Appendix O1. Water Service Study

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FANITA RANCH WATER SERVICE STUDY
FOR THE
PADRE DAM MUNICIPAL WATER DISTRICT

PDMWD JN: 204020
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Final – February 4, 2020

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Section 1 - Introduction

The purpose of this Water Service Study (Study) is to determine the potential impact of proposed near-term and long-term potable water demand from the Fanita Ranch Project (Project) and identify the necessary water system improvements in parts of the Padre Dam Municipal Water District (District) located in the City of Santee (City). The Project was originally designed as a Planned Development and is proposed to be designated as Specific Plan according to the Fanita Ranch General Plan Amendment application dated June 2018 for the City.

The proposed Project area is located within the Padre Dam Municipal Water District (District) Western Service Area, serving potable, wastewater and recycled water to the City of Santee and parts of El Cajon and Lakeside. Water supply to the Western Service Area is provided by imported treated water supply connections from the San Diego County Water Authority (SDCWA). This Study evaluates the feasibility and potential impacts to the District's system in order to provide water supply to the Project from the Western Service Area.

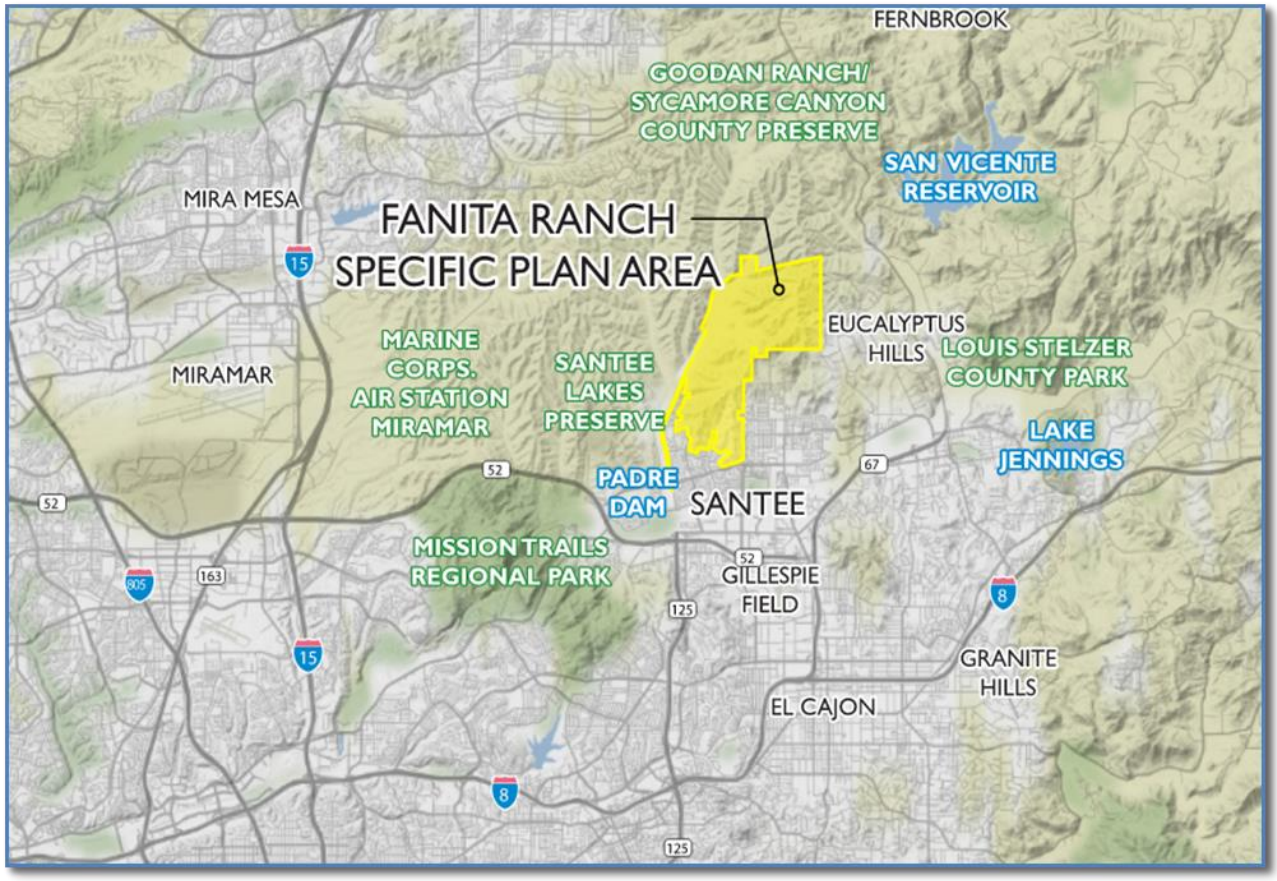
This Study is organized to provide background data, hydraulic analysis, and a summary of the impacts from the Project's proposed potable water demands. The analysis and evaluation reviewed existing District facilities and proposed onsite facilities under max day plus fire flow and peak-hour demands.

Section 2 - Project Description

2.1 Project Location

The Fanita Ranch Project site consists of approximately 2,638 acres in the northern portion of the City of Santee (City) in eastern San Diego County. The City is located approximately 18 miles east of downtown San Diego and the Pacific Ocean. The project site is north of State Route (SR) 52 and west of SR-67 (See Figure 2-1 – Project Site Location Map). Access to the project site will be provided by the northerly extensions of Fanita Parkway and Cuyamaca Street and the extension of Magnolia Avenue to Cuyamaca Street. The project site is bordered by Marine Corps Air Station Miramar and Padre Dam Municipal Water District (PDMWD) facilities and Santee Lakes Recreation Preserve to the west; open space/recreational areas, including Goodan Ranch Regional Park and Sycamore Canyon County Preserve, to the north and west; existing City residential neighborhoods to the south; and Eucalyptus Hills, an existing residential community, to the east.

Figure 2-1: Project Site Location Map



(Map courtesy of the Fanita Ranch Specific Plan, Public Review Draft, dated February 2020)

2.2 Project Description

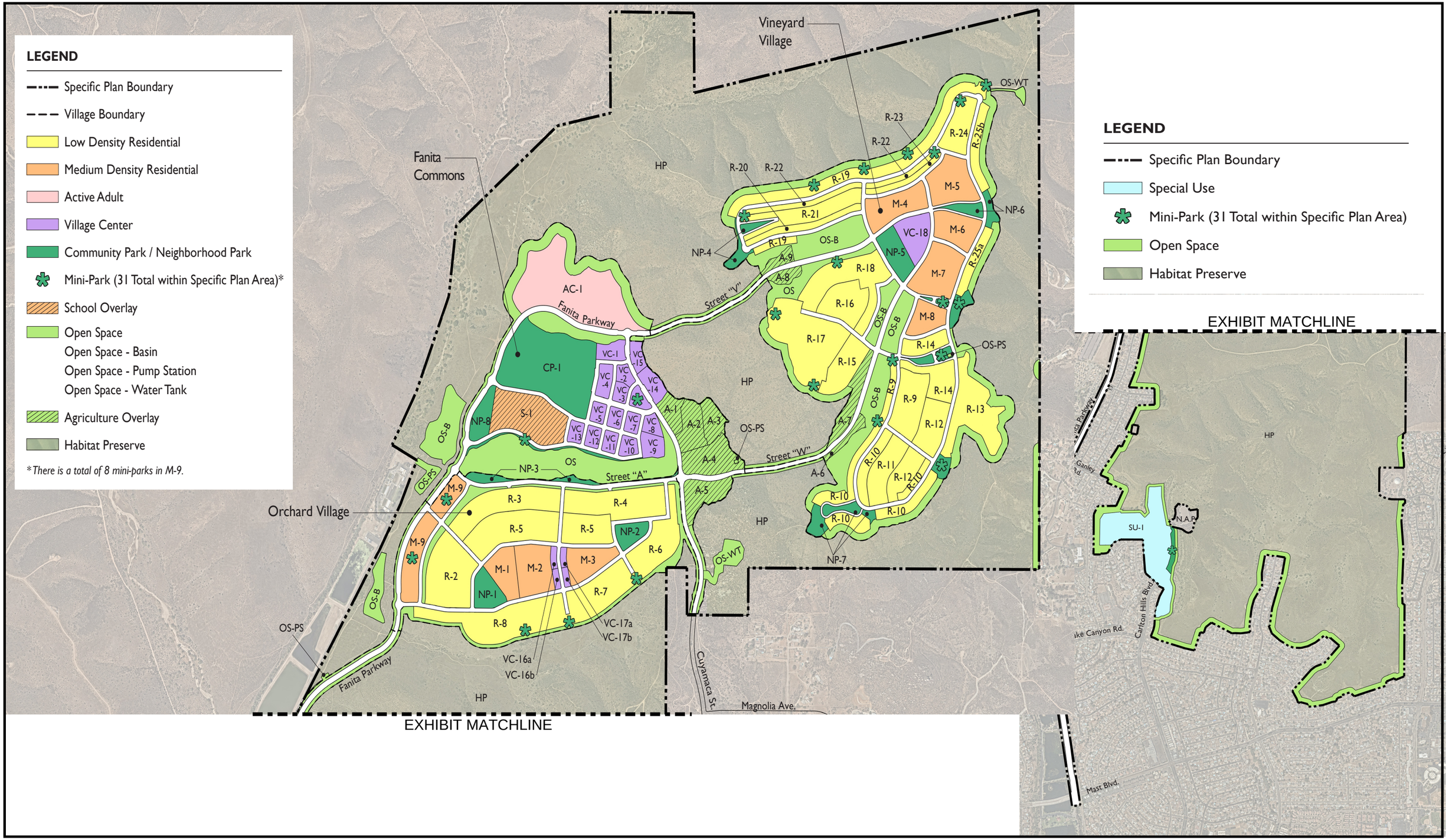
Fanita Ranch is a master-planned community consisting of up to 2,949 homes[1], up to 80,000 square feet of commercial uses, a school site, parks, open space and agricultural uses (See Figure 2-2 – Proposed Site Layout and Land Use). The Fanita Ranch Specific Plan preserves more than 60 percent of the project site as a permanent Habitat Preserve (approximately 1,650.4 acres). Development is clustered within three villages: Fanita Commons, Orchard Village and Vineyard Village. Each village is defined by its unique design theme, location, physical characteristics and mix of housing types and land uses. In addition to the villages, the Specific Plan includes a 31.9-acre Special Use Area located in the southwest portion of the project site. The Specific Plan provides approximately 78.0 acres of public and private parks distributed throughout the three villages, including the 31.2-acre community park, 30.4 acres of neighborhood parks and approximately 16.4 acres of mini-parks and paseos. The farm is approximately 27.3 acres, with an additional 10.9 acres of open space with an agricultural overlay. Approximately 256.0 acres of open space, outside of the Habitat Preserve, includes manufactured open space slopes, fuel modification areas, trails, water quality/hydromodification basins, water pump stations and water storage tanks.

Each village/development area and key project components are summarized below. The proposed site layout of the planned area and land uses are shown on Figure 2-2.

Fanita Commons

Fanita Commons is in the northwest portion of the project site and is planned as the primary activity center for Fanita Ranch. Fanita Commons includes a mixed-use village center, an active-adult neighborhood, a K-8 school site, a community park, a working farm and two preserved natural drainages with an adjoining linear park. With the farm as its focal point, orchards, vineyards, fields and a barn for community events define this village. The mixed-use village center allows for up to 40,000 square feet of commercial uses and residential, recreation and civic uses, including a site for a new City fire station. A 15-acre school site could accommodate 700 students. If the Santee School District does not acquire the school site, the underlying Medium Density Residential (MDR) land use designation may be implemented. In that case, the maximum total number of units permitted in the Specific Plan would increase by 59 units for a total of 3,008 units. Fanita Commons includes a total of 768 residential units, including 445 Active Adult homes and 323 homes within the mixed-use village center.

[1] If the school site is not utilized for school purposes, the school site may be developed with residential uses and the total authorized units would be increased to 3,008 homes.



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FANITA RANCH WATER SERVICE STUDY

PROPOSED SITE LAYOUT AND LAND USE

Figure 2-2

Orchard Village

The Orchard Village is located south of Fanita Commons and consists of residential land uses, neighborhood and mini-parks and a centrally located mixed-use village center. The Orchard Village provides a total of 855 residential units, including 454 Low Density Residential (LDR) homes, 368 MDR homes and 33 homes within the mixed-use village center. Open space and a linear riparian area geographically and topographically separate the Orchard Village from Fanita Commons. Roadways, trails and a pedestrian bridge connect the Orchard Village to Fanita Commons. A neighborhood-serving village center includes up to 10,000 square feet of retail, office and commercial uses. The Orchard Village also includes neighborhood parks and mini-parks.

Vineyard Village

The Vineyard Village is in the northeastern portion of the project site. The Vineyard Village is separated from the other two villages by an open space/wildlife corridor within the Habitat Preserve. Two local streets connect the Vineyard Village to Fanita Commons and the Orchard Village. The Vineyard Village provides a total of 1,326 residential units including, 749 LDR homes, 498 MDR homes and 79 homes within the mixed-use village center. The neighborhood-serving village center includes up to 10,000 square feet of retail and office uses. The Vineyard Village also features agricultural land planned for vineyards, as well as neighborhood parks and mini-parks.

Habitat Preserve

The Habitat Preserve is comprised of approximately 1,650.4 acres of permanently preserved open space. Open space within the Habitat Preserve will be dedicated to the Santee Multiple Species Conservation Program (MSCP) Subarea Plan Preserve. The Subarea Plan is currently being prepared by the City of Santee to ensure permanent preservation and management. A Habitat Management Plan will be adopted for the Habitat Preserve within Fanita Ranch to direct the long-term management of biological resources and meet the requirements of the MSCP Subarea Plan. A trail system through the Habitat Preserve will be designed to provide public access, consistent with the MSCP Subarea Plan.

The Farm

The Farm is the community focal point for Fanita Ranch. The approximately 27.3-acre Farm is located along the eastern edge of Fanita Commons and the Orchard Village, near the center of Fanita Ranch. An event barn featuring iconic agrarian architecture will set the theme for the community and provide a venue for special events and farming operations. The working Farm is planned to include terraced vegetable fields, pasture lands, limited housing for employees, raised gardens, limited animal keeping and up to 20,000 square feet of commercial uses. A Community Supported Agriculture program is planned for the Farm. Food grown on the Farm may be distributed to local schools, restaurants and other institutional facilities such as the congregate care and assisted living facilities. Agricultural uses have an underlying open space (OS) land use designation in the Specific Plan. The Specific Plan includes an

"Agricultural Overlay" for 38.2 acres including the Farm which provides details regarding permitted agricultural uses.

Special Use Area

The Special Use area is comprised of approximately 31.9 acres in the south portion of the project site. Potential uses may include a solar farm, recreational vehicle and boat storage, above ground agriculture, such as greenhouses or similar uses. A Mini Park (MP-31) is planned west of Carlton Hills Boulevard which would include a trail staging and parking area. Access to the Special Use Area is provided via Carlton Hills Boulevard.

Parks, Trails and Recreational Facilities

The Fanita Ranch project includes a coordinated system of parks and non-motorized use trails that connect to the three villages, regional trails and surrounding open space areas, including the Habitat Preserve. The trail system connects to existing off-site trails in Sycamore Canyon Open Space Preserve, Goodan Ranch Regional Park, Mission Trails Regional Park and Santee Lakes Recreation Preserve. Approximately 78.0 acres of public and private parks are distributed throughout the three villages. The Community Park, located in Fanita Commons, provides for both active and passive recreation opportunities. Neighborhood parks are planned in key locations to provide recreational opportunities within walking distance of all homes. Mini-parks provide trail heads, overlooks and passive and active recreational opportunities. A series of trails and paths ("AgMeander") connect the Farm to the Fanita Ranch villages.

Mobility (on-site)

The Fanita Ranch Specific Plan establishes an on-site roadway network and street cross sections designed as a system of complete streets that support motorists, pedestrians, bicyclists and transit users. On-site streets are generally two lanes and include traffic calming measures such as gateways, roundabouts, narrowed travel lanes, on-street bike facilities and parking, a chicane, raised crosswalks and intersection pop-outs. On-site streets that cross open space areas are designed to minimize impacts to sensitive habitat and to accommodate wildlife crossings.

Mobility Improvements

Mobility improvements include the extension of three roadways identified in the Santee General Plan Mobility Element, including: 1) Fanita Parkway improvements from Mast Boulevard to the current northern limit; 2) Cuyamaca Street improvements from Mast Boulevard to the current northern limit; 3) the extension of Fanita Parkway from Ganley Road through the project site; 4) the extension of Cuyamaca Street from north of Chaparral Drive through the project site; and 5) the extension of Magnolia Avenue from its current northern limit to Cuyamaca Street.

Development Phasing

Fanita Ranch is anticipated to be developed in four phases over a 10 to 15-year period. Phases may overlap or vary depending on market conditions and may be broken down into smaller sub-phases. Construction is anticipated to begin in 2021. The Special Use Area is not tied to development phasing and may be developed anytime during project build-out.

2.3 Water Study

A hydraulic analysis was performed using the District's existing Innovyze InfoWater™ hydraulic water model to evaluate the impact of the Project demands. This analysis utilized water demand, pressure zone, and facilities information from the following sources:

- Fanita Ranch Specific Plan, Public Review Draft, dated February 2020
- Fanita Ranch Project Description, KTGY Architects and Planners, October 2019
- Fanita Ranch Tentative Map/Preliminary Grading Plan, Hunsaker& Associates, September 17, 2019
- Santee Municipal Code
- District 2015 Comprehensive Facilities Master Plan, Carollo, October 2015 (2015 Master Plan)
- Water Agencies Standard (WAS) Design Guidelines (Rev. 07/28/2014)

While the Project has been planned for some time and counted in the overall water demand for the District, the need for additional storage that could be triggered by the Project has not been evaluated. The 2015 Master Plan reduced per capita water duty factors (WDF) based on conservation and other water-saving efforts, which could provide additional capacity in existing tanks.

The potential impacts on the District's system to provide water supply to the Project may include lower water pressures at existing parcel pads or hydrants, and higher velocities in distribution mains. The following scope of work for this Study was developed to identify and address these potential impacts:

- Perform Peak Hour Demand (PHD), and Maximum Day Demand (MDD) plus Fire Flow modeling scenarios for each phase of development.
- Review potential pinch points in the existing water system along Fanita Parkway and Cuyamaca Street. Determine if this existing system will require improvements based on the hydraulic modeling results.
- The Study assumes primary water supply is from the Carlton Hills Reservoir and a pipeline along Fanita Parkway.
- Size the onsite facilities, including storage tanks and pump stations.
- Water recycling is assumed to be incorporated into the potable supply via the Advance Water Purification (AWP) Project. Therefore, irrigated spaces are included in the potable water demand projections.

Based on the above scope, this Study provides recommendations for system improvements to ensure the District's water system in the area of the Study meets the requirements of the Water Agencies' Standards (WAS) Design Guidelines. Specifically, the following criteria from the WAS Design Guidelines Section 4.1 – Water Planning, were applied (see Table 4-1)[2]:

- Demands:
  - Average Day Demand (ADD) represents the single day demand that is determined by dividing the average demand over a one year period by 365 days, thus representing a daily average.
  - Maximum Day Demand (MDD) represents the highest one-day (24-hour) demand that may occur within a one-year period and given as a multiple of the ADD.
  - Peak Hour Demand (PHD) represents the highest one-hour flow rate that may occur during the Maximum Day Demand (MDD).
  - The ADD, MDD and PHD can be expressed in terms of millions of gallons per day (MGD), gallons per day (gpd), or gallons per minute (gpm).
- Maximum pipeline velocities:
  - Shall not exceed 8 feet per second (ft/s) under Peak Hour Demand flow conditions.
  - Shall not exceed 10 ft/s under Maximum Day Demand plus fire flow conditions for new pipelines and 15 ft/s for existing pipelines.
- Operating pressures:
  - Peak Hour Demand (PHD) conditions shall maintain a residual water distribution pipeline pressure of at least 40 pounds per square inch (psi).
  - MDD plus fire flow shall be maintained above 25 psi to the service meter[3].

2.4 Study Area and Phasing

As previously described under 2.2 Project Description, the Project study area comprises approximately 2,638 acres of land with highly variable topography generally sloping from east to west. Proposed ground elevations within the study area will range from approximately 490 feet in the western portion of the development to 1,154 feet at the highest proposed lot in the northeast.

As previously noted, the Project is predominantly residential planned for 2,949 dwelling units consisting of low-density single-family homes, medium-density multi-family homes, active adult and mixed-use village centers that are predominantly residential. The project includes commercial area, parks, farm and agricultural area, and a new school. If the school site is not utilized for school purposes, the Project includes a provision that allows the school site to be developed with an additional 59 residential uses increasing the total authorized residential units to 3,008 homes. This Water Study utilizes the higher

[2] Padre Dam Municipal Water District may adjust specific guideline criteria on a case by case basis to facilitate a technically feasible engineering solution.
[3] The required minimum pressure of 25 psi through the service meter under maximum day plus fire flow is a Padre Dam specific requirement.

authorized residential unit alternative in lieu of the school since the additional residential units generate slighter higher water demand than the proposed school.

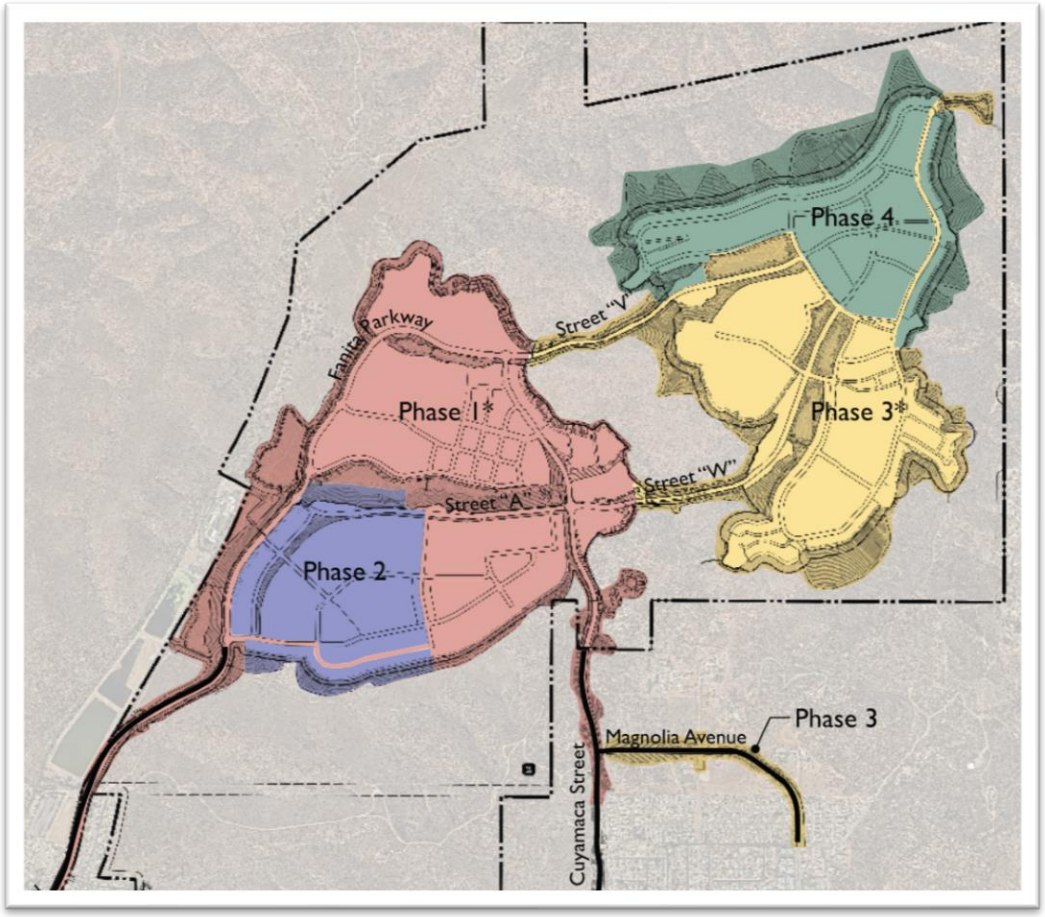
As previously discussed in Section 2.2, and for the purpose of the preparation of this Water Study, the Project is conceptually planned in four (4) phases, as shown in Figure 2-3. This conceptual phasing provides coordination for the proper development of necessary public facilities and services. Phase 1 includes the development of Fanita Commons and the eastern portion of Orchard Village. This phase also includes off-site and on-site improvements to Fanita Parkway and Cuyamaca Street roadway extensions, and the construction and installation of a new 880 Tank. Phase 2 is planned for the construction of the western portion of Orchard Village. The anticipated development of the Vineyard Village is planned in two phases. Phase 3 includes the construction of the southerly half of Vineyard Village, including a new 1230 Pump Station and 1230 Reservoir. Phase 4 includes the construction of the north portion of Vineyard Village. Construction is expected to start during Summer 2021. Each phase is likely to obtain completion within two (2) to four (4) years and full build-out of the development is estimated for completion within ten (10) to fifteen (15) years from the start of construction. Phase development may vary, overlap or become divided into smaller sub-phases depending on conditions during construction and market related influences.

Furthermore, the study area is comprised of four main water service areas:

1. Existing Magnolia 880 Zone and associated 1.2-MG Magnolia Tank
2. New 880 Zone and associated 880 PS and 880 Tank
3. Existing Gravity 629 Zone and associated 6.0-MG Carlton Hills Tank
4. New onsite 1230 Zone with new 1230 Tank

The Project will make two connections to the District's system – one at the intersection of Chaparral Drive and Cuyamaca Street to the Magnolia Zone, and one at the Carlton Hills Tank to the Gravity Zone.

Figure 2-3: Proposed Project Phasing



Section 3 - Water Demands

3.1 Average Daily Demand (ADD) Development

The Average Day Demand (ADD) was previously defined under Section 2.3. Water duty factors (WDF) were obtained from the 2015 Master Plan and applied to each land use type. Water recycling will be used as part of the AWP process and included in the potable supply. No separate dedicated recycled water lines are proposed. Therefore, irrigated spaces are accounted for in the potable demand. Table 3-1 provides a breakdown of average day demands by land use.

