

Water System Hydraulic Evaluation

TECHNICAL MEMORANDUM

DATE: May 27, 2025

Project No.: 462-60-23-50

SENT VIA: EMAIL

TO: Stephen Tovmassian, PE, City of San Bruno

CC: Frank Navarro, PE, City of San Bruno

FROM: Laura Toomey, EIT #1748471

REVIEWED BY: Amy Kwong, PE, RCE #73231

SUBJECT: Water System Hydraulic Evaluation of the Tanforan Redevelopment Project



This technical memorandum (TM) summarizes the findings and conclusions of West Yost's technical evaluation of the City of San Bruno's (City) existing water distribution system and its ability to serve the proposed Tanforan Redevelopment Project (Project). The following sections summarize the hydraulic evaluation.

- Project Description
- Estimated Water Demand for the Project
- Planning and Modeling Criteria
- Hydraulic Evaluation Findings and Conclusions

PROJECT DESCRIPTION

The Project will redevelop an existing 44-acre site (currently occupied by the Shops at Tanforan) located in the northeast portion of the City. As shown on Figure 1, the Project is generally bounded by Sneath Lane to the north, Huntington Avenue to the west, Interstate 380 to the south, and El Camino Real to the east.

The Project is located in the vicinity of existing Pressure Zone 1/4A (Zone 1/4A) pipelines as shown on Figure 1. This Project will be served by Regulating Stations 20 and 21 (RS20 and RS21)¹. In the preliminary utility plan provided to West Yost, included as Attachment A, the Project proposed five connections to the existing 12-inch diameter water mains located in Sneath Lane and Huntington Avenue.

The on-site pipelines within the Project for domestic, irrigation, and fire service are planned to be 12 inches in diameter (refer to orange pipes on Figure 2). Based on a discussion with the City's Fire Department, an additional 1,300 linear feet of 12-inch diameter pipeline that is not currently shown on the preliminary utility plan is recommended to provide looping and supply to hydrants located on the west side of the Project (refer to green pipes on Figure 2). This evaluation assumes that all on-site pipes

¹ RS20 is assumed to be the lead supply into Zone 1/4A,

will be privately owned and that all connections to the City’s system will be equipped with backflow preventors.

Two land use scenarios of varying residential and non-residential densities were evaluated in the Tanforan Redevelopment Water Supply Assessment (WSA) to capture the highest water demand scenario that would be permitted under the proposed Project. The Residential scenario (Scenario B) resulted in higher water demands than the Research & Development (R&D) scenario (Scenario A) and was selected for this hydraulic evaluation.

The following sections review the projected water demands, hydraulic evaluation criteria, and hydraulic evaluation findings and conclusions.

ESTIMATED WATER DEMAND FOR THE PROJECT

As discussed above, the Residential scenario (Scenario B) was selected for this hydraulic evaluation. Water demands for the Project were estimated using water use factors developed in the 2022 Water System Master Plan (WSMP). Table 1 presents the estimated Project water demand.

Table 1. Estimated Water Demand for the Project				
Land Use Type	Quantity ^(a)	Water Use Factor ^(b)	Water Use Factor Units	Average Day Demand Potable Water Use, gpd
Residential Scenario (Scenario B) ^(a)				
Commercial Retail	477,321 sf	0.19	gpd/sf	90,691
Commercial Office	1,229,000 sf	0.13	gpd/sf	159,770
Multi-Family Residential	1,514 du	120	gpd/du	181,680
Hotel ^(c)	170 rooms	120	gpd/room	20,400
Total				452,541
(a) Based on data provided to West Yost by the City of Bruno on 2/4/2025. (b) From the December 2022 WSMP. Factor includes an assumed 8.0 percent non-revenue water (NRW). (c) Based on hotel water use factor used in the Bayhill Specific Plan Development Project WSA (September 2019). sf = square foot; du = dwelling unit; gpd = gallons per day				

System-wide peaking factors from the 2022 WSMP were used to scale the estimated average day demand to maximum day and peak hour demands. The metered water demands from the existing developed parcels were subtracted from the projected water demands for the Project to determine the actual net increase in water demand. Table 2 summarizes the projected average day, maximum day, and peak hour demands for the Project.

Table 2. Summary of Average Day, Maximum Day, and Peak Hour Water Demands						
Land Use Type	Average Day Demand ^(a)		Maximum Day Demand ^(b)		Peak Hour Demand ^(c)	
	gpm	gpd	gpm	gpd	gpm	gpd
Proposed Project Demand						
Commercial Retail	63.0	90,691	110.2	158,709	220.4	317,419
Commercial Office	111.0	159,770	194.2	279,598	388.3	559,195
Multi-Family Residential	126.2	181,680	220.8	317,940	441.6	635,880
Hotel	14.2	20,400	24.8	35,700	49.6	71,400
Total Proposed Demand	314.4	452,541	550.0	791,947	1099.9	1,583,894
Existing Demand^(d)						
Commercial Retail	47.5	68,377	83.1	119,659	166.2	239,318
Total Net Increase in Demand	266.8	384,164	466.9	672,288	933.7	1,344,576
(a) Average Day Demand for the Project is from Table 1. (b) Equal to 1.75 times the average day demand. (c) Equal to 3.5 times the average day demand. (d) Based on the existing 2019 metered consumption data for the parcels being redeveloped and scaled up to match the historical 2019 water production. Refer to Table 2-3 of the Tanforan Redevelopment Project WSA for details. gpm = gallons per minute; gpd = gallons per day						

PLANNING AND MODELING CRITERIA

Evaluation of the Project is based on the following system performance and operational criteria developed in the 2022 WSMP:

- Minimum allowable service pressure is 35 pounds per square inch (psi) under normal system operating conditions.
- Maximum allowable service pressure is 80 psi under normal system operating conditions. Services that experience pressures exceeding 80 psi must have an individual pressure reducing valve (PRV) installed on the service lateral.
- Residual pressure at the flowing hydrant (during maximum day demand plus fire flow conditions) and at service locations throughout Zones 1/4A and 1/4 must be equal to or greater than 20 psi.
- Maximum allowable pipeline velocity is 4 feet per second (ft/s) during a non-fire demand condition.
- Maximum allowable pipeline velocity in new pipelines is 10 ft/s during a simulated fire demand condition.
- New pipelines are modeled with a roughness coefficient (C-factor) of 140.

