak demands. The City conducted a Recycled Water Feasibility Study (Carollo, 2014) (RWFS) to assist with future planning for expansion of the system. The 2014 report is the basis for our analysis with regards to the potential interaction and impacts of the Project. As of March 22, 2022, the City Council approved the RWFS update, including the list of recommendations. However, the findings form the updated RWFS were not included in this report as the study results and Council direction were not available at the time of preparation.

The RWFS anticipates expansion of the existing recycled water system into NASA/Moffett Field and East Whisman area, known as the "Recommended Project". Phase 1 of the expansion includes new customers with North Bayshore and serving a portion of NASA/Moffett. Phase 2 of the expansion completes serving the remaining customers within NASA/Moffett Field. Phase 3 of the expansion includes extending the distribution system into East Whisman. The RWFS anticipates recycled water demands comprised of outdoor irrigation and indoor dual-plumbed buildings, with irrigation making up most of the demands.

The RWFS develops recycled water demands for each of the proposed phases. Each phase has a calculated average daily demand and maximum daily demand; which are used to determine supply sufficiency, storage requirements, and pipeline sizes. Table 6-1 summarizes the recycled water demands outlined in the RWFS by phase of the Recommended Project. The values are per phase and are not cumulative.

Table 6-1: RWFS Recycled Water Demands*

| Phase | Average Day Demand (MGD) | Max Day Demand (MGD) |
|---|---|---|
| **Existing** | 0.46 | 1.06 |
| **Phase 1 (NBS Expansion)** | 0.53 | 1.20 |
| **Phase 2 (NASA/Moffett)** | 0.28 | 0.62 |
| **Phase 3 (East Whisman)** | 0.20 | 0.43 |
| **Totals** | **1.47** | **3.31** |

*Values from Chapter 7 -Table 7.1 and 7.2

The cumulative maximum day demand of 3.31 MGD is greater than the City's contractual supply limit of 3.0 MGD. As recycled water demands increase, water storage will be required to meet instantaneous peak demands above the 3.0 MGD contractual limit. Depending on customer demands as future phases are implemented, the City may need to procure additional supply rights to serve the whole of the "Recommended Project". The RWFS does not specifically state the peak hour demands (used as the instantaneous peak), but the report does discuss the requirement of water storage capacity at buildout of each phase. The RWFS proposes 1.6 MG of operational storage and 3.0 MG of emergency storage be constructed during Phase 2. The report identifies operational constraints during Phase 1 implementation due to demands projected to exceed contractual supply capacity. The RWFS recommends modifying the supply regime to the Shoreline Golf pond and renegotiating the supply contract with Palo Alto to remedy the constraints.

## 6.1. Project Impacts

The Middlefield Park Master Plan proposes to connect to the City's utility system or as a design option, to construct and operate a private wastewater treatment plant and produce Title 22 recycled water to meet the Project's non-potable water demands. Chapter 2 of this report discusses the Projects anticipated recycled water demands as approximately 0.26 MGD average day demand. The Project is proposing a design option to construct a private treatment plant that will produce 0.25 MGD of recycled water, slightly less than the anticipated average day demand.

There are potential positive and negative impacts associated with the Project proposed private recycled water plant. The following discussion outlines the impacts to the City.

The positive impacts of the Project implementing a private recycled water plant are: additional flexibility for City recycled water expansion timeline and reduction of recycled water demand on the City's system. Based on the RWFS, the Phase 3 expansion of the recycled water system into East Whisman is a long-term project and does not have an implementation timeline. Demands in East Whisman do not include in the developments proposed in the East Whisman Precise Plan and demands are based on older land uses proposed in the City's General Plan. Dependent upon the Project construction timeline for the recycled water plant, there could be potential to reduce the City's potable water demand sooner than if the Project relies on the City's recycled water system expansion into East Whisman. Also, the total projected City recycled water demand exceeds the contractual supply limit. The Project's private recycled water plant would reduce the recycled water demand on the City's system, potentially not requiring amendment to the City's existing contract.

The negative impacts of the Project implementing a private recycled plant are: decreased demand for City expansion south of US-101, significant decrease in sewer flows to the RWQCP, and potential peak demands on the City's potable water system. Based on the RWFS, the Phase 3 expansion anticipates an increase of 0.20 MGD average day demand in the East Whisman area. As the Project recycled water demands exceed the anticipated demands in the RWFS, so there is potential that eliminating a major customer could render the Phase 3 expansion cost prohibitive and therefore reduce the amount of customers that could be served by recycled water. Additionally, wastewater that flows to RWQCP will be affected by the Agreement between Valley Water, Palo Alto, and Mountain View, which entitles Valley Water to an annual average of 9 mgd of wastewater. The City of Mountain View has rights to the sewage that flows to the RWQCP, in the future as water supply reliability is impacted, the City may wish to increase the recycled water production capacity at the RWQCP in relationship to the amount of sewage the City sends to the plant. If the Project diverts sewer flows from the City's collection system, there will be less sewer flow to the RWQCP. This may cause supply impact to the entire recycled water system. Lastly, the Projects recycled water plant capacity is less than the Projects average day recycled water demand. Dependent upon the design of the private treatment plant and private recycled water storage capacity, the Project may likely require additional potable water from the City to meet maximum day and peak hour recycled water demands.

## 6.2. Additional Considerations

There are many variables in water supply planning and the Project and City should consider how certain variables may affect the implementation of public and private recycled water systems. Water demand forecasting is one such variable. The City is currently working to update their RWFS which may include changes to demand forecasts. Also, the Project's private recycled water plant and system should take into account the demand forecasting of seasonal demand variations and daily peak demand variability when sizing infrastructure to ensure the Project's recycled water demands can be safely met at all times. During design and implementation, it will be important for the Project to coordinate with the City to build redundancy and back up systems into the private utility infrastructure that will allow the City to serve the Project with municipal supplied water in cases of private system outages or emergencies.

# 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 | Under Construction |
| **3** | Downtown Mixed Use Building | Downtown/Evelyn Corridor | 605 Castro St | Completed |
| **4** | Residential Condominium Project | Downtown/Evelyn Corridor | 325, 333, 339 Franklin St | Approved |
| **5** | St Joseph's Church | Downtown/Evelyn Corridor | 599 Castro St | Completed |
| **6** | Bryant/Dana Office | Downtown/Evelyn Corridor | 250 Bryant St | Completed |
| **7** | Quad/Lovewell | East Whisman | 369 N Whisman Rd | Approved but Inactive |
| **8** | Renault & Handley | East Whisman | 625-685 Clyde Ave | Completed |
| **9** | LinkedIn | East Whisman | 700 E Middlefield Rd | Under Construction |
| **10** | National Avenue Partners | East Whisman | 600 National Ave | Completed |
| **11** | 2700 West El Camino Real | El Camino Real | 2700 El Camino Real W | Completed |
| **12** | SummerHill Apt | El Camino Real | 2650 El Camino Real W | Completed |
| **13** | Alta Housing | El Camino Real | 950 West El Camino Real | Completed |
| **14** | Lennar Multi-Family Communities | El Camino Real | 2268 El Camino Real W | Completed |
| **15** | UDR | El Camino Real | 1984 El Camino Real W | Completed |
| **16** | Residence Inn Gatehouse | El Camino Real | 1854 El Camino Real W | Completed |
| **17** | Residence Inn | El Camino Real | 1740 El Camino Real W | Completed |
| **18** | Tropicana Lodge - Prometheus | El Camino Real | 1720 El Camino Real W | Completed |
| **19** | Austin's - Prometheus | El Camino Real | 1616 El Camino Real W | Completed |
| **20** | 1701 W El Camino Real | El Camino Real | 1701 El Camino Real W | Completed |
| **21** | First Community Housing | El Camino Real | 1585 El Camino Real W | Completed |
| **22** | Harv's Car Wash - Regis House | El Camino Real | 1101 El Camino Real W | Completed |
| **23** | Greystar | El Camino Real | 801 El Camino Real W | Completed |
| **24** | Medical Building | El Camino Real | 412 El Camino Real W | Completed |
| **25** | 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, October 2021)*

Table A-1: Additional Considered Projects (Continued)

| | Project | Change Area/Planning Area | Address | Status* |
|---|---|---|---|---|
| **26** | Wonder Years Preschool | El Camino Real | 86 El Camino Real | Completed |
| **27** | Evelyn Family Apartments | Grant/Sylvan | 779 East Evelyn Ave | Completed |
| **28** | 344 Bryant Ave | Grant/Sylvan | 344 Bryant Ave | Under Construction |
| **29** | Adachi Project | Grant/Sylvan | 1991 Sun Mor Ave | Completed |
| **30** | 840 E El Camino Real | Grant/Sylvan | 840 El Camino Real E | Approved |
| **31** | Loop Convenience Store | Grant/Sylvan | 790 El Camino Real E | Completed |
| **32** | El Camino Real Hospital Campus | Miramonte/Springer | 2500 Grant Ave | Completed |
| **33** | City Sports | Miramonte/Springer | 1040 Grant Ave | Completed |
| **34** | Prometheus | Moffett/Whisman | 100 Moffett Blvd | Completed |
| **35** | Hampton Inn Addition | Moffett/Whisman | 390 Moffett Blvd | Completed |
| **36** | Calvano Development | Moffett/Whisman | 1075 Terra Bella Avenue | Completed |
| **37** | Moffett Gateway | Moffett/Whisman | 750 Moffett Blvd | Completed |
| **38** | Holiday Inn Express | Moffett/Whisman | 870 Leong Dr | Approved |
| **39** | Warmington Residential | Moffett/Whisman | 660 Tyrella Avenue | Completed |
| **40** | Dividend Homes | Moffett/Whisman | 111 and 123 Fairchild Dr | Completed |
| **41** | 133-149 Fairchild Dr | Moffett/Whisman | 133-149 Fairchild Dr | Completed |
| **42** | Warmington Residential | Moffett/Whisman | 277 Fairchild Dr | Completed |
| **43** | Hetch-Hetchy Property | Moffett/Whisman | 450 N Whisman Dr | Completed |
| **44** | DeNardi Homes | Moffett/Whisman | 186 East Middlefield Road | Under Construction |
| **45** | Tripointe Homes | Moffett/Whisman | 135 Ada Ave | Completed |
| **46** | Tripointe Homes | Moffett/Whisman | 129 Ada Ave | Completed |
| **47** | Robson Homes | Moffett/Whisman | 137 Easy St | Completed |
| **48** | 167 N Whisman Rd | Moffett/Whisman | 167 N Whisman Rd | Completed |
| **49** | Antenna Farm (Pacific Dr) | Moffett/Whisman | Pacific Dr | Completed |
| **50** | Pulte Homes | Moffett/Whisman | 100, 420-430 Ferguson Dr | Completed |
| **51** | EFL Development | Moffett/Whisman | 500 Ferguson Dr | Completed |
| **52** | 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, October 2021)*

Table A-1: Additional Considered Projects (Continued)

| | Project | Change Area/Planning Area | Address | Status* |
|---|---|---|---|---|
| **53** | 1185 Terra Bella Ave | Moffett/Whisman | 1185 Terra Bella Ave | Under Review |
| **54** | Linde Hydrogen Fueling Station | Moffett/Whisman | 830 Leong Dr | Completed |
| **55** | Windsor Academy | Monta Loma/Farley/Rock | 908 N Rengstorff Ave | Completed |
| **56** | D.R. Horton | Monta Loma/Farley/Rock | 827 N Rengstorff Ave | Completed |
| **57** | ROEM/Eden | Monta Loma/Farley/Rock | 819 N Rengstorff Ave | Completed |
| **58** | Paul Ryan | Monta Loma/Farley/Rock | 858 Sierra Vista Ave | Completed |
| **59** | William Lyon Homes | Monta Loma/Farley/Rock | 1951 Colony St | Completed |
| **60** | Dividend Homes | Monta Loma/Farley/Rock | 1958 Rock St | Completed |
| **61** | Paul Ryan | Monta Loma/Farley/Rock | 2392 Rock St | Completed |
| **62** | San Antonio Station | Monta Loma/Farley/Rock | 100 & 250 Mayfield Ave | Completed |
| **63** | Northpark Apartments | Monta Loma/Farley/Rock | 111 N Rengstorff Ave | Completed |
| **64** | 333 N Rengstorff Ave | Monta Loma/Farley/Rock | 333 N Rengstorff Ave | Completed |
| **65** | Classic Communities | Monta Loma/Farley/Rock | 1946 San Luis Ave | Completed |
| **66** | 1998-2024 Montecitio Ave | Monta Loma/Farley/Rock | 1998-2024 Montecito Ave | Under Construction |
| **67** | Classic Communities | Monta Loma/Farley/Rock | 647 Sierra Vista Ave | Completed |
| **68** | Dividend Homes | Monta Loma/Farley/Rock | 1968 Hackett Ave & 208-210 Sierra Vista Ave | Completed |
| **69** | California Communities | Monta Loma/Farley/Rock | 2025 & 2065 San Luis Ave | Completed |
| **70** | 2044 and 2054 Montecito Ave | Monta Loma/Farley/Rock | 2044 & 2054 Montecito Ave | Under Construction |
| **71** | Shorebreeze Apartments | Monta Loma/Farley/Rock | 460 North Shoreline Blvd | Completed |
| **72** | Intuit | North Bayshore | 2600 Marine Way | Completed |
| **73** | Sobrato Organization | North Bayshore | 1255 Pear Ave | Approved |
| **74** | Charleston East | North Bayshore | 2000 North Shoreline Blvd | Under Construction |
| **75** | Google and Sywest | North Bayshore | 1400 North Shoreline Blvd | On Hold |
| **76** | Broadreach | North Bayshore | 1625 Plymouth Street | Completed |
| **77** | Microsoft | North Bayshore | 1045-1085 La Avenida St | Completed |
| **78** | Shashi Hotel | North Bayshore | 1625 North Shoreline Blvd | Completed |