Table 3-1: Average Day Demands

Land Use	Dwelling Units	Gross Area (gac)	Water Use		ADD	
			(gpd/DU)	(gpd/nac)	gpd	gpm
Residential						
Active Adult	445	31.0	310	--	137,950	95.8
Single-Family	1,203	240.9	340	--	409,020	284.0
Multi-Family	925	82.0	310	--	286,750	199.1
Village Center	435	36.5	310	--	134,850	93.6
Subtotal Residential	***3,008***	***390.4***			***968,570***	***672.6***
Commercial						
Village Center	--	1.4	--	5,000	6,890	4.8
Agriculture	--	0.5		5,000	2,295	1.6
Subtotal Commercial	***0***	***1.8***			***9,185***	***6.4***
Irrigation						
Agriculture	--	38.2	--	1,800	68,742	47.7
Parks	--	78.0	--	2,240	174,653	121.3
Other		65.9		1,800	118,620	82.4
Fire Mangement Zones and Basins		103.6		1,000	103,598	71.9
Subtotal Irrigation	***0***	***285.7***			***465,613***	***323.3***
Other (Fire Station)	--	--	--	--	800	0.6
TOTAL	***3,008***	***677.9***			***1,444,168***	***1,002.9***

3.2 Max Day and Peak Hour Demands

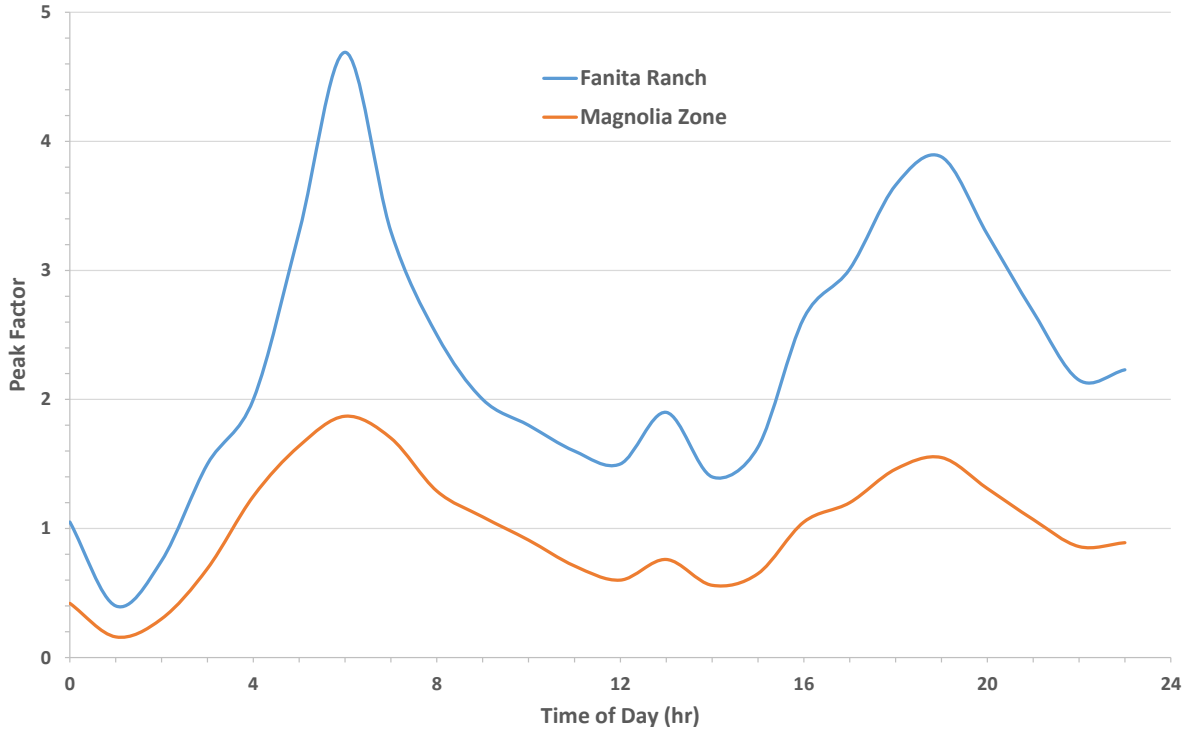
Maximum Day Demand (MDD): As defined previously in Section 2 of this Study, the MDD represents the highest single day (24-hour) demand that will occur during any given year. Per the 2015 Master Plan, a MDD peaking factor of 2.0 was determined and used for conservative planning purpose.

Peak Hour Demand (PHD): As defined previously in Section 2 of this Study, the PHD represents the highest 1-hour demand that will occur during the MDD. In order to develop the PHD factor for the Project, the SDWAS Peaking Factor Curves were used. Per the SDWAS Peaking Factor Curves (See Figures 3-2 and 3-3),

a Curve Number must be associated with the Project demands. Knowing the Project ADD, as well as the ratio of MDD to ADD (from the 2015 Master Plan), the associated Curve Number from the Maximum Day Demand Peaking Factor Curve (Figure 3-2) was selected. From Figure 3-2, the ADD demand of 1.44 MGD was indicated on the x-axis and shown to cross the MDD to ADD ratio of 2.0 on the y-axis most nearly at Curve 3. Knowing that the Project is based on Curve 3, the ratio of PHD to ADD using the ADD of 1.44 MGD and Curve 3 was determined to be about 4.5 from Figure 3-3. Therefore, the MDD and PHD for the Project are 2.89 MGD and 6.50 MGD, respectively.

Extended Period Simulation: The Project water system layout and demands were added to the existing District hydraulic model. The existing Magnolia Zone system diurnal curve accounts for the demand in the entire zone and is therefore lower than on a project-by-project basis. The existing model uses a PHD factor of 1.87 and a MDD factor of approximately 1.3. The Fanita Ranch demands are conservatively modeled using the 2.0 MDD factor and 4.5 to 5.1 PHD factors, depending on the phase of development. These higher peaked demands are used in this analysis to size the onsite facilities. Figure 3-1 shows the diurnal curves for the Project and the Magnolia Zone.

Figure 3-1: Diurnal Curves



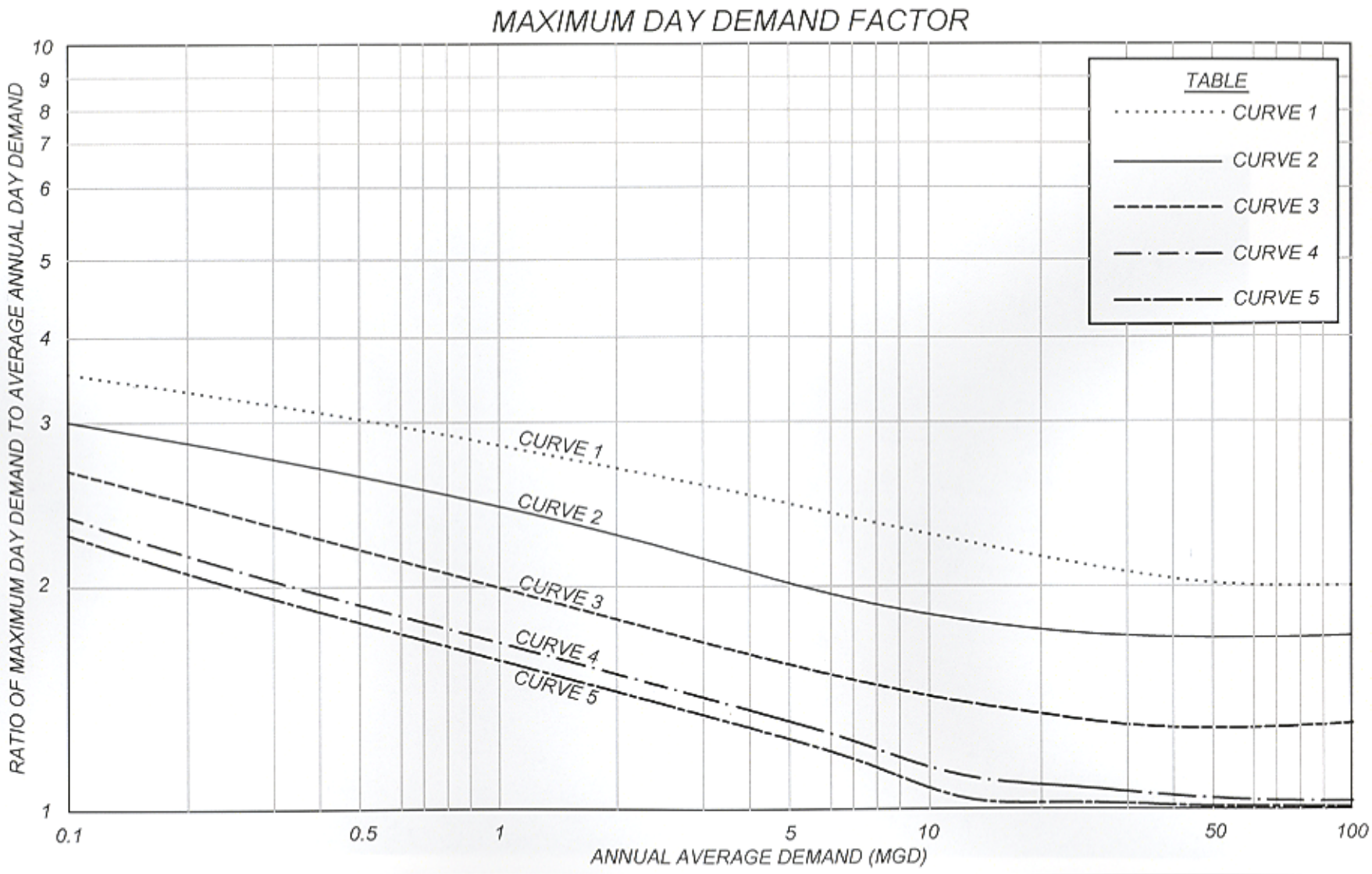


Figure 3-2: WAS Section 4.1 MDD Peaking Factor Curves

WATER AGENCIES' DESIGN GUIDELINES

WATER PLANNING

MAXIMUM DAY DEMAND
PEAKING FACTOR CURVE
FIGURE 4–1–2

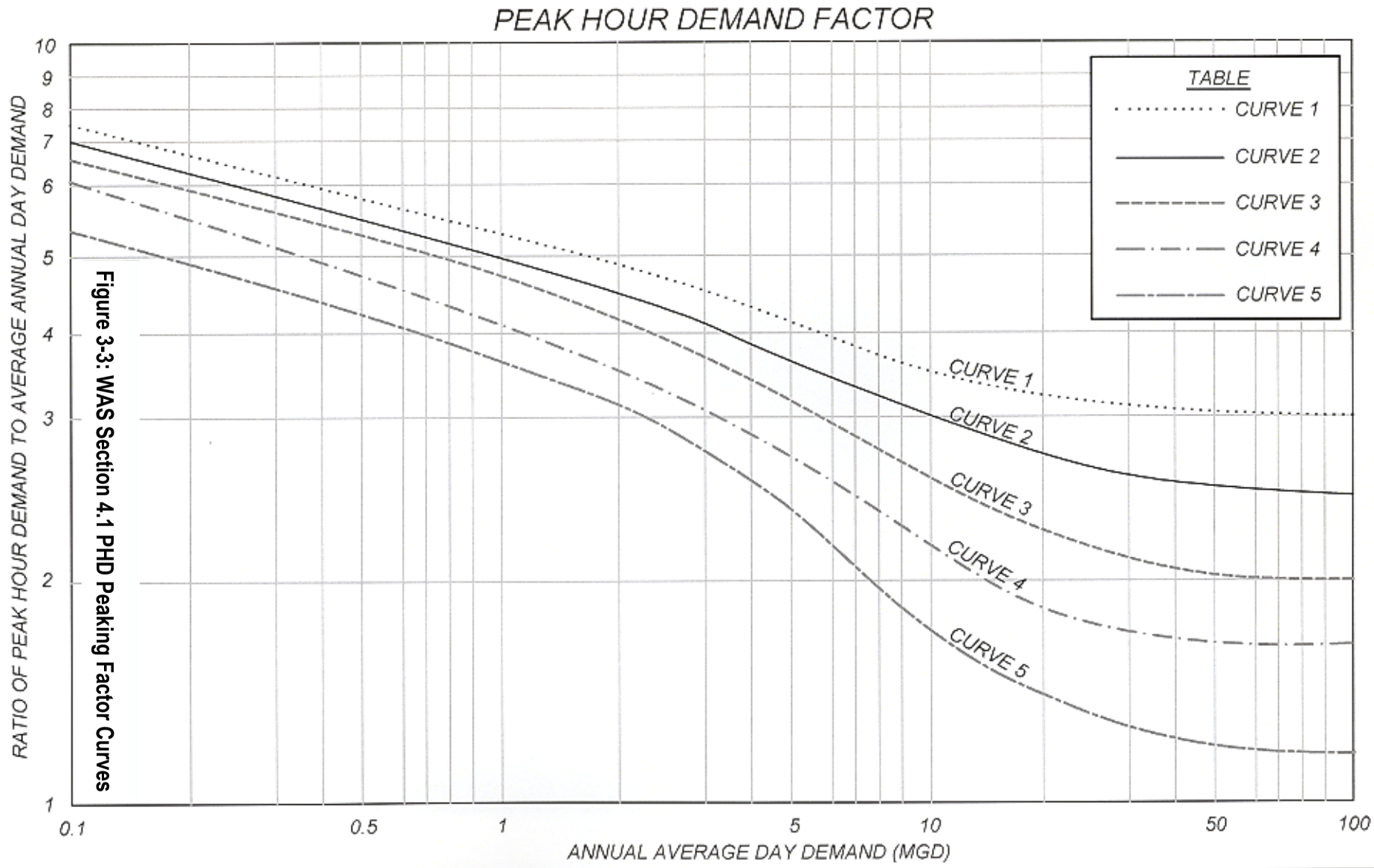


Figure 3-3: WAS Section 4.1 PHD Peaking Factor Curves

WATER AGENCIES' DESIGN GUIDELINES

WATER PLANNING

PEAK HOUR DEMAND
PEAKING FACTOR CURVE
FIGURE 4-1-1

3.3 Phasing

The Project will be constructed in four proposed phases. Phasing may change at any time based on market demands.

Initial access to the Project will be provided by an extension of both Fanita Parkway and Cuyamaca Street. Phase I includes the development of Fanita Commons and the eastern portion of Orchard Village, which includes some Village Center areas, Active Adult Community, Fire Station, farming, and several park areas. The connection to the Gravity Zone includes the proposed 880 Pump Station (PS) and associated piping that would take suction from the existing Gravity Zone at the Carlton Hills Tank. Phase I will also require the construction of the new 3.63-MG 880 Tank will be served entirely from the Gravity Zone via the proposed 880 PS.

The second phase of construction (Phase II) will include the western portion of Orchard Village, which includes single and multi-family residential and Village Center areas. Phase II will be served by making internal connections to Phase I infrastructure. The connection in Cuyamaca Street at Chaparral Drive to the existing 16-inch in the Magnolia Zone will be completed during Phase I.

The third phase (Phase III) includes the construction of the southerly half of Vineyard Village. This area is predominantly single and multi-family residential with several internal parks and agriculture. Due to the elevation change within Phase III, a new 1230 Tank will be required, along with a new 1230 PS. A site has been determined that is suitable for the tank and is shown on Figure 3-4. The 1230 PS will be located on the west side of the Street Y, as shown on Figure 3-4. Phase III will connect to the Phase II water system near the intersection of Street A and Cuyamaca Street. Phase III will be served entirely by the 1230 Zone.

The final phase (Phase IV) will build out the remainder of the Project to the north, which includes single and multi-family residential, parks, some Village Center areas, and agriculture. This phase will be served by making internal connections to the Phase III water system. No additional offsite facilities are required to serve Phase IV. Phase IV will be served entirely by the 1230 Zone.

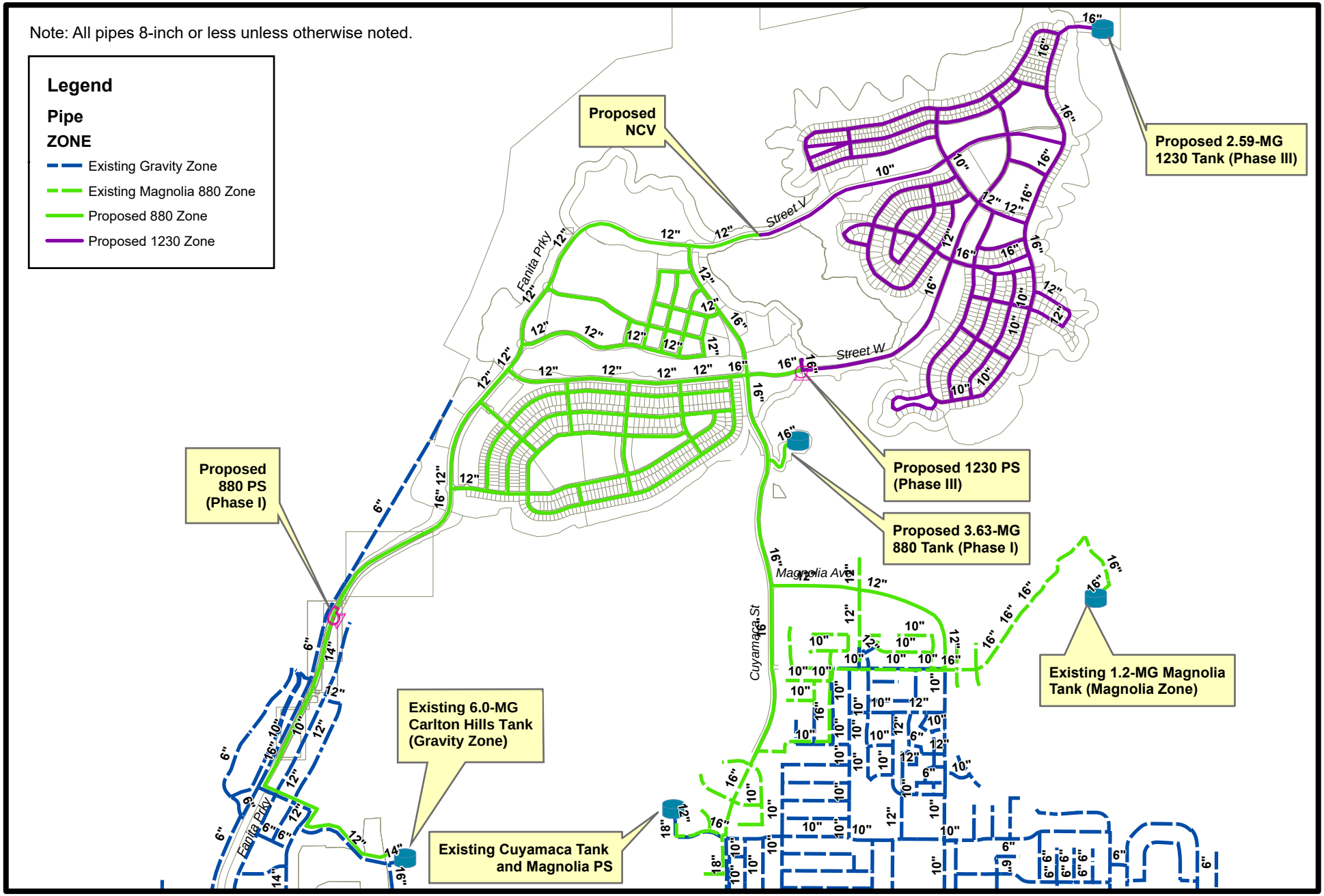
Table 3-2 shows the Fanita Ranch demands by phase.

Figure 3-5 shows the onsite potable water system phasing.

Table 3-2: Demands by Phase

Phase	Land Use	DUs	Gross Area	Water Use (gpd/DU)	Water Use (gpd/nac)	ADD gpd	ADD gpm
I - Fanita Commons & Orchard Village [5]	Active Adult (AC-1)	445	31.0	310	--	137,950	95.8
	Single-Family Residential	187	36.7	340	--	63,580	44.2
	Multi-Family Residential	138	21.5	310	--	42,780	29.7
	Village Center - MF Residential	339	29.0	310	--	105,090	73.0
	Village Center - Commercial	--	1.0	--	5,000	5,145	3.6
	Village Center - Agriculture	--	0.5	--	5,000	2,295	1.6
	Fire Station (Other) [1]	--	--		--	800	0.6
	Irrigation - Agriculture (VC) [2]	--	27.3	--	1,800	49,086	34.1
	Irrigation - Park	--	43.4	--	2,240	97,194	67.5
	Irrigation - Other [3]	--	36.2	--	1,800	65,160	45.3
	Irrigation - FMZ [4]	--	31.1	--	1,000	31,100	21.6
Subtotal Phase I		***1,109***	***257.6***			***600,180***	***416.8***
II - Orchard Village	Single-Family Residential	267	51.9	340	--	90,780	63.0
	Multi-Family Residential	289	20.7	310	--	89,590	62.2
	Village Center - Residential	17	1.4	310	--	5,270	3.7
	Village Center - Commercial	--	0.1	--	5,000	595	0.4
	Irrigation - Park	--	9.6	--	2,240	21,392	14.9
	Irrigation - Other [3]	--	9.9	--	1,800	17,820	12.4
	Irrigation - FMZ [4]	--	15.5	--	1,000	15,500	10.8
Subtotal Phase II		***573***	***109.1***			***240,947***	***167.3***
III - Vineyard Village	Single-Family Residential	451	105.3	340	--	153,340	106.5
	Multi-Family Residential	61	4.9	310	--	18,910	13.1
	Irrigation - Agriculture [2]	--	9.1	--	1,800	16,344	11.4
	Irrigation - Park	--	9.5	--	2,240	21,213	14.7
	Irrigation - Other [3]	--	13.2	--	1,800	23,760	16.5
	Irrigation - FMZ [4]	--	31.1	--	1,000	31,100	21.6
Subtotal Phase III		***512***	***173.1***			***264,667***	***183.8***
IV - Vineyard Village	Single-Family Residential	298	47.0	340	--	101,320	70.4
	Multi-Family Residential	437	34.9	310	--	135,470	94.1
	Village Center - Residential	79	6.1	310	--	24,490	17.0
	Village Center - Commercial	--	0.2	--	5,000	1,150	0.8
	Irrigation - Agriculture [2]	--	1.8	--	1,800	3,312	2.3
	Irrigation - Park	--	15.6	--	2,240	34,854	24.2
	Irrigation - Other [3]	--	6.6	--	1,800	11,880	8.3
	Irrigation - FMZ [4]	--	25.9	--	1,000	25,898	18.0
Subtotal Phase IV		***814***	***138.1***			***338,374***	***235.0***
TOTAL		**3,008**	**677.9**			**1,444,168**	**1,002.9**

1. Assumes 8 full-time people at all times and 1 EDU = 800 gpd.
2. Assumes 60% of land for faming
3. Irrigated "other" includes general landscaped areas, parkways, medians, and slopes
4. Fire Management zones and water quality basins
5. A demand was generated using the residential demand factor because the total water demand is greater than the school water demand. This was done in an effort to remain conservative of the final water demand needed for the project.



Fanita Ranch Water Service Study

Water System

Figure 3-4

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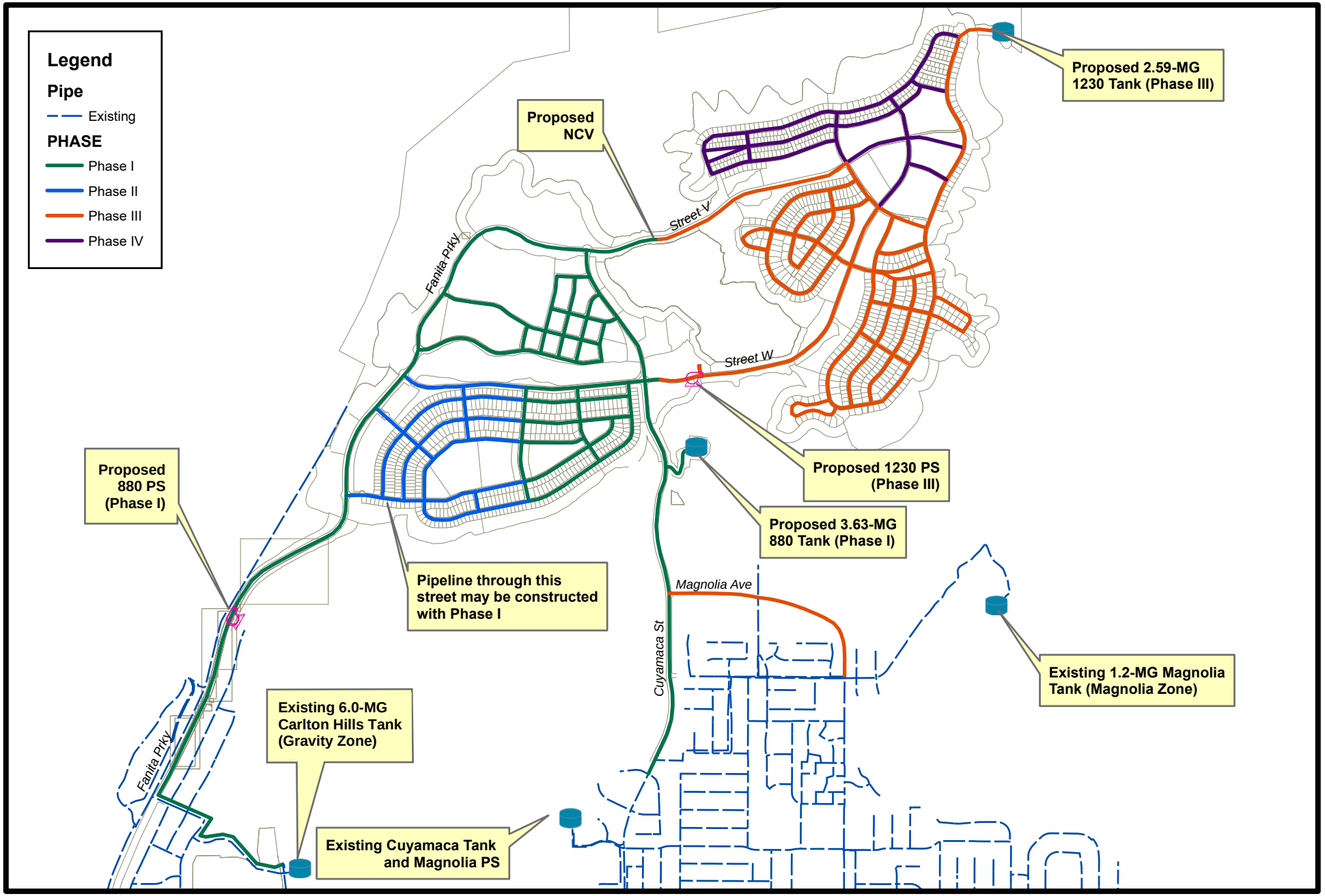


Fanita Ranch Water Service Study

Water System Phasing

Figure 3-5

Section 4 - Hydraulic Analysis

The proposed on-site distribution and existing and proposed off-site transmission systems were evaluated using a hydraulic computer model in InfoWater™. Analyses consisted of assessing the proposed water system's ability to supply peak hour demands and maximum day demands plus fire flow conditions based on Water Agency Standard (WAS) design criteria (Table 4-1). Fire flow simulations were performed at critical locations, such as dead ends, high elevation points, points farthest from the supply point, and larger fire flows.