In addition, the following Project-specific criterion was used in this evaluation:

- Based on the 2022 WSMP, available fire flow must meet a minimum requirement of 2,500 gpm (General Commercial). This requirement assumes that the proposed buildings are sprinklered.

HYDRAULIC EVALUATION FINDINGS AND CONCLUSIONS

The hydraulic model of the City's existing water distribution system from the 2022 WSMP is the basis for this hydraulic evaluation. After updating the hydraulic model with the projected water demands shown in Table 2 and proposed facilities shown on Figure 2, West Yost used the hydraulic model to simulate both existing peak hour demand and existing maximum day demand plus fire flow conditions to determine the impacts of the Project to the City's water system. Results from these evaluations are discussed below.

Peak Hour Demand Evaluation

Figure 3 shows that model-simulated system pressures for the Project are above the minimum required pressure of 35 psi and below the maximum allowable pressure of 80 psi during a peak hour demand condition. The pressures at the Project's service connection points range from approximately 46 to 59 psi.

The hydraulic grade at the Project Site is estimated to be approximately 168 ft; this can be used to estimate the service pressure for each building when the building heights are considered.

As shown on Figure 3, velocities in all existing and new Zone 1/4A pipelines near the Project are below 4 ft/s during a peak hour demand condition. However, the 8-inch diameter pipelines upstream and downstream of RS20 have a simulated velocity of approximately 5 to 6 ft/s, which exceeds the City's maximum pipeline velocity constraint of 4 ft/s. These high pipeline velocities occur due to the additional water demands from the proposed Project. To mitigate this issue, the existing pipelines should be upsized to 12 inches in diameter (approximately 520 linear feet of pipeline).

Maximum Day Demand plus Fire Flow Evaluation

The minimum fire flow requirement for the Project is 2,500 gpm. As shown on Figure 4, results from the hydraulic model indicate that the proposed pipelines serving the Project are adequate to meet this requirement during a maximum day plus fire flow demand condition while maintaining a residual pressure of 20 psi and a maximum pipeline velocity of 10 ft/s on proposed pipelines.

It should be noted that existing hydrants northeast of the Project in El Camino Real do not meet the required fire flow requirement (2,500 gpm) during a maximum day plus fire flow demand condition. However, these hydrants did not meet the fire flow requirement prior to the addition of the Project, and recommended improvements are detailed in the 2022 WSMP.

Summary of Hydraulic Evaluation

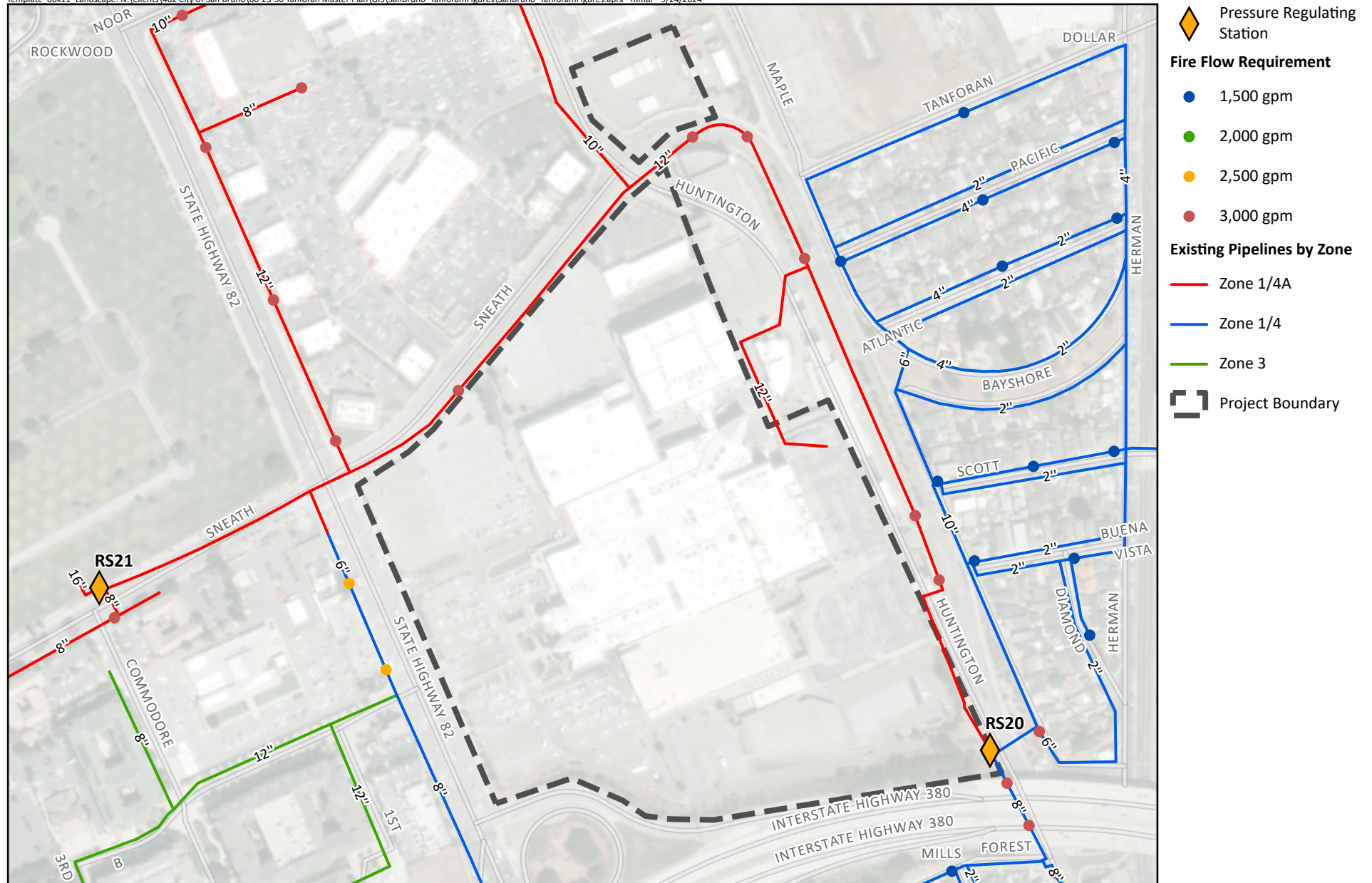
Based on the results from the hydraulic evaluation discussed above, the City's existing water system requires the following improvement in addition to the proposed and required on-site pipelines shown on Figure 2 to adequately serve the Project: the existing 8-inch diameter pipelines upstream and downstream of RS20 would need to be upsized to 12-inch diameter pipelines as shown on Figure 5 (refer to red lines).