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, October 2021)*

Table A-1: Additional Considered Projects (Continued)

| | Project | Change Area/Planning Area | Address | Status* |
|---|---|---|---|---|
| **79** | Community School of Music and Art | San Antonio | 250 San Antonio Circle | Completed |
| **80** | Prometheus | San Antonio | 400 San Antonio Rd | Completed |
| **81** | Octane Fayette | San Antonio | 2645 & 2655 Fayette Dr | Approved |
| **82** | Merlone Geier Partners (MGP) | San Antonio | 405 San Antonio Rd | Completed |
| **83** | Anton Calega | San Antonio/Rengstorff/ Del Medio | 394 Ortega Ave | Completed |
| **84** | Barry Swenson Builder | San Antonio/Rengstorff/ Del Medio | 1958 Latham St | Approved |
| **85** | 2296 Mora Drive | San Antonio/Rengstorff/ Del Medio | 2296 Mora Dr | Completed |
| **86** | St Francis High School | Miramonte/Springer | 1885 Miramonte Ave | Approved |
| **87** | Franklin | Central/Downtown | 325 Franklin Street | Approved |
| **88** | California | Central/Downtown | 756 California Street | Under Review |
| **89** | North Shoreline | Moffett/Whisman | 1001 North Shorelin Boulevard | Approved |
| **90** | 555 West Middlefield Road | Moffett/Whisman | 555 West Middlefield Road | Under Review |
| **91** | DeNardini | San Antonio | 1919-1933 Gamel Way, 574 Escuela Ave | Approved |
| **92** | Tyrella | Moffett/Whisman | 294-296 Tyrella Avenue | Approved |
| **93** | Logue | Moffett/Whisman | 400 Logue Avenue | Approved |
| **94** | Google Landings | North Bayshore | 1860-2159 Landings Dr., 1014-1058 Huff Ave, 900 Alta Avenue, 2000 North Shoreline | Approved |
| **95** | Phan | Moffett/Whisman | 198 Easy Street | Approved |

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, October 2021)*

Table A-1: Additional Considered Projects (Continued)

| | Project | Change Area/Planning Area | Address | Status* |
|---|---|---|---|---|
| **96** | Dana Street | Downtown | 676 West Dana Street | Approved |
| **97** | Summer Hill | Monta Loma/Farley/Rock | 1555 West Middlefield Road | Approved |
| **98** | Ambrosio | El Camino Real | 855-1023 West El Camino Real | Approved |
| **99** | BPR | El Camino Real | 2300 West El Camino Real | Approved |
| **100** | Dutchints | San Antonio | 570 South Rengstorff Avenue | Approved |
| **101** | Ambra | Monta Loma/Farley/Rock | 901-987 N. Rengstorff Avenue | Under Review |
| **102** | Hylan | Monta Loma/Farley/Rock | 410-414 Sierra Vista Avenue | Under Construction |
| **103** | Maston | Miramonte/Springer | 982 Bonita Avenue | Under Construction |
| **104** | McKim | Monta Loma/Farley/Rock | 2019 Leghorn Street | Approved |
| **105** | Sand Hill | Moffett/Whisman | 189 North Bernardo Avenue | Under Review |
| **106** | Maston | El Camino Real | 1313 and 1347 West El Camino Real | Approved |
| **107** | Anderson | El Camino Real | 601 Escuela Ave and 1873 Latham Street | Under Review |
| **108** | SummerHill | Moffett/Whisman | 355-418 E Middlefield Road | Approved |
| **109** | Prometheus | Monta Loma/Farley/Rock | 1950 Montecito Avenue | Under Construction |
| **110** | Dividend Homes | Monta Loma/Farley/Rock | 2310 Rock Street | Under Construction |
| **111** | Insight Realty | Downtown | 701 W. Evelyn Avenue | Approved |
| **112** | Prometheus | Downtown | 1720 Villa Street | Under Construction |
| **113** | Fortbay | Moffett/Whisman | 777 West Middlefield Road | Approved |

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, October 2021)*

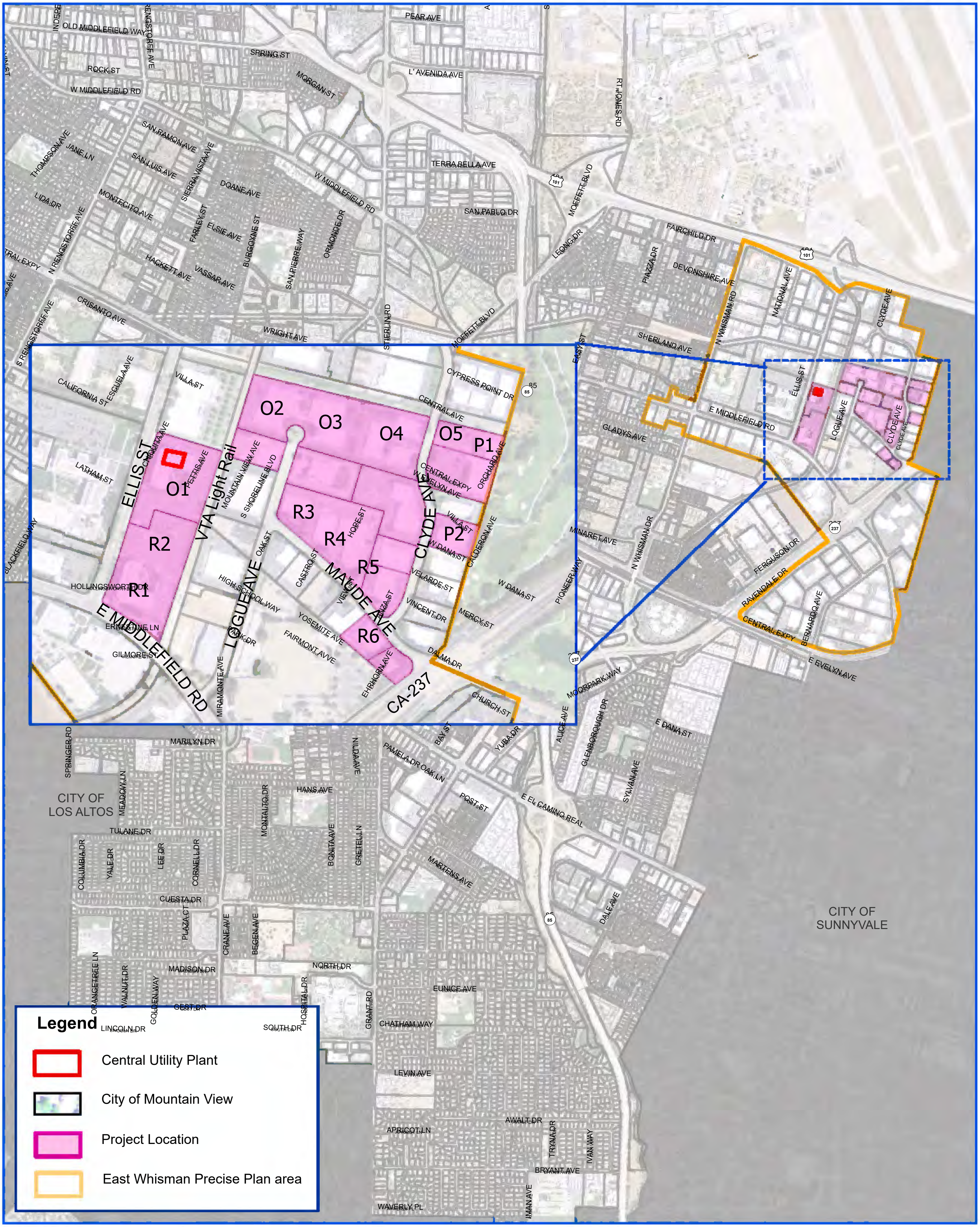
Table A-1: Additional Considered Projects (Continued)

| | Project | Change Area/Planning Area | Address | Status* |
|---|---|---|---|---|
| **114** | Prometheus Real estate | Moffett/Whisman | 759 W. Middlefield Road | Under Construction |
| **115** | Green Company | Downtown | Hope Street Lots 4 & 8 | Approved |
| **116** | Dividend Homes | Monta Loma/Farley/Rock | 2005 Rock Street | Under Construction |
| **117** | Classic Communities | Monta Loma/Farley/Rock | 315 & 319 Sierra Vista | Completed |
| **118** | SummerHill | Downtown | 257-279 Calderon Ave | Completed |
| **119** | SummerHill | Moffett/Whisman | 535 and 555 Walker Drive | Under Construction |
| **120** | Google | - | Nasa Research Park | Under Construction |
| **121** | Renault & Handly | Moffett/Whisman | 580-620 Clyde Avenue | Completed |
| **122** | Flower Mart | Grant Sylvan Park | 525 East Evelyn Ave | Under Construction |
| **123** | Greystar | San Antonio | 2580 and 2590 California St / 201 San Antonia Circle | Under Construction |
| **124** | Eden Housing | North Bayshore | 1100 La Avenida St | Approved |
| **125** | DeNardi | Miramonte/Springer | 773 Cuesta Dr | Approved |
| **126** | Legend Colony | Monta Loma/ Farley/Rock | 828 & 836 Sierra Vista Avenue | Approved |
| **127** | Jason Kim Lee | San Antonio | 1958 Latham St | Approved |
| **128** | Colony Sierra Homes | Moffett/Whisman | 851-853 Sierra Vista Ave | Approved |
| **129** | Lux Largo | El Camino Real | 1411-1495 West El Camino | Approved |
| **130** | Sobrato | Moffett/Whisman | 600 Ellis St | Approved |
| **131** | Zachary Trailer | Moffett/Whisman | 730 Central Ave | Under Review |

**Source: City of Mountain View Planning Division Current Project List (City of Mountain View, October 2021)*

# APPENDIX B:

Figures

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0 1,000 2,000 Feet

FIGURE B-1:

**Project Location**

Middlefield Park Master Plan Utility Impact Study

April 2022

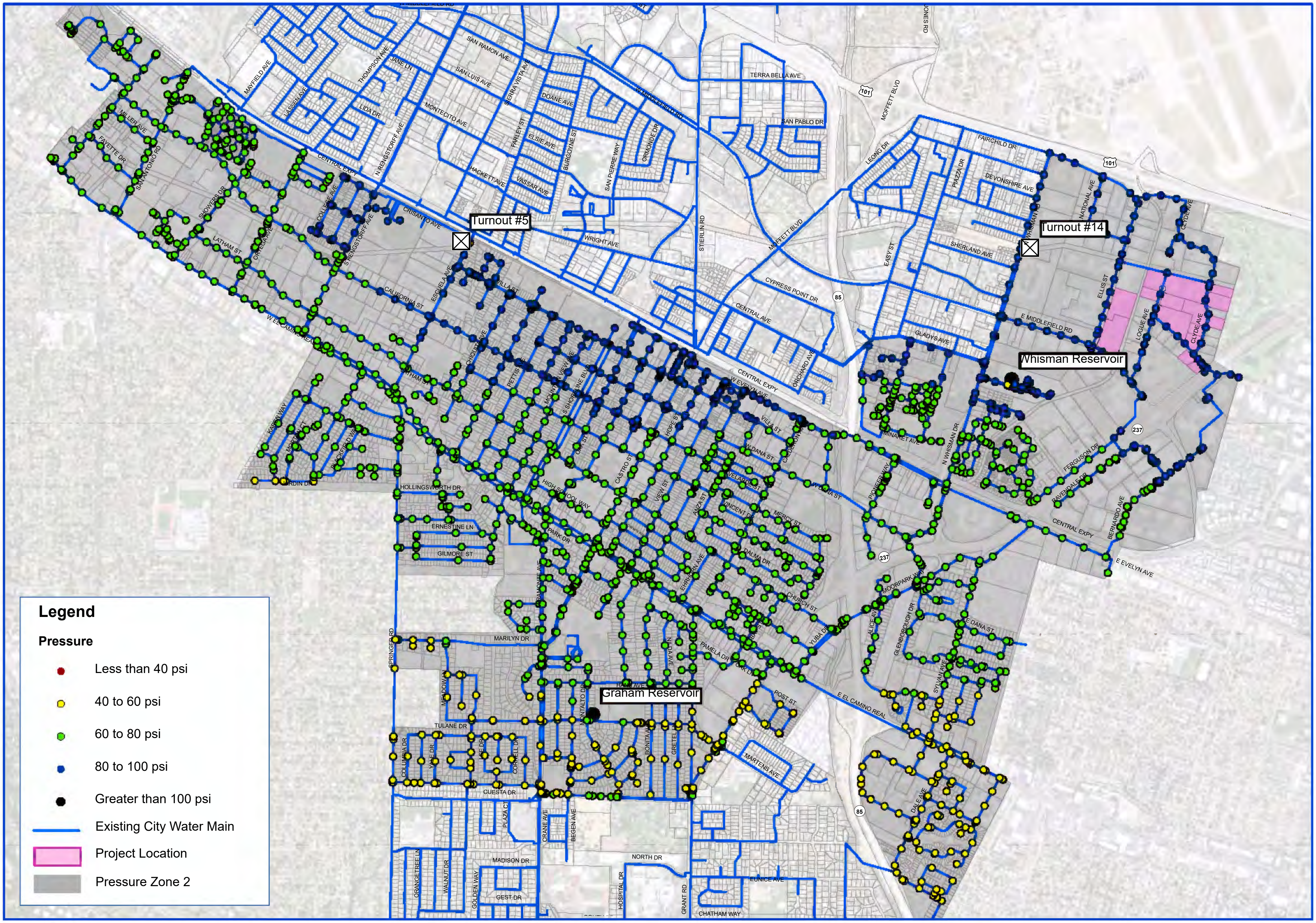


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FIGURE B-2:

## Peak Hour Demand (PHD) - Without Project

**Water System Model - Existing Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

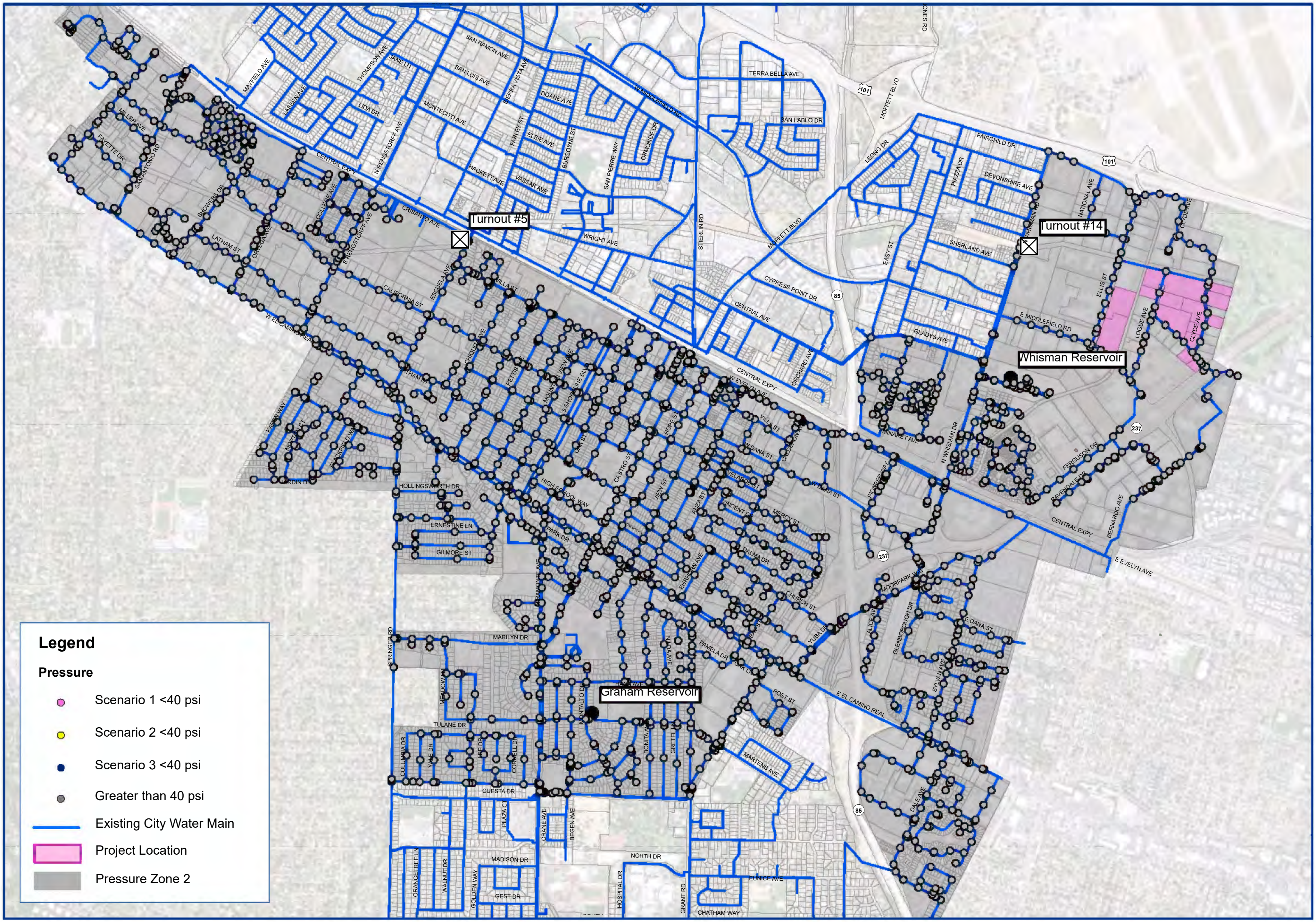


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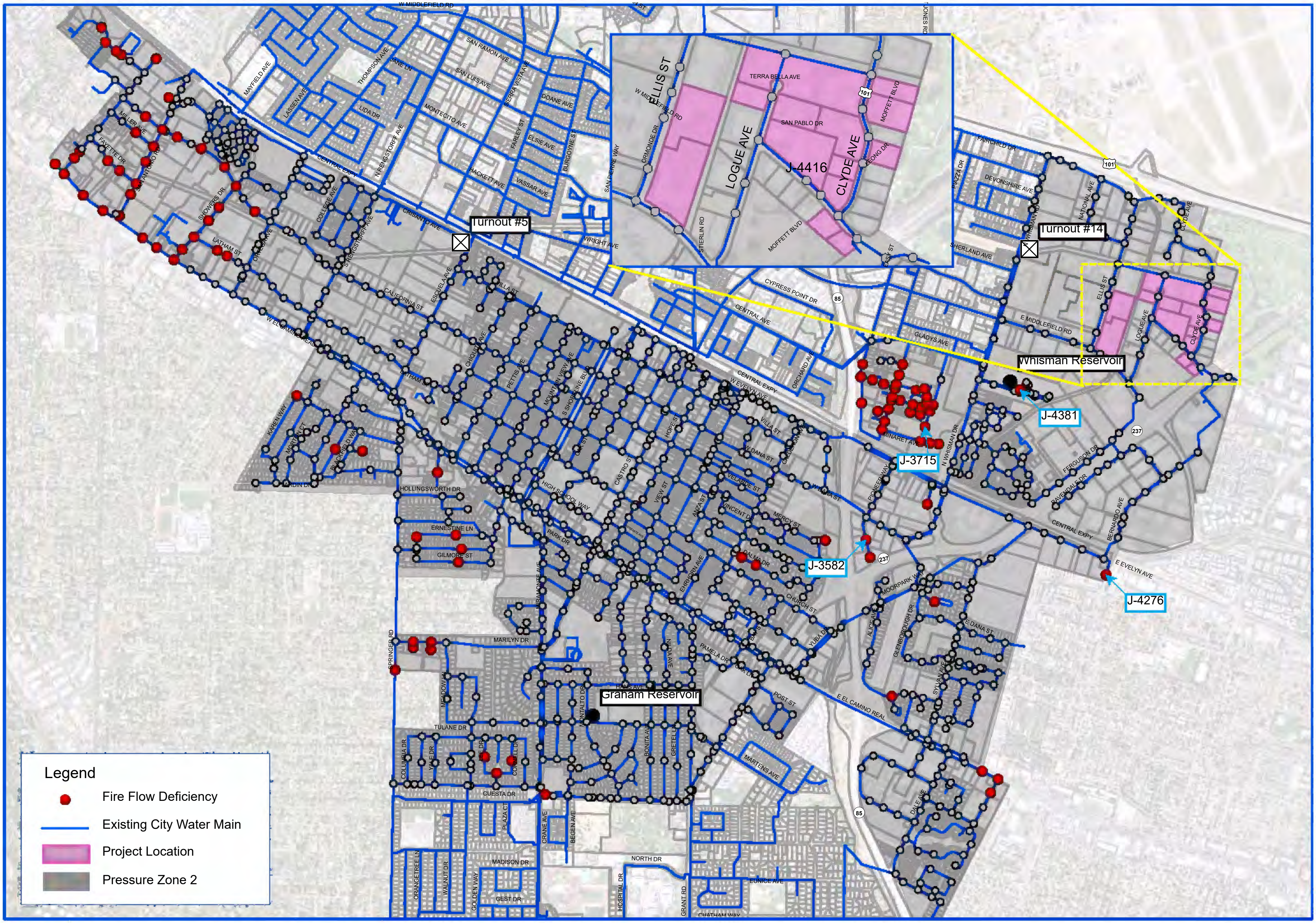
FIGURE B-3:

## Peak Hour Demand (PHD) - With Projects

**Water System Model - Existing Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022




Schaaf & Wheeler
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FIGURE B-4:

## Fire Flow Analysis - Without Project

**Water System Model - Existing Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

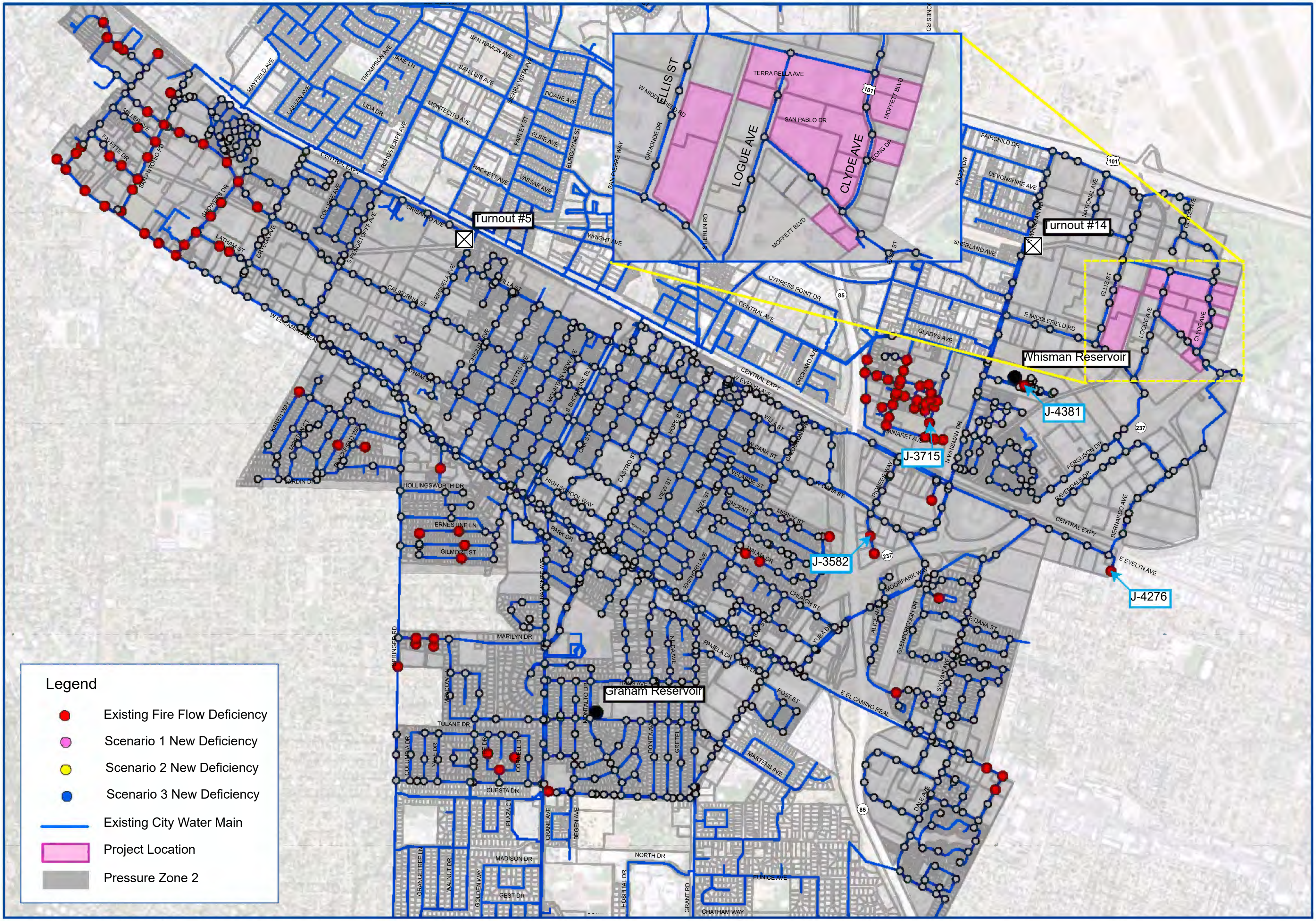


FIGURE B-5:

## Fire Flow Analysis - With Projects

**Water System Model - Existing Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

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0 1,000 2,000 Feet

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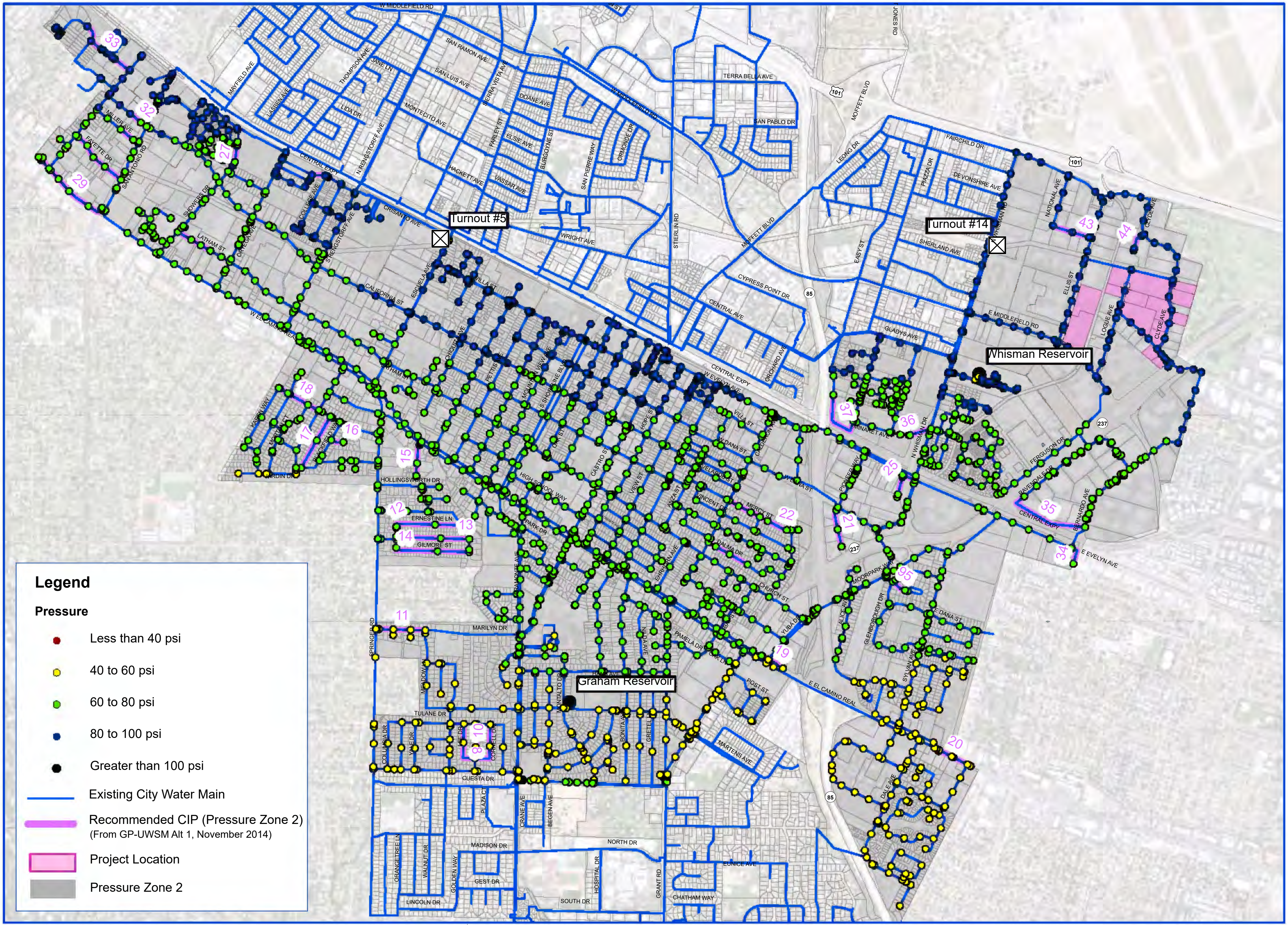


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FIGURE B-6:

**Peak Hour Demand (PHD) - Without Project**

**Water System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

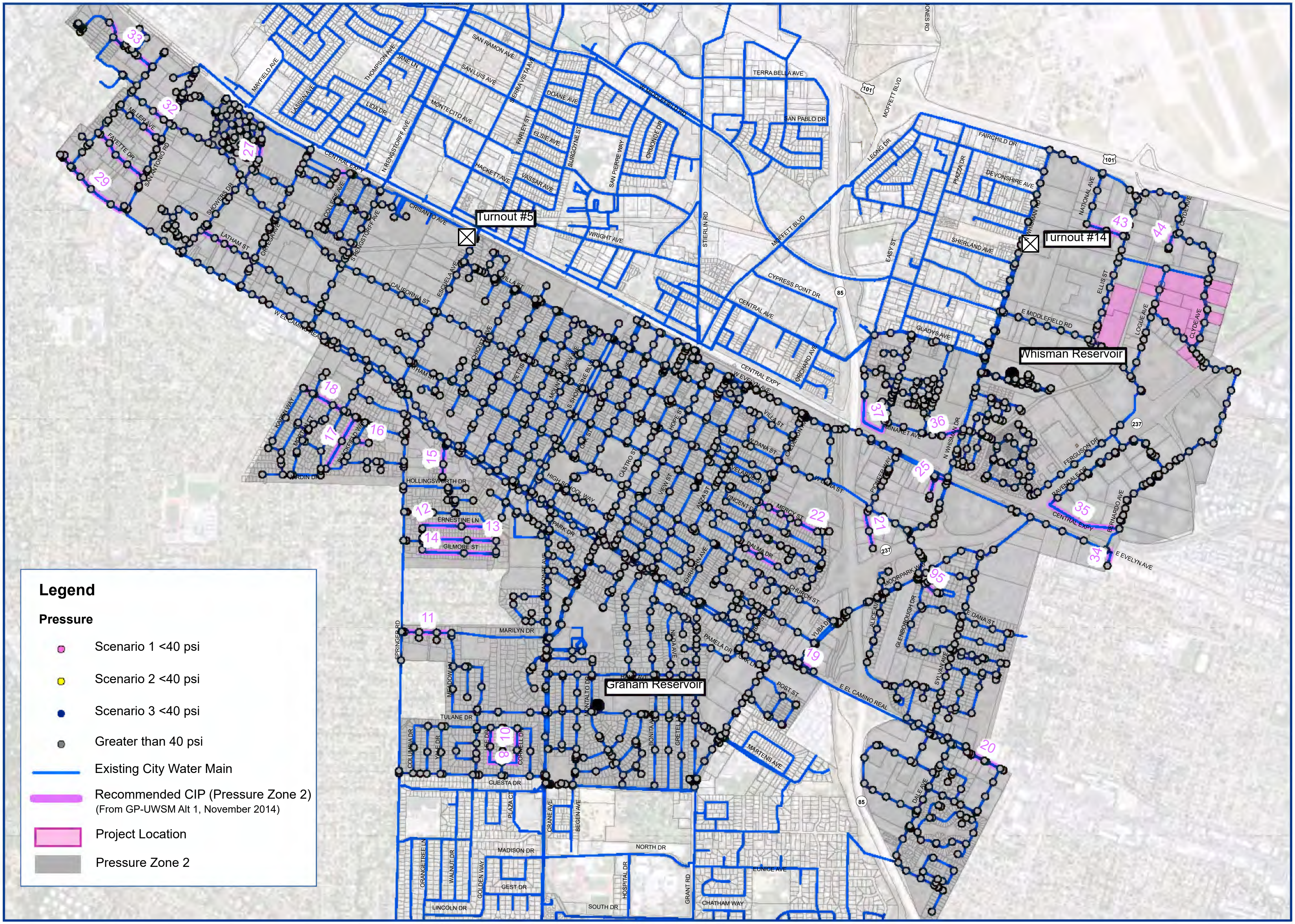


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FIGURE B-7:

## Peak Hour Demand (PHD) - With Projects

**Water System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

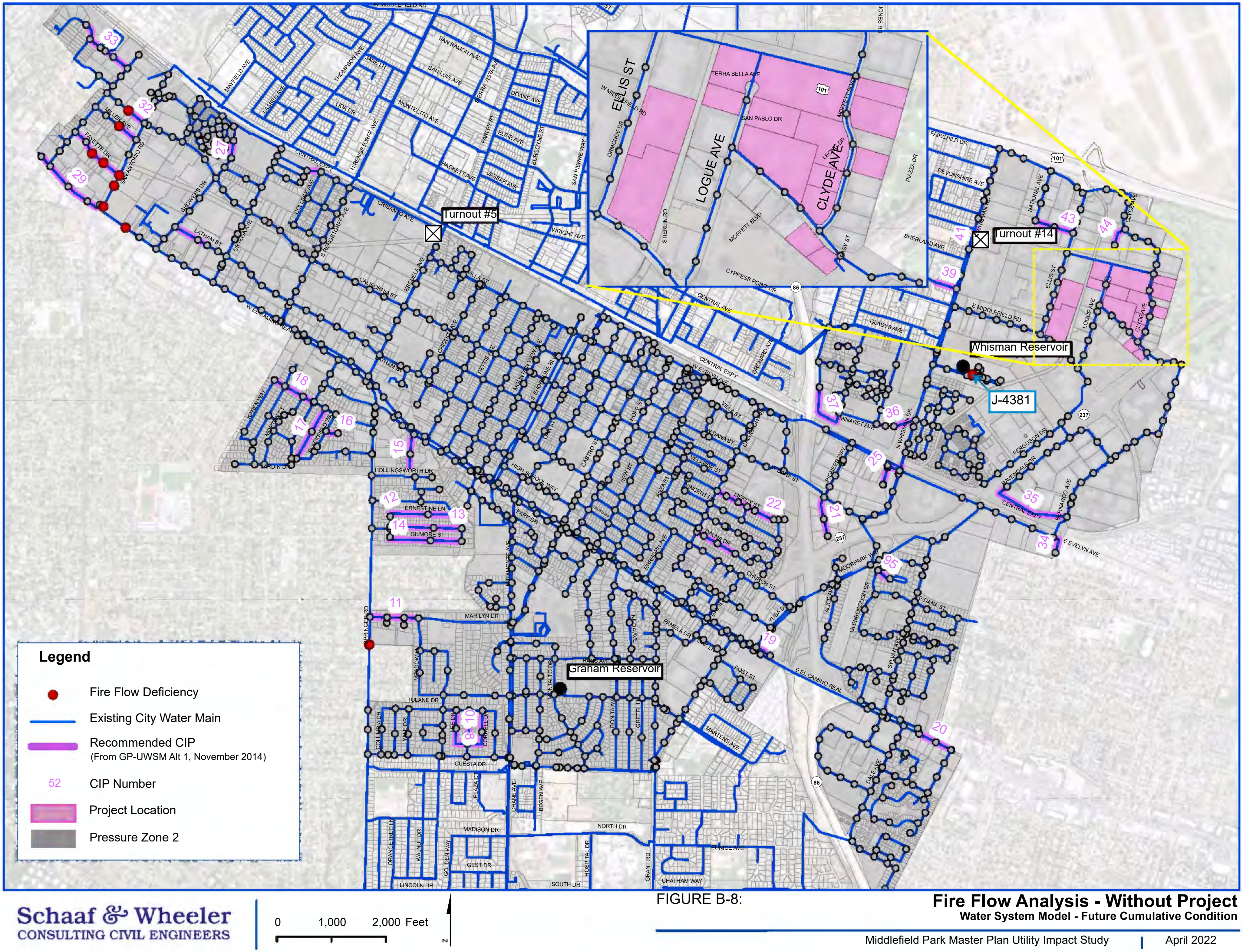


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FIGURE B-8:

**Fire Flow Analysis - Without Project**

**Water System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

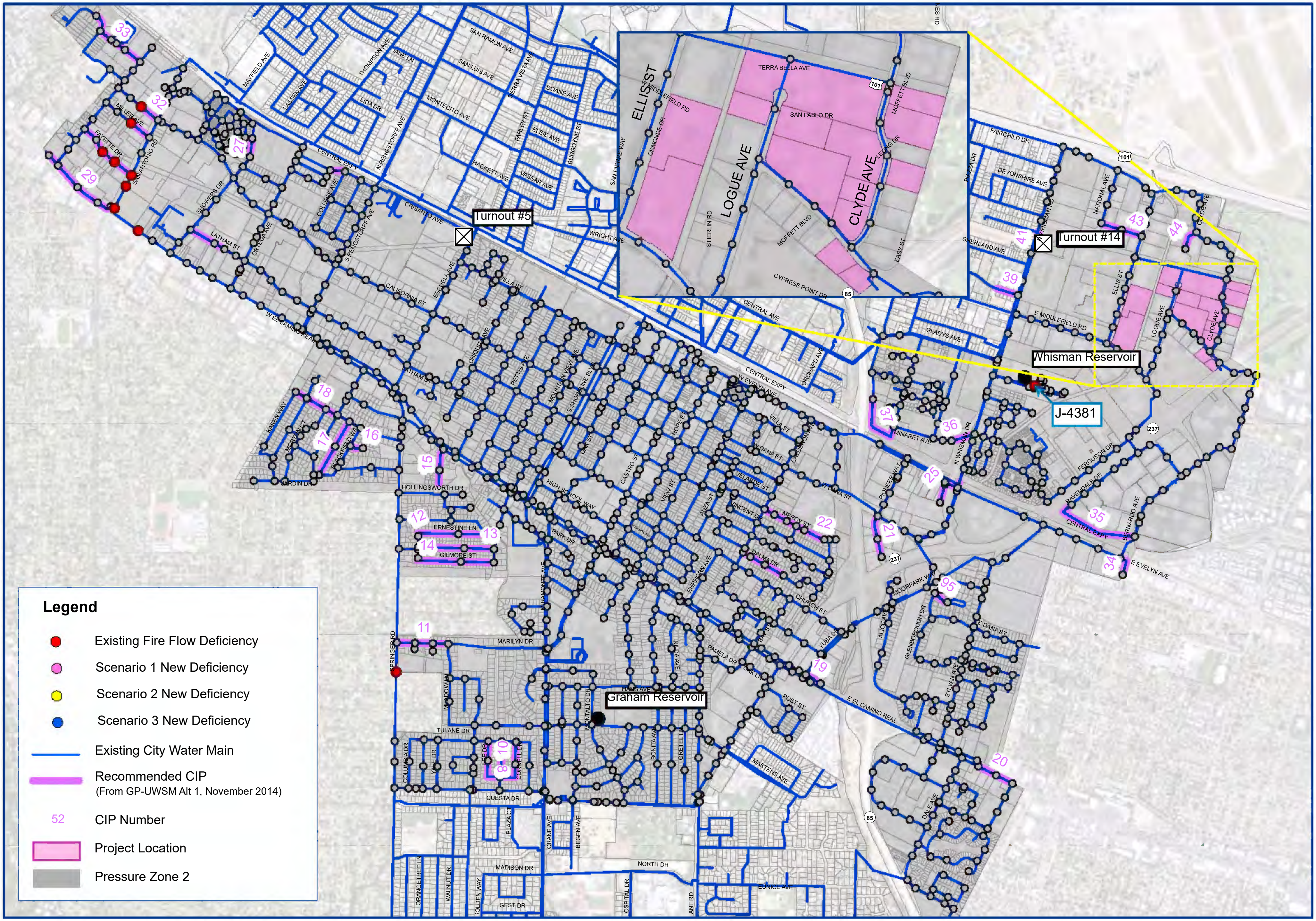


FIGURE B-9:

# Fire Flow Analysis - With Projects

## Water System Model - Future Cumulative Condition

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0 1,000 2,000 Feet

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Middlefield Park Master Plan Utility Impact Study | April 2022

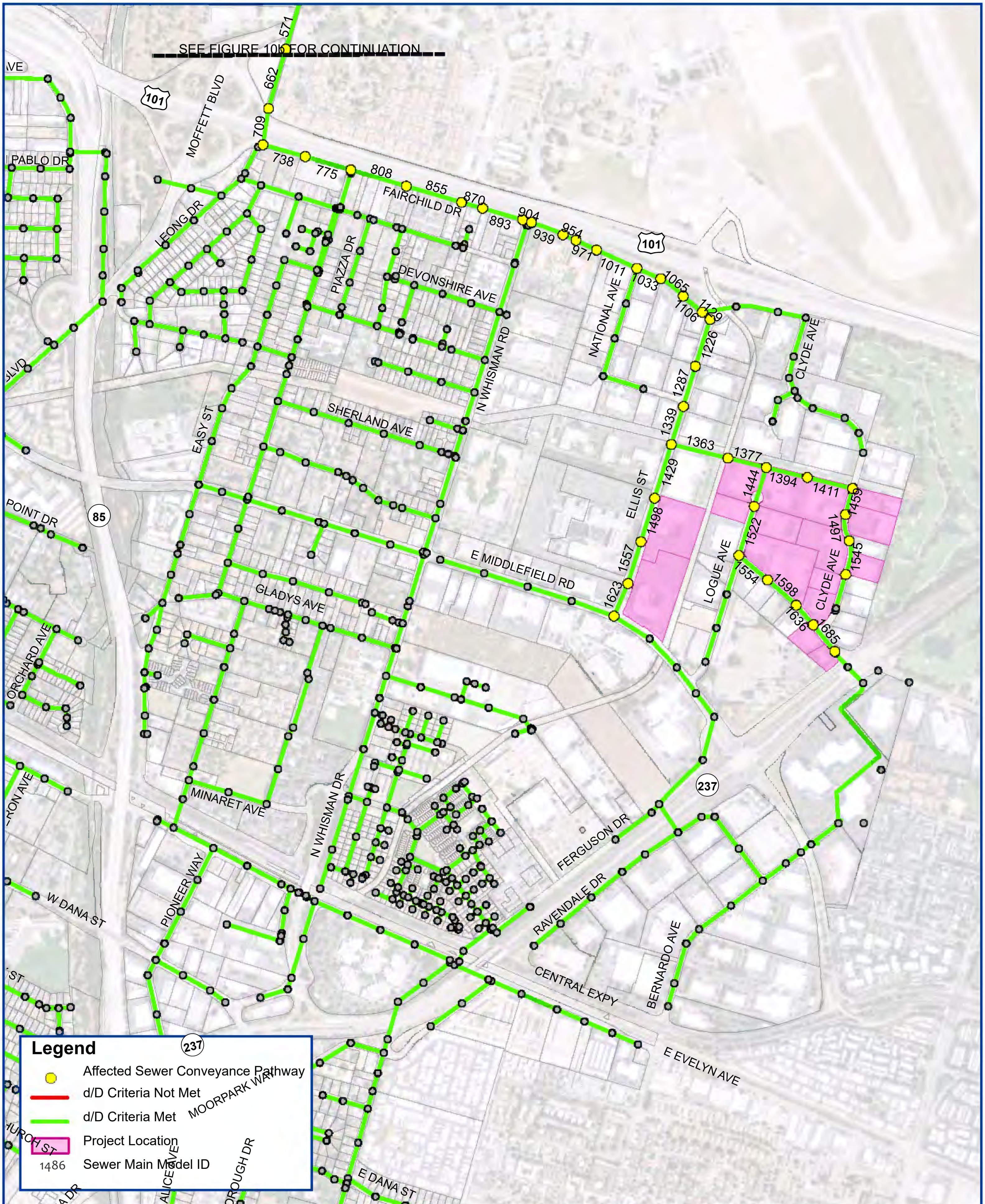


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FIGURE B-10a:

**PWWF - Without Project**

**Sewer System Model - Existing Condition**

Middlefield PArk Master Plan Utility Impact Study

April 2022

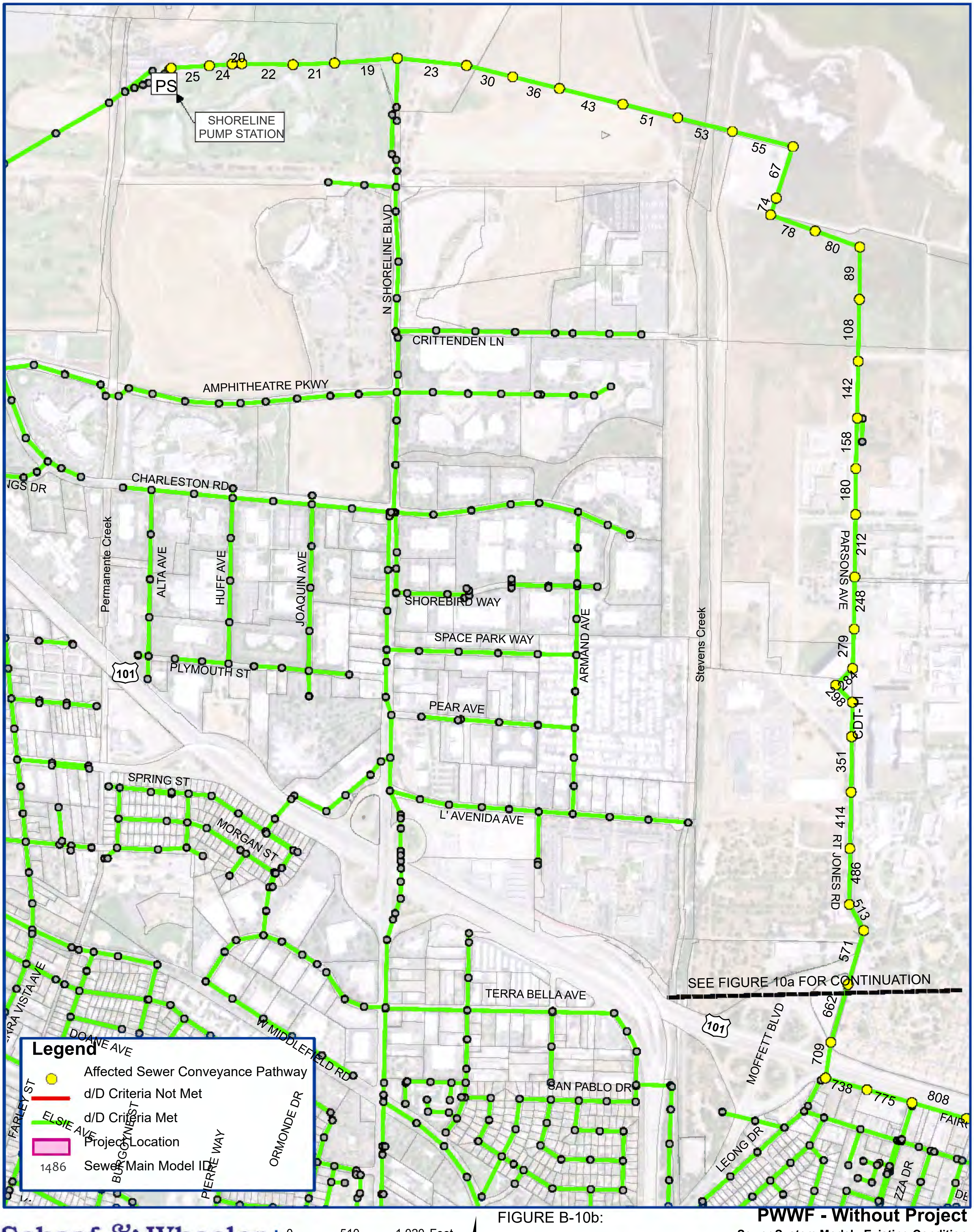


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FIGURE B-10b:

**PWWF - Without Project**

**Sewer System Model - Existing Condition**

Middlefield Park Master Plan Utility Impact Study

April 2022

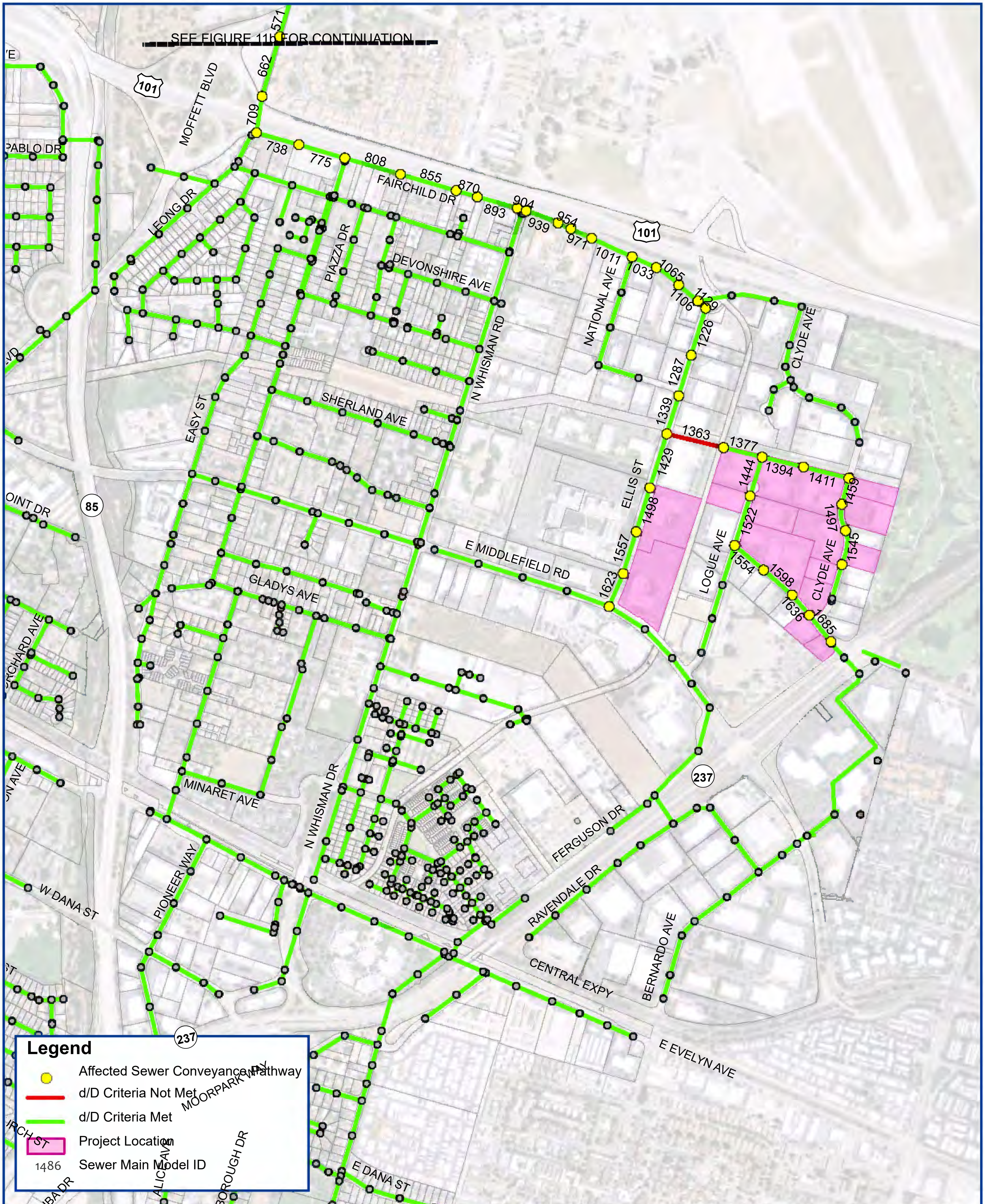


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FIGURE B-11a: **PWWF - With Project - Scenario 1**

**Sewer System Model - Existing Condition**

Middlefield PArk Master Plan Utility Impact Study | April 2022

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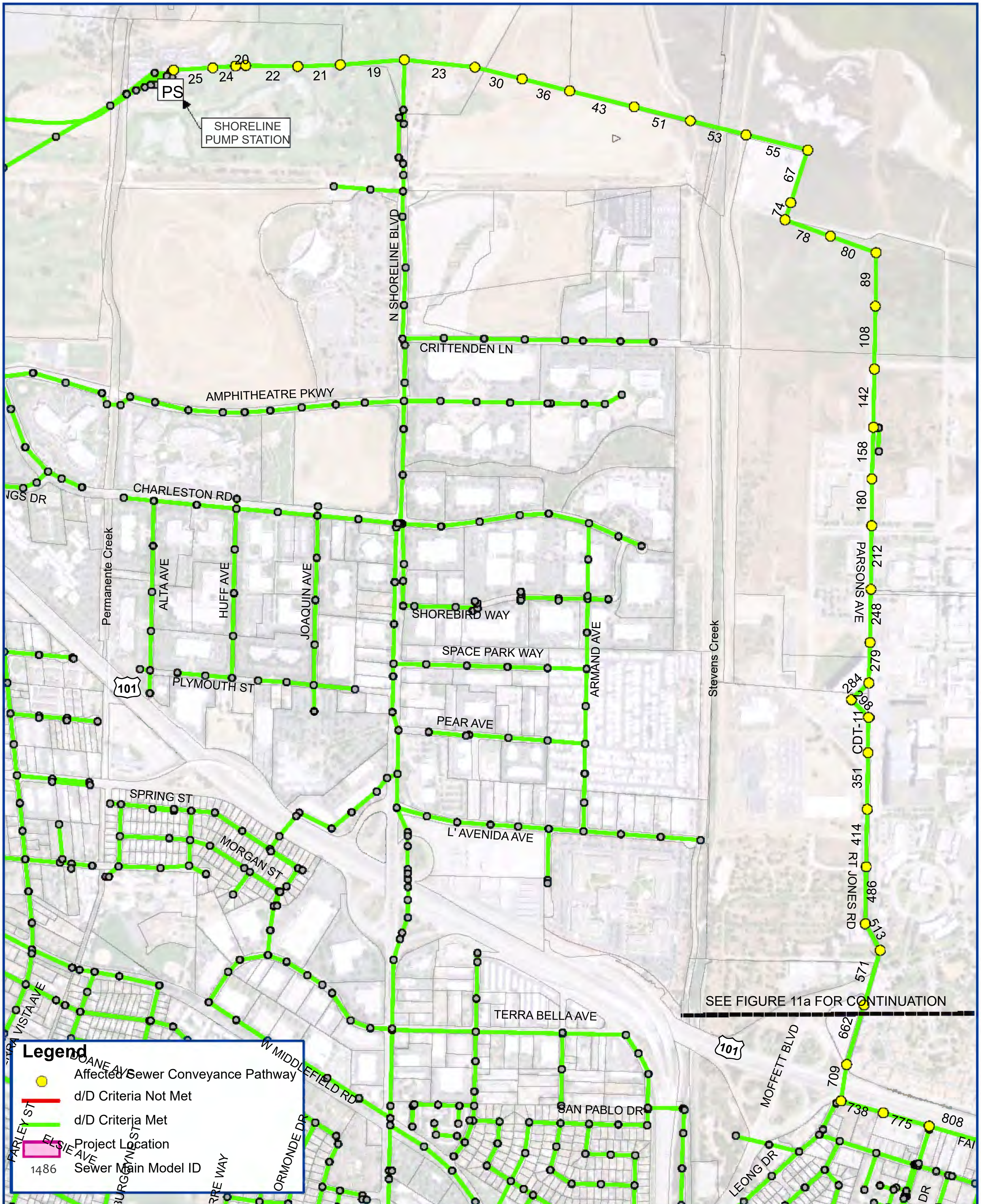


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FIGURE B-11b: **PWWF - With Project - Scenario 1**