Table 4-1: WAS Section 4.1 –Criteria

Criteria	
Fire Flow [1]	
Single Family Fire (per Fire Marshal)	2,500 gpm for a 3-hr duration
Multi-Family Fire	2,500 gpm for a 3-hr duration
Commercial	3,500 gpm for a 4-hr duration
Park and Open Space (per Fire Marshal)	2,500 gpm for a 3-hr duration
Pipelines	
Max Velocity during PHD	8 fps
Max Velocity during MDD + Fire	10 fps new, 15 fps existing
C-factor: </= 12-inch diameter	120
C-factor: >12-inch diameter	130
Pressures	
Minimum: Peak-Hour Demand (PHD)	40 psi
Minimum: Maximum Day Demand (MDD) + Fire	25 psi[2]
with a pressure regulator at the service meter	150 psi max
without a pressure regulator at the service meter	80 psi max
Storage Volume	
Operational	30% of MDD
Fire	Max Fire Flow x 50% Duration
Emergency Storage	300% ADD
Pump Station Capacity	Max Fire Flow
Normal Conditions - Zones with Gravity Storage	Flow, redundant pump, and emergency generator backup supply

(1) Per the Fire Department staff, all fire flows shall be minimum 2,500 gpm.
(2) The District has specifically requested that the minimum pressure during MDD + Fire be evaluated at 25 psi before the meter for this Project.

Based on the criteria listed in Table 4-1 and discussions with District staff, the following pump station and tank sizes are recommended for this Project.

Table 4-2: Facility Sizing – Tanks

Facility	Avg Day Demand Served	Max Day Demand Served	Largest Fire Flow Served		Operational Storage [1]	Emergency Storage [2]	Total Storage
			Flow and Duration	Volume			
Tanks							
880	0.84 MGD	1.68 MGD	2,500 gpm for 4 hr	0.60 MG	0.50 MG	2.52 MG	3.63 MG
1230	0.60 MGD	1.21 MGD	3,500 gpm for 2 hr	0.42 MG	0.36 MG	1.81 MG	2.59 MG

(1) Based on Table 4-1: 30% MDD
(2) Based on Table 4-1: 300% ADD

Table 4-3: Facility Sizing – Pump Stations

Facility	Avg Day Demand Served	Max Day Demand Served	Firm Capacity	Fire Capacity	Approx Capacity per Pump	Total Pumping Capacity
Pump Stations						
880	0.84 MGD	1.68 MGD	1,307 gpm	654 gpm	654 gpm	1,961 gpm
1230	0.60 MGD	1.21 MGD	3,500 gpm	1,750 gpm	1,750 gpm	5,250 gpm

The proposed 880 Tank is sized to serve the proposed Project demands and fire storage equal to the deficit in the existing 880 Zone, as this storage can be accounted for in the existing Magnolia Zone storage. The existing 880 Zone storage includes fire storage for a 2,000 gpm fire for 2 hours (0.24 MGD) from the Magnolia Summit Tank. Therefore, the remaining 2,500 gpm for 4 hour (0.60 MGD) needs to be stored at the proposed tank to make up the total volume for 3,500 gpm fire for 4 hours. The total volume in the proposed 880 Tank is 3.63 MG.

The proposed 880 Pump Station (PS), to be located near the existing Carlton Hills Tank or along Fanita Parkway, is sized to serve the entire Project as the primary supply. The exact location of the pump station has yet to be finalized. The PS will not need to pump full fire flow, as this need is already met elsewhere in the system. Therefore, the new 880 PS will serve the maximum day demands of the entire Project plus fire flow recharge in the 880 Tank over 3 days. The PS is anticipated to house 3 identical pumps, each with a design point near 654 gpm (total dynamic head to be determined during final design).

The proposed 1230 PS is sized to serve the 1230 Zone fire flow needs of 3,500 gpm. The station is anticipated to house 3 identical pumps, each with a design point near 1,750 gpm (total dynamic head to be determined during final design). The need for the increased head at this PS is discussed further in the following sections. The proposed 1230 Tank will also serve the demands from Phases III and IV only with a total volume of 2.59 MG.

4.1 Hydraulic Water Model Assumptions

Simulations were performed to verify the hydraulic performance of the proposed on-site distribution system, as well as the off-site facilities serving the project. The simulations noted in Table 4-3 are the

worst-case scenarios for the system based on the residual pressures and pipe velocities. Appendix A contains the hydraulic simulation output reports and model pipe and node maps. Results show that the majority of the proposed system is able to maintain pressure and velocity within the District's recommended criteria under peak operating conditions.

For purposes of this study, the 880 PS is intended as the primary supply to the Project. The Magnolia PS was not designed to accommodate Fanita Ranch demands or fire flow to the area and will be converted to a backup station once the connection along Cuyamaca Street is completed. At that point, the new 880 PS will be used to fill both the new 880 Tank and the existing Magnolia Tank.

The pipeline in the southern portion of Orchard Village along R-8 could be included with Phase I improvements, but the minimum required infrastructure was analyzed in this study. This road is necessary to provide sewer service during Phase I, but may only be improved to half-width. Therefore, the water infrastructure in this road is assumed in Phase II, but could be constructed during Phase I.

For Phases III and IV, the 1230 PS provides flow tank filling and fire flow conditions. However, due to the low-pressure situation caused by high elevations in a portion of Phase III near node J250, the station should be equipped with a low-pressure sensor. For the purpose of this study, it was assumed that in addition to tank level settings, this 1230 PS was also set to turn on if node J250 dropped below 25 psi. In addition, the pump head was increased to provide more pressure to the system. The maximum static head condition is the difference between the high level of the 1230 Tank and the low level of the 880 Tank, which results in 379 ft. Adding in estimated system losses and the need for increased discharge pressure, the total dynamic head of the pump is approximately 425 ft. The 1230 PS during a Phase III or IV fire condition shows that the pumps operate near the proposed design point. However, this should be verified during detailed design of the station which will occur at a later date.

A pipeline has been provided to serve brush management fire hydrants and irrigation along in Street V. The District has requested a 12-inch main connecting to the 880 Zone in Cuyamaca Street, traveling east and connecting to a 10-inch main extending from the 1230 Zone. A normally-closed valve will connect the two systems. The District will require 4-inch blow-offs on either side of this valve to accommodate by-pass pumping in an emergency. Irrigation meters should also be placed near the valve in order to move water through the pipe and promote water quality.

As this is a stand-alone system, the 1230 Tank should be a dual tank facility to accommodate maintenance needs and low demand periods.

Table 4-4: Water Model Scenarios

Phase	Run No.	Description	Min Pressure (psi)	Max Velocity (fps)
I	1	Peak Hour (pf = 5.1)	48.8 psi @ FR-J16	2.8 fps @ P183
	2	MDD + 3,500 gpm MF Fire at Node FR-J234	42.3 psi @ FR-J16	6.0 fps @ P181
	3	MDD + 3,500 gpm Comm Fire at Node J88	42.8 psi @ FR-J16	6.1 fps @ FR-P129
	4	MDD + 2,500 gpm SF Fire split at Node FR-J20	41.1 psi @ FR-J16	9.9 fps @ FR-P59
II	5	Peak Hour (pf = 5.0)	47.2 psi @ FR-J16	3.6 fps @ P183
	6	MDD + 3,500 gpm MF Fire at Node FR-J234	43.3 psi @ FR-J16	5.5 fps @ P121
	7	MDD + 3,500 gpm Comm Fire split at Nodes J238 & J242	40.3 psi @ FR-J16	8.5 fps @ FR-P57
III [1]	8	Peak Hour (pf = 4.7)	30.3 psi @ J250 [2]	3.0 fps @ P73
	9	MDD + 3,500 gpm MF Fire at Node FR-J234	30.2 psi @ J250	5.5 fps @ FR-P121
	10	MDD + 3,500 gpm Comm Fire at Nodes FR-J170/FR-J136	26.4 psi @ J250	4.7 fps @ P243
	11	MDD + 2,500 gpm SF Fire at J250	26.8 psi @ J250	4.0 fps @ FR-P365
	12	MDD + 2,500 gpm brush fire at J9636	29.1 psi @ J250	10.5 fps @ FR-P277 [3]
IV [1]	13	Peak Hour (pf = 4.5)	29.4 psi @ J250 [2]	3.0 fps @ P73
	14	MDD + 3,500 gpm MF Fire at Node FR-J234	28.9 psi @ J250	5.5 fps @ FR-P121
	15	MDD + 3,500 gpm Comm Fire at Node FR-J124	26.6 psi @ J250	8.4 fps @ FR-P263
	16	MDD + 2,500 gpm SF Fire at J250	25.6 psi @ J250	4.0 fps @ FR-P365
	17	MDD + 2,500 gpm brush fire at	28.3 psi @ J250	10.2 fps @ P322 [3]

(1) One pump operating at 1230 PS during fire event.
(2) Pressures are below the 40-psi minimum in the Vineyard Village R-13 area along Street "FF". The affected individual lots in this area will require private booster stations.
(3) The district has authorized the 10" pipe segment in Street "V" to slightly exceed the 10-fps velocity due to its proximity to the requirement.

4.2 Model Results

An extended-period simulation was run to simulate water system behavior under MDD plus Fire and PHD. Scenario output tables have been included in **Appendix A**, showing node pressures and pipeline velocities in the area of study.

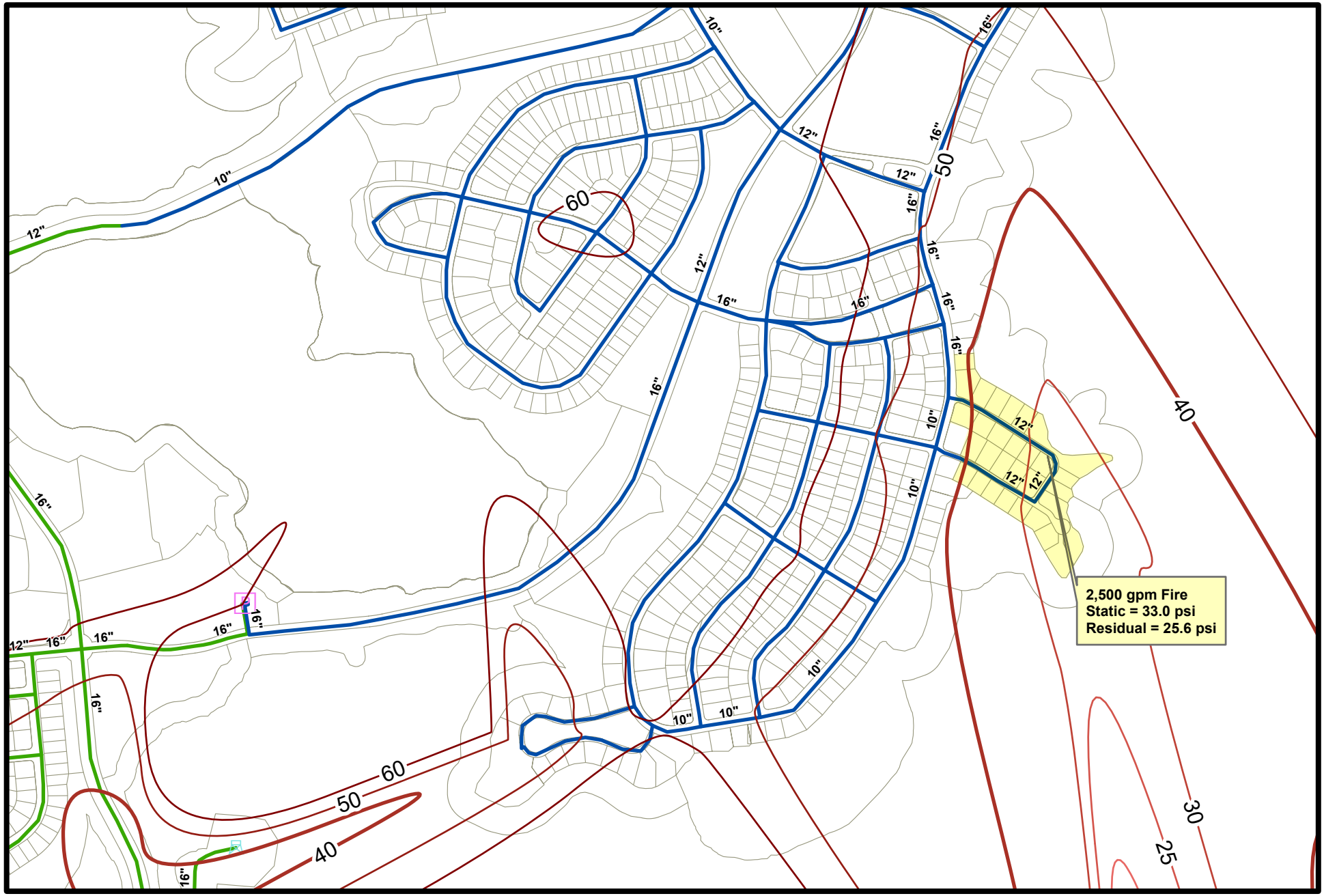
MDD Plus Fire – The existing MDD plus Fire scenario with 2.0 times the ADD for a total of 1,843 gpm and various fire flows does show some low node pressures that remain **above** 25 psi in the R-13 Area for Phases III and IV as identified in Figure 4-1. Velocities were less than 10 fps except in the proposed pipeline along "V" Street where velocities approach 10.5 fps during a 2,500 gpm brush fire. The District set the required pipe size for the "V" Street pipeline to 10-inch and will waive the 10 fps velocity criteria for this stretch of pipeline.

Peak Hour Demand (PHD) – Also similar to the MDD scenarios, the PHD scenario with 4.5 to 5.1 times the ADD and does show some low node pressures below 40 psi in the R-13 Area for Phases III and IV as shown on Figure 4-1. These areas where the pressure is below 40 will require private booster pumps to supply higher pressures for any domestic water use within this area. Pipeline velocities were less than 8 fps throughout the study area.

No appreciable offsite impacts are noted. No offsite improvements other than those required to serve the Project are needed to maintain service levels to existing customers.

4.3 Model Results – Fire Flow

The hydraulic fire flow analysis was run using the automated fire flow analysis engine in InfoWater™. This analysis engine allows for the automated calculation of available fire flow for each node. The fire flow was set to run with two constraint conditions simultaneously applied. The first calculates the maximum design fire flow that can be achieved while ensuring that a residual pressure of 25 psi or greater throughout the system. The second mode calculates the maximum fire flow that can be achieved while limiting maximum pipeline velocities to 10 fps as specified in the WAS. The model then determines which of the two constraint conditions result in the lowest available fire flow (design fire flow) from any given node by phase. The analyses were performed for all nodes within the study area. The results of the analysis are provided in **Appendix B**. However, these fire flows are calculated using the software under a semi-static condition. **The model scenarios presented in Table 4-3 were prepared under extended-period simulation and give slightly more accurate results**.



Fanita Ranch Water Service Study

Fire Flow Low Pressure Area

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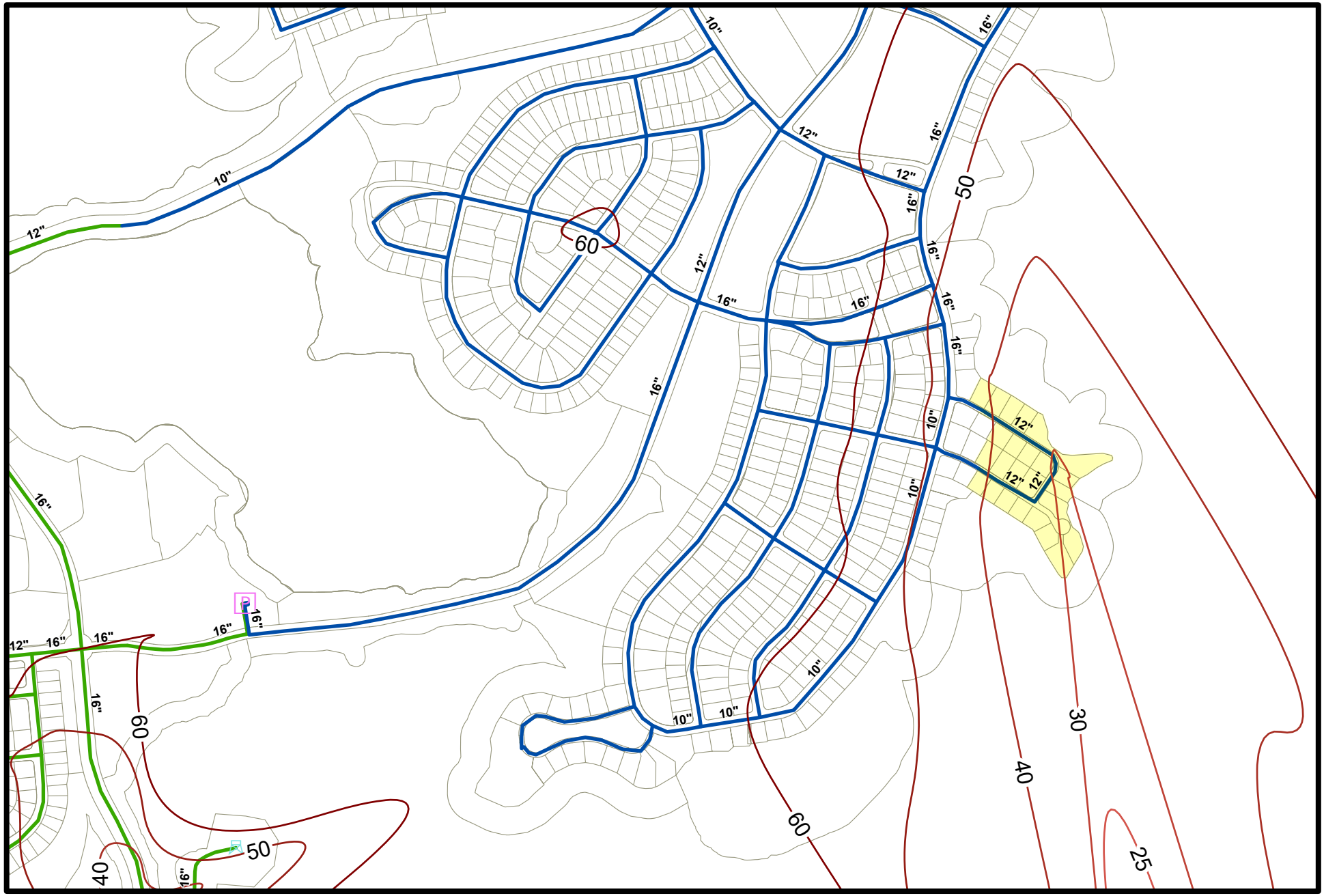
Figure 4-1



Fanita Ranch Water Service Study

Peak Hour Low Pressure Area

Figure 4-2

Michael Baker INTERNATIONAL

Section 5 - Conclusions

Based on the discussions provided in Sections 2 and 3, and the analysis results provided in Section 4, the following conclusions are provided:

1. *Low Pressure* – During domestic demand analyses under Phase III and IV scenarios there is an area of low pressure. This area should be further studied, but could benefit from the use of private pumps to the dwellings to boost service pressure. However, per District staff these private pumps must also be equipped with reduced pressure backflow assemblies (RPDAs) after the meter. The headloss through the District's meter is 2 to 3 psi. These RPDAs typically have an overall headloss of several psi, depending on the manufacturer, which will further reduce the available suction pressure for the private pumps and should be considered when selecting an appropriate pump. The RPDA is not the responsibility of the District.

2. *Pipeline Velocities* – Results from the various modeling scenarios show that pipeline velocities throughout all simulations remained less than 10 ft/s. The exception being the 10-inch pipeline that serves hydrants along "V" Street, as that size was provided by District staff to minimize oversizing of the pipeline. The maximum velocity in the "V" Street pipeline is 10.5 ft/s in Phase III and 10.2 ft/s in Phase IV during a 2,500 gpm brush fire. The District will accept this minimal velocity increase over the standard maximum of 10 ft/s.

3. *Fire Flow* – The fire flow simulation indicated that the proposed domestic water system was capable of providing fire flows per criteria listed in Table 4-1 for different land use types. Fire flows resulted in satisfactory pressures and velocities during MDD plus Fire scenarios.

4. *Offsite Improvements* – Based on the analysis performed in this study, offsite improvements are required on Cuyamaca street, Magnolia avenue, and Fanita Parkway. These offsite improvements will allow conveyance from the two existing water tanks (Carlton Hills Tank and the Magnolia Tank). The pipeline extension on Magnolia avenue will be used to serve the new hydrants on the street and is not hydraulically significant to the Project. Padre Dam's existing system is capable of supplying flow to the Project without compromising pressure or velocity standards to existing customers.

Based on the above conclusions, the Project demands as identified in this report can be met by the existing Padre Dam water system and proposed onsite without the need for any additional offsite upgrades or improvements that has not already been stated in this report, to the existing system.

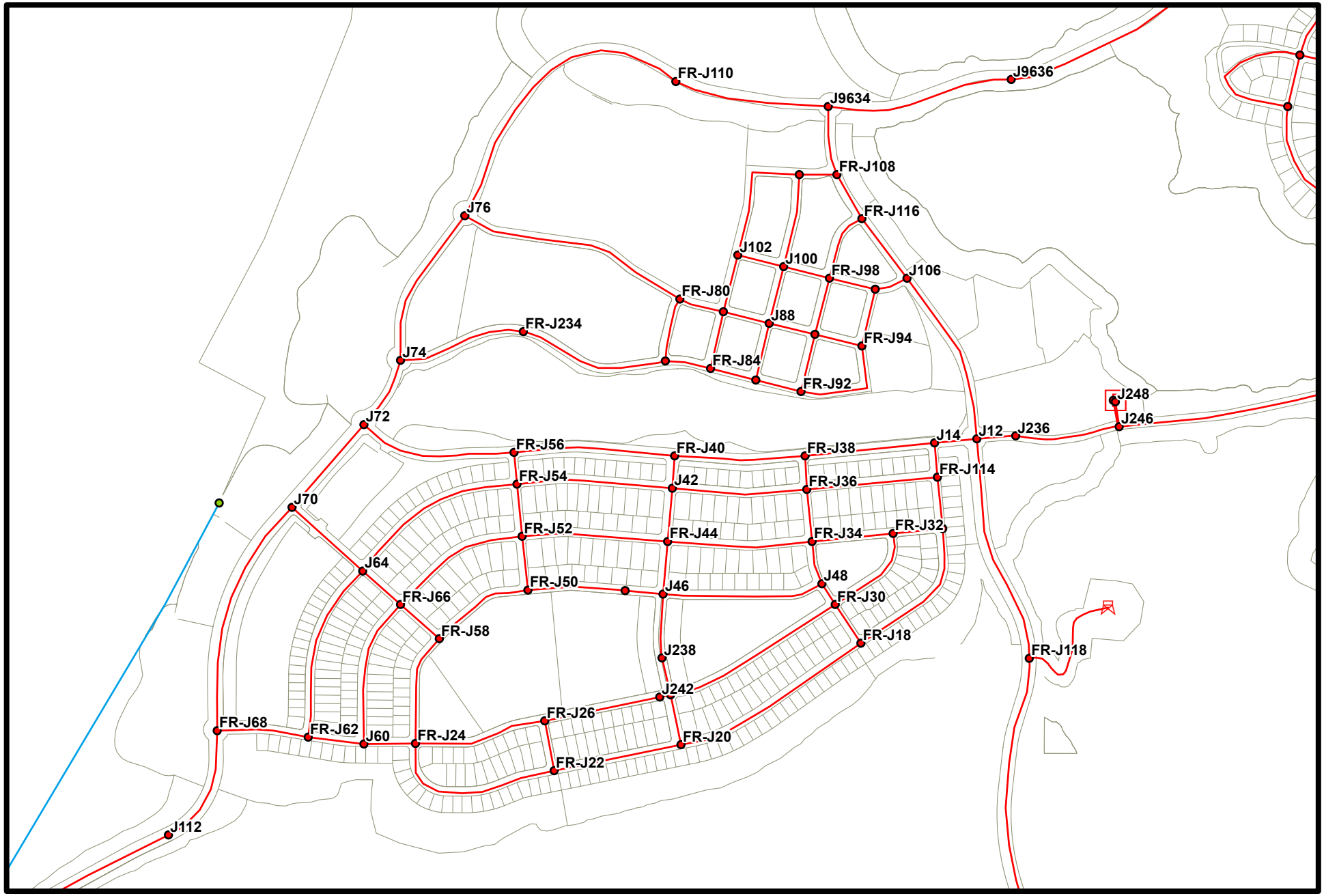
Section 6 - Appendices

A. Scenario Results Tables

B. Fire Flow Tabular Results

C. Miscellaneous Documentation

APPENDIX A – Scenario Results Table



Fanita Ranch Water Service Study

Node Map

Exhibit A-1

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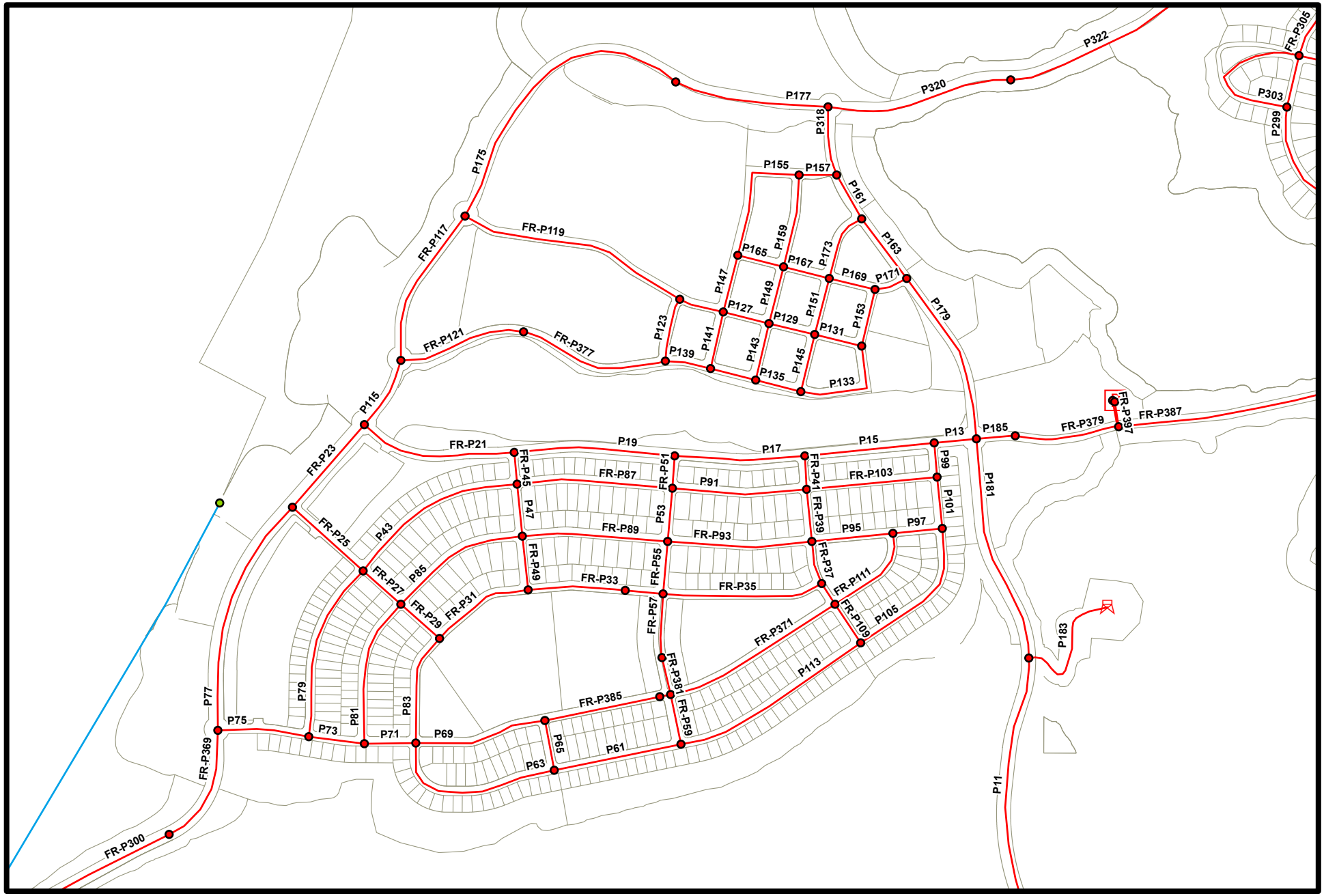