West Yost calculated the Project's pumping and storage requirements to determine whether any additional pumping or storage capacity would be required. It should be noted that the Project would be served by Zone 1/4A, which is a reduced pressure zone served by Zone 1/4 and therefore Zone 1/4A is included in calculations for Zone 1/4. Zone 1/4 is supplied by groundwater wells (assumed to be offline for this evaluation) and turnouts, not via pumping. Therefore, the pumping capacity evaluation does not apply to this Project. For storage capacity, there is a deficit of 0.24 million gallons (MG) in Zone 1/4 under existing demand conditions when the Project is included in the evaluation. The planned Tank 1

replacement within Zone 1/4 with design currently in progress² would increase the storage capacity of the zone by 1.0 MG and would be adequate to serve this Project. The Project was included in the City's 2022 WSMP as Unidentified Future Demand. The Project's water demands are included in the buildout facility capacity evaluations, and the planned 3.5 MG Tank 1 replacement (discussed above) is adequate to serve buildout of Zone 1/4 (including the proposed Project).

It is important to note that these fire flow results are based on the available pipeline capacity and may not be representative of the actual flow that the individual hydrants can produce. Additionally, the hydraulic evaluation performed for the Project is based on the criteria listed above. If any of these items are changed or modified in any way, other than described in this TM, additional hydraulic evaluation will be required.

² The City's Tank 1 replacement project is currently at the 90% Plans stage. It is anticipated that construction of this tank should be complete by the time this Project is in construction.



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Project Location

Figure 1



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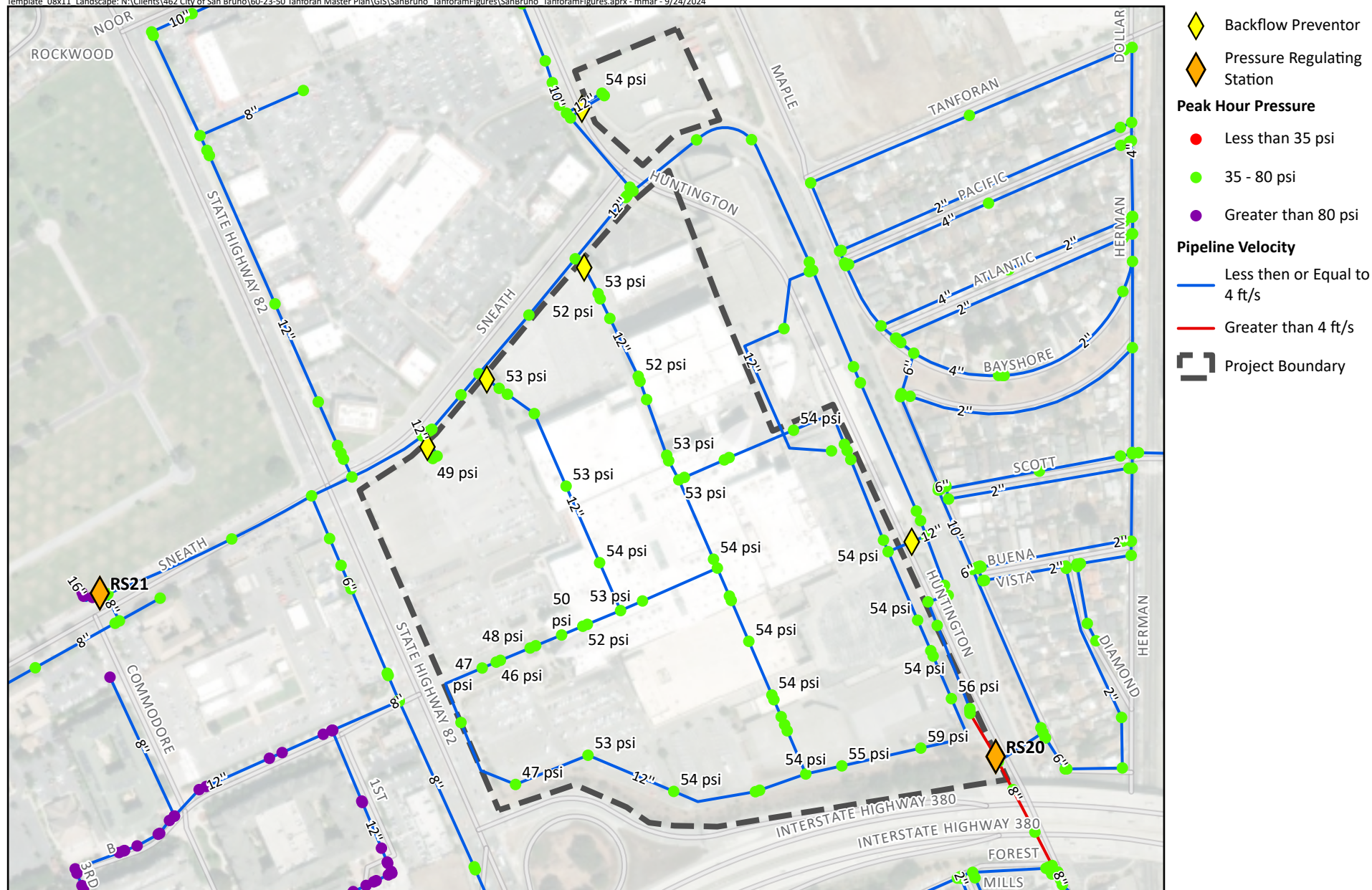
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**Proposed Project
Facilities**