**Sewer System Model - Existing Condition**

Middlefield Park Master Plan Utility Impact Study

April 2022

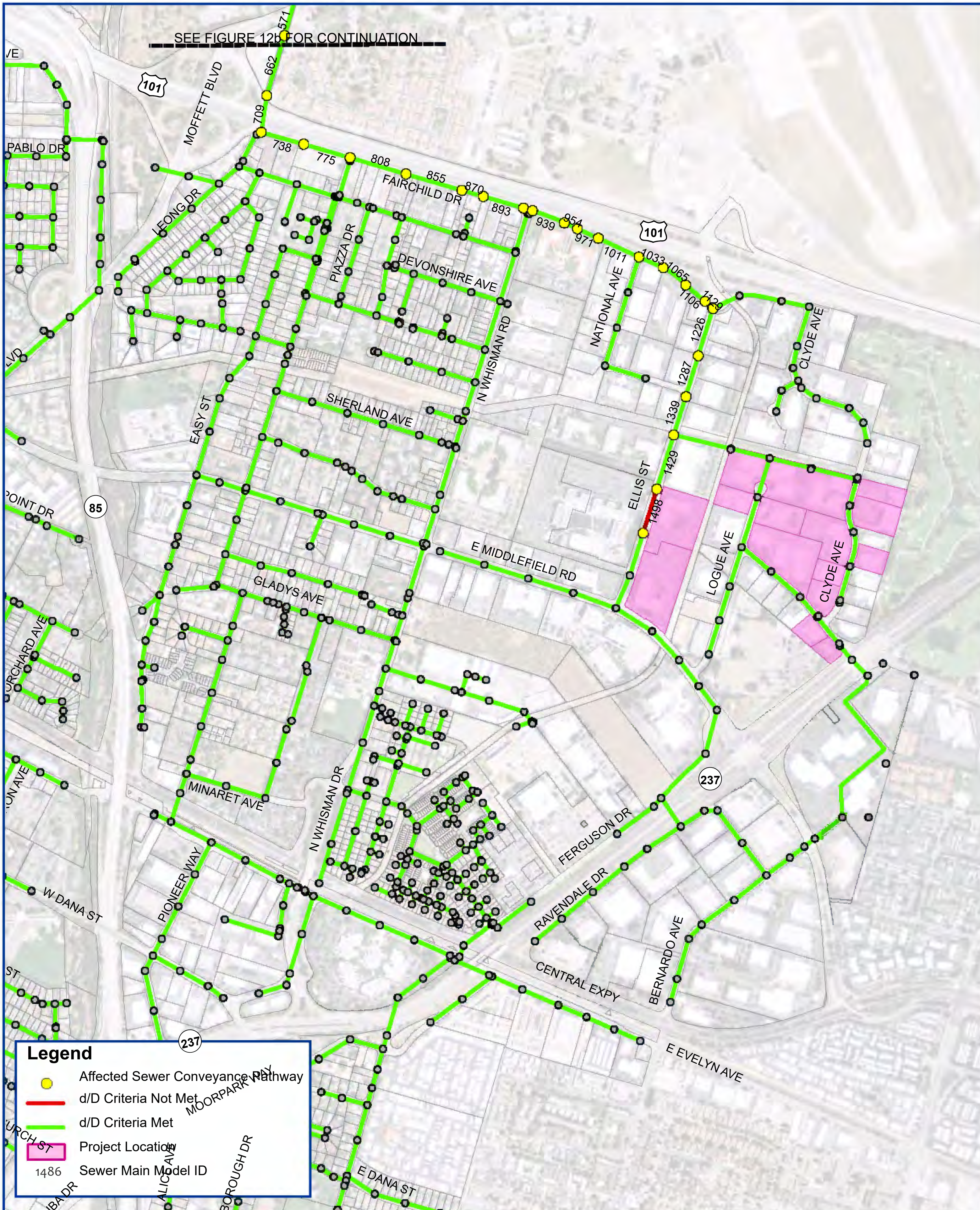


FIGURE B-12a: **PWWF - With Project - Scenario 2**

**Sewer System Model - Existing Condition**

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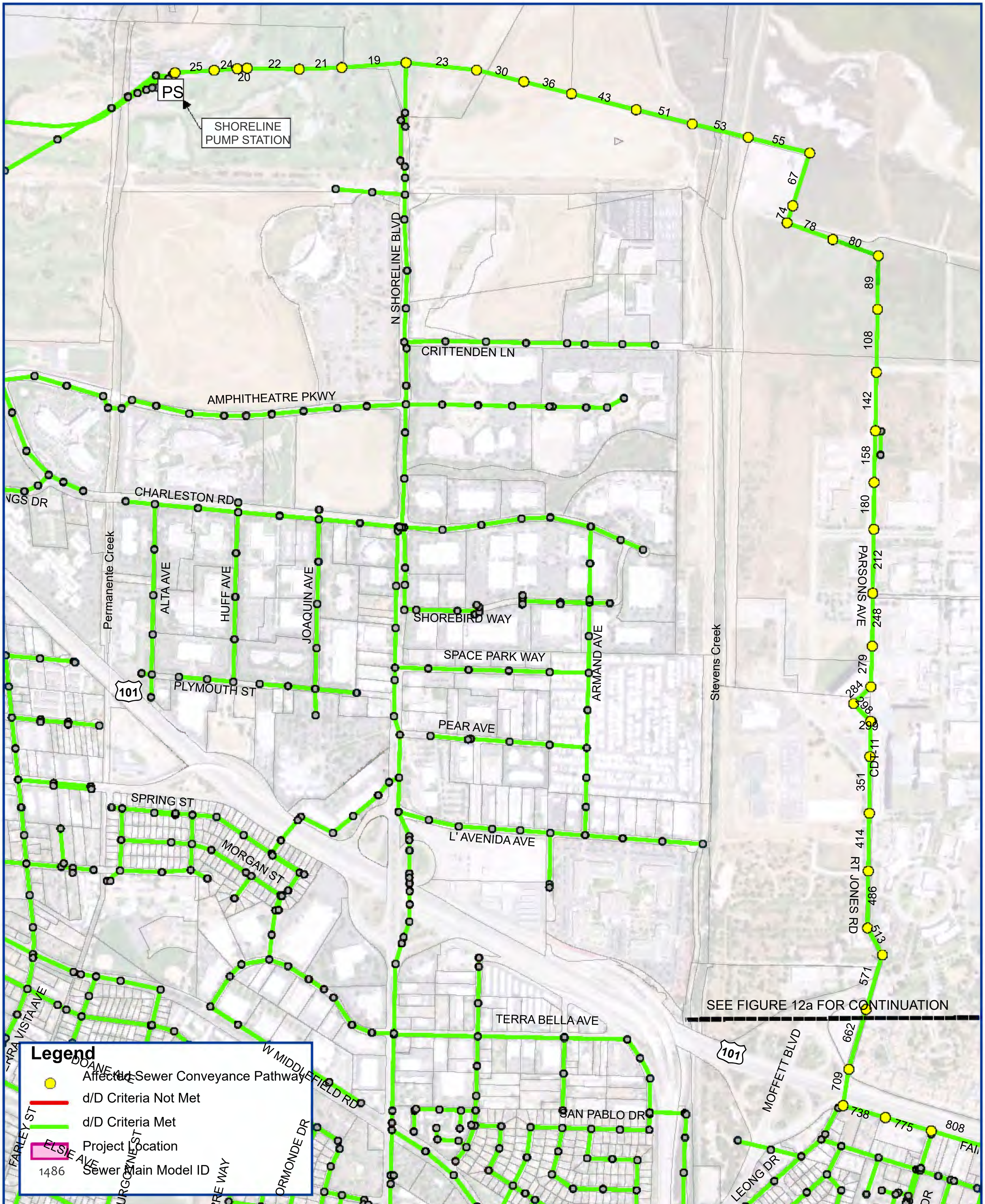
Middlefield Park Master Plan Utility Impact Study | April 2022

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0 500 1,000 Feet

FIGURE B-12b: **PWWF - With Project - Scenario 2**

**Sewer System Model - Existing Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

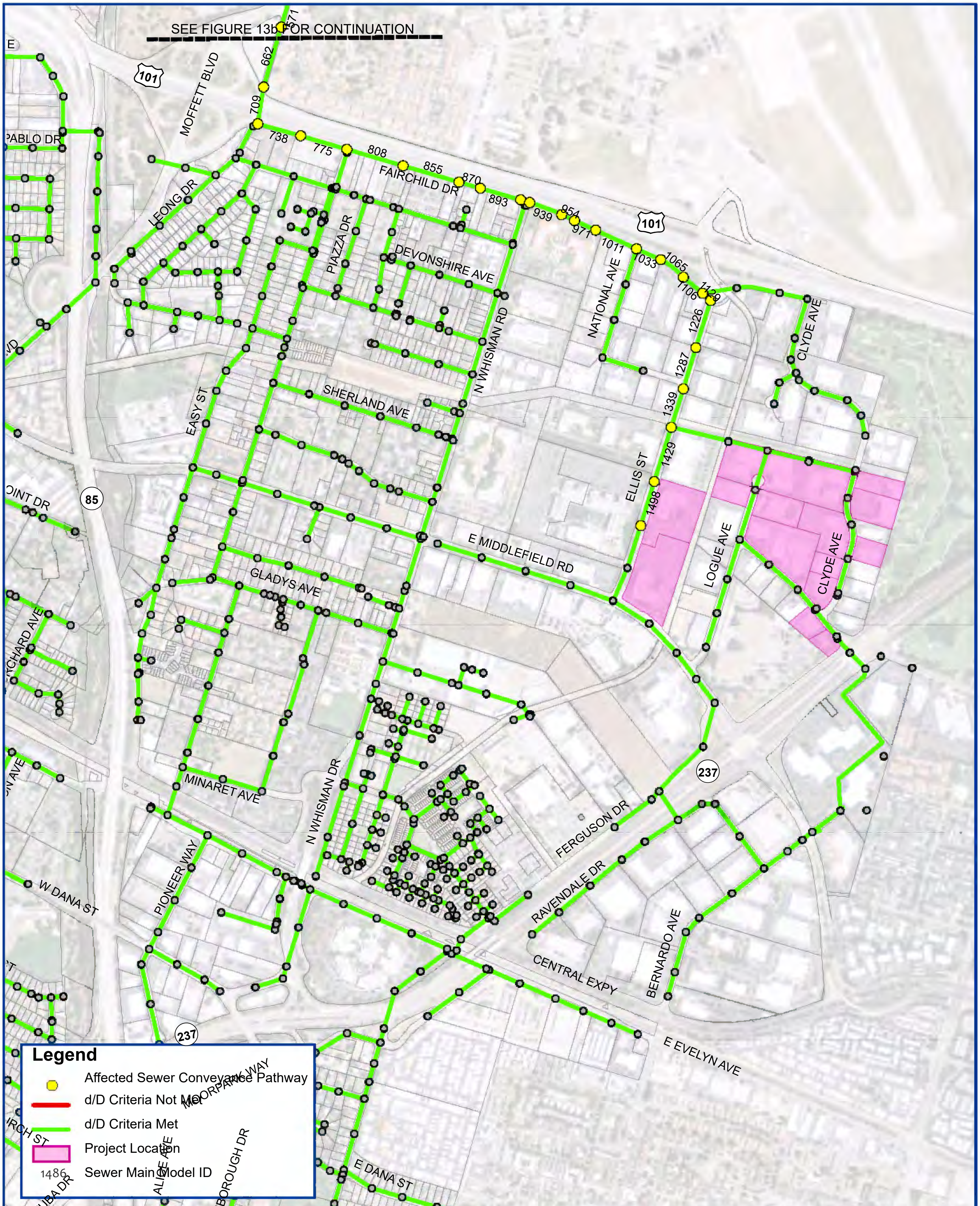


FIGURE B-13a: **PWWF - With Project - Scenario 3**

**Sewer System Model - Existing Condition**

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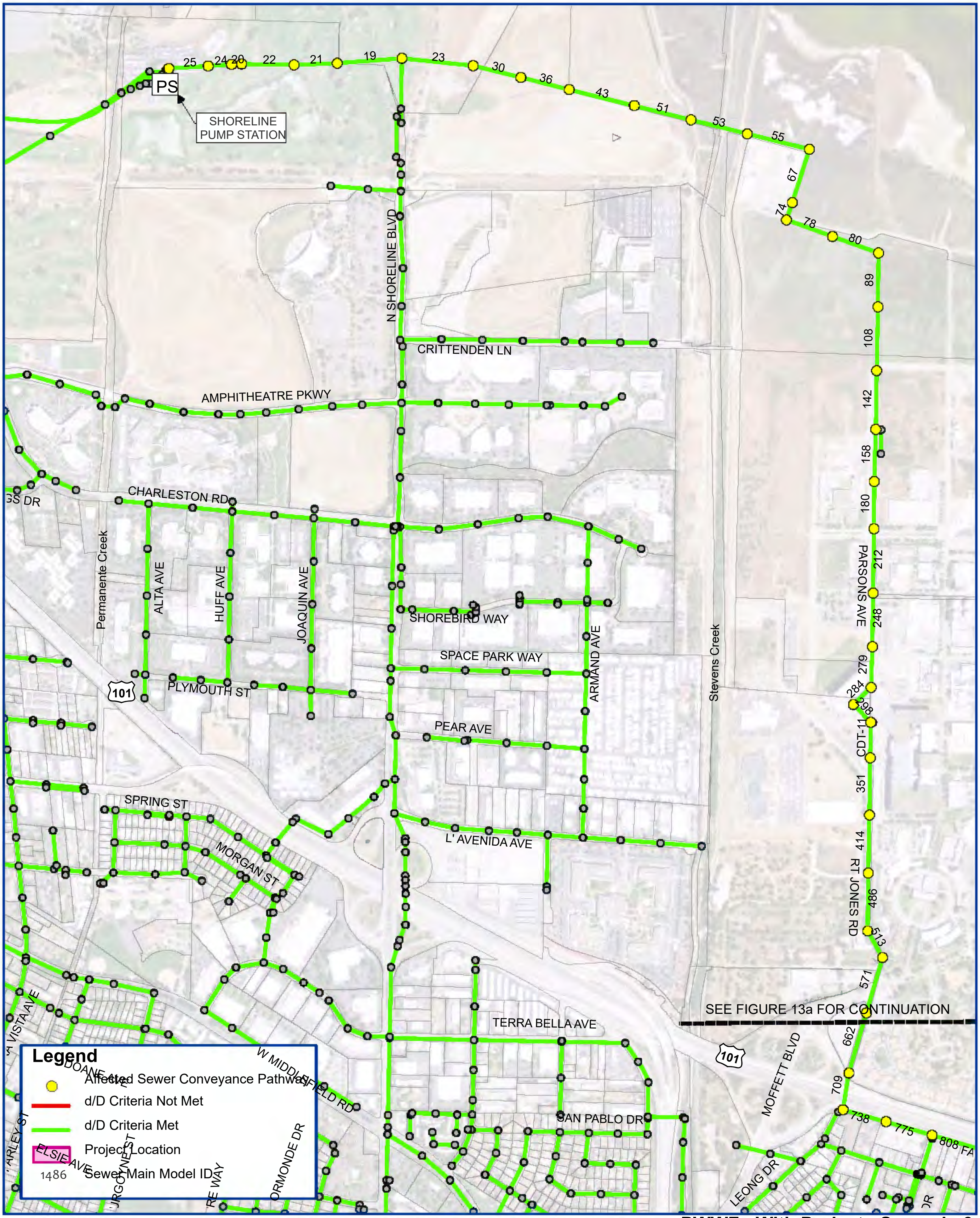