Fanita Ranch Water Service Study

Pipe Map

Exhibit A-2

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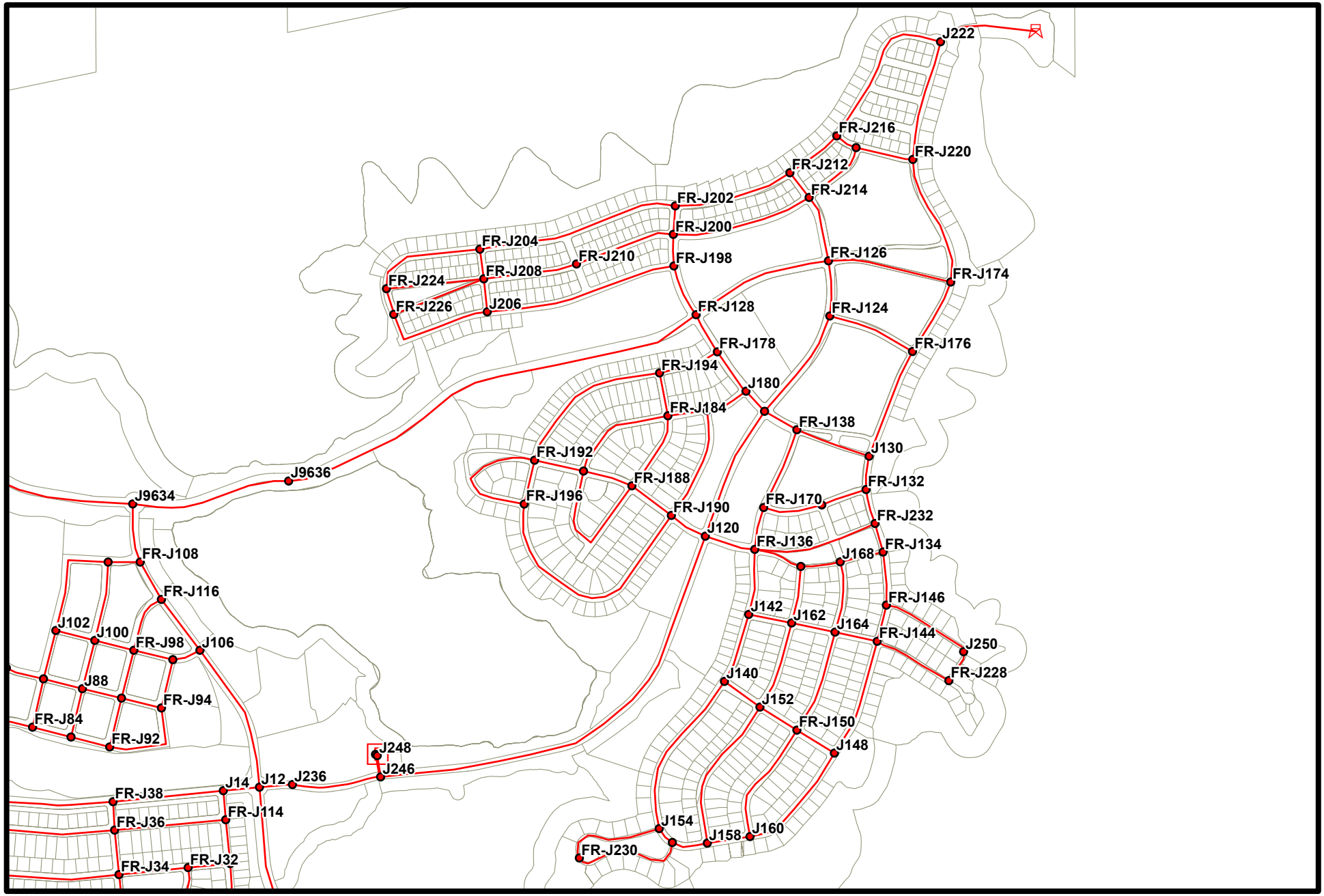

Fanita Ranch Water Service Study

Node Map

Exhibit A-3

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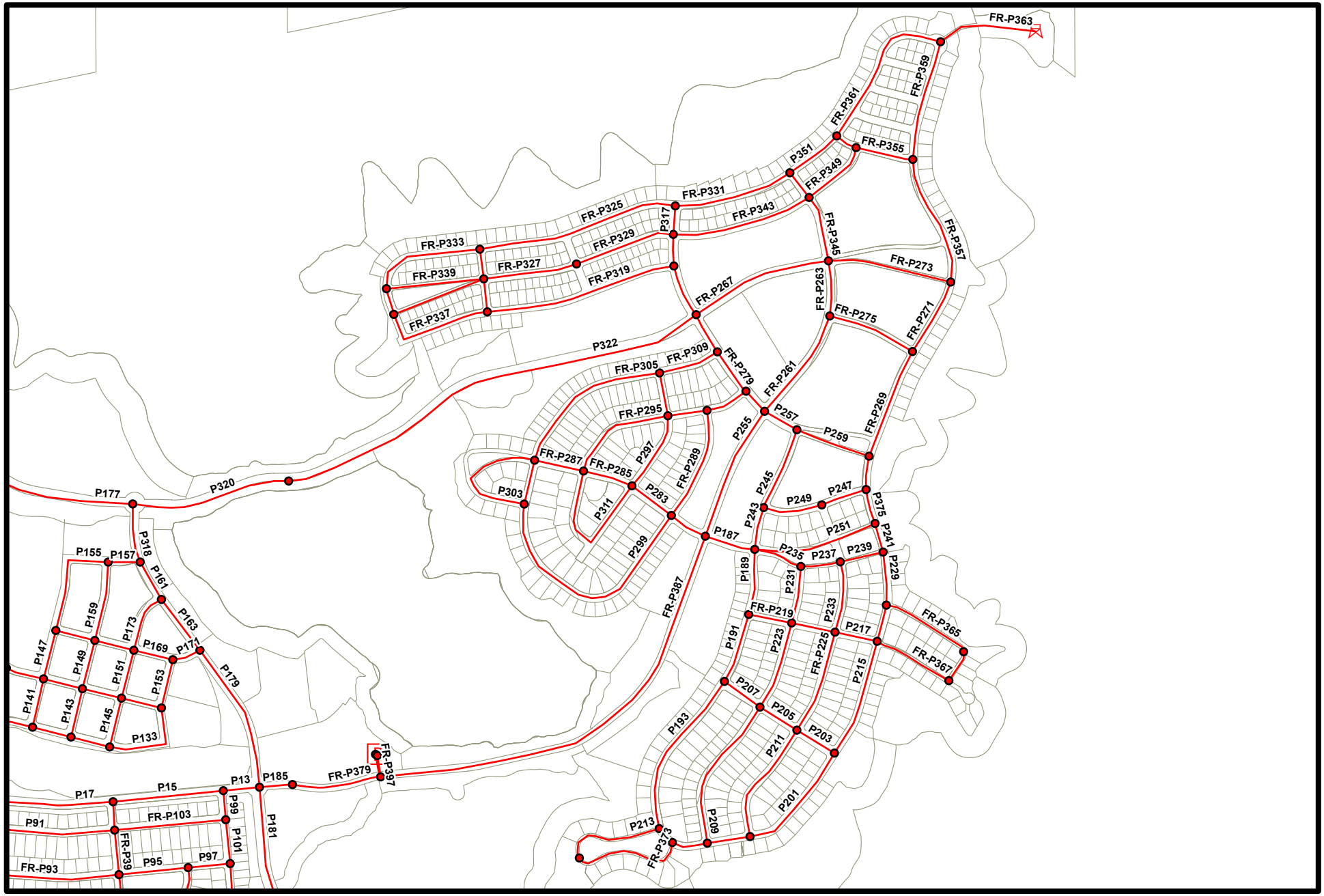

Fanita Ranch Water Service Study

Pipe Map

Exhibit A-4

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ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	92.9	606.0	865.8	112.6
J102	6.1	599.0	865.8	115.6
FR-J104	92.9	612.0	865.8	110.0
J106	289.1	625.0	866.1	104.5
FR-J108	0.0	615.0	865.8	108.7
FR-J110	487.6	595.0	865.2	117.1
J112	0.0	530.0	871.0	147.8
FR-J114	0.0	730.0	866.7	59.2
FR-J116	0.0	619.0	865.9	107.0
J12	8.1	725.0	866.7	61.4
J14	0.0	724.0	866.7	61.8
FR-J16	0.0	754.0	866.6	48.8
FR-J18	23.8	726.0	866.6	60.9
FR-J20	0.0	656.0	866.5	91.2
FR-J234	64.6	560.0	865.9	132.6
J238	151.2	684.0	866.5	79.1
FR-J28	0.0	680.0	866.5	80.8
FR-J30	0.0	731.0	866.6	58.7
FR-J32	23.8	744.0	866.6	53.1
FR-J34	0.0	721.0	866.6	63.1
FR-J36	23.8	697.0	866.6	73.5
FR-J38	0.0	691.0	866.7	76.1
FR-J40	0.0	650.0	866.7	93.9
J42	23.8	655.0	866.6	91.7
FR-J44	0.0	679.0	866.6	81.3
J46	0.0	703.0	866.6	70.9
J48	16.7	732.0	866.6	58.3
FR-J56	48.4	617.0	866.7	108.2
FR-J68	0.0	557.0	870.7	135.9
J70	0.0	557.0	868.0	134.7
J72	0.0	545.0	866.7	139.4
J74	44.8	540.0	866.1	141.3
J76	403.6	555.0	865.4	134.5
FR-J78	0.0	582.0	865.9	123.0
FR-J80	0.0	587.0	865.8	120.8
FR-J82	84.7	592.0	865.8	118.6
FR-J84	0.0	587.0	865.9	120.8
FR-J86	6.1	595.0	865.9	117.4
J88	0.0	599.0	865.8	115.6
FR-J90	92.9	608.0	865.9	111.7
FR-J92	0.0	602.0	865.9	114.3
FR-J94	3.1	617.0	865.9	107.9
FR-J96	4.6	623.0	866.0	105.3
FR-J98	6.1	615.0	865.9	108.7

Run No. 1: Phase I Peak Hour (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.07	8	120	77.25	0.49	0.06	0.18
☐	FR-P103	FR-J114	FR-J36	785.30	8	120	25.08	0.16	0.02	0.02
☐	P105	FR-J16	FR-J18	931.69	8	120	37.02	0.24	0.04	0.05
☐	FR-P107	J48	FR-J30	148.31	8	120	21.58	0.14	0.00	0.02
☐	FR-P109	FR-J30	FR-J18	277.95	8	120	17.71	0.11	0.00	0.01
☐	FR-P111	FR-J32	FR-J30	599.32	8	120	34.06	0.22	0.02	0.04
☐	P113	FR-J18	FR-J20	1,249.60	8	120	30.92	0.20	0.04	0.03
☐	P115	J72	J74	449.07	12	120	692.24	1.96	0.67	1.49
☐	FR-P117	J74	J76	983.83	12	120	452.63	1.28	0.67	0.68
☐	FR-P119	J76	FR-J80	1,411.75	8	120	-100.04	0.64	0.42	0.30
☐	FR-P121	J74	FR-J234	771.10	12	120	194.82	0.55	0.11	0.14
☐	P123	FR-J78	FR-J80	385.16	8	120	79.34	0.51	0.07	0.19
☐	P125	FR-J80	FR-J82	272.63	8	120	-20.70	0.13	0.00	0.02
☐	P127	FR-J82	J88	282.91	8	120	-57.07	0.36	0.03	0.11
☐	P129	J88	FR-J90	282.08	8	120	-57.58	0.37	0.03	0.11
☐	P13	J12	J14	254.59	16	120	217.91	0.35	0.01	0.04
☐	P131	FR-J90	FR-J94	289.65	8	120	-84.34	0.54	0.06	0.22
☐	P133	FR-J94	FR-J92	655.12	12	120	131.24	0.37	0.04	0.07
☐	P135	FR-J92	FR-J86	279.55	12	120	92.56	0.26	0.01	0.04
☐	P137	FR-J86	FR-J84	279.55	12	120	28.13	0.08	0.00	0.00
☐	P139	FR-J84	FR-J78	275.65	12	120	-50.84	0.14	0.00	0.01
☐	P141	FR-J82	FR-J84	348.69	8	120	-78.97	0.50	0.07	0.19
☐	P143	J88	FR-J86	349.47	8	120	-58.33	0.37	0.04	0.11
☐	P145	FR-J90	FR-J92	353.65	8	120	-38.68	0.25	0.02	0.05
☐	P147	FR-J82	J102	351.12	8	120	30.60	0.20	0.01	0.03
☐	P149	J88	J100	351.12	8	120	58.84	0.38	0.04	0.11
☐	P15	J14	FR-J38	779.21	12	120	115.59	0.33	0.04	0.05
☐	P151	FR-J90	FR-J98	347.76	8	120	-27.45	0.18	0.01	0.03
☐	P153	FR-J94	FR-J96	349.47	12	120	-218.64	0.62	0.06	0.18
☐	P155	J102	FR-J104	786.92	8	120	38.87	0.25	0.04	0.05
☐	P157	FR-J104	FR-J108	225.66	8	120	-5.98	0.04	0.00	0.00
☐	P159	FR-J104	J100	561.94	8	120	-48.04	0.31	0.04	0.08
☐	P161	FR-J108	FR-J116	303.29	12	120	-344.50	0.98	0.12	0.41
☐	P163	FR-J116	J106	448.55	12	120	-356.07	1.01	0.19	0.43
☐	P165	J102	J100	282.92	8	120	-14.38	0.09	0.00	0.01
☐	P167	J100	FR-J98	282.92	8	120	-96.47	0.62	0.08	0.28
☐	P169	FR-J98	FR-J96	282.08	8	120	-118.46	0.76	0.11	0.41
☐	P17	FR-J38	FR-J40	783.03	12	120	35.33	0.10	0.00	0.01

Run No. 1: Phase I Peak Hour (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P171	FR-J96	J106	204.15	12	120	-341.68	0.97	0.08	0.40
☐	P173	FR-J98	FR-J116	428.93	8	120	-11.56	0.07	0.00	0.01
☐	P175	J76	FR-J110	1,850.07	12	120	149.06	0.42	0.16	0.09
☐	P177	FR-J110	FR-J108	1,348.70	12	120	-338.53	0.96	0.53	0.40
☐	P179	J106	J12	1,077.13	16	130	-986.84	1.57	0.66	0.61
☐	P19	FR-J40	FR-J56	965.35	12	120	-45.22	0.13	0.01	0.01
☐	FR-P21	FR-J56	J72	956.40	12	120	-93.57	0.27	0.03	0.04
☐	FR-P23	J72	J70	657.10	12	120	-785.82	2.23	1.24	1.88
☐	FR-P35	J46	J48	968.28	8	120	-18.65	0.12	0.01	0.01
☐	FR-P369	FR-J68	J112	738.09	16	130	-785.82	1.25	0.29	0.40
☐	FR-P37	J48	FR-J34	262.83	8	120	-56.92	0.36	0.03	0.10
☐	FR-P371	FR-J28	FR-J30	1,132.42	8	120	-37.93	0.24	0.06	0.05
☐	FR-P377	FR-J234	FR-J78	907.29	12	120	130.18	0.37	0.06	0.07
☐	FR-P381	J238	FR-J28	227.50	8	120	-68.85	0.44	0.03	0.15
☐	FR-P39	FR-J34	FR-J36	314.01	8	120	-71.13	0.45	0.05	0.16
☐	FR-P41	FR-J36	FR-J38	201.63	8	120	-80.26	0.51	0.04	0.20
☐	FR-P51	FR-J40	J42	194.91	8	120	80.55	0.51	0.04	0.20
☐	P53	J42	FR-J44	320.60	8	120	67.12	0.43	0.05	0.14
☐	FR-P55	FR-J44	J46	317.14	8	120	63.67	0.41	0.04	0.13
☐	FR-P57	J46	J238	383.59	8	120	82.32	0.53	0.08	0.21
☐	FR-P59	FR-J28	FR-J20	305.03	8	120	-30.92	0.20	0.01	0.03
☐	P77	J70	FR-J68	1,466.13	12	120	-785.82	2.23	2.76	1.88
☐	P91	FR-J36	J42	808.31	8	120	10.39	0.07	0.00	0.00
☐	FR-P93	FR-J34	FR-J44	867.58	8	120	-3.46	0.02	0.00	0.00
☐	P95	FR-J34	FR-J32	488.46	8	120	17.66	0.11	0.01	0.01
☐	P97	FR-J32	FR-J16	297.66	8	120	-40.23	0.26	0.02	0.06
☐	P99	J14	FR-J114	206.06	8	120	102.33	0.65	0.06	0.31
☐	FR-P300	J112	J9632	7,595.32	16	130	-785.82	1.25	3.03	0.40
☐	P181	FR-J118	J12	1,373.76	16	130	1,212.90	1.94	1.23	0.89
☐	P183	FR-J118	T5000	798.27	16	130	-1,774.31	2.83	1.44	1.81
☐	P11	332	FR-J118	4,814.14	16	130	-561.40	0.90	1.03	0.21

Run No. 2 - Phase I MDD + 3,500 gpm MF Fire at Node FR-J234

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	49.6	606.0	846.0	104.0
J102	3.3	599.0	845.7	106.9
FR-J104	49.6	612.0	846.2	101.5
J106	154.3	625.0	849.1	97.1
FR-J108	0.0	615.0	846.6	100.4
FR-J110	260.2	595.0	844.8	108.2
J112	0.0	530.0	851.9	139.5
FR-J114	0.0	730.0	852.6	53.1
FR-J116	0.0	619.0	847.4	99.0
J12	4.3	725.0	853.4	55.6
J14	0.0	724.0	853.2	56.0
FR-J16	0.0	754.0	852.3	42.6
FR-J18	12.7	726.0	852.1	54.6
FR-J20	0.0	656.0	852.0	84.9
FR-J234	3,534.5	560.0	836.2	119.7
J238	80.7	684.0	851.9	72.8
FR-J28	0.0	680.0	852.0	74.5
FR-J30	0.0	731.0	852.1	52.5
FR-J32	12.7	744.0	852.1	46.9
FR-J34	0.0	721.0	852.1	56.8
FR-J36	12.7	697.0	852.1	67.2
FR-J38	0.0	691.0	852.2	69.8
FR-J40	0.0	650.0	851.3	87.2
J42	12.7	655.0	851.7	85.2
FR-J44	0.0	679.0	851.9	74.9
J46	0.0	703.0	851.9	64.5
J48	8.9	732.0	852.1	52.0
FR-J56	25.8	617.0	849.1	100.6
FR-J68	0.0	557.0	851.5	127.6
J70	0.0	557.0	848.4	126.3
J72	0.0	545.0	847.1	130.9
J74	23.9	540.0	843.6	131.6
J76	215.4	555.0	843.8	125.1
FR-J78	0.0	582.0	842.9	113.1
FR-J80	0.0	587.0	843.9	111.3
FR-J82	45.2	592.0	844.8	109.6
FR-J84	0.0	587.0	844.3	111.5
FR-J86	3.3	595.0	845.3	108.4
J88	0.0	599.0	845.6	106.9
FR-J90	49.6	608.0	846.3	103.3
FR-J92	0.0	602.0	845.9	105.7
FR-J94	1.6	617.0	847.0	99.6
FR-J96	2.4	623.0	848.0	97.5
FR-J98	3.3	615.0	846.9	100.5

Run No. 2: Phase I MDD + 3,500 gpm MF Fire at Node FR-J234

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8	120	201.9	1.3	0.3	1.1
☐	FR-P103	FR-J114	FR-J36	785.3	8	120	146.6	0.9	0.5	0.6
☐	P105	FR-J16	FR-J18	931.7	8	120	79.1	0.5	0.2	0.2
☐	FR-P107	J48	FR-J30	148.3	8	120	-34.2	0.2	0.0	0.0
☐	FR-P109	FR-J30	FR-J18	277.9	8	120	-26.0	0.2	0.0	0.0
☐	FR-P111	FR-J32	FR-J30	599.3	8	120	54.0	0.3	0.1	0.1
☐	P113	FR-J18	FR-J20	1,249.6	8	120	40.4	0.3	0.1	0.1
☐	P115	J72	J74	449.1	12	120	1,680.0	4.8	3.5	7.7
☐	FR-P117	J74	J76	983.8	12	120	-233.7	0.7	0.2	0.2
☐	FR-P119	J76	FR-J80	1,411.8	8	120	-50.7	0.3	0.1	0.1
☐	FR-P121	J74	FR-J234	771.1	12	120	1,889.8	5.4	7.4	9.6
☐	P123	FR-J78	FR-J80	385.2	8	120	-318.4	2.0	1.0	2.5
☐	P125	FR-J80	FR-J82	272.6	8	120	-369.1	2.4	0.9	3.3
☐	P127	FR-J82	J88	282.9	8	120	-331.6	2.1	0.8	2.7
☐	P129	J88	FR-J90	282.1	8	120	-312.2	2.0	0.7	2.5
☐	P13	J12	J14	254.6	16	120	1,009.0	1.6	0.2	0.7
☐	P131	FR-J90	FR-J94	289.7	8	120	-298.5	1.9	0.7	2.3
☐	P133	FR-J94	FR-J92	655.1	12	120	706.4	2.0	1.0	1.5
☐	P135	FR-J92	FR-J86	279.5	12	120	899.9	2.6	0.7	2.4
☐	P137	FR-J86	FR-J84	279.6	12	120	1,086.6	3.1	1.0	3.4
☐	P139	FR-J84	FR-J78	275.6	12	120	1,326.3	3.8	1.4	5.0
☐	P141	FR-J82	FR-J84	348.7	8	120	239.7	1.5	0.5	1.5
☐	P143	J88	FR-J86	349.5	8	120	190.0	1.2	0.3	1.0
☐	P145	FR-J90	FR-J92	353.7	8	120	193.5	1.2	0.4	1.0
☐	P147	FR-J82	J102	351.1	8	120	-322.4	2.1	0.9	2.6
☐	P149	J88	J100	351.1	8	120	-209.4	1.3	0.4	1.2
☐	P15	J14	FR-J38	779.2	12	120	660.5	1.9	1.1	1.4
☐	P151	FR-J90	FR-J98	347.8	8	120	-256.8	1.6	0.6	1.7
☐	P153	FR-J94	FR-J96	349.5	12	120	-1,006.4	2.9	1.0	3.0
☐	P155	J102	FR-J104	786.9	8	120	-137.1	0.9	0.4	0.5
☐	P157	FR-J104	FR-J108	225.7	8	120	-280.3	1.8	0.5	2.0
☐	P159	FR-J104	J100	561.9	8	120	93.6	0.6	0.1	0.3
☐	P161	FR-J108	FR-J116	303.3	12	120	-938.8	2.7	0.8	2.6
☐	P163	FR-J116	J106	448.5	12	120	-1,152.0	3.3	1.7	3.8
☐	P165	J102	J100	282.9	8	120	-188.5	1.2	0.3	1.0
☐	P167	J100	FR-J98	282.9	8	120	-353.9	2.3	0.9	3.1
☐	P169	FR-J98	FR-J96	282.1	8	120	-400.8	2.6	1.1	3.9
☐	P17	FR-J38	FR-J40	783.0	12	120	589.1	1.7	0.9	1.1