Figure 2



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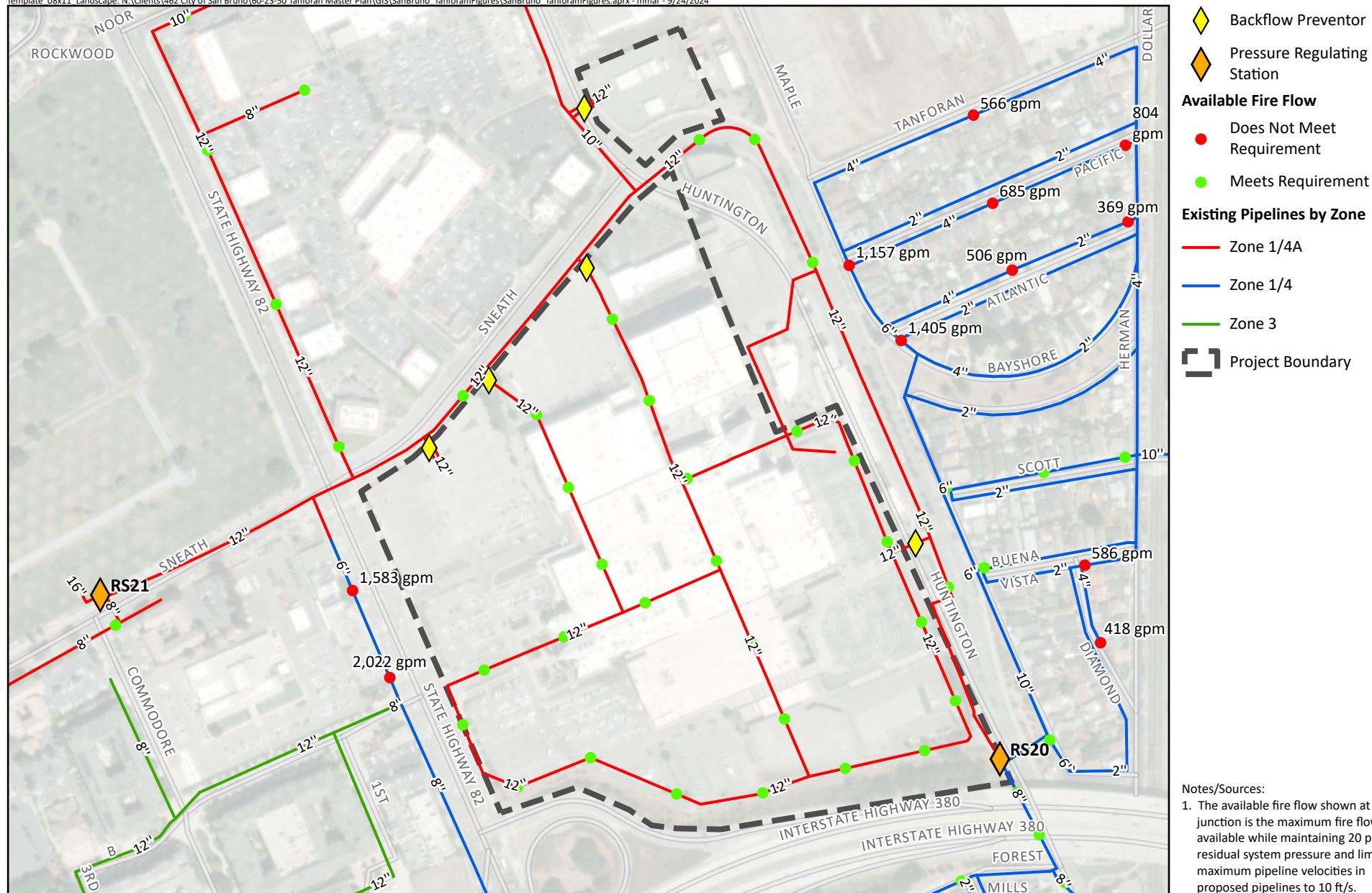
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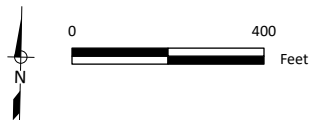