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0 500 1,000 Feet

FIGURE B-13b: **PWWF - With Project - Scenario 3**

**Sewer System Model - Existing Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

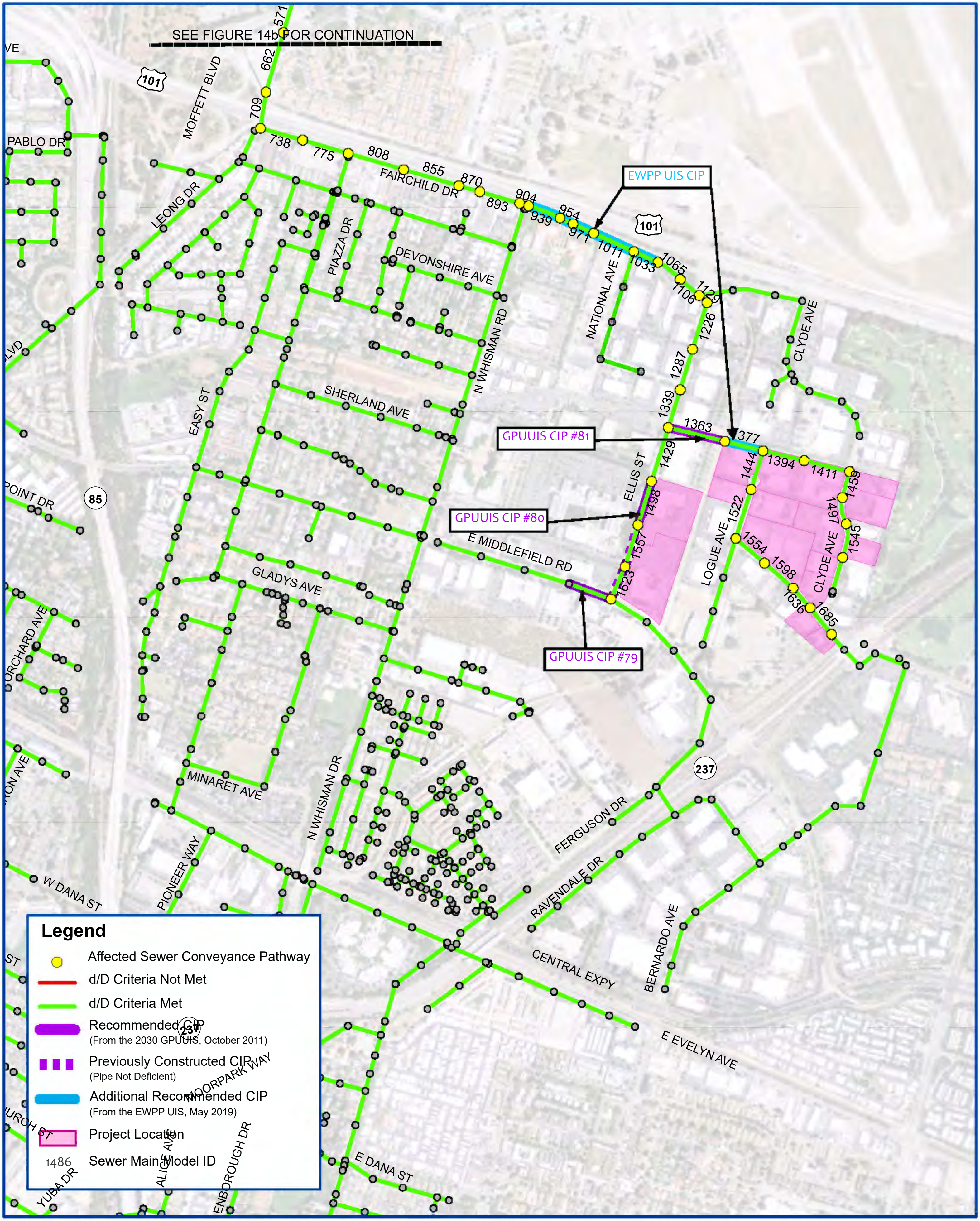


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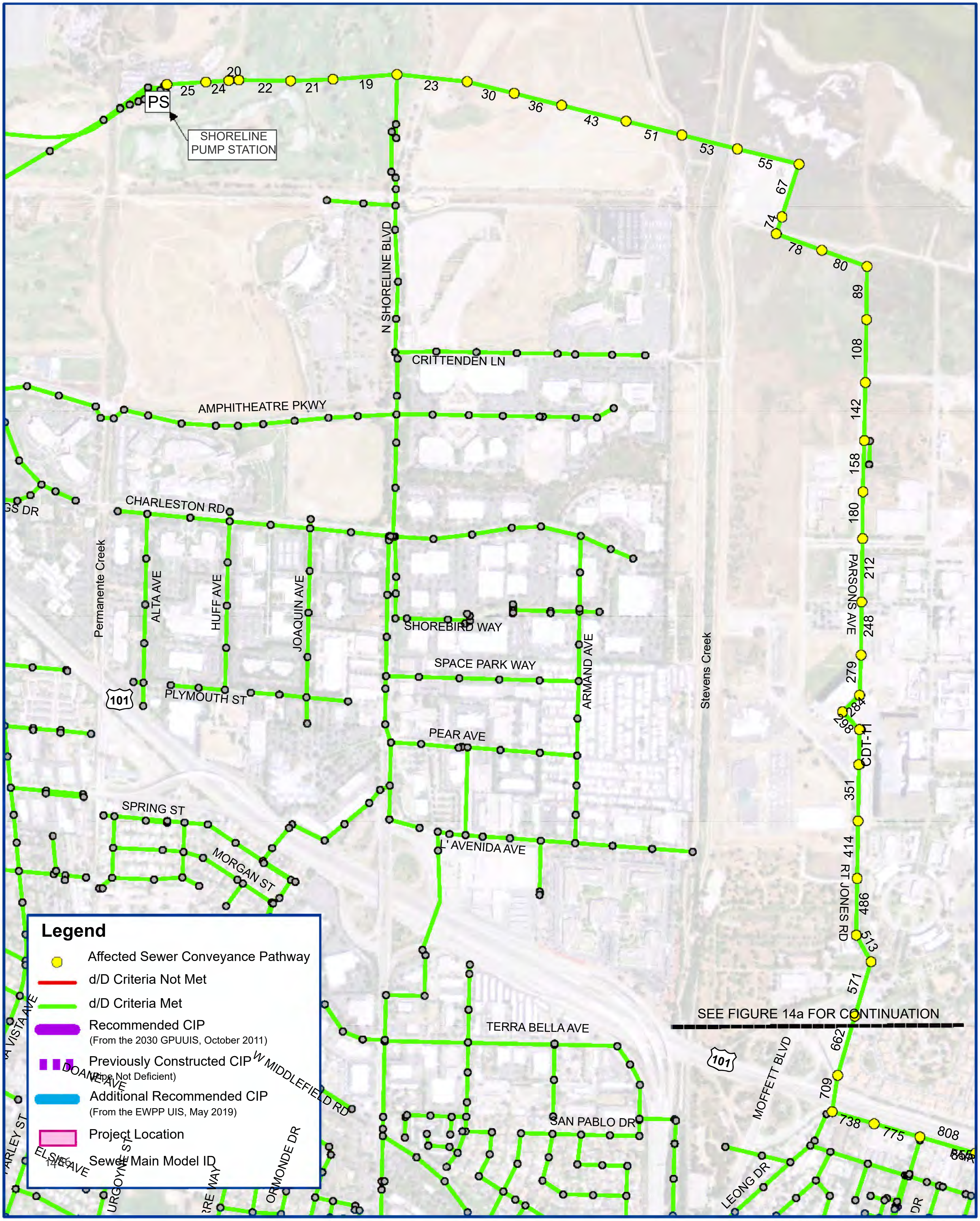
FIGURE B-14a: **PWWF - Without Project**

**Sewer System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study April 2022

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0 500 1,000 Feet

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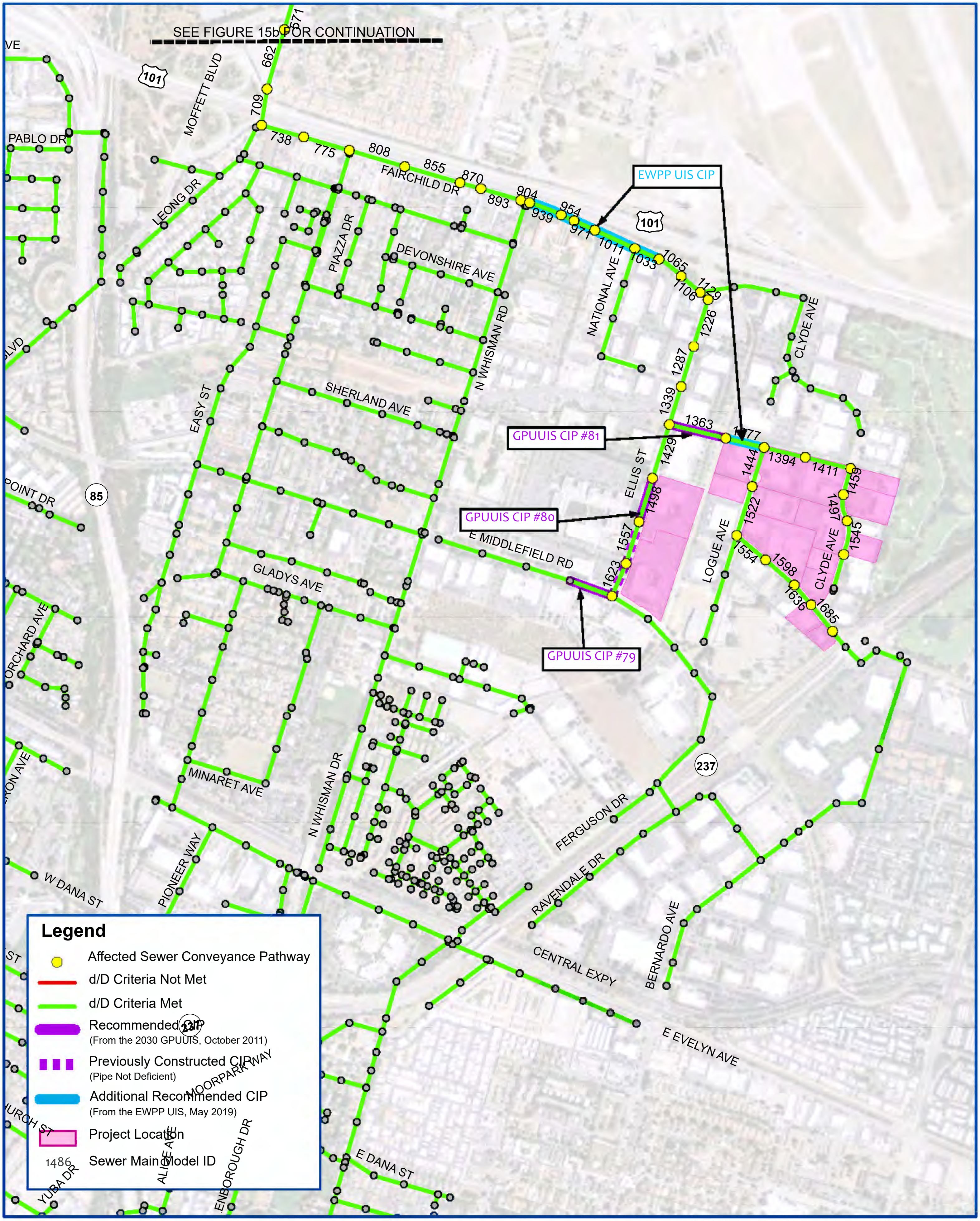
FIGURE B-14b:

**PWWF - Without Project**

**Sewer System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

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0 500 1,000 Feet

FIGURE B-15a: **PWWF - With Project - Scenario 1**

**Sewer System Model - Future Cumulative Condition**

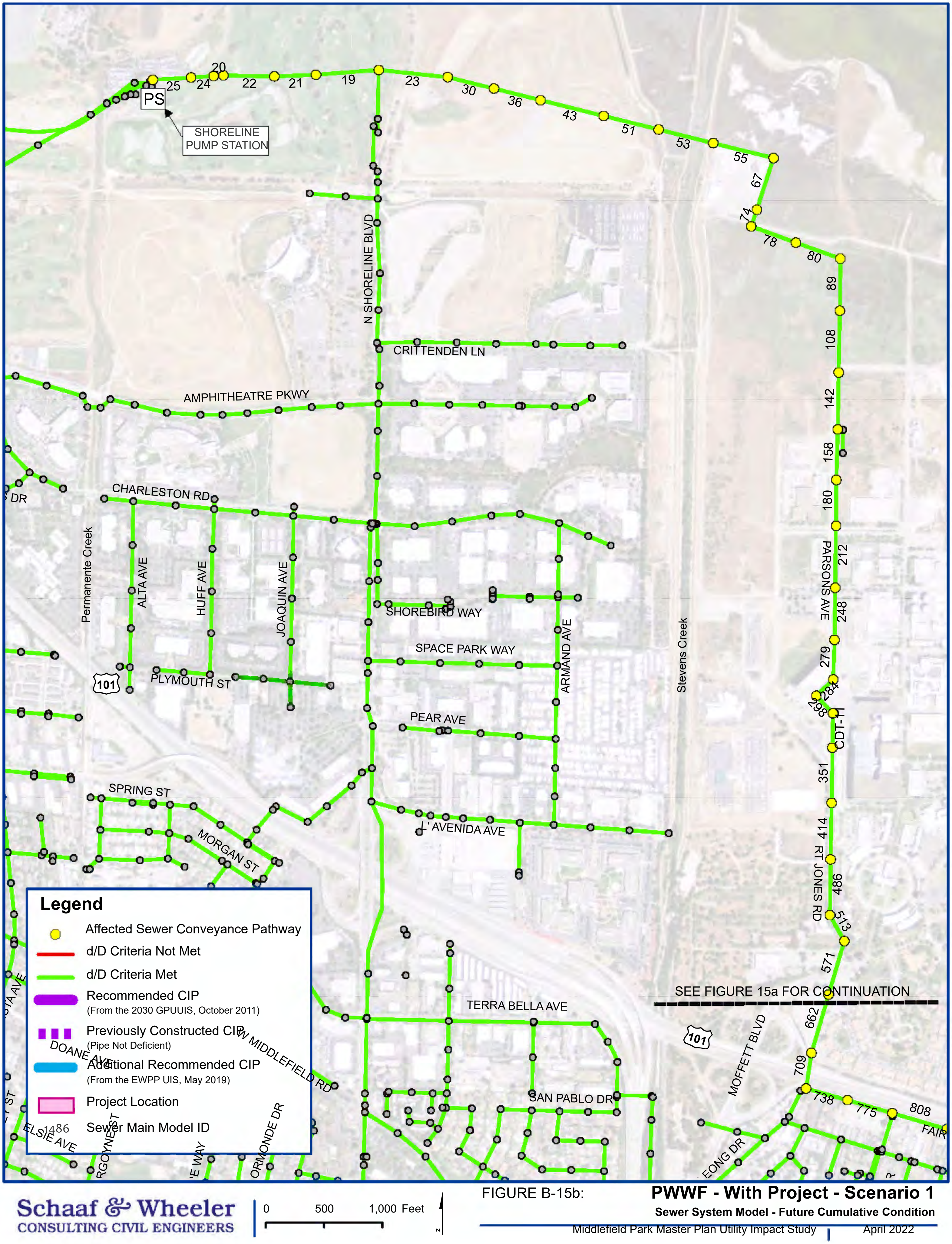


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FIGURE B-15b: **PWWF - With Project - Scenario 1**