Run No. 2: Phase I MDD + 3,500 gpm MF Fire at Node FR-J234

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P171	FR-J96	J106	204.2	12	120	-1,409.7	4.0	1.1	5.6
☐	P173	FR-J98	FR-J116	428.9	8	120	-213.2	1.4	0.5	1.2
☐	P175	J76	FR-J110	1,850.1	12	120	-398.4	1.1	1.0	0.5
☐	P177	FR-J110	FR-J108	1,348.7	12	120	-658.5	1.9	1.8	1.4
☐	P179	J106	J12	1,077.1	16	130	-2,715.9	4.3	4.3	4.0
☐	P19	FR-J40	FR-J56	965.3	12	120	868.6	2.5	2.2	2.3
☐	FR-P21	FR-J56	J72	956.4	12	120	842.8	2.4	2.0	2.1
☐	FR-P23	J72	J70	657.1	12	120	-837.2	2.4	1.4	2.1
☐	FR-P35	J46	J48	968.3	8	120	-63.8	0.4	0.1	0.1
☐	FR-P369	FR-J68	J112	738.1	16	130	-837.2	1.3	0.3	0.4
☐	FR-P37	J48	FR-J34	262.8	8	120	-38.5	0.2	0.0	0.1
☐	FR-P371	FR-J28	FR-J30	1,132.4	8	120	-45.9	0.3	0.1	0.1
☐	FR-P377	FR-J234	FR-J78	907.3	12	120	-1,644.7	4.7	6.7	7.4
☐	FR-P381	J238	FR-J28	227.5	8	120	-86.3	0.6	0.1	0.2
☐	FR-P39	FR-J34	FR-J36	314.0	8	120	-66.5	0.4	0.0	0.1
☐	FR-P41	FR-J36	FR-J38	201.6	8	120	-71.4	0.5	0.0	0.2
☐	FR-P51	FR-J40	J42	194.9	8	120	-279.5	1.8	0.4	2.0
☐	P53	J42	FR-J44	320.6	8	120	-153.4	1.0	0.2	0.7
☐	FR-P55	FR-J44	J46	317.1	8	120	-69.4	0.4	0.0	0.2
☐	FR-P57	J46	J238	383.6	8	120	-5.6	0.0	0.0	0.0
☐	FR-P59	FR-J28	FR-J20	305.0	8	120	-40.4	0.3	0.0	0.1
☐	P77	J70	FR-J68	1,466.1	12	120	-837.2	2.4	3.1	2.1
☐	P91	FR-J36	J42	808.3	8	120	138.8	0.9	0.4	0.5
☐	FR-P93	FR-J34	FR-J44	867.6	8	120	84.0	0.5	0.2	0.2
☐	P95	FR-J34	FR-J32	488.5	8	120	-56.0	0.4	0.0	0.1
☐	P97	FR-J32	FR-J16	297.7	8	120	-122.8	0.8	0.1	0.4
☐	P99	J14	FR-J114	206.1	8	120	348.5	2.2	0.6	3.0
☐	FR-P300	J112	J9632	7,595.3	16	130	-837.2	1.3	3.4	0.4
☐	P181	FR-J118	J12	1,373.8	16	130	3,729.3	6.0	9.8	7.1
☐	P183	FR-J118	T5000	798.3	16	130	-3,198.5	5.1	4.3	5.4
☐	P11	332	FR-J118	4,814.1	16	130	530.7	0.8	0.9	0.2

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	49.6	606.0	843.3	102.8
J102	3.3	599.0	843.3	105.8
FR-J104	49.6	612.0	844.5	100.7
J106	154.3	625.0	848.3	96.8
FR-J108	0.0	615.0	846.2	100.2
FR-J110	260.2	595.0	846.1	108.8
J112	0.0	530.0	854.7	140.7
FR-J114	0.0	730.0	852.9	53.2
FR-J116	0.0	619.0	846.7	98.7
J12	4.3	725.0	853.4	55.6
J14	0.0	724.0	853.2	56.0
FR-J16	0.0	754.0	852.7	42.7
FR-J18	12.7	726.0	852.5	54.8
FR-J20	0.0	656.0	852.5	85.1
FR-J234	34.5	560.0	845.9	123.9
J238	80.7	684.0	852.5	73.0
FR-J28	0.0	680.0	852.5	74.7
FR-J30	0.0	731.0	852.5	52.7
FR-J32	12.7	744.0	852.6	47.0
FR-J34	0.0	721.0	852.6	57.0
FR-J36	12.7	697.0	852.6	67.4
FR-J38	0.0	691.0	852.6	70.0
FR-J40	0.0	650.0	852.1	87.6
J42	12.7	655.0	852.3	85.5
FR-J44	0.0	679.0	852.4	75.2
J46	0.0	703.0	852.5	64.8
J48	8.9	732.0	852.5	52.2
FR-J56	25.8	617.0	851.0	101.4
FR-J68	0.0	557.0	854.3	128.8
J70	0.0	557.0	851.3	127.5
J72	0.0	545.0	849.9	132.1
J74	23.9	540.0	847.4	133.2
J76	215.4	555.0	846.3	126.2
FR-J78	0.0	582.0	844.2	113.6
FR-J80	0.0	587.0	844.0	111.4
FR-J82	45.2	592.0	842.9	108.7
FR-J84	0.0	587.0	843.9	111.3
FR-J86	3.3	595.0	843.8	107.8
J88	3,500.0	599.0	838.3	103.7
FR-J90	49.6	608.0	843.8	102.2
FR-J92	0.0	602.0	844.1	104.9
FR-J94	1.6	617.0	845.2	98.9
FR-J96	2.4	623.0	846.7	96.9
FR-J98	3.3	615.0	845.0	99.7

Run No. 3 - Phase I MDD + 3,500 gpm Comm Fire at Node FR-J88 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8.0	120.0	155.7	1.0	0.2	0.7
☐	FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	109.4	0.7	0.3	0.4
☐	P105	FR-J16	FR-J18	931.7	8.0	120.0	61.4	0.4	0.1	0.1
☐	FR-P107	J48	FR-J30	148.3	8.0	120.0	-22.0	0.1	0.0	0.0
☐	FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	-16.7	0.1	0.0	0.0
☐	FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	42.2	0.3	0.0	0.1
☐	P113	FR-J18	FR-J20	1,249.6	8.0	120.0	32.0	0.2	0.0	0.0
☐	P115	J72	J74	449.1	12.0	120.0	1,423.4	4.0	2.5	5.7
☐	FR-P117	J74	J76	983.8	12.0	120.0	596.4	1.7	1.1	1.1
☐	FR-P119	J76	FR-J80	1,411.8	8.0	120.0	249.1	1.6	2.3	1.6
☐	FR-P121	J74	FR-J234	771.1	12.0	120.0	803.1	2.3	1.5	2.0
☐	P123	FR-J78	FR-J80	385.2	8.0	120.0	149.4	1.0	0.2	0.6
☐	P125	FR-J80	FR-J82	272.6	8.0	120.0	398.4	2.5	1.1	3.9
☐	P127	FR-J82	J88	282.9	8.0	120.0	875.1	5.6	4.7	16.5
☐	P129	J88	FR-J90	282.1	8.0	120.0	-960.9	6.1	5.6	19.7
☐	P13	J12	J14	254.6	16.0	120.0	759.3	1.2	0.1	0.4
☐	P131	FR-J90	FR-J94	289.7	8.0	120.0	-455.0	2.9	1.4	4.9
☐	P133	FR-J94	FR-J92	655.1	12.0	120.0	748.7	2.1	1.1	1.7
☐	P135	FR-J92	FR-J86	279.5	12.0	120.0	572.6	1.6	0.3	1.0
☐	P137	FR-J86	FR-J84	279.6	12.0	120.0	-287.3	0.8	0.1	0.3
☐	P139	FR-J84	FR-J78	275.6	12.0	120.0	-619.2	1.8	0.3	1.2
☐	P141	FR-J82	FR-J84	348.7	8.0	120.0	-332.0	2.1	1.0	2.7
☐	P143	J88	FR-J86	349.5	8.0	120.0	-856.6	5.5	5.6	15.9
☐	P145	FR-J90	FR-J92	353.7	8.0	120.0	-176.1	1.1	0.3	0.8
☐	P147	FR-J82	J102	351.1	8.0	120.0	-190.0	1.2	0.3	1.0
☐	P149	J88	J100	351.1	8.0	120.0	-807.3	5.2	5.0	14.3
☐	P15	J14	FR-J38	779.2	12.0	120.0	494.2	1.4	0.6	0.8
☐	P151	FR-J90	FR-J98	347.8	8.0	120.0	-379.4	2.4	1.2	3.5
☐	P153	FR-J94	FR-J96	349.5	12.0	120.0	-1,205.3	3.4	1.5	4.2
☐	P155	J102	FR-J104	786.9	8.0	120.0	-240.8	1.5	1.2	1.5
☐	P157	FR-J104	FR-J108	225.7	8.0	120.0	-581.9	3.7	1.8	7.8
☐	P159	FR-J104	J100	561.9	8.0	120.0	291.5	1.9	1.2	2.2
☐	P161	FR-J108	FR-J116	303.3	12.0	120.0	-710.1	2.0	0.5	1.6
☐	P163	FR-J116	J106	448.5	12.0	120.0	-1,110.7	3.2	1.6	3.6
☐	P165	J102	J100	282.9	8.0	120.0	47.5	0.3	0.0	0.1
☐	P167	J100	FR-J98	282.9	8.0	120.0	-517.8	3.3	1.8	6.3
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	-499.9	3.2	1.7	5.9
☐	P17	FR-J38	FR-J40	783.0	12.0	120.0	426.6	1.2	0.5	0.6

Run No. 3 - Phase I MDD + 3,500 gpm Comm Fire at Node FR-J88 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P171	FR-J96	J106	204.2	12.0	120.0	-1,707.6	4.8	1.6	7.9
☐	P173	FR-J98	FR-J116	428.9	8.0	120.0	-400.6	2.6	1.7	3.9
☐	P175	J76	FR-J110	1,850.1	12.0	120.0	132.0	0.4	0.1	0.1
☐	P177	FR-J110	FR-J108	1,348.7	12.0	120.0	-128.2	0.4	0.1	0.1
☐	P179	J106	J12	1,077.1	16.0	130.0	-2,972.5	4.7	5.1	4.7
☐	P19	FR-J40	FR-J56	965.3	12.0	120.0	618.9	1.8	1.2	1.2
☐	FR-P21	FR-J56	J72	956.4	12.0	120.0	593.1	1.7	1.1	1.1
☐	FR-P23	J72	J70	657.1	12.0	120.0	-830.3	2.4	1.4	2.1
☐	FR-P35	J46	J48	968.3	8.0	120.0	-50.8	0.3	0.1	0.1
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-830.3	1.3	0.3	0.4
☐	FR-P37	J48	FR-J34	262.8	8.0	120.0	-37.8	0.2	0.0	0.0
☐	FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	-36.9	0.2	0.1	0.0
☐	FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	768.6	2.2	1.6	1.8
☐	FR-P381	J238	FR-J28	227.5	8.0	120.0	-68.9	0.4	0.0	0.1
☐	FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	-62.1	0.4	0.0	0.1
☐	FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	-67.6	0.4	0.0	0.1
☐	FR-P51	FR-J40	J42	194.9	8.0	120.0	-192.3	1.2	0.2	1.0
☐	P53	J42	FR-J44	320.6	8.0	120.0	-102.8	0.7	0.1	0.3
☐	FR-P55	FR-J44	J46	317.1	8.0	120.0	-39.1	0.2	0.0	0.1
☐	FR-P57	J46	J238	383.6	8.0	120.0	11.7	0.1	0.0	0.0
☐	FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-32.0	0.2	0.0	0.0
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-830.3	2.4	3.1	2.1
☐	P91	FR-J36	J42	808.3	8.0	120.0	102.3	0.7	0.3	0.3
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	63.7	0.4	0.1	0.1
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	-39.4	0.3	0.0	0.1
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	-94.3	0.6	0.1	0.3
☐	P99	J14	FR-J114	206.1	8.0	120.0	265.1	1.7	0.4	1.8
☐	FR-P300	J112	J9632	7,595.3	16.0	130.0	-830.3	1.3	3.4	0.4
☐	P181	FR-J118	J12	1,373.8	16.0	130.0	3,736.2	6.0	9.8	7.2
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-3,204.1	5.1	4.3	5.4
☐	P11	332	FR-J118	4,814.1	16.0	130.0	532.1	0.8	0.9	0.2

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	49.6	606.0	858.8	109.6
J102	3.3	599.0	858.8	112.6
FR-J104	49.6	612.0	858.8	107.0
J106	154.3	625.0	859.0	101.4
FR-J108	0.0	615.0	858.8	105.7
FR-J110	260.2	595.0	858.6	114.2
J112	0.0	530.0	863.3	144.4
FR-J114	0.0	730.0	854.1	53.8
FR-J116	0.0	619.0	858.9	104.0
J12	4.3	725.0	859.4	58.2
J14	0.0	724.0	858.7	58.4
FR-J16	0.0	754.0	848.9	41.1
FR-J18	12.7	726.0	842.8	50.6
FR-J20	2,500.0	656.0	818.4	70.4
FR-J234	34.5	560.0	858.8	129.5
J238	80.7	684.0	836.7	66.2
FR-J28	0.0	680.0	832.9	66.2
FR-J30	0.0	731.0	844.0	49.0
FR-J32	12.7	744.0	848.0	45.0
FR-J34	0.0	721.0	848.4	55.2
FR-J36	12.7	697.0	853.7	67.9
FR-J38	0.0	691.0	856.5	71.7
FR-J40	0.0	650.0	856.4	89.4
J42	12.7	655.0	853.6	86.0
FR-J44	0.0	679.0	848.6	73.5
J46	0.0	703.0	844.3	61.2
J48	8.9	732.0	845.1	49.0
FR-J56	25.8	617.0	857.6	104.2
FR-J68	0.0	557.0	863.0	132.6
J70	0.0	557.0	860.1	131.3
J72	0.0	545.0	858.8	136.0
J74	23.9	540.0	858.8	138.1
J76	215.4	555.0	858.6	131.6
FR-J78	0.0	582.0	858.8	119.9
FR-J80	0.0	587.0	858.8	117.8
FR-J82	45.2	592.0	858.8	115.6
FR-J84	0.0	587.0	858.8	117.8
FR-J86	3.3	595.0	858.8	114.3
J88	0.0	599.0	858.8	112.6
FR-J90	49.6	608.0	858.9	108.7
FR-J92	0.0	602.0	858.9	111.3
FR-J94	1.6	617.0	858.9	104.8
FR-J96	2.4	623.0	859.0	102.2
FR-J98	3.3	615.0	858.9	105.7

Run No. 4 - Phase I MDD + 2,500 gpm SF Fire at Node FR-J20 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8.0	120.0	871.2	5.6	5.1	16.4
☐	FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	114.5	0.7	0.3	0.4
☐	P105	FR-J16	FR-J18	931.7	8.0	120.0	526.9	3.4	6.0	6.5
☐	FR-P107	J48	FR-J30	148.3	8.0	120.0	567.4	3.6	1.1	7.4
☐	FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	437.0	2.8	1.3	4.6
☐	FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	527.0	3.4	3.9	6.5
☐	P113	FR-J18	FR-J20	1,249.6	8.0	120.0	953.7	6.1	24.2	19.4
☐	P115	J72	J74	449.1	12.0	120.0	701.5	2.0	0.7	1.5
☐	FR-P117	J74	J76	983.8	12.0	120.0	375.3	1.1	0.5	0.5
☐	FR-P119	J76	FR-J80	1,411.8	8.0	120.0	36.4	0.2	0.1	0.0
☐	FR-P121	J74	FR-J234	771.1	12.0	120.0	307.1	0.9	0.3	0.3
☐	P123	FR-J78	FR-J80	385.2	8.0	120.0	48.2	0.3	0.0	0.1
☐	P125	FR-J80	FR-J82	272.6	8.0	120.0	84.6	0.5	0.1	0.2
☐	P127	FR-J82	J88	282.9	8.0	120.0	45.8	0.3	0.0	0.1
☐	P129	J88	FR-J90	282.1	8.0	120.0	41.0	0.3	0.0	0.1
☐	P13	J12	J14	254.6	16.0	120.0	1,836.7	2.9	0.6	2.2
☐	P131	FR-J90	FR-J94	289.7	8.0	120.0	9.9	0.1	0.0	0.0
☐	P133	FR-J94	FR-J92	655.1	12.0	120.0	-88.0	0.2	0.0	0.0
☐	P135	FR-J92	FR-J86	279.5	12.0	120.0	-129.0	0.4	0.0	0.1
☐	P137	FR-J86	FR-J84	279.6	12.0	120.0	-175.3	0.5	0.0	0.1
☐	P139	FR-J84	FR-J78	275.6	12.0	120.0	-231.3	0.7	0.1	0.2
☐	P141	FR-J82	FR-J84	348.7	8.0	120.0	-55.9	0.4	0.0	0.1
☐	P143	J88	FR-J86	349.5	8.0	120.0	-43.8	0.3	0.0	0.1
☐	P145	FR-J90	FR-J92	353.7	8.0	120.0	-41.0	0.3	0.0	0.1
☐	P147	FR-J82	J102	351.1	8.0	120.0	58.6	0.4	0.0	0.1
☐	P149	J88	J100	351.1	8.0	120.0	48.5	0.3	0.0	0.1
☐	P15	J14	FR-J38	779.2	12.0	120.0	851.1	2.4	1.7	2.2
☐	P151	FR-J90	FR-J98	347.8	8.0	120.0	32.4	0.2	0.0	0.0
☐	P153	FR-J94	FR-J96	349.5	12.0	120.0	96.6	0.3	0.0	0.0
☐	P155	J102	FR-J104	786.9	8.0	120.0	27.4	0.2	0.0	0.0
☐	P157	FR-J104	FR-J108	225.7	8.0	120.0	13.0	0.1	0.0	0.0
☐	P159	FR-J104	J100	561.9	8.0	120.0	-25.2	0.2	0.0	0.0
☐	P161	FR-J108	FR-J116	303.3	12.0	120.0	-28.5	0.1	0.0	0.0
☐	P163	FR-J116	J106	448.5	12.0	120.0	-1.0	0.0	0.0	0.0
☐	P165	J102	J100	282.9	8.0	120.0	28.6	0.2	0.0	0.0
☐	P167	J100	FR-J98	282.9	8.0	120.0	12.3	0.1	0.0	0.0
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	14.5	0.1	0.0	0.0
☐	P17	FR-J38	FR-J40	783.0	12.0	120.0	47.3	0.1	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P171	FR-J96	J106	204.2	12.0	120.0	109.2	0.3	0.0	0.0
☐	P173	FR-J98	FR-J116	428.9	8.0	120.0	27.6	0.2	0.0	0.0
☐	P175	J76	FR-J110	1,850.1	12.0	120.0	166.6	0.5	0.2	0.1
☐	P177	FR-J110	FR-J108	1,348.7	12.0	120.0	-41.5	0.1	0.0	0.0
☐	P179	J106	J12	1,077.1	16.0	130.0	-15.2	0.0	0.0	0.0
☐	P19	FR-J40	FR-J56	965.3	12.0	120.0	-775.6	2.2	1.8	1.8
☐	FR-P21	FR-J56	J72	956.4	12.0	120.0	-796.2	2.3	1.8	1.9
☐	FR-P23	J72	J70	657.1	12.0	120.0	-1,497.7	4.2	4.1	6.2
☐	FR-P35	J46	J48	968.3	8.0	120.0	-175.5	1.1	0.8	0.8
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-1,497.7	2.4	1.0	1.3
☐	FR-P37	J48	FR-J34	262.8	8.0	120.0	-750.0	4.8	3.3	12.4
☐	FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	-657.4	4.2	11.0	9.7
☐	FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	279.5	0.8	0.3	0.3
☐	FR-P381	J238	FR-J28	227.5	8.0	120.0	888.9	5.7	3.9	17.0
☐	FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	-872.9	5.6	5.2	16.5
☐	FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	-803.9	5.1	2.9	14.1
☐	FR-P51	FR-J40	J42	194.9	8.0	120.0	822.8	5.3	2.9	14.8
☐	P53	J42	FR-J44	320.6	8.0	120.0	847.9	5.4	5.0	15.6
☐	FR-P55	FR-J44	J46	317.1	8.0	120.0	777.9	5.0	4.2	13.3
☐	FR-P57	J46	J238	383.6	8.0	120.0	953.4	6.1	7.4	19.4
☐	FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	1,546.3	9.9	14.5	47.5
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-1,497.7	4.2	9.1	6.2
☐	P91	FR-J36	J42	808.3	8.0	120.0	35.2	0.2	0.0	0.0
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	-70.0	0.4	0.1	0.2
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	192.9	1.2	0.5	1.0
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	-344.3	2.2	0.9	2.9
☐	P99	J14	FR-J114	206.1	8.0	120.0	985.6	6.3	4.2	20.6
☐	FR-P300	J112	J9632	7,595.3	16.0	130.0	-1,497.7	2.4	10.0	1.3
☐	P181	FR-J118	J12	1,373.8	16.0	130.0	1,855.4	3.0	2.7	2.0
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-1,620.3	2.6	1.2	1.5
☐	P11	332	FR-J118	4,814.1	16.0	130.0	235.1	0.4	0.2	0.0

Run No. 5 - Phase II Peak Hour (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	91.0	606.0	862.1	111.0
J102	6.0	599.0	862.1	114.0
FR-J104	91.0	612.0	862.1	108.4
J106	283.3	625.0	862.6	102.9
FR-J108	0.0	615.0	862.1	107.1
FR-J110	477.8	595.0	861.5	115.5
FR-J114	0.0	730.0	863.0	57.6
FR-J116	0.0	619.0	862.3	105.4
J12	8.0	725.0	863.5	60.0
J14	0.0	724.0	863.4	60.4
FR-J16	0.0	754.0	862.7	47.1
FR-J18	23.3	726.0	862.5	59.2
FR-J20	0.0	656.0	862.4	89.4
FR-J22	51.1	642.0	862.3	95.5
FR-J234	63.3	560.0	862.1	130.9
J238	148.1	684.0	862.3	77.3
FR-J24	150.4	632.0	862.3	99.8
FR-J240	51.1	690.0	862.4	74.7
J242	47.4	679.0	862.3	79.4
FR-J26	51.1	666.0	862.3	85.1
FR-J28	0.0	680.0	862.3	79.0
FR-J30	0.0	731.0	862.5	57.0
FR-J32	23.3	744.0	862.6	51.4
FR-J34	0.0	721.0	862.6	61.4
FR-J36	23.3	697.0	862.8	71.8
FR-J38	0.0	691.0	862.9	74.5
FR-J40	0.0	650.0	862.7	92.1
J42	23.3	655.0	862.6	90.0
FR-J44	0.0	679.0	862.5	79.5
J46	0.0	703.0	862.4	69.1
J48	16.4	732.0	862.5	56.6
FR-J50	51.1	670.0	862.4	83.4
FR-J52	51.1	646.0	862.5	93.8
FR-J54	51.1	623.0	862.5	103.8
FR-J56	47.4	617.0	862.5	106.4

Run No. 5 - Phase II Peak Hour (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J58	51.1	644.0	862.4	94.6
J60	51.1	608.0	862.5	110.3
FR-J62	51.1	584.0	863.1	120.9
J64	51.1	596.0	862.6	115.5
FR-J66	51.1	620.0	862.5	105.1
J70	0.0	557.0	862.7	132.4
J72	0.0	545.0	862.4	137.5
J74	43.9	540.0	862.1	139.6
J76	395.5	555.0	861.6	132.8
FR-J78	0.0	582.0	862.1	121.4
FR-J80	0.0	587.0	862.1	119.2
FR-J82	83.0	592.0	862.1	117.0
FR-J84	0.0	587.0	862.1	119.2
FR-J86	6.0	595.0	862.2	115.8
J88	0.0	599.0	862.2	114.0
FR-J90	91.0	608.0	862.2	110.2
FR-J92	0.0	602.0	862.2	112.8
FR-J94	3.0	617.0	862.3	106.3
FR-J96	4.5	623.0	862.4	103.7
FR-J98	6.0	615.0	862.3	107.1
FR-J68	0.0	557.0	863.4	132.8
J112	0.0	530.0	863.7	144.6