Peak Hour Results

Figure 3



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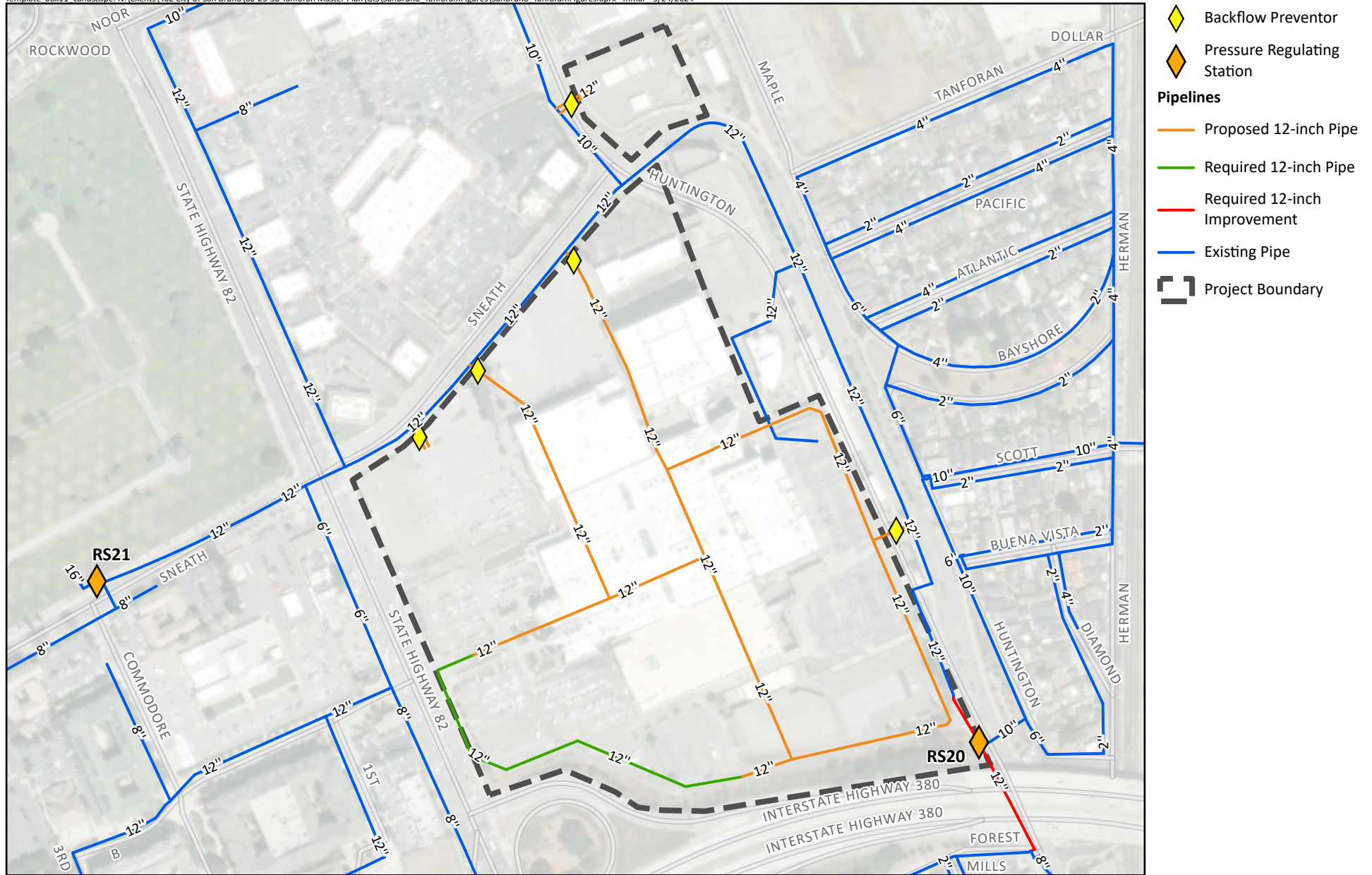
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**Maximum Day
Plus Fire Flow Results**

Figure 4



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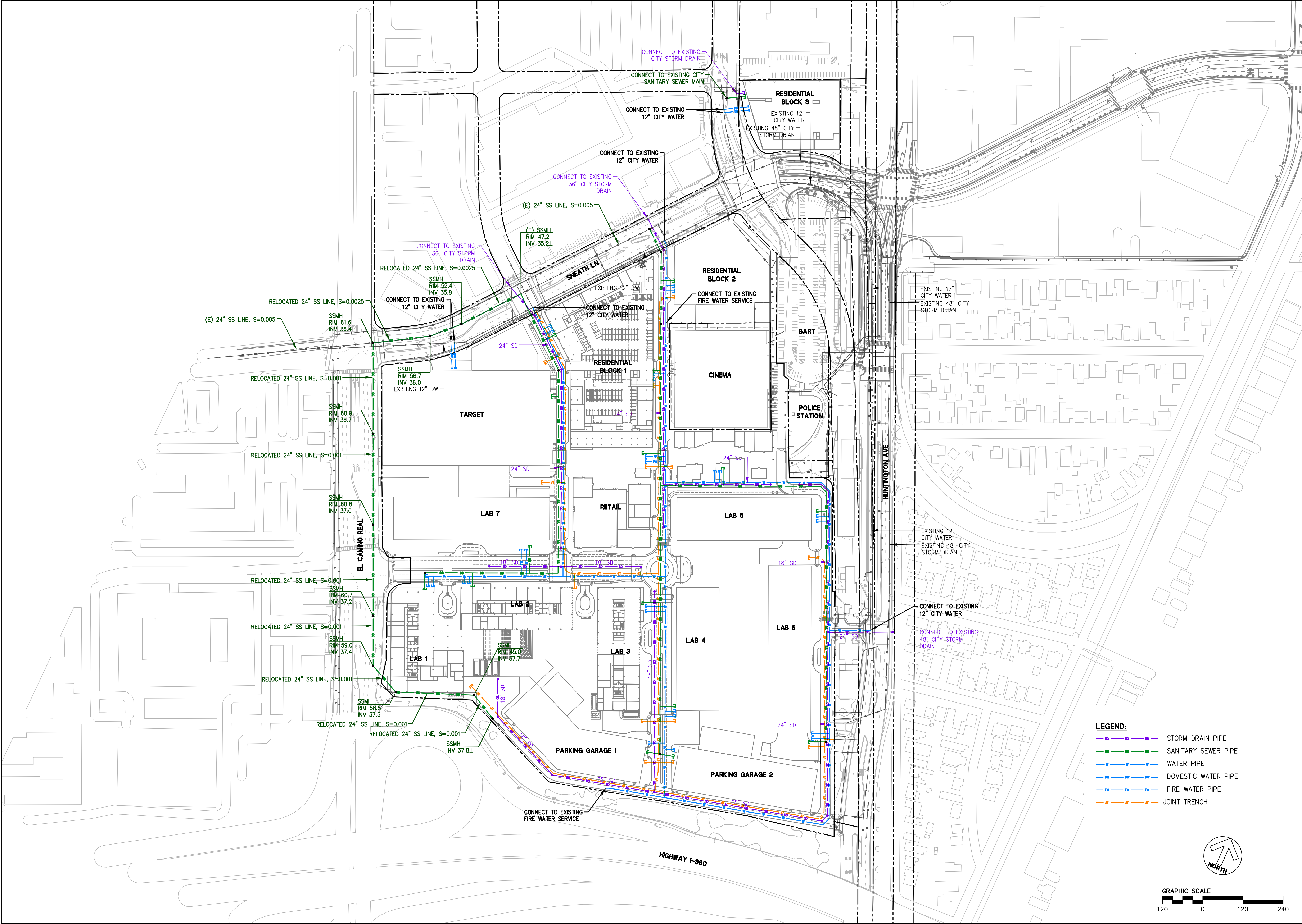
**Proposed and
Recommended
Improvements**