**Sewer System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

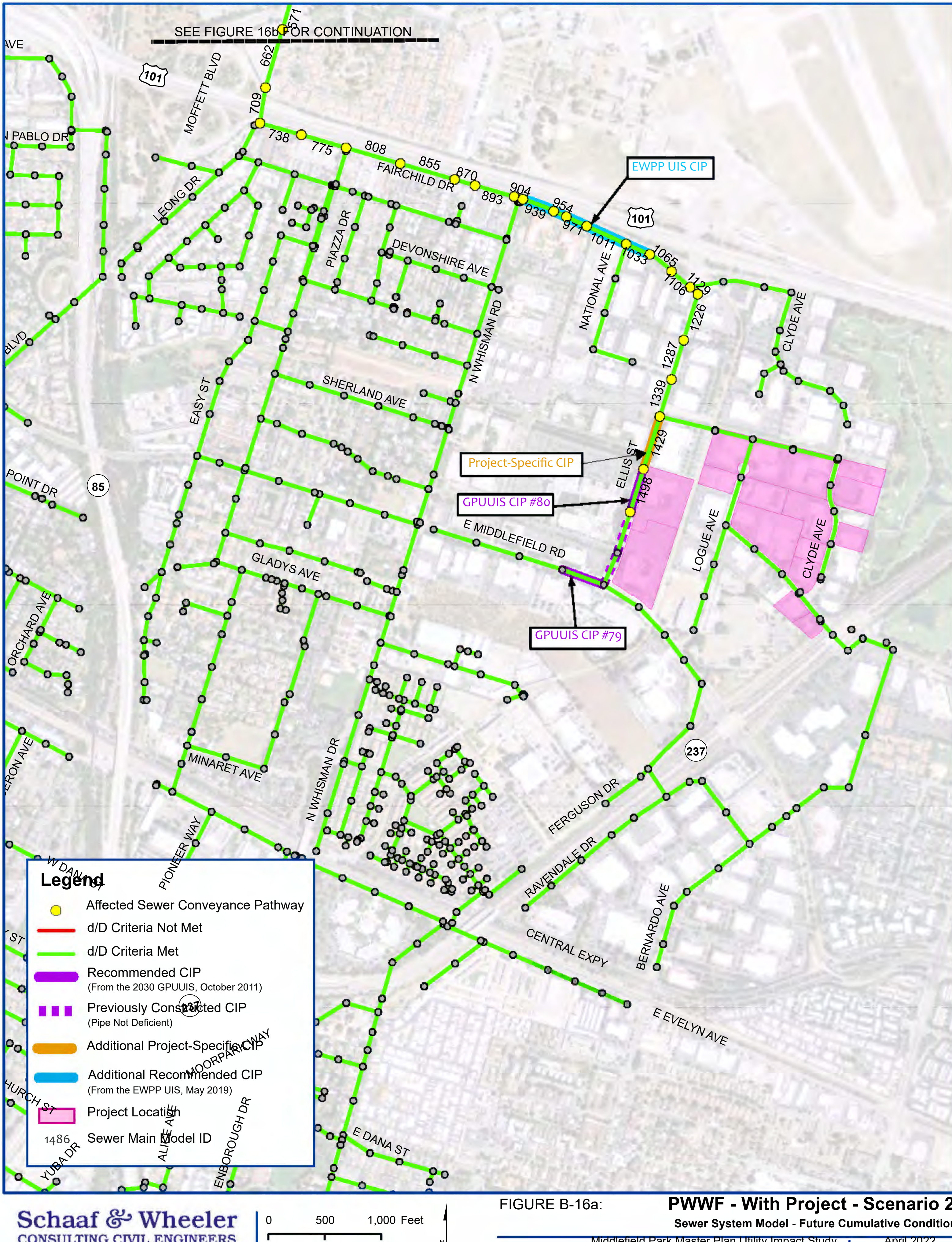


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FIGURE B-16a: **PWWF - With Project - Scenario 2**

**Sewer System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

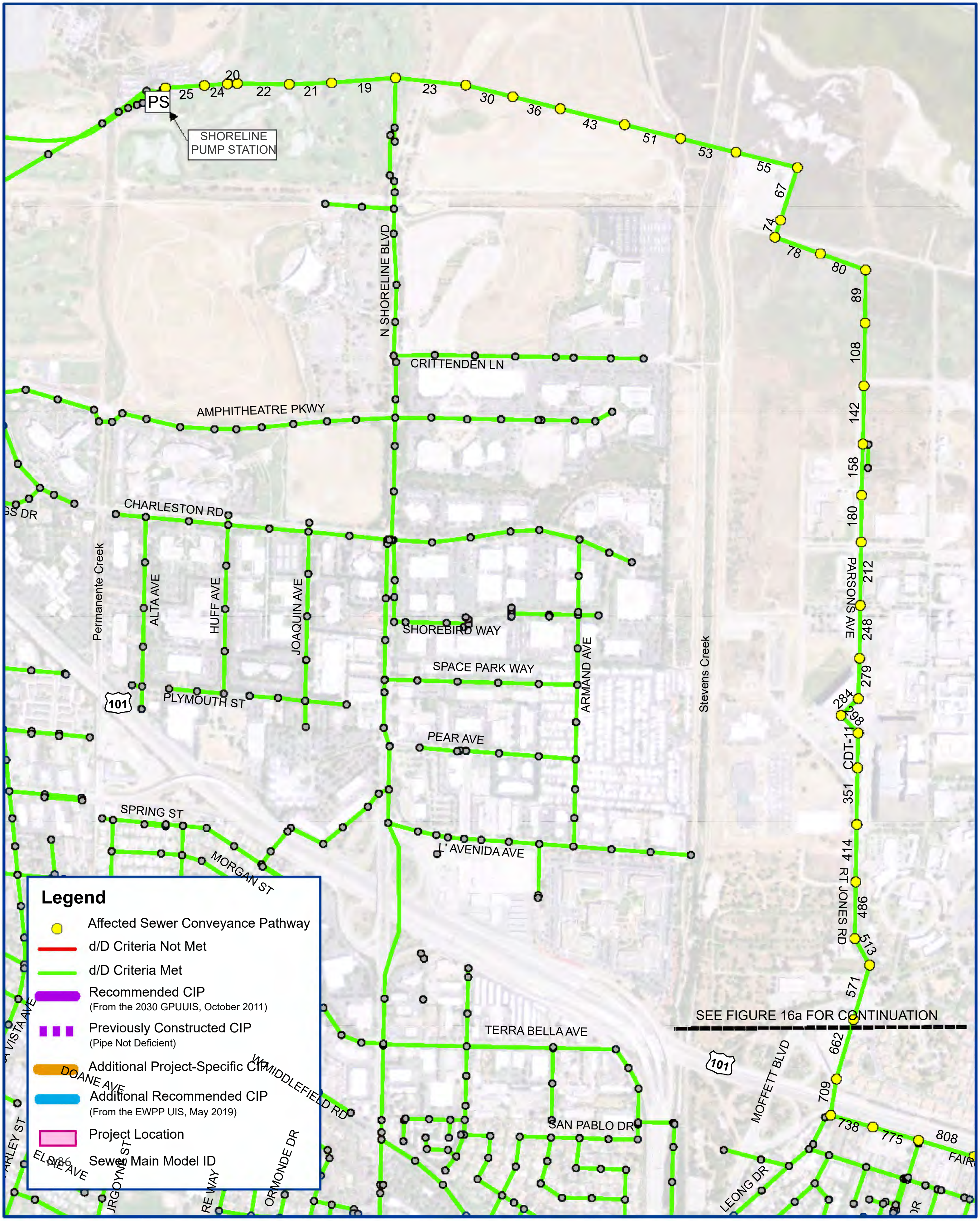


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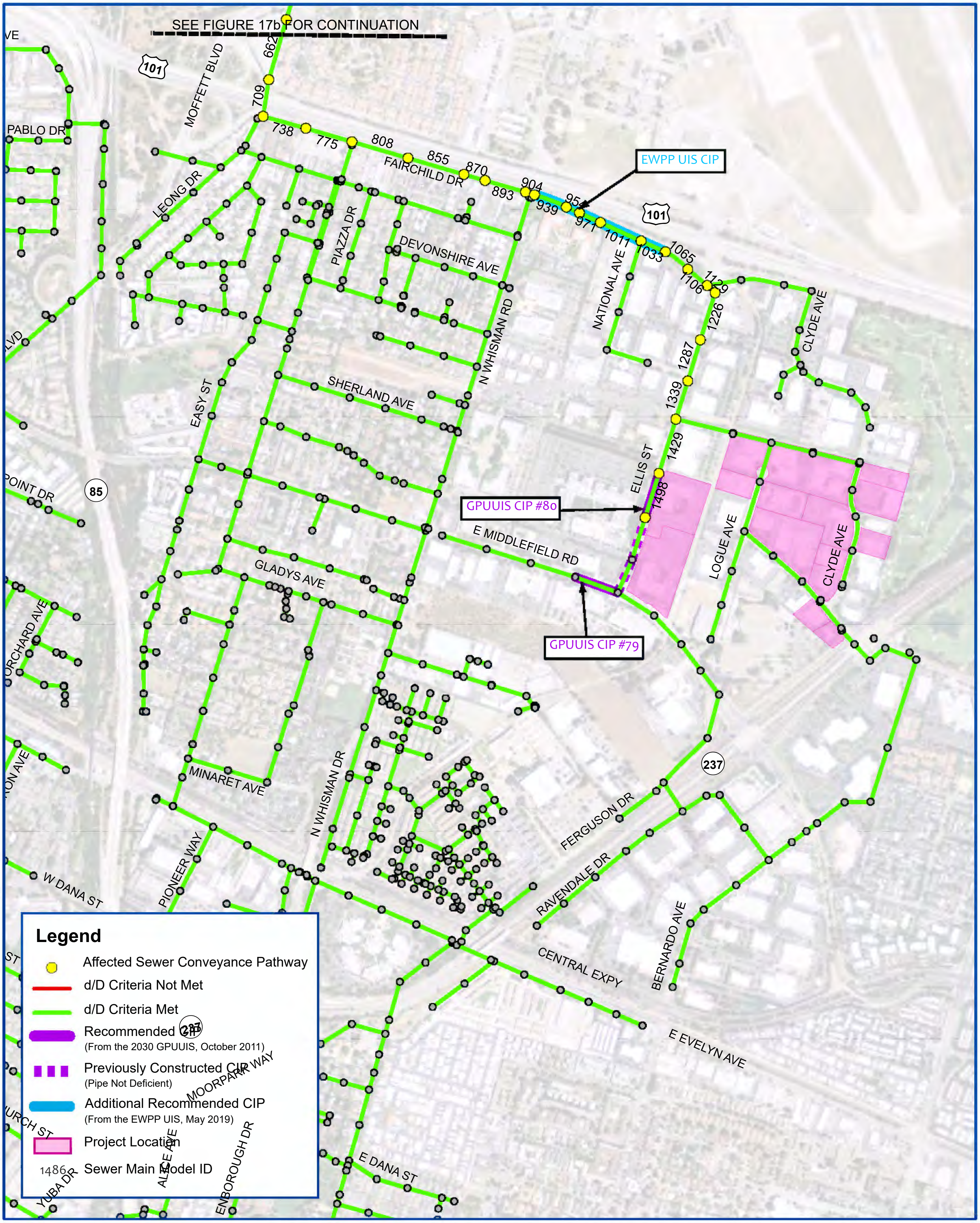
FIGURE B-16b: **PWWF - With Project - Scenario 2**

**Sewer System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

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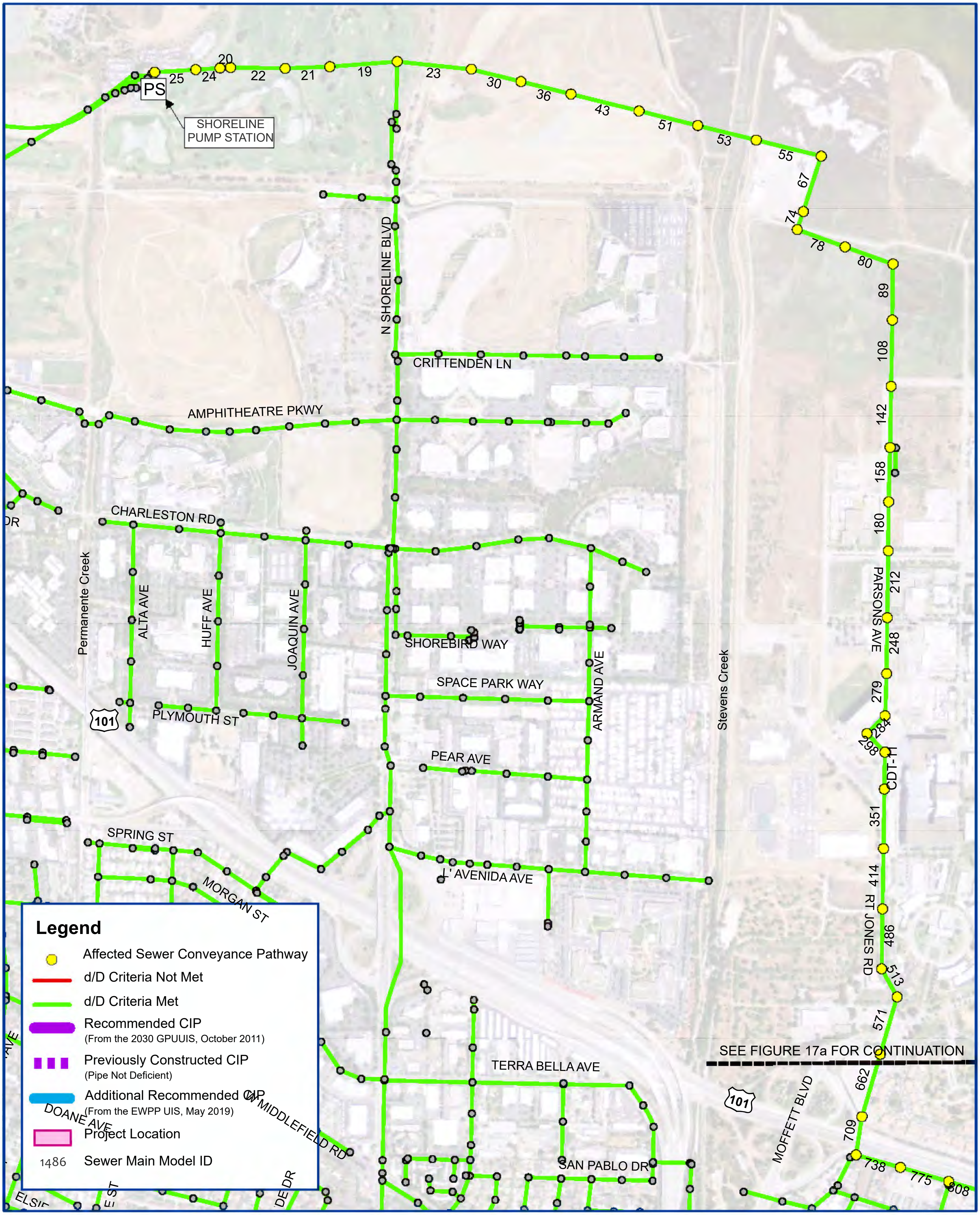
0 500 1,000 Feet

FIGURE B-17a: **PWWF - With Project - Scenario 3**

**Sewer System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022

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0 500 1,000 Feet

FIGURE B-17b: **PWWF - With Project - Scenario 3**

**Sewer System Model - Future Cumulative Condition**

Middlefield Park Master Plan Utility Impact Study | April 2022