Run No. 5 - Phase II Peak Hour (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8.0	120.0	182.0	1.2	0.3	0.9
☐	FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	95.5	0.6	0.2	0.3
☐	P105	FR-J16	FR-J18	931.7	8.0	120.0	78.5	0.5	0.2	0.2
☐	FR-P107	J48	FR-J30	148.3	8.0	120.0	23.5	0.1	0.0	0.0
☐	FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	13.3	0.1	0.0	0.0
☐	FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	65.1	0.4	0.1	0.1
☐	P113	FR-J18	FR-J20	1,249.6	8.0	120.0	68.4	0.4	0.2	0.1
☐	P115	J72	J74	449.1	12.0	120.0	456.8	1.3	0.3	0.7
☐	FR-P117	J74	J76	983.8	12.0	120.0	398.6	1.1	0.5	0.5
☐	FR-P119	J76	FR-J80	1,411.8	8.0	120.0	-109.2	0.7	0.5	0.4
☐	FR-P121	J74	FR-J234	771.1	12.0	120.0	14.3	0.0	0.0	0.0
☐	P123	FR-J78	FR-J80	385.2	8.0	120.0	57.5	0.4	0.0	0.1
☐	P125	FR-J80	FR-J82	272.6	8.0	120.0	-51.7	0.3	0.0	0.1
☐	P127	FR-J82	J88	282.9	8.0	120.0	-69.0	0.4	0.0	0.1
☐	P129	J88	FR-J90	282.1	8.0	120.0	-79.9	0.5	0.1	0.2
☐	P13	J12	J14	254.6	16.0	120.0	717.4	1.1	0.1	0.4
☐	P131	FR-J90	FR-J94	289.7	8.0	120.0	-107.1	0.7	0.1	0.3
☐	P133	FR-J94	FR-J92	655.1	12.0	120.0	200.2	0.6	0.1	0.1
☐	P135	FR-J92	FR-J86	279.5	12.0	120.0	198.2	0.6	0.0	0.1
☐	P137	FR-J86	FR-J84	279.6	12.0	120.0	157.7	0.4	0.0	0.1
☐	P139	FR-J84	FR-J78	275.6	12.0	120.0	106.5	0.3	0.0	0.0
☐	P141	FR-J82	FR-J84	348.7	8.0	120.0	-51.1	0.3	0.0	0.1
☐	P143	J88	FR-J86	349.5	8.0	120.0	-34.5	0.2	0.0	0.0
☐	P145	FR-J90	FR-J92	353.7	8.0	120.0	-2.1	0.0	0.0	0.0
☐	P147	FR-J82	J102	351.1	8.0	120.0	-14.6	0.1	0.0	0.0
☐	P149	J88	J100	351.1	8.0	120.0	45.3	0.3	0.0	0.1
☐	P15	J14	FR-J38	779.2	12.0	120.0	440.0	1.2	0.5	0.6
☐	P151	FR-J90	FR-J98	347.8	8.0	120.0	-61.7	0.4	0.0	0.1
☐	P153	FR-J94	FR-J96	349.5	12.0	120.0	-310.3	0.9	0.1	0.3
☐	P155	J102	FR-J104	786.9	8.0	120.0	19.1	0.1	0.0	0.0
☐	P157	FR-J104	FR-J108	225.7	8.0	120.0	-35.2	0.2	0.0	0.0
☐	P159	FR-J104	J100	561.9	8.0	120.0	-36.7	0.2	0.0	0.0
☐	P161	FR-J108	FR-J116	303.3	12.0	120.0	-400.8	1.1	0.2	0.5
☐	P163	FR-J116	J106	448.5	12.0	120.0	-442.8	1.3	0.3	0.7
☐	P165	J102	J100	282.9	8.0	120.0	-39.7	0.3	0.0	0.1
☐	P167	J100	FR-J98	282.9	8.0	120.0	-122.1	0.8	0.1	0.4

Run No. 5 - Phase II Peak Hour (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	-147.8	0.9	0.2	0.6
☐	P17	FR-J38	FR-J40	783.0	12.0	120.0	294.5	0.8	0.2	0.3
☐	P171	FR-J96	J106	204.2	12.0	120.0	-462.6	1.3	0.1	0.7
☐	P173	FR-J98	FR-J116	428.9	8.0	120.0	-42.0	0.3	0.0	0.1
☐	P175	J76	FR-J110	1,850.1	12.0	120.0	112.2	0.3	0.1	0.1
☐	P177	FR-J110	FR-J108	1,348.7	12.0	120.0	-365.6	1.0	0.6	0.5
☐	P179	J106	J12	1,077.1	16.0	130.0	-1,188.7	1.9	0.9	0.9
☐	P181	FR-J118	J12	1,373.8	16.0	130.0	1,914.1	3.1	2.9	2.1
☐	P19	FR-J40	FR-J56	965.3	12.0	120.0	204.3	0.6	0.1	0.2
☐	FR-P21	FR-J56	J72	956.4	12.0	120.0	143.1	0.4	0.1	0.1
☐	FR-P23	J72	J70	657.1	12.0	120.0	-313.6	0.9	0.2	0.3
☐	FR-P25	J70	J64	570.3	8.0	120.0	69.9	0.4	0.1	0.2
☐	FR-P27	J64	FR-J66	302.4	8.0	120.0	103.1	0.7	0.1	0.3
☐	FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	83.9	0.5	0.1	0.2
☐	FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	-21.0	0.1	0.0	0.0
☐	FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	-2.0	0.0	0.0	0.0
☐	FR-P35	J46	J48	968.3	8.0	120.0	-56.6	0.4	0.1	0.1
☐	FR-P37	J48	FR-J34	262.8	8.0	120.0	-96.5	0.6	0.1	0.3
☐	FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	-75.3	0.5	0.2	0.2
☐	FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	-49.1	0.1	0.0	0.0
☐	FR-P381	J238	FR-J28	227.5	8.0	120.0	-46.3	0.3	0.0	0.1
☐	FR-P383	FR-J240	J46	228.2	8.0	120.0	-53.1	0.3	0.0	0.1
☐	FR-P385	J242	FR-J26	703.2	8.0	120.0	17.1	0.1	0.0	0.0
☐	FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	-135.4	0.9	0.2	0.5
☐	FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	-145.4	0.9	0.1	0.6
☐	P43	J64	FR-J54	1,109.8	8.0	120.0	40.8	0.3	0.1	0.1
☐	FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	13.7	0.1	0.0	0.0
☐	P47	FR-J54	FR-J52	314.0	8.0	120.0	62.0	0.4	0.0	0.1
☐	FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	70.2	0.4	0.1	0.2
☐	FR-P51	FR-J40	J42	194.9	8.0	120.0	90.3	0.6	0.0	0.2
☐	P53	J42	FR-J44	320.6	8.0	120.0	90.5	0.6	0.1	0.2
☐	FR-P55	FR-J44	J46	317.1	8.0	120.0	98.3	0.6	0.1	0.3
☐	FR-P57	J46	J238	383.6	8.0	120.0	101.8	0.6	0.1	0.3
☐	FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-35.5	0.2	0.0	0.0
☐	P61	FR-J20	FR-J22	776.2	8.0	120.0	32.9	0.2	0.0	0.0
☐	P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-23.9	0.2	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P65	FR-J22	FR-J26	303.7	8.0	120.0	5.7	0.0	0.0	0.0
☐	P67	FR-J28	J242	66.1	8.0	120.0	64.5	0.4	0.0	0.1
☐	P69	FR-J26	FR-J24	799.4	8.0	120.0	-28.3	0.2	0.0	0.0
☐	P71	FR-J24	J60	309.0	8.0	120.0	-148.8	0.9	0.2	0.6
☐	P73	J60	FR-J62	335.9	8.0	120.0	-245.0	1.6	0.5	1.6
☐	P75	FR-J62	FR-J68	549.1	12.0	120.0	-421.3	1.2	0.3	0.6
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-383.5	1.1	0.7	0.5
☐	P79	J64	FR-J62	1,090.0	8.0	120.0	-125.2	0.8	0.5	0.5
☐	P81	FR-J66	J60	903.3	8.0	120.0	-45.1	0.3	0.1	0.1
☐	P83	FR-J58	FR-J24	674.4	8.0	120.0	53.8	0.3	0.1	0.1
☐	P85	FR-J52	FR-J66	869.1	8.0	120.0	-13.1	0.1	0.0	0.0
☐	FR-P87	J42	FR-J54	934.2	8.0	120.0	58.5	0.4	0.1	0.1
☐	FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	46.2	0.3	0.1	0.1
☐	P91	FR-J36	J42	808.3	8.0	120.0	82.1	0.5	0.2	0.2
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	54.0	0.3	0.1	0.1
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	-15.0	0.1	0.0	0.0
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	-103.5	0.7	0.1	0.3
☐	P99	J14	FR-J114	206.1	8.0	120.0	277.4	1.8	0.4	2.0
☐	P11	332	FR-J118	4,814.1	16.0	130.0	-368.6	0.6	0.5	0.1
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-2,282.7	3.6	2.3	2.9
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-804.8	1.3	0.3	0.4
☐	FR-P300	J112	J9632	7,595.3	16.0	130.0	-804.8	1.3	3.2	0.4

Run No. 6 - Phase II MDD + 3,500 gpm MF Fire at Node FR-J234 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	48.6	606.0	848.5	105.1
J102	3.2	599.0	848.3	108.0
FR-J104	48.6	612.0	848.7	102.5
J106	151.2	625.0	851.2	98.0
FR-J108	0.0	615.0	849.1	101.4
FR-J110	255.0	595.0	847.6	109.4
FR-J114	0.0	730.0	854.3	53.9
FR-J116	0.0	619.0	849.7	100.0
J12	4.3	725.0	854.9	56.3
J14	0.0	724.0	854.8	56.7
FR-J16	0.0	754.0	854.0	43.3
FR-J18	12.5	726.0	853.9	55.4
FR-J20	0.0	656.0	853.8	85.7
FR-J22	27.3	642.0	853.8	91.8
FR-J234	3,533.8	560.0	839.3	121.0
J238	79.0	684.0	853.7	73.5
FR-J24	80.2	632.0	853.9	96.1
FR-J240	27.3	690.0	853.7	70.9
J242	25.3	679.0	853.8	75.7
FR-J26	27.3	666.0	853.8	81.4
FR-J28	0.0	680.0	853.8	75.3
FR-J30	0.0	731.0	853.9	53.2
FR-J32	12.5	744.0	853.9	47.6
FR-J34	0.0	721.0	853.9	57.6
FR-J36	12.5	697.0	854.0	68.0
FR-J38	0.0	691.0	854.1	70.7
FR-J40	0.0	650.0	853.6	88.2
J42	12.5	655.0	853.7	86.1
FR-J44	0.0	679.0	853.7	75.7
J46	0.0	703.0	853.7	65.3
J48	8.7	732.0	853.9	52.8
FR-J50	27.3	670.0	853.7	79.6
FR-J52	27.3	646.0	853.6	90.0
FR-J54	27.3	623.0	853.4	99.8
FR-J56	25.3	617.0	852.9	102.2

Run No. 6 - Phase II MDD + 3,500 gpm MF Fire at Node FR-J234 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J58	27.3	644.0	853.7	90.9
☐	J60	27.3	608.0	854.3	106.7
☐	FR-J62	27.3	584.0	855.8	117.8
☐	J64	27.3	596.0	853.7	111.7
☐	FR-J66	27.3	620.0	853.7	101.3
☐	J70	0.0	557.0	853.2	128.3
☐	J72	0.0	545.0	851.0	132.6
☐	J74	23.4	540.0	846.9	133.0
☐	J76	211.1	555.0	846.9	126.5
☐	FR-J78	0.0	582.0	845.7	114.3
☐	FR-J80	0.0	587.0	846.8	112.6
☐	FR-J82	44.3	592.0	847.5	110.7
☐	FR-J84	0.0	587.0	847.0	112.6
☐	FR-J86	3.2	595.0	847.8	109.5
☐	J88	0.0	599.0	848.1	108.0
☐	FR-J90	48.6	608.0	848.7	104.3
☐	FR-J92	0.0	602.0	848.4	106.8
☐	FR-J94	1.6	617.0	849.3	100.7
☐	FR-J96	2.4	623.0	850.2	98.4
☐	FR-J98	3.2	615.0	849.3	101.5
☐	FR-J68	0.0	557.0	856.6	129.8
☐	J112	0.0	530.0	857.7	142.0

Run No. 6 - Phase II MDD + 3,500 gpm MF Fire at Node FR-J234 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8.0	120.0	182.0	1.2	0.3	0.9
☐	FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	95.5	0.6	0.2	0.3
☐	P105	FR-J16	FR-J18	931.7	8.0	120.0	78.5	0.5	0.2	0.2
☐	FR-P107	J48	FR-J30	148.3	8.0	120.0	23.5	0.1	0.0	0.0
☐	FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	13.3	0.1	0.0	0.0
☐	FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	65.1	0.4	0.1	0.1
☐	P113	FR-J18	FR-J20	1,249.6	8.0	120.0	68.4	0.4	0.2	0.1
☐	P115	J72	J74	449.1	12.0	120.0	456.8	1.3	0.3	0.7
☐	FR-P117	J74	J76	983.8	12.0	120.0	398.6	1.1	0.5	0.5
☐	FR-P119	J76	FR-J80	1,411.8	8.0	120.0	-109.2	0.7	0.5	0.4
☐	FR-P121	J74	FR-J234	771.1	12.0	120.0	14.3	0.0	0.0	0.0
☐	P123	FR-J78	FR-J80	385.2	8.0	120.0	57.5	0.4	0.0	0.1
☐	P125	FR-J80	FR-J82	272.6	8.0	120.0	-51.7	0.3	0.0	0.1
☐	P127	FR-J82	J88	282.9	8.0	120.0	-69.0	0.4	0.0	0.1
☐	P129	J88	FR-J90	282.1	8.0	120.0	-79.9	0.5	0.1	0.2
☐	P13	J12	J14	254.6	16.0	120.0	717.4	1.1	0.1	0.4
☐	P131	FR-J90	FR-J94	289.7	8.0	120.0	-107.1	0.7	0.1	0.3
☐	P133	FR-J94	FR-J92	655.1	12.0	120.0	200.2	0.6	0.1	0.1
☐	P135	FR-J92	FR-J86	279.5	12.0	120.0	198.2	0.6	0.0	0.1
☐	P137	FR-J86	FR-J84	279.6	12.0	120.0	157.7	0.4	0.0	0.1
☐	P139	FR-J84	FR-J78	275.6	12.0	120.0	106.5	0.3	0.0	0.0
☐	P141	FR-J82	FR-J84	348.7	8.0	120.0	-51.1	0.3	0.0	0.1
☐	P143	J88	FR-J86	349.5	8.0	120.0	-34.5	0.2	0.0	0.0
☐	P145	FR-J90	FR-J92	353.7	8.0	120.0	-2.1	0.0	0.0	0.0
☐	P147	FR-J82	J102	351.1	8.0	120.0	-14.6	0.1	0.0	0.0
☐	P149	J88	J100	351.1	8.0	120.0	45.3	0.3	0.0	0.1
☐	P15	J14	FR-J38	779.2	12.0	120.0	440.0	1.2	0.5	0.6
☐	P151	FR-J90	FR-J98	347.8	8.0	120.0	-61.7	0.4	0.0	0.1
☐	P153	FR-J94	FR-J96	349.5	12.0	120.0	-310.3	0.9	0.1	0.3
☐	P155	J102	FR-J104	786.9	8.0	120.0	19.1	0.1	0.0	0.0
☐	P157	FR-J104	FR-J108	225.7	8.0	120.0	-35.2	0.2	0.0	0.0
☐	P159	FR-J104	J100	561.9	8.0	120.0	-36.7	0.2	0.0	0.0
☐	P161	FR-J108	FR-J116	303.3	12.0	120.0	-400.8	1.1	0.2	0.5
☐	P163	FR-J116	J106	448.5	12.0	120.0	-442.8	1.3	0.3	0.7
☐	P165	J102	J100	282.9	8.0	120.0	-39.7	0.3	0.0	0.1
☐	P167	J100	FR-J98	282.9	8.0	120.0	-122.1	0.8	0.1	0.4

Run No. 6 - Phase II MDD + 3,500 gpm MF Fire at Node FR-J234 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	-147.8	0.9	0.2	0.6
☐	P17	FR-J38	FR-J40	783.0	12.0	120.0	294.5	0.8	0.2	0.3
☐	P171	FR-J96	J106	204.2	12.0	120.0	-462.6	1.3	0.1	0.7
☐	P173	FR-J98	FR-J116	428.9	8.0	120.0	-42.0	0.3	0.0	0.1
☐	P175	J76	FR-J110	1,850.1	12.0	120.0	112.2	0.3	0.1	0.1
☐	P177	FR-J110	FR-J108	1,348.7	12.0	120.0	-365.6	1.0	0.6	0.5
☐	P179	J106	J12	1,077.1	16.0	130.0	-1,188.7	1.9	0.9	0.9
☐	P181	FR-J118	J12	1,373.8	16.0	130.0	1,914.1	3.1	2.9	2.1
☐	P19	FR-J40	FR-J56	965.3	12.0	120.0	204.3	0.6	0.1	0.2
☐	FR-P21	FR-J56	J72	956.4	12.0	120.0	143.1	0.4	0.1	0.1
☐	FR-P23	J72	J70	657.1	12.0	120.0	-313.6	0.9	0.2	0.3
☐	FR-P25	J70	J64	570.3	8.0	120.0	69.9	0.4	0.1	0.2
☐	FR-P27	J64	FR-J66	302.4	8.0	120.0	103.1	0.7	0.1	0.3
☐	FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	83.9	0.5	0.1	0.2
☐	FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	-21.0	0.1	0.0	0.0
☐	FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	-2.0	0.0	0.0	0.0
☐	FR-P35	J46	J48	968.3	8.0	120.0	-56.6	0.4	0.1	0.1
☐	FR-P37	J48	FR-J34	262.8	8.0	120.0	-96.5	0.6	0.1	0.3
☐	FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	-75.3	0.5	0.2	0.2
☐	FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	-49.1	0.1	0.0	0.0
☐	FR-P381	J238	FR-J28	227.5	8.0	120.0	-46.3	0.3	0.0	0.1
☐	FR-P383	FR-J240	J46	228.2	8.0	120.0	-53.1	0.3	0.0	0.1
☐	FR-P385	J242	FR-J26	703.2	8.0	120.0	17.1	0.1	0.0	0.0
☐	FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	-135.4	0.9	0.2	0.5
☐	FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	-145.4	0.9	0.1	0.6
☐	P43	J64	FR-J54	1,109.8	8.0	120.0	40.8	0.3	0.1	0.1
☐	FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	13.7	0.1	0.0	0.0
☐	P47	FR-J54	FR-J52	314.0	8.0	120.0	62.0	0.4	0.0	0.1
☐	FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	70.2	0.4	0.1	0.2
☐	FR-P51	FR-J40	J42	194.9	8.0	120.0	90.3	0.6	0.0	0.2
☐	P53	J42	FR-J44	320.6	8.0	120.0	90.5	0.6	0.1	0.2
☐	FR-P55	FR-J44	J46	317.1	8.0	120.0	98.3	0.6	0.1	0.3
☐	FR-P57	J46	J238	383.6	8.0	120.0	101.8	0.6	0.1	0.3
☐	FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-35.5	0.2	0.0	0.0
☐	P61	FR-J20	FR-J22	776.2	8.0	120.0	32.9	0.2	0.0	0.0
☐	P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-23.9	0.2	0.0	0.0

Run No. 6 - Phase II MDD + 3,500 gpm MF Fire at Node FR-J234 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P65	FR-J22	FR-J26	303.7	8.0	120.0	5.7	0.0	0.0	0.0
☐	P67	FR-J28	J242	66.1	8.0	120.0	64.5	0.4	0.0	0.1
☐	P69	FR-J26	FR-J24	799.4	8.0	120.0	-28.3	0.2	0.0	0.0
☐	P71	FR-J24	J60	309.0	8.0	120.0	-148.8	0.9	0.2	0.6
☐	P73	J60	FR-J62	335.9	8.0	120.0	-245.0	1.6	0.5	1.6
☐	P75	FR-J62	FR-J68	549.1	12.0	120.0	-421.3	1.2	0.3	0.6
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-383.5	1.1	0.7	0.5
☐	P79	J64	FR-J62	1,090.0	8.0	120.0	-125.2	0.8	0.5	0.5
☐	P81	FR-J66	J60	903.3	8.0	120.0	-45.1	0.3	0.1	0.1
☐	P83	FR-J58	FR-J24	674.4	8.0	120.0	53.8	0.3	0.1	0.1
☐	P85	FR-J52	FR-J66	869.1	8.0	120.0	-13.1	0.1	0.0	0.0
☐	FR-P87	J42	FR-J54	934.2	8.0	120.0	58.5	0.4	0.1	0.1
☐	FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	46.2	0.3	0.1	0.1
☐	P91	FR-J36	J42	808.3	8.0	120.0	82.1	0.5	0.2	0.2
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	54.0	0.3	0.1	0.1
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	-15.0	0.1	0.0	0.0
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	-103.5	0.7	0.1	0.3
☐	P99	J14	FR-J114	206.1	8.0	120.0	277.4	1.8	0.4	2.0
☐	P11	332	FR-J118	4,814.1	16.0	130.0	-368.6	0.6	0.5	0.1
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-2,282.7	3.6	2.3	2.9
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-804.8	1.3	0.3	0.4
☐	FR-P300	J112	J9632	7,595.3	16.0	130.0	-804.8	1.3	3.2	0.4

Run No. 6 - Phase II MDD + 3,500 gpm Comm Fire at Nodes J238/J242 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	48.6	606.0	853.2	107.1
J102	3.2	599.0	853.2	110.1
FR-J104	48.6	612.0	853.2	104.5
J106	151.2	625.0	853.9	99.2
FR-J108	0.0	615.0	853.2	103.2
FR-J110	255.0	595.0	852.4	111.5
FR-J114	0.0	730.0	850.6	52.3
FR-J116	0.0	619.0	853.5	101.6
J12	4.3	725.0	855.0	56.3
J14	0.0	724.0	854.3	56.5
FR-J16	0.0	754.0	847.0	40.3
FR-J18	12.5	726.0	843.3	50.8
FR-J20	0.0	656.0	835.2	77.7
FR-J22	27.3	642.0	837.2	84.6
FR-J234	33.8	560.0	852.5	126.7
J238	1,829.0	684.0	829.2	62.9
FR-J24	80.2	632.0	843.4	91.6
FR-J240	27.3	690.0	843.7	66.6
J242	1,775.3	679.0	829.0	65.0
FR-J26	27.3	666.0	837.0	74.1
FR-J28	0.0	680.0	830.5	65.2
FR-J30	0.0	731.0	843.5	48.7
FR-J32	12.5	744.0	846.2	44.3
FR-J34	0.0	721.0	846.5	54.4
FR-J36	12.5	697.0	849.8	66.2
FR-J38	0.0	691.0	851.5	69.6
FR-J40	0.0	650.0	850.9	87.0
J42	12.5	655.0	849.6	84.3
FR-J44	0.0	679.0	846.6	72.6
J46	0.0	703.0	842.9	60.6
J48	8.7	732.0	844.1	48.6
FR-J50	27.3	670.0	846.0	76.3
FR-J52	27.3	646.0	847.4	87.3
FR-J54	27.3	623.0	849.6	98.2
FR-J56	25.3	617.0	850.9	101.3

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J58	27.3	644.0	846.0	87.5
☐	J60	27.3	608.0	847.4	103.7
☐	FR-J62	27.3	584.0	851.7	116.0
☐	J64	27.3	596.0	849.8	110.0
☐	FR-J66	27.3	620.0	847.5	98.6
☐	J70	0.0	557.0	852.0	127.8
☐	J72	0.0	545.0	851.9	133.0
☐	J74	23.4	540.0	852.2	135.3
☐	J76	211.1	555.0	852.2	128.8
☐	FR-J78	0.0	582.0	853.0	117.4
☐	FR-J80	0.0	587.0	853.0	115.2
☐	FR-J82	44.3	592.0	853.1	113.1
☐	FR-J84	0.0	587.0	853.1	115.3
☐	FR-J86	3.2	595.0	853.2	111.9
☐	J88	0.0	599.0	853.2	110.2
☐	FR-J90	48.6	608.0	853.3	106.3
☐	FR-J92	0.0	602.0	853.3	108.9
☐	FR-J94	1.6	617.0	853.5	102.5
☐	FR-J96	2.4	623.0	853.7	100.0
☐	FR-J98	3.2	615.0	853.4	103.3
☐	FR-J68	0.0	557.0	853.5	128.5
☐	J112	0.0	530.0	854.6	140.6

Run No. 6 - Phase II MDD + 3,500 gpm Comm Fire at Nodes J238/J242 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P101	FR-J114	FR-J16	310.1	8.0	120.0	724.0	4.6	3.6	11.6
FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	192.6	1.2	0.8	1.0
P105	FR-J16	FR-J18	931.7	8.0	120.0	404.0	2.6	3.7	4.0
FR-P107	J48	FR-J30	148.3	8.0	120.0	412.3	2.6	0.6	4.1
FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	135.4	0.9	0.1	0.5
FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	439.9	2.8	2.8	4.6
P113	FR-J18	FR-J20	1,249.6	8.0	120.0	526.9	3.4	8.1	6.5
P115	J72	J74	449.1	12.0	120.0	-421.6	1.2	0.3	0.6
FR-P117	J74	J76	983.8	12.0	120.0	-95.9	0.3	0.0	0.0
FR-P119	J76	FR-J80	1,411.8	8.0	120.0	-135.3	0.9	0.7	0.5
FR-P121	J74	FR-J234	771.1	12.0	120.0	-349.1	1.0	0.3	0.4
P123	FR-J78	FR-J80	385.2	8.0	120.0	-2.2	0.0	0.0	0.0
P125	FR-J80	FR-J82	272.6	8.0	120.0	-137.5	0.9	0.1	0.5
P127	FR-J82	J88	282.9	8.0	120.0	-119.6	0.8	0.1	0.4
P129	J88	FR-J90	282.1	8.0	120.0	-122.5	0.8	0.1	0.4
P13	J12	J14	254.6	16.0	120.0	2,031.4	3.2	0.7	2.7
P131	FR-J90	FR-J94	289.7	8.0	120.0	-133.3	0.9	0.1	0.5
P133	FR-J94	FR-J92	655.1	12.0	120.0	275.3	0.8	0.2	0.3
P135	FR-J92	FR-J86	279.5	12.0	120.0	325.7	0.9	0.1	0.4
P137	FR-J86	FR-J84	279.6	12.0	120.0	351.0	1.0	0.1	0.4
P139	FR-J84	FR-J78	275.6	12.0	120.0	380.7	1.1	0.1	0.5
P141	FR-J82	FR-J84	348.7	8.0	120.0	29.8	0.2	0.0	0.0
P143	J88	FR-J86	349.5	8.0	120.0	28.5	0.2	0.0	0.0
P145	FR-J90	FR-J92	353.7	8.0	120.0	50.4	0.3	0.0	0.1
P147	FR-J82	J102	351.1	8.0	120.0	-92.0	0.6	0.1	0.3
P149	J88	J100	351.1	8.0	120.0	-25.5	0.2	0.0	0.0
P15	J14	FR-J38	779.2	12.0	120.0	1,114.8	3.2	2.8	3.6
P151	FR-J90	FR-J98	347.8	8.0	120.0	-88.2	0.6	0.1	0.2
P153	FR-J94	FR-J96	349.5	12.0	120.0	-410.2	1.2	0.2	0.6
P155	J102	FR-J104	786.9	8.0	120.0	-31.9	0.2	0.0	0.0
P157	FR-J104	FR-J108	225.7	8.0	120.0	-60.1	0.4	0.0	0.1
P159	FR-J104	J100	561.9	8.0	120.0	-20.4	0.1	0.0	0.0
P161	FR-J108	FR-J116	303.3	12.0	120.0	-486.6	1.4	0.2	0.8
P163	FR-J116	J106	448.5	12.0	120.0	-550.9	1.6	0.4	1.0
P165	J102	J100	282.9	8.0	120.0	-63.3	0.4	0.0	0.1
P167	J100	FR-J98	282.9	8.0	120.0	-157.8	1.0	0.2	0.7