Figure 5



Attachment A

Tanforan Utility Plan



TANFORAN REDEVELOPMENT
CONCEPT DESIGN
UTILITY PLAN

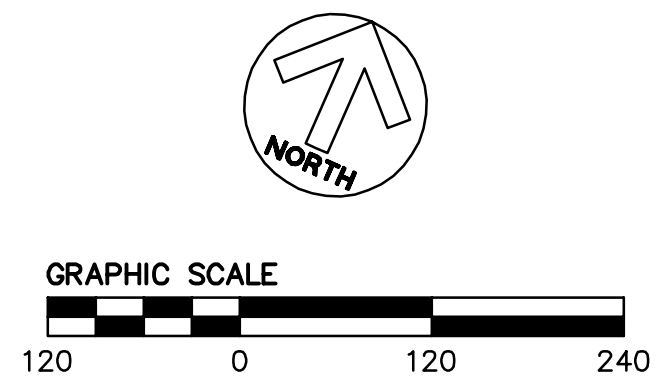
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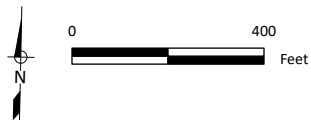
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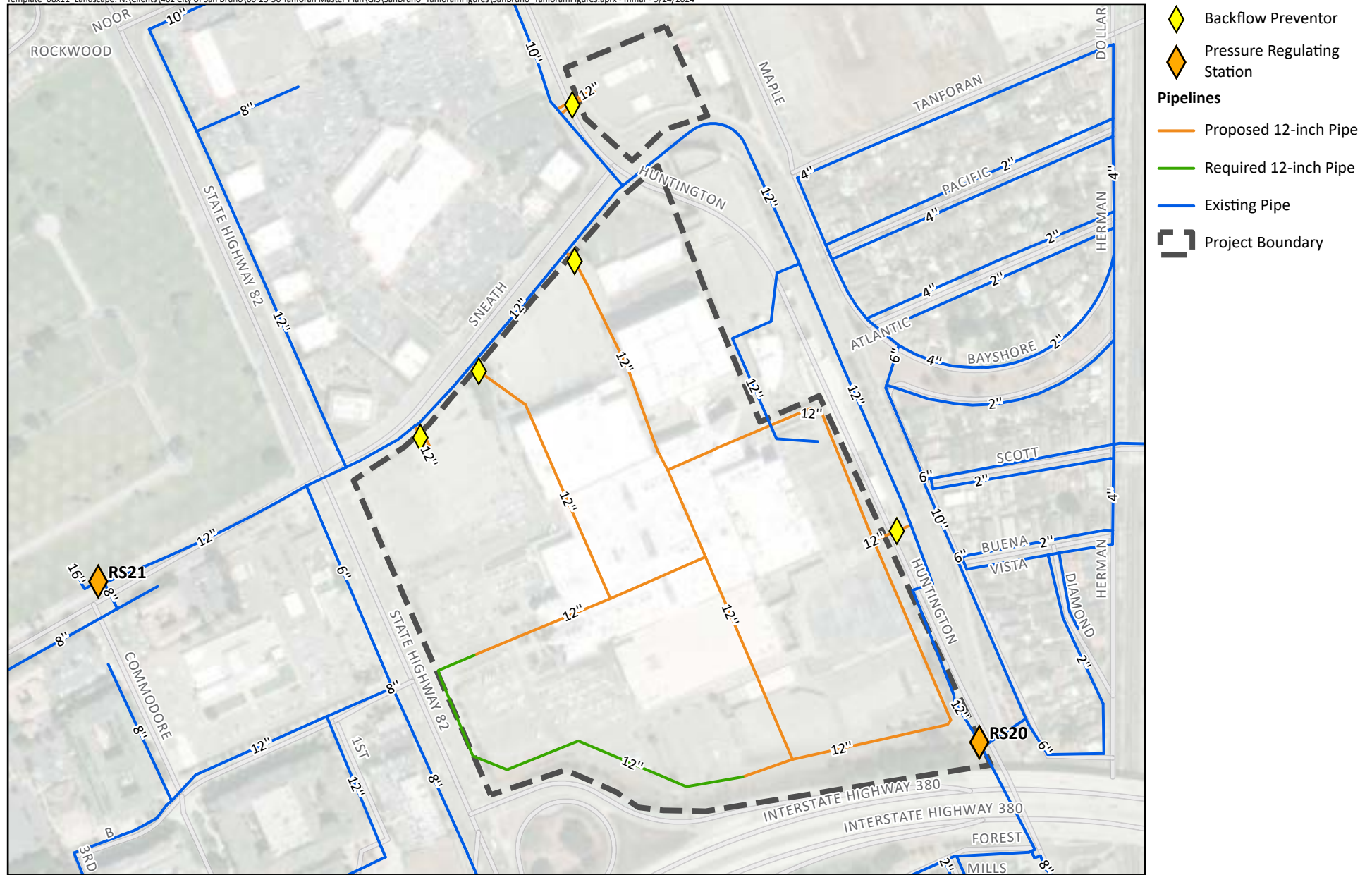
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Project Location

Figure 1



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0 400 Feet

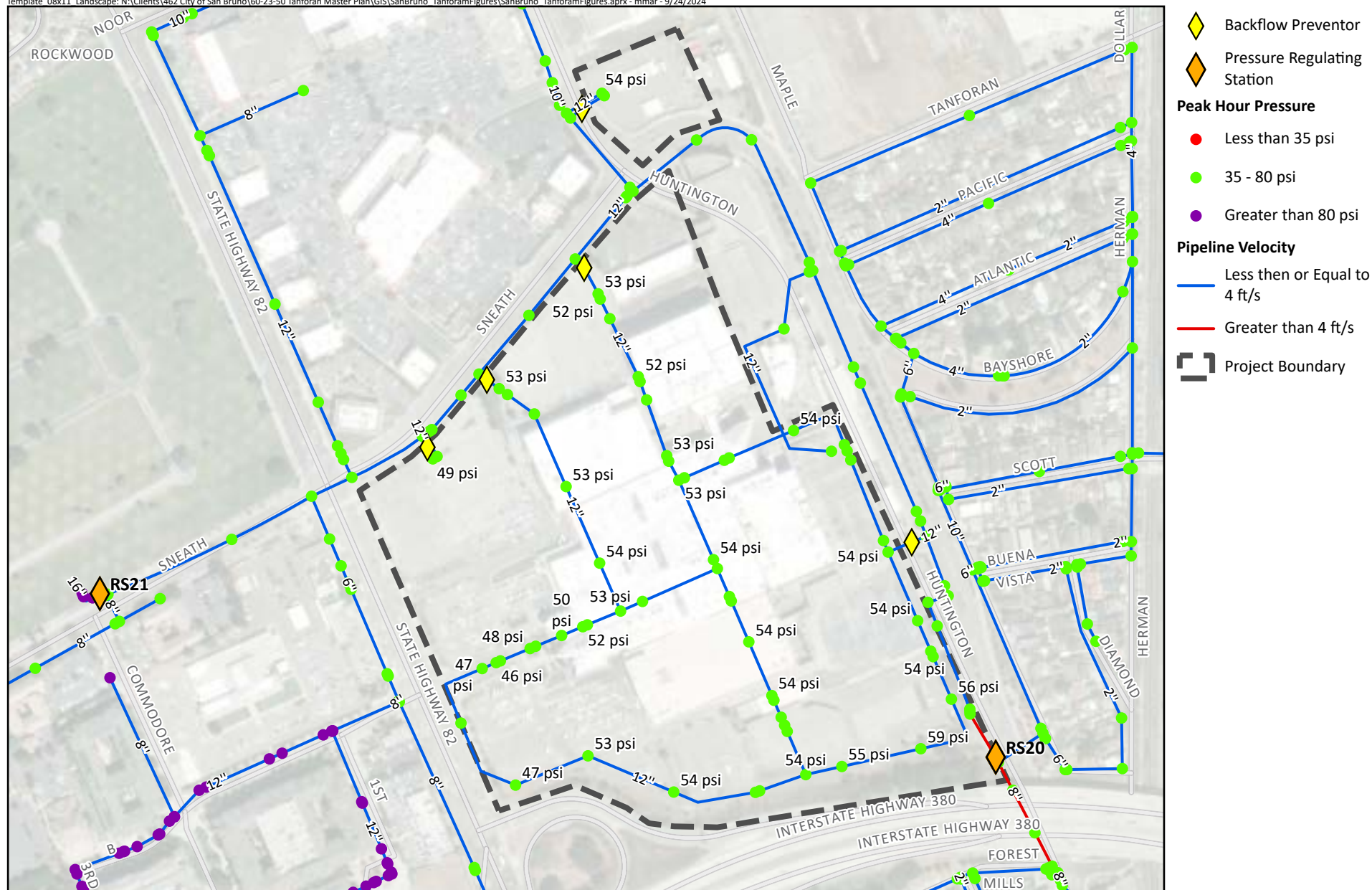
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Proposed Project
Facilities

Figure 2



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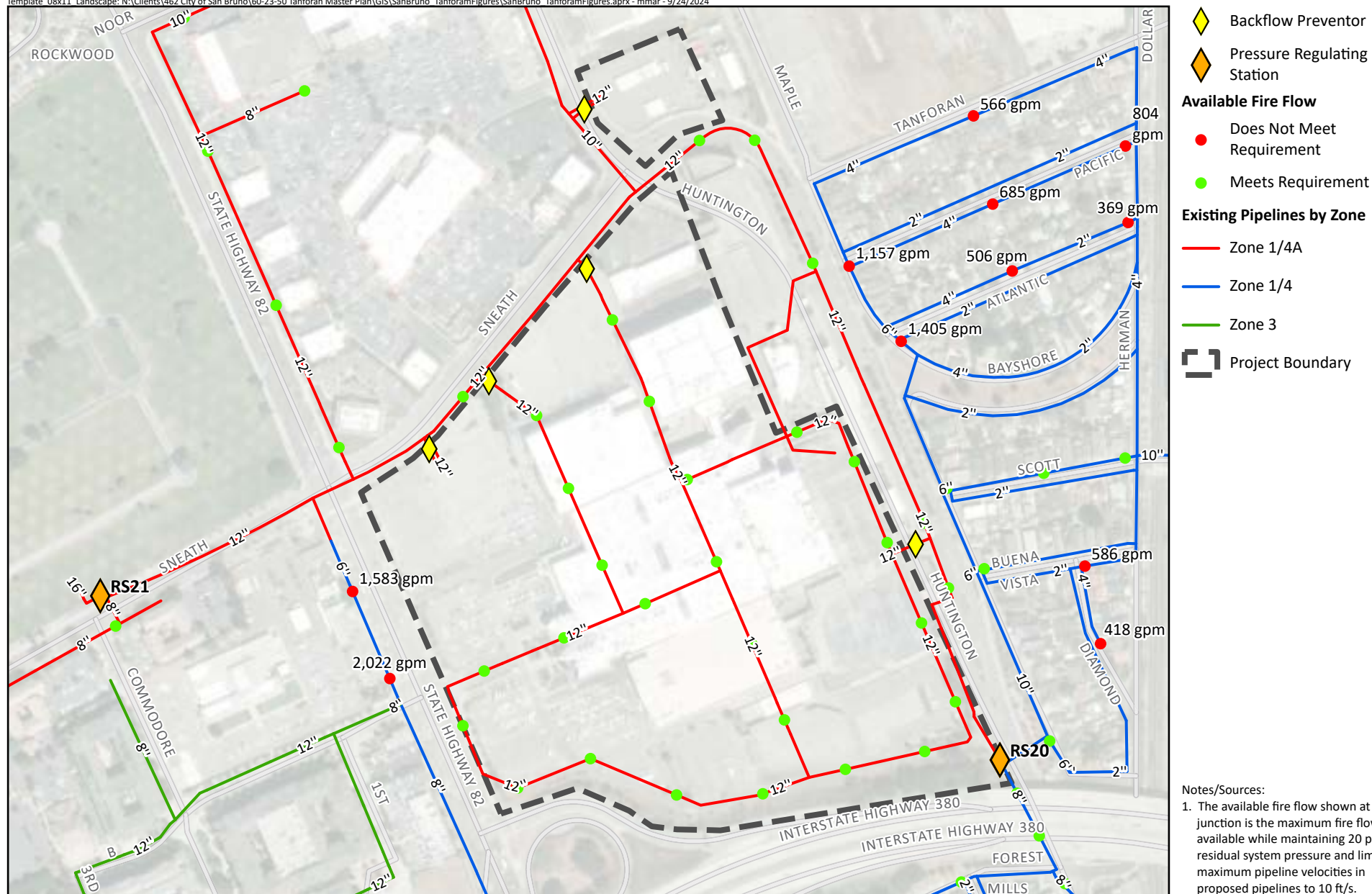
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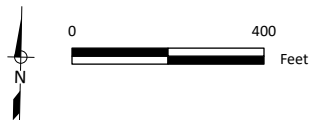