Run No. 6 - Phase II MDD + 3,500 gpm Comm Fire at Nodes J238/J242 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P169	FR-J98	FR-J96	282.1	8.0	120.0	-184.9	1.2	0.3	0.9
P17	FR-J38	FR-J40	783.0	12.0	120.0	506.5	1.4	0.7	0.8
P171	FR-J96	J106	204.2	12.0	120.0	-597.5	1.7	0.2	1.1
P173	FR-J98	FR-J116	428.9	8.0	120.0	-64.3	0.4	0.1	0.1
P175	J76	FR-J110	1,850.1	12.0	120.0	-171.6	0.5	0.2	0.1
P177	FR-J110	FR-J108	1,348.7	12.0	120.0	-426.5	1.2	0.8	0.6
P179	J106	J12	1,077.1	16.0	130.0	-1,299.6	2.1	1.1	1.0
P181	FR-J118	J12	1,373.8	16.0	130.0	3,335.2	5.3	8.0	5.8
P19	FR-J40	FR-J56	965.3	12.0	120.0	-25.3	0.1	0.0	0.0
FR-P21	FR-J56	J72	956.4	12.0	120.0	-585.1	1.7	1.0	1.1
FR-P23	J72	J70	657.1	12.0	120.0	-163.5	0.5	0.1	0.1
FR-P25	J70	J64	570.3	8.0	120.0	401.4	2.6	2.2	3.9
FR-P27	J64	FR-J66	302.4	8.0	120.0	571.8	3.6	2.3	7.5
FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	444.2	2.8	1.5	4.7
FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	17.4	0.1	0.0	0.0
FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	406.5	2.6	2.3	4.0
FR-P35	J46	J48	968.3	8.0	120.0	-215.3	1.4	1.2	1.2
FR-P37	J48	FR-J34	262.8	8.0	120.0	-636.3	4.1	2.4	9.2
FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	-716.8	4.6	12.9	11.4
FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	-382.9	1.1	0.5	0.5
FR-P381	J238	FR-J28	227.5	8.0	120.0	-502.6	3.2	1.3	5.9
FR-P383	FR-J240	J46	228.2	8.0	120.0	379.2	2.4	0.8	3.5
FR-P385	J242	FR-J26	703.2	8.0	120.0	-716.9	4.6	8.0	11.4
FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	-689.9	4.4	3.3	10.7
FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	-608.3	3.9	1.7	8.4
P43	J64	FR-J54	1,109.8	8.0	120.0	66.1	0.4	0.2	0.1
FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	534.5	3.4	1.3	6.6
P47	FR-J54	FR-J52	314.0	8.0	120.0	554.5	3.5	2.2	7.1
FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	416.4	2.7	1.4	4.2
FR-P51	FR-J40	J42	194.9	8.0	120.0	531.9	3.4	1.3	6.6
P53	J42	FR-J44	320.6	8.0	120.0	636.8	4.1	2.9	9.2
FR-P55	FR-J44	J46	317.1	8.0	120.0	731.9	4.7	3.8	11.9
FR-P57	J46	J238	383.6	8.0	120.0	1,326.4	8.5	13.7	35.7
FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-844.2	5.4	4.7	15.5
P61	FR-J20	FR-J22	776.2	8.0	120.0	-317.3	2.0	2.0	2.5
P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-497.0	3.2	6.2	5.8

Run No. 6 - Phase II MDD + 3,500 gpm Comm Fire at Nodes J238/J242 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P65	FR-J22	FR-J26	303.7	8.0	120.0	152.4	1.0	0.2	0.7
☐	P67	FR-J28	J242	66.1	8.0	120.0	1,058.4	6.8	1.6	23.5
☐	P69	FR-J26	FR-J24	799.4	8.0	120.0	-591.8	3.8	6.4	8.0
☐	P71	FR-J24	J60	309.0	8.0	120.0	-769.5	4.9	4.0	13.0
☐	P73	J60	FR-J62	335.9	8.0	120.0	-759.5	4.8	4.3	12.7
☐	P75	FR-J62	FR-J68	549.1	12.0	120.0	-1,050.6	3.0	1.8	3.2
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-564.9	1.6	1.5	1.0
☐	P79	J64	FR-J62	1,090.0	8.0	120.0	-263.8	1.7	2.0	1.8
☐	P81	FR-J66	J60	903.3	8.0	120.0	37.2	0.2	0.0	0.0
☐	P83	FR-J58	FR-J24	674.4	8.0	120.0	399.5	2.5	2.6	3.9
☐	P85	FR-J52	FR-J66	869.1	8.0	120.0	-63.1	0.4	0.1	0.1
☐	FR-P87	J42	FR-J54	934.2	8.0	120.0	-18.8	0.1	0.0	0.0
☐	FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	-173.9	1.1	0.7	0.8
☐	P91	FR-J36	J42	808.3	8.0	120.0	98.6	0.6	0.2	0.3
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	-78.7	0.5	0.2	0.2
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	132.3	0.8	0.2	0.5
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	-320.0	2.0	0.8	2.6
☐	P99	J14	FR-J114	206.1	8.0	120.0	916.6	5.9	3.7	18.0
☐	P11	332	FR-J118	4,814.1	16.0	130.0	483.6	0.8	0.8	0.2
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-2,851.6	4.6	3.5	4.3
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-1,615.5	2.6	1.1	1.5
☐	FR-P300	J112	J9632	7,595.3	16.0	130.0	-1,615.5	2.6	11.5	1.5

Run No. 8 - Phase II MDD Peak Hour (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	J100	81.9	606.0	863.2	111.4
☐	J102	5.4	599.0	863.2	114.5
☐	FR-J104	81.9	612.0	863.1	108.8
☐	J106	255.0	625.0	863.4	103.3
☐	FR-J108	0.0	615.0	863.1	107.5
☐	FR-J110	430.1	595.0	862.7	116.0
☐	J112	0.0	530.0	868.5	146.7
☐	FR-J114	0.0	730.0	863.9	58.0
☐	FR-J116	0.0	619.0	863.2	105.8
☐	FR-J118	0.0	785.0	864.7	34.5
☐	J12	7.2	725.0	863.9	60.2
☐	J120	78.2	1,057.0	1,224.0	72.3
☐	FR-J122	12.6	1,066.0	1,224.0	68.5
☐	FR-J128	181.9	1,025.7	1,223.4	85.7
☐	J130	12.6	1,095.7	1,224.1	55.6
☐	FR-J132	12.6	1,100.4	1,224.1	53.6
☐	FR-J134	12.6	1,114.0	1,224.0	47.7
☐	FR-J136	12.6	1,050.0	1,224.0	75.4
☐	FR-J138	12.6	1,077.6	1,224.0	63.4
☐	J14	0.0	724.0	863.9	60.6
☐	J140	12.6	1,028.0	1,223.9	84.9
☐	J142	12.6	1,036.5	1,223.9	81.2
☐	FR-J144	12.6	1,108.5	1,224.0	50.0
☐	FR-J146	12.6	1,111.0	1,224.0	49.0
☐	J148	12.6	1,100.0	1,223.9	53.7
☐	FR-J150	12.6	1,076.0	1,223.9	64.1
☐	J152	12.6	1,062.0	1,223.9	70.2
☐	J154	12.6	1,050.0	1,223.8	75.3
☐	J156	12.6	1,057.0	1,223.8	72.3
☐	J158	12.6	1,068.0	1,223.9	67.5
☐	FR-J16	0.0	754.0	863.9	47.6
☐	J160	12.6	1,092.0	1,223.9	57.1
☐	J162	12.6	1,060.5	1,223.9	70.8
☐	J164	12.6	1,098.0	1,224.0	54.6
☐	FR-J166	12.6	1,069.0	1,224.0	67.1
☐	J168	12.6	1,090.0	1,224.0	58.1

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J170	12.6	1,057.0	1,224.0	72.4
☐	FR-J172	12.6	1,072.0	1,224.0	65.9
☐	FR-J174	0.0	1,096.3	1,224.7	55.6
☐	FR-J176	0.0	1,102.3	1,224.5	52.9
☐	FR-J178	12.6	1,039.7	1,223.7	79.7
☐	FR-J18	21.0	726.0	863.9	59.7
☐	J180	12.6	1,056.0	1,223.8	72.7
☐	FR-J182	12.6	1,057.0	1,223.8	72.3
☐	FR-J184	12.6	1,061.5	1,223.8	70.3
☐	FR-J186	12.6	1,072.7	1,223.8	65.5
☐	FR-J188	12.6	1,094.0	1,223.8	56.2
☐	FR-J190	12.6	1,072.0	1,223.8	65.8
☐	FR-J192	12.6	1,046.5	1,223.8	76.8
☐	FR-J194	12.6	1,041.0	1,223.7	79.2
☐	FR-J196	12.6	1,049.2	1,223.8	75.6
☐	FR-J20	0.0	656.0	863.9	90.1
☐	FR-J22	46.0	642.0	863.9	96.1
☐	FR-J220	0.0	1,100.7	1,225.2	53.9
☐	J222	0.0	1,109.0	1,225.6	50.5
☐	FR-J228	12.6	1,148.0	1,224.0	32.9
☐	FR-J230	115.4	1,075.5	1,223.8	64.2
☐	FR-J232	12.6	1,105.0	1,224.0	51.6
☐	FR-J234	57.0	560.0	863.3	131.4
☐	J236	28.2	728.0	863.9	58.9
☐	J238	133.3	684.0	863.8	77.9
☐	FR-J24	135.3	632.0	864.1	100.6
☐	FR-J240	46.0	690.0	863.9	75.3
☐	J242	42.6	679.0	863.8	80.1
☐	FR-J244	0.0	718.0	863.9	63.2
☐	J246	0.0	760.0	1,224.0	201.0
☐	J248	0.0	718.0	1,224.0	219.2
☐	J250	12.6	1,154.0	1,224.0	30.3
☐	FR-J26	46.0	666.0	863.9	85.7
☐	FR-J28	0.0	680.0	863.8	79.7
☐	FR-J30	0.0	731.0	863.9	57.6
☐	FR-J32	21.0	744.0	863.9	51.9

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J34	0.0	721.0	863.9	61.9
☐	FR-J36	21.0	697.0	863.9	72.3
☐	FR-J38	0.0	691.0	863.9	74.9
☐	FR-J40	0.0	650.0	863.9	92.7
☐	J42	21.0	655.0	863.9	90.5
☐	FR-J44	0.0	679.0	863.9	80.1
☐	J46	0.0	703.0	863.9	69.7
☐	J48	14.7	732.0	863.9	57.1
☐	FR-J50	46.0	670.0	863.9	84.0
☐	FR-J52	46.0	646.0	864.0	94.4
☐	FR-J54	46.0	623.0	864.0	104.4
☐	FR-J56	42.6	617.0	863.9	107.0
☐	FR-J58	46.0	644.0	864.1	95.4
☐	J60	46.0	608.0	864.8	111.2
☐	FR-J62	46.0	584.0	866.5	122.4
☐	J64	46.0	596.0	864.6	116.4
☐	FR-J66	46.0	620.0	864.3	105.9
☐	FR-J68	0.0	557.0	867.5	134.5
☐	J70	0.0	557.0	864.8	133.4
☐	J72	0.0	545.0	863.9	138.2
☐	J74	39.5	540.0	863.4	140.1
☐	J76	356.0	555.0	862.9	133.4
☐	FR-J78	0.0	582.0	863.2	121.9
☐	FR-J80	0.0	587.0	863.2	119.7
☐	FR-J82	74.7	592.0	863.2	117.5
☐	FR-J84	0.0	587.0	863.2	119.7
☐	FR-J86	5.4	595.0	863.2	116.2
☐	J88	0.0	599.0	863.2	114.5
☐	FR-J90	81.9	608.0	863.2	110.6
☐	FR-J92	0.0	602.0	863.2	113.2
☐	FR-J94	2.7	617.0	863.3	106.7
☐	FR-J96	4.0	623.0	863.3	104.1
☐	FR-J98	5.4	615.0	863.2	107.6
☐	J9634	0.0	608.8	863.0	110.1
☐	J9636	0.0	768.0	1,223.4	197.3

Run No. 8 - Phase II MDD Peak Hour (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8	120.0	39.4	0.3	0.0	0.0
☐	FR-P103	FR-J114	FR-J36	785.3	8	120.0	-2.4	0.0	0.0	0.0
☐	P105	FR-J16	FR-J18	931.7	8	120.0	17.8	0.1	0.0	0.0
☐	FR-P107	J48	FR-J30	148.3	8	120.0	17.2	0.1	0.0	0.0
☐	FR-P109	FR-J30	FR-J18	277.9	8	120.0	11.7	0.1	0.0	0.0
☐	P11	332	FR-J118	4,814.1	16	130.0	-402.6	0.6	0.6	0.1
☐	FR-P111	FR-J32	FR-J30	599.3	8	120.0	18.0	0.1	0.0	0.0
☐	P113	FR-J18	FR-J20	1,249.6	8	120.0	8.4	0.1	0.0	0.0
☐	P115	J72	J74	449.1	12	120.0	618.2	1.8	0.5	1.2
☐	FR-P117	J74	J76	983.8	12	120.0	401.4	1.1	0.5	0.5
☐	FR-P119	J76	FR-J80	1,411.8	8	120.0	-87.5	0.6	0.3	0.2
☐	FR-P121	J74	FR-J234	771.1	12	120.0	177.3	0.5	0.1	0.1
☐	P123	FR-J78	FR-J80	385.2	8	120.0	70.4	0.4	0.1	0.2
☐	P125	FR-J80	FR-J82	272.6	8	120.0	-17.1	0.1	0.0	0.0
☐	P127	FR-J82	J88	282.9	8	120.0	-49.8	0.3	0.0	0.1
☐	P129	J88	FR-J90	282.1	8	120.0	-49.9	0.3	0.0	0.1
☐	P13	J12	J14	254.6	16	130.0	36.7	0.1	0.0	0.0
☐	P131	FR-J90	FR-J94	289.7	8	120.0	-73.8	0.5	0.0	0.2
☐	P133	FR-J94	FR-J92	655.1	12	120.0	112.9	0.3	0.0	0.1
☐	P135	FR-J92	FR-J86	279.5	12	120.0	77.7	0.2	0.0	0.0
☐	P137	FR-J86	FR-J84	279.6	12	120.0	20.2	0.1	0.0	0.0
☐	P139	FR-J84	FR-J78	275.6	12	120.0	-49.9	0.1	0.0	0.0
☐	P141	FR-J82	FR-J84	348.7	8	120.0	-70.1	0.4	0.1	0.2
☐	P143	J88	FR-J86	349.5	8	120.0	-52.1	0.3	0.0	0.1
☐	P145	FR-J90	FR-J92	353.7	8	120.0	-35.2	0.2	0.0	0.0
☐	P147	FR-J82	J102	351.1	8	120.0	28.0	0.2	0.0	0.0
☐	P149	J88	J100	351.1	8	120.0	52.2	0.3	0.0	0.1
☐	P15	J14	FR-J38	779.2	12	120.0	-0.3	0.0	0.0	0.0
☐	P151	FR-J90	FR-J98	347.8	8	120.0	-22.8	0.1	0.0	0.0
☐	P153	FR-J94	FR-J96	349.5	12	120.0	-189.4	0.5	0.0	0.1
☐	P155	J102	FR-J104	786.9	8	120.0	34.6	0.2	0.0	0.0
☐	P157	FR-J104	FR-J108	225.7	8	120.0	-4.8	0.0	0.0	0.0
☐	P159	FR-J104	J100	561.9	8	120.0	-42.6	0.3	0.0	0.1
☐	P161	FR-J108	FR-J116	303.3	12	120.0	-301.9	0.9	0.1	0.3
☐	P163	FR-J116	J106	448.5	12	120.0	-310.8	0.9	0.2	0.3
☐	P165	J102	J100	282.9	8	120.0	-12.0	0.1	0.0	0.0
☐	P167	J100	FR-J98	282.9	8	120.0	-84.2	0.5	0.1	0.2
☐	P169	FR-J98	FR-J96	282.1	8	120.0	-103.5	0.7	0.1	0.3

Run No. 8 - Phase II MDD Peak Hour (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P17	FR-J38	FR-J40	783.0	12	120.0	-37.4	0.1	0.0	0.0
☐	P171	FR-J96	J106	204.2	12	120.0	-296.9	0.8	0.1	0.3
☐	P173	FR-J98	FR-J116	428.9	8	120.0	-9.0	0.1	0.0	0.0
☐	P175	J76	FR-J110	1,850.1	12	120.0	133.0	0.4	0.1	0.1
☐	P177	FR-J110	J9634	932.1	12	120.0	-297.1	0.8	0.3	0.3
☐	P179	J106	J12	1,077.1	16	130.0	-862.7	1.4	0.5	0.5
☐	P181	FR-J118	J12	1,373.8	16	130.0	934.9	1.5	0.8	0.6
☐	P183	FR-J118	T5000	798.3	16	130.0	-1,337.5	2.1	0.9	1.1
☐	P185	J12	J236	233.6	16	130.0	28.2	0.0	0.0	0.0
☐	P187	J120	FR-J136	360.9	16	130.0	-194.1	0.3	0.0	0.0
☐	P189	FR-J136	J142	463.3	8	120.0	49.5	0.3	0.0	0.1
☐	P19	FR-J40	FR-J56	965.3	12	120.0	-61.8	0.2	0.0	0.0
☐	P191	J142	J140	504.2	8	120.0	47.4	0.3	0.0	0.1
☐	P193	J140	J154	1,203.3	8	120.0	42.5	0.3	0.1	0.1
☐	P195	J154	J156	136.1	8	120.0	-28.2	0.2	0.0	0.0
☐	P197	J156	J158	254.4	10	120.0	-98.1	0.4	0.0	0.1
☐	P199	J158	J160	304.4	10	120.0	-76.2	0.3	0.0	0.1
☐	P201	J160	J148	870.8	10	120.0	-58.1	0.2	0.0	0.0
☐	P203	J148	FR-J150	309.6	8	120.0	14.6	0.1	0.0	0.0
☐	P205	FR-J150	J152	305.7	8	120.0	12.8	0.1	0.0	0.0
☐	P207	J152	J140	308.3	8	120.0	7.7	0.0	0.0	0.0
☐	P209	J152	J158	1,101.6	8	120.0	34.5	0.2	0.0	0.0
☐	FR-P21	FR-J56	J72	956.4	12	120.0	-36.6	0.1	0.0	0.0
☐	P211	FR-J150	J160	875.5	8	120.0	30.7	0.2	0.0	0.0
☐	P213	J154	FR-J230	729.8	8	120.0	58.1	0.4	0.1	0.1
☐	P215	J148	FR-J144	849.8	10	120.0	-85.3	0.3	0.1	0.1
☐	P217	FR-J144	J164	303.3	8	120.0	47.3	0.3	0.0	0.1
☐	FR-P219	J162	J142	306.8	8	120.0	10.5	0.1	0.0	0.0
☐	P221	J164	J162	312.3	8	120.0	25.3	0.2	0.0	0.0
☐	P223	J152	J162	637.3	8	120.0	-42.1	0.3	0.0	0.1
☐	FR-P225	FR-J150	J164	746.2	8	120.0	-41.5	0.3	0.0	0.1
☐	FR-P227	FR-J144	FR-J146	262.7	10	120.0	-97.2	0.4	0.0	0.1
☐	P229	FR-J146	FR-J134	376.3	16	130.0	-183.0	0.3	0.0	0.0
☐	FR-P23	J72	J70	657.1	12	120.0	-654.8	1.9	0.9	1.3
☐	P231	J162	FR-J166	404.6	8	120.0	-39.9	0.3	0.0	0.1
☐	P233	J164	J168	504.6	8	120.0	-32.1	0.2	0.0	0.0
☐	P235	FR-J136	FR-J166	349.6	8	120.0	34.0	0.2	0.0	0.0
☐	P237	FR-J166	J168	280.4	8	120.0	-18.5	0.1	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P239	J168	FR-J134	308.8	8	120.0	-63.2	0.4	0.0	0.1
☐	P241	FR-J134	FR-J232	208.9	16	130.0	-258.9	0.4	0.0	0.1
☐	P243	FR-J136	FR-J170	302.4	8	120.0	-49.1	0.3	0.0	0.1
☐	P245	FR-J170	FR-J138	602.0	8	120.0	-18.2	0.1	0.0	0.0
☐	P247	FR-J132	FR-J172	329.0	8	120.0	56.1	0.4	0.0	0.1
☐	P249	FR-J172	FR-J170	418.5	8	120.0	43.5	0.3	0.0	0.1
☐	FR-P25	J70	J64	570.3	8	120.0	115.6	0.7	0.2	0.4
☐	P251	FR-J136	FR-J232	882.1	16	130.0	-241.2	0.4	0.0	0.0
☐	P253	FR-J132	J130	247.4	16	130.0	-581.5	0.9	0.1	0.2
☐	P255	J120	FR-J122	979.3	12	120.0	-19.4	0.1	0.0	0.0
☐	P257	FR-J122	FR-J138	261.2	12	120.0	-204.6	0.6	0.0	0.2
☐	P259	FR-J138	J130	540.8	12	120.0	-235.5	0.7	0.1	0.2
☐	FR-P265	FR-J122	J180	193.1	8	120.0	172.7	1.1	0.2	0.8
☐	FR-P269	J130	FR-J176	798.7	16	130.0	-829.5	1.3	0.4	0.4
☐	FR-P27	J64	FR-J66	302.4	8	120.0	185.6	1.2	0.3	0.9
☐	FR-P271	FR-J176	FR-J174	559.7	16	130.0	-829.5	1.3	0.2	0.4
☐	FR-P277	FR-J178	FR-J128	301.0	8	120.0	181.9	1.2	0.3	0.9
☐	FR-P279	J180	FR-J178	343.9	8	120.0	122.1	0.8	0.1	0.4
☐	FR-P281	J120	FR-J190	282.0	8	120.0	135.3	0.9	0.1	0.5
☐	P283	FR-J190	FR-J188	347.2	8	120.0	63.7	0.4	0.0	0.1
☐	FR-P285	FR-J188	FR-J186	356.7	8	120.0	21.9	0.1	0.0	0.0
☐	FR-P287	FR-J186	FR-J192	352.1	8	120.0	21.3	0.1	0.0	0.0
☐	FR-P289	FR-J190	FR-J182	807.9	8	120.0	29.1	0.2	0.0	0.0
☐	FR-P29	FR-J66	FR-J58	309.9	8	120.0	152.5	1.0	0.2	0.7
☐	FR-P291	J180	FR-J182	311.0	8	120.0	38.0	0.2	0.0	0.0
☐	FR-P293	FR-J182	FR-J184	276.9	8	120.0	54.5	0.3	0.0	0.1
☐	FR-P295	FR-J184	FR-J186	775.5	8	120.0	-0.1	0.0	0.0	0.0
☐	P297	FR-J184	FR-J188	570.0	8	120.0	-17.0	0.1	0.0	0.0
☐	P299	FR-J190	FR-J196	1,748.0	8	120.0	29.9	0.2	0.1	0.0
☐	FR-P301	FR-J196	FR-J192	317.5	8	120.0	11.1	0.1	0.0	0.0
☐	P303	FR-J196	FR-J192	943.8	8	120.0	6.2	0.0	0.0	0.0
☐	FR-P305	FR-J192	FR-J194	1,158.4	8	120.0	26.0	0.2	0.0	0.0
☐	FR-P307	FR-J184	FR-J194	307.7	8	120.0	59.0	0.4	0.0	0.1
☐	FR-P309	FR-J194	FR-J178	437.0	8	120.0	72.4	0.5	0.1	0.2
☐	FR-P31	FR-J58	FR-J50	632.6	8	120.0	90.2	0.6	0.2	0.2
☐	P311	FR-J186	FR-J188	1,054.4	8	120.0	-12.2	0.1	0.0	0.0
☐	FR-P33	FR-J50	FR-J240	583.5	8	120.0	62.7	0.4	0.1	0.1
☐	FR-P35	J46	J48	968.3	8	120.0	-2.8	0.0	0.0	0.0