Peak Hour Results

Figure 3



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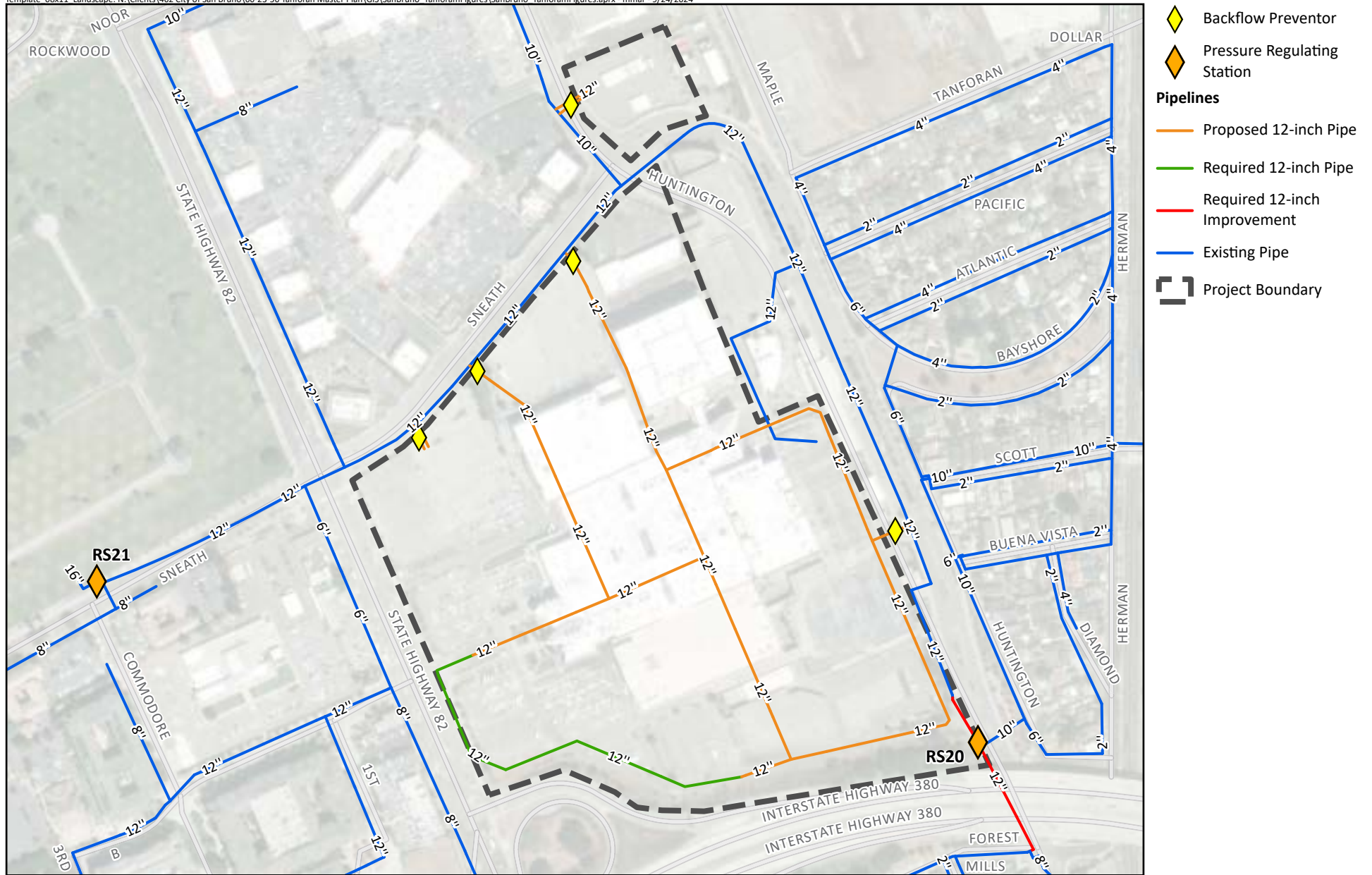
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**Maximum Day
Plus Fire Flow Results**

Figure 4



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**Proposed and
Recommended
Improvements**

Figure 5