Run No. 8 - Phase II MDD Peak Hour (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P357	FR-J174	FR-J220	925.0	16	120.0	-829.5	1.3	0.5	0.5
☐	FR-P359	FR-J220	J222	855.4	16	130.0	-829.5	1.3	0.4	0.4
☐	FR-P363	J222	T5002	706.1	16	130.0	-829.5	1.3	0.3	0.4
☐	FR-P365	FR-J146	J250	647.1	12	120.0	73.3	0.2	0.0	0.0
☐	FR-P367	FR-J228	FR-J144	576.3	12	120.0	48.0	0.1	0.0	0.0
☐	FR-P369	FR-J68	J112	738.1	16	130.0	-1,540.3	2.5	1.0	1.4
☐	FR-P37	J48	FR-J34	262.8	8	120.0	-34.8	0.2	0.0	0.0
☐	FR-P371	FR-J28	FR-J30	1,132.4	8	120.0	-23.5	0.2	0.0	0.0
☐	FR-P373	FR-J230	J156	783.6	8	120.0	-57.3	0.4	0.1	0.1
☐	P375	FR-J232	FR-J132	247.6	16	130.0	-512.7	0.8	0.0	0.2
☐	FR-P377	FR-J234	FR-J78	907.3	12	120.0	120.3	0.3	0.1	0.1
☐	FR-P379	J236	FR-J244	776.6	16	130.0	0.0	0.0	0.0	0.0
☐	FR-P381	J238	FR-J28	227.5	8	120.0	-66.3	0.4	0.0	0.1
☐	FR-P383	FR-J240	J46	228.2	8	120.0	16.7	0.1	0.0	0.0
☐	FR-P385	J242	FR-J26	703.2	8	120.0	-44.4	0.3	0.0	0.1
☐	FR-P387	J246	J120	3,168.1	16	130.0	0.0	0.0	0.0	0.0
☐	FR-P389	FR-J244	U7000	14.8	16	130.0	0.0	0.0	0.0	0.0
☐	FR-P39	FR-J34	FR-J36	314.0	8	120.0	-31.9	0.2	0.0	0.0
☐	FR-P391	U7000	J248	41.5	16	130.0	0.0	0.0	0.0	0.0
☐	FR-P397	J248	J246	151.4	16	130.0	0.0	0.0	0.0	0.0
☐	FR-P399	J250	FR-J228	236.6	12	120.0	60.6	0.2	0.0	0.0
☐	FR-P41	FR-J36	FR-J38	201.6	8	120.0	-37.1	0.2	0.0	0.0
☐	P43	J64	FR-J54	1,109.8	8	120.0	142.6	0.9	0.6	0.6
☐	FR-P45	FR-J56	FR-J54	191.7	8	120.0	-67.9	0.4	0.0	0.1
☐	P47	FR-J54	FR-J52	314.0	8	120.0	-10.1	0.1	0.0	0.0
☐	FR-P49	FR-J52	FR-J50	324.7	8	120.0	18.5	0.1	0.0	0.0
☐	FR-P51	FR-J40	J42	194.9	8	120.0	24.4	0.2	0.0	0.0
☐	P53	J42	FR-J44	320.6	8	120.0	24.1	0.2	0.0	0.0
☐	FR-P55	FR-J44	J46	317.1	8	120.0	47.5	0.3	0.0	0.1
☐	FR-P57	J46	J238	383.6	8	120.0	67.0	0.4	0.1	0.1
☐	FR-P59	FR-J28	FR-J20	305.0	8	120.0	-41.1	0.3	0.0	0.1
☐	P61	FR-J20	FR-J22	776.2	8	120.0	-32.6	0.2	0.0	0.0
☐	P63	FR-J22	FR-J24	1,070.3	8	120.0	-77.9	0.5	0.2	0.2
☐	P65	FR-J22	FR-J26	303.7	8	120.0	-0.8	0.0	0.0	0.0
☐	P67	FR-J28	J242	66.1	8	120.0	-1.7	0.0	0.0	0.0
☐	P69	FR-J26	FR-J24	799.4	8	120.0	-91.2	0.6	0.2	0.3
☐	P71	FR-J24	J60	309.0	8	120.0	-288.1	1.8	0.7	2.1
☐	P73	J60	FR-J62	335.9	8	120.0	-465.3	3.0	1.7	5.1

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P75	FR-J62	FR-J68	549.1	12	120.0	-769.9	2.2	1.0	1.8
☐	P77	J70	FR-J68	1,466.1	12	120.0	-770.4	2.2	2.7	1.8
☐	P79	J64	FR-J62	1,090.0	8	120.0	-258.6	1.7	1.9	1.7
☐	P81	FR-J66	J60	903.3	8	120.0	-131.2	0.8	0.4	0.5
☐	P83	FR-J58	FR-J24	674.4	8	120.0	16.3	0.1	0.0	0.0
☐	P85	FR-J52	FR-J66	869.1	8	120.0	-118.3	0.8	0.4	0.4
☐	FR-P87	J42	FR-J54	934.2	8	120.0	-38.8	0.2	0.0	0.1
☐	FR-P89	FR-J44	FR-J52	873.8	8	120.0	-43.7	0.3	0.1	0.1
☐	P91	FR-J36	J42	808.3	8	120.0	-18.1	0.1	0.0	0.0
☐	FR-P93	FR-J34	FR-J44	867.6	8	120.0	-20.3	0.1	0.0	0.0
☐	P95	FR-J34	FR-J32	488.5	8	120.0	17.4	0.1	0.0	0.0
☐	P97	FR-J32	FR-J16	297.7	8	120.0	-21.6	0.1	0.0	0.0
☐	P99	J14	FR-J114	206.1	8	120.0	37.0	0.2	0.0	0.0
☐	FR-P300	J9638	J112	7,595.0	16	130.0	1,540.3	2.5	10.6	1.4
☐	P318	J9634	FR-J108	416.6	12	120.0	-297.1	0.8	0.1	0.3
☐	P320	J9634	J9636	1,125.0	12	120.0	0.0	0.0	0.0	0.0
☐	P322	J9636	FR-J128	3,148.4	10	120.0	0.0	0.0	0.0	0.0

Run No. 9 - Phase III MDD + 3,500 gpm MF Fire at FR-J234 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	39.3	606.0	847.8	104.8
J102	2.6	599.0	847.5	107.7
FR-J104	39.3	612.0	847.9	102.2
J106	122.4	625.0	850.2	97.6
FR-J108	0.0	615.0	848.3	101.1
FR-J110	206.5	595.0	847.0	109.2
J112	0.0	530.0	856.9	141.7
FR-J114	0.0	730.0	853.2	53.4
FR-J116	0.0	619.0	848.9	99.6
FR-J118	0.0	785.0	860.5	32.7
J12	3.4	725.0	853.6	55.7
J120	37.5	1,057.0	1,223.6	72.2
FR-J122	6.1	1,066.0	1,223.6	68.3
FR-J128	87.3	1,025.7	1,223.5	85.7
J130	6.1	1,095.7	1,223.7	55.5
FR-J132	6.1	1,100.4	1,223.7	53.4
FR-J134	6.1	1,114.0	1,223.7	47.5
FR-J136	6.1	1,050.0	1,223.6	75.2
FR-J138	6.1	1,077.6	1,223.7	63.3
J14	0.0	724.0	853.5	56.1
J140	6.1	1,028.0	1,223.6	84.8
J142	6.1	1,036.5	1,223.6	81.1
FR-J144	6.1	1,108.5	1,223.6	49.9
FR-J146	6.1	1,111.0	1,223.7	48.8
J148	6.1	1,100.0	1,223.6	53.6
FR-J150	6.1	1,076.0	1,223.6	64.0
J152	6.1	1,062.0	1,223.6	70.0
J154	6.1	1,050.0	1,223.6	75.2
J156	6.1	1,057.0	1,223.6	72.2
J158	6.1	1,068.0	1,223.6	67.4
FR-J16	0.0	754.0	853.0	42.9
J160	6.1	1,092.0	1,223.6	57.0
J162	6.1	1,060.5	1,223.6	70.7
J164	6.1	1,098.0	1,223.6	54.4
FR-J166	6.1	1,069.0	1,223.6	67.0
J168	6.1	1,090.0	1,223.6	57.9

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J170	6.1	1,057.0	1,223.7	72.2
FR-J172	6.1	1,072.0	1,223.7	65.7
FR-J174	0.0	1,096.3	1,223.8	55.3
FR-J176	0.0	1,102.3	1,223.8	52.6
FR-J178	6.1	1,039.7	1,223.6	79.7
FR-J18	10.1	726.0	852.9	55.0
J180	6.1	1,056.0	1,223.6	72.6
FR-J182	6.1	1,057.0	1,223.6	72.2
FR-J184	6.1	1,061.5	1,223.6	70.2
FR-J186	6.1	1,072.7	1,223.6	65.4
FR-J188	6.1	1,094.0	1,223.6	56.2
FR-J190	6.1	1,072.0	1,223.6	65.7
FR-J192	6.1	1,046.5	1,223.6	76.7
FR-J194	6.1	1,041.0	1,223.6	79.1
FR-J196	6.1	1,049.2	1,223.6	75.6
FR-J20	0.0	656.0	852.9	85.3
FR-J22	22.1	642.0	852.9	91.4
FR-J220	0.0	1,100.7	1,224.0	53.4
J222	0.0	1,109.0	1,224.1	49.9
FR-J228	6.1	1,148.0	1,223.6	32.8
FR-J230	55.4	1,075.5	1,223.6	64.2
FR-J232	6.1	1,105.0	1,223.7	51.4
FR-J234	3,527.4	560.0	838.6	120.7
J236	13.5	728.0	853.6	54.4
J238	64.0	684.0	852.8	73.2
FR-J24	65.0	632.0	853.0	95.8
FR-J240	22.1	690.0	852.8	70.5
J242	20.5	679.0	852.9	75.3
FR-J244	0.0	718.0	853.6	58.8
J246	0.0	760.0	1,223.6	200.9
J248	0.0	718.0	1,223.6	219.1
J250	6.1	1,154.0	1,223.6	30.2
FR-J26	22.1	666.0	852.9	81.0
FR-J28	0.0	680.0	852.9	74.9
FR-J30	0.0	731.0	852.9	52.8
FR-J32	10.1	744.0	853.0	47.2

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J34	0.0	721.0	852.9	57.2
FR-J36	10.1	697.0	853.0	67.6
FR-J38	0.0	691.0	853.0	70.2
FR-J40	0.0	650.0	852.7	87.8
J42	10.1	655.0	852.7	85.7
FR-J44	0.0	679.0	852.8	75.3
J46	0.0	703.0	852.8	64.9
J48	7.1	732.0	852.9	52.4
FR-J50	22.1	670.0	852.8	79.2
FR-J52	22.1	646.0	852.7	89.6
FR-J54	22.1	623.0	852.5	99.4
FR-J56	20.5	617.0	852.0	101.8
FR-J58	22.1	644.0	852.9	90.5
J60	22.1	608.0	853.5	106.4
FR-J62	22.1	584.0	855.0	117.4
J64	22.1	596.0	852.9	111.3
FR-J66	22.1	620.0	852.9	100.9
FR-J68	0.0	557.0	855.8	129.5
J70	0.0	557.0	852.4	128.0
J72	0.0	545.0	850.3	132.3
J74	19.0	540.0	846.2	132.7
J76	171.0	555.0	846.3	126.2
FR-J78	0.0	582.0	845.0	114.0
FR-J80	0.0	587.0	846.2	112.3
FR-J82	35.9	592.0	846.8	110.4
FR-J84	0.0	587.0	846.2	112.3
FR-J86	2.6	595.0	847.1	109.2
J88	0.0	599.0	847.4	107.6
FR-J90	39.3	608.0	847.9	104.0
FR-J92	0.0	602.0	847.6	106.4
FR-J94	1.3	617.0	848.5	100.3
FR-J96	1.9	623.0	849.3	98.1
FR-J98	2.6	615.0	848.5	101.2
J9634	0.0	608.8	847.9	103.6
J9636	0.0	768.0	1,223.5	197.4

Run No. 9 - Phase III MDD + 3,500 gpm MF Fire at FR-J234 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8.0	120.0	124.9	0.8	0.1	0.4
☐	FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	90.8	0.6	0.2	0.2
☐	P105	FR-J16	FR-J18	931.7	8.0	120.0	47.0	0.3	0.1	0.1
☐	FR-P107	J48	FR-J30	148.3	8.0	120.0	-38.3	0.2	0.0	0.1
☐	FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	-27.7	0.2	0.0	0.0
☐	P11	332	FR-J118	4,814.1	16.0	130.0	512.8	0.8	0.9	0.2
☐	FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	31.0	0.2	0.0	0.0
☐	P113	FR-J18	FR-J20	1,249.6	8.0	120.0	10.4	0.1	0.0	0.0
☐	P115	J72	J74	449.1	12.0	120.0	1,809.1	5.1	4.0	8.8
☐	FR-P117	J74	J76	983.8	12.0	120.0	-133.1	0.4	0.1	0.1
☐	FR-P119	J76	FR-J80	1,411.8	8.0	120.0	57.6	0.4	0.2	0.1
☐	FR-P121	J74	FR-J234	771.1	12.0	120.0	1,925.3	5.5	7.6	9.9
☐	P123	FR-J78	FR-J80	385.2	8.0	120.0	-352.3	2.2	1.2	3.1
☐	P125	FR-J80	FR-J82	272.6	8.0	120.0	-294.7	1.9	0.6	2.2
☐	P127	FR-J82	J88	282.9	8.0	120.0	-285.7	1.8	0.6	2.1
☐	P129	J88	FR-J90	282.1	8.0	120.0	-273.9	1.7	0.5	1.9
☐	P13	J12	J14	254.6	16.0	130.0	618.7	1.0	0.1	0.3
☐	P131	FR-J90	FR-J94	289.7	8.0	120.0	-257.8	1.6	0.5	1.7
☐	P133	FR-J94	FR-J92	655.1	12.0	120.0	629.8	1.8	0.8	1.2
☐	P135	FR-J92	FR-J86	279.5	12.0	120.0	811.8	2.3	0.6	2.0
☐	P137	FR-J86	FR-J84	279.6	12.0	120.0	997.5	2.8	0.8	2.9
☐	P139	FR-J84	FR-J78	275.6	12.0	120.0	1,246.7	3.5	1.2	4.4
☐	P141	FR-J82	FR-J84	348.7	8.0	120.0	249.3	1.6	0.6	1.6
☐	P143	J88	FR-J86	349.5	8.0	120.0	187.9	1.2	0.3	1.0
☐	P145	FR-J90	FR-J92	353.7	8.0	120.0	182.0	1.2	0.3	0.9
☐	P147	FR-J82	J102	351.1	8.0	120.0	-290.1	1.9	0.8	2.1
☐	P149	J88	J100	351.1	8.0	120.0	-199.7	1.3	0.4	1.1
☐	P15	J14	FR-J38	779.2	12.0	120.0	403.0	1.1	0.4	0.5
☐	P151	FR-J90	FR-J98	347.8	8.0	120.0	-233.1	1.5	0.5	1.4
☐	P153	FR-J94	FR-J96	349.5	12.0	120.0	-888.8	2.5	0.8	2.4
☐	P155	J102	FR-J104	786.9	8.0	120.0	-127.3	0.8	0.4	0.5
☐	P157	FR-J104	FR-J108	225.7	8.0	120.0	-257.5	1.6	0.4	1.7
☐	P159	FR-J104	J100	561.9	8.0	120.0	95.2	0.6	0.2	0.3
☐	P161	FR-J108	FR-J116	303.3	12.0	120.0	-783.7	2.2	0.6	1.9
☐	P163	FR-J116	J106	448.5	12.0	120.0	-979.8	2.8	1.3	2.8
☐	P165	J102	J100	282.9	8.0	120.0	-165.2	1.1	0.2	0.8
☐	P167	J100	FR-J98	282.9	8.0	120.0	-304.6	1.9	0.7	2.3
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	-343.9	2.2	0.8	2.9

Run No. 9 - Phase III MDD + 3,500 gpm MF Fire at FR-J234 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P17	FR-J38	FR-J40	783.0	12.0	120.0	340.6	1.0	0.3	0.4
P171	FR-J96	J106	204.2	12.0	120.0	-1,234.4	3.5	0.9	4.3
P173	FR-J98	FR-J116	428.9	8.0	120.0	-196.1	1.3	0.4	1.0
P175	J76	FR-J110	1,850.1	12.0	120.0	-342.6	1.0	0.7	0.4
P177	FR-J110	J9634	932.1	12.0	120.0	-526.2	1.5	0.8	0.9
P179	J106	J12	1,077.1	16.0	130.0	-2,323.1	3.7	3.2	3.0
P181	FR-J118	J12	1,373.8	16.0	130.0	2,956.8	4.7	6.4	4.6
P183	FR-J118	T5000	798.3	16.0	130.0	-2,444.0	3.9	2.6	3.3
P185	J12	J236	233.6	16.0	130.0	12.0	0.0	0.0	0.0
P187	J120	FR-J136	360.9	16.0	130.0	-82.9	0.1	0.0	0.0
P189	FR-J136	J142	463.3	8.0	120.0	21.1	0.1	0.0	0.0
P19	FR-J40	FR-J56	965.3	12.0	120.0	443.9	1.3	0.6	0.7
P191	J142	J140	504.2	8.0	120.0	20.2	0.1	0.0	0.0
P193	J140	J154	1,203.3	8.0	120.0	18.2	0.1	0.0	0.0
P195	J154	J156	136.1	8.0	120.0	-12.0	0.1	0.0	0.0
P197	J156	J158	254.4	10.0	120.0	-41.9	0.2	0.0	0.0
P199	J158	J160	304.4	10.0	120.0	-32.5	0.1	0.0	0.0
P201	J160	J148	870.8	10.0	120.0	-24.8	0.1	0.0	0.0
P203	J148	FR-J150	309.6	8.0	120.0	6.2	0.0	0.0	0.0
P205	FR-J150	J152	305.7	8.0	120.0	5.4	0.0	0.0	0.0
P207	J152	J140	308.3	8.0	120.0	3.3	0.0	0.0	0.0
P209	J152	J158	1,101.6	8.0	120.0	14.7	0.1	0.0	0.0
FR-P21	FR-J56	J72	956.4	12.0	120.0	755.4	2.1	1.7	1.7
P211	FR-J150	J160	875.5	8.0	120.0	13.1	0.1	0.0	0.0
P213	J154	FR-J230	729.8	8.0	120.0	24.8	0.2	0.0	0.0
P215	J148	FR-J144	849.8	10.0	120.0	-36.4	0.1	0.0	0.0
P217	FR-J144	J164	303.3	8.0	120.0	20.2	0.1	0.0	0.0
FR-P219	J162	J142	306.8	8.0	120.0	4.5	0.0	0.0	0.0
P221	J164	J162	312.3	8.0	120.0	10.8	0.1	0.0	0.0
P223	J152	J162	637.3	8.0	120.0	-18.0	0.1	0.0	0.0
FR-P225	FR-J150	J164	746.2	8.0	120.0	-17.7	0.1	0.0	0.0
FR-P227	FR-J144	FR-J146	262.7	10.0	120.0	-41.5	0.2	0.0	0.0
P229	FR-J146	FR-J134	376.3	16.0	130.0	-78.1	0.1	0.0	0.0
FR-P23	J72	J70	657.1	12.0	120.0	-1,053.7	3.0	2.1	3.2
P231	J162	FR-J166	404.6	8.0	120.0	-17.0	0.1	0.0	0.0
P233	J164	J168	504.6	8.0	120.0	-13.7	0.1	0.0	0.0
P235	FR-J136	FR-J166	349.6	8.0	120.0	14.5	0.1	0.0	0.0
P237	FR-J166	J168	280.4	8.0	120.0	-7.9	0.1	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P239	J168	FR-J134	308.8	8.0	120.0	-27.0	0.2	0.0	0.0
☐	P241	FR-J134	FR-J232	208.9	16.0	130.0	-110.5	0.2	0.0	0.0
☐	P243	FR-J136	FR-J170	302.4	8.0	120.0	-21.0	0.1	0.0	0.0
☐	P245	FR-J170	FR-J138	602.0	8.0	120.0	-7.8	0.0	0.0	0.0
☐	P247	FR-J132	FR-J172	329.0	8.0	120.0	24.0	0.2	0.0	0.0
☐	P249	FR-J172	FR-J170	418.5	8.0	120.0	18.6	0.1	0.0	0.0
☐	FR-P25	J70	J64	570.3	8.0	120.0	-171.7	1.1	0.5	0.8
☐	P251	FR-J136	FR-J232	882.1	16.0	130.0	-103.0	0.2	0.0	0.0
☐	P253	FR-J132	J130	247.4	16.0	130.0	-248.2	0.4	0.0	0.0
☐	P255	J120	FR-J122	979.3	12.0	120.0	-8.3	0.0	0.0	0.0
☐	P257	FR-J122	FR-J138	261.2	12.0	120.0	-87.4	0.2	0.0	0.0
☐	P259	FR-J138	J130	540.8	12.0	120.0	-100.5	0.3	0.0	0.0
☐	FR-P265	FR-J122	J180	193.1	8.0	120.0	73.7	0.5	0.0	0.2
☐	FR-P269	J130	FR-J176	798.7	16.0	130.0	-354.1	0.6	0.1	0.1
☐	FR-P27	J64	FR-J66	302.4	8.0	120.0	-29.1	0.2	0.0	0.0
☐	FR-P271	FR-J176	FR-J174	559.7	16.0	130.0	-354.1	0.6	0.1	0.1
☐	FR-P277	FR-J178	FR-J128	301.0	8.0	120.0	77.6	0.5	0.1	0.2
☐	FR-P279	J180	FR-J178	343.9	8.0	120.0	52.1	0.3	0.0	0.1
☐	FR-P281	J120	FR-J190	282.0	8.0	120.0	57.8	0.4	0.0	0.1
☐	P283	FR-J190	FR-J188	347.2	8.0	120.0	27.2	0.2	0.0	0.0
☐	FR-P285	FR-J188	FR-J186	356.7	8.0	120.0	9.3	0.1	0.0	0.0
☐	FR-P287	FR-J186	FR-J192	352.1	8.0	120.0	9.1	0.1	0.0	0.0
☐	FR-P289	FR-J190	FR-J182	807.9	8.0	120.0	12.4	0.1	0.0	0.0
☐	FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	24.9	0.2	0.0	0.0
☐	FR-P291	J180	FR-J182	311.0	8.0	120.0	16.2	0.1	0.0	0.0
☐	FR-P293	FR-J182	FR-J184	276.9	8.0	120.0	23.2	0.1	0.0	0.0
☐	FR-P295	FR-J184	FR-J186	775.5	8.0	120.0	-0.1	0.0	0.0	0.0
☐	P297	FR-J184	FR-J188	570.0	8.0	120.0	-7.3	0.0	0.0	0.0
☐	P299	FR-J190	FR-J196	1,748.0	8.0	120.0	12.8	0.1	0.0	0.0
☐	FR-P301	FR-J196	FR-J192	317.5	8.0	120.0	4.7	0.0	0.0	0.0
☐	P303	FR-J196	FR-J192	943.8	8.0	120.0	2.6	0.0	0.0	0.0
☐	FR-P305	FR-J192	FR-J194	1,158.4	8.0	120.0	11.1	0.1	0.0	0.0
☐	FR-P307	FR-J184	FR-J194	307.7	8.0	120.0	25.2	0.2	0.0	0.0
☐	FR-P309	FR-J194	FR-J178	437.0	8.0	120.0	30.9	0.2	0.0	0.0
☐	FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	79.2	0.5	0.1	0.2
☐	P311	FR-J186	FR-J188	1,054.4	8.0	120.0	-5.2	0.0	0.0	0.0
☐	FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	-10.2	0.1	0.0	0.0
☐	FR-P35	J46	J48	968.3	8.0	120.0	-51.3	0.3	0.1	0.1

Run No. 9 - Phase III MDD + 3,500 gpm MF Fire at FR-J234 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
FR-P357	FR-J174	FR-J220	925.0	16.0	120.0	-354.1	0.6	0.1	0.1
FR-P359	FR-J220	J222	855.4	16.0	130.0	-354.1	0.6	0.1	0.1
FR-P363	J222	T5002	706.1	16.0	130.0	-354.1	0.6	0.1	0.1
FR-P365	FR-J146	J250	647.1	12.0	120.0	31.3	0.1	0.0	0.0
FR-P367	FR-J228	FR-J144	576.3	12.0	120.0	20.5	0.1	0.0	0.0
FR-P369	FR-J68	J112	738.1	16.0	130.0	-1,599.7	2.6	1.1	1.5
FR-P37	J48	FR-J34	262.8	8.0	120.0	-19.3	0.1	0.0	0.0
FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	-20.4	0.1	0.0	0.0
FR-P373	FR-J230	J156	783.6	8.0	120.0	-24.5	0.2	0.0	0.0
P375	FR-J232	FR-J132	247.6	16.0	130.0	-218.9	0.3	0.0	0.0
FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	-1,599.0	4.5	6.4	7.0
FR-P379	J236	FR-J244	776.6	16.0	130.0	0.0	0.0	0.0	0.0
FR-P381	J238	FR-J28	227.5	8.0	120.0	-91.6	0.6	0.1	0.3
FR-P383	FR-J240	J46	228.2	8.0	120.0	-29.9	0.2	0.0	0.0
FR-P385	J242	FR-J26	703.2	8.0	120.0	-45.5	0.3	0.0	0.1
FR-P387	J246	J120	3,168.1	16.0	130.0	0.0	0.0	0.0	0.0
FR-P389	FR-J244	U7000	14.8	16.0	130.0	0.0	0.0	0.0	0.0
FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	-47.5	0.3	0.0	0.1
FR-P391	U7000	J248	41.5	16.0	130.0	0.0	0.0	0.0	0.0
FR-P397	J248	J246	151.4	16.0	130.0	0.0	0.0	0.0	0.0
FR-P399	J250	FR-J228	236.6	12.0	120.0	25.9	0.1	0.0	0.0
FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	-62.4	0.4	0.0	0.1
P43	J64	FR-J54	1,109.8	8.0	120.0	110.5	0.7	0.4	0.4
FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	-329.7	2.1	0.5	2.7
P47	FR-J54	FR-J52	314.0	8.0	120.0	-161.7	1.0	0.2	0.7
FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	-69.8	0.4	0.0	0.2
FR-P51	FR-J40	J42	194.9	8.0	120.0	-103.3	0.7	0.1	0.3
P53	J42	FR-J44	320.6	8.0	120.0	-92.7	0.6	0.1	0.3
FR-P55	FR-J44	J46	317.1	8.0	120.0	-56.1	0.4	0.0	0.1
FR-P57	J46	J238	383.6	8.0	120.0	-34.6	0.2	0.0	0.0
FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-43.9	0.3	0.0	0.1
P61	FR-J20	FR-J22	776.2	8.0	120.0	-33.6	0.2	0.0	0.0
P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-54.5	0.3	0.1	0.1
P65	FR-J22	FR-J26	303.7	8.0	120.0	1.3	0.0	0.0	0.0
P67	FR-J28	J242	66.1	8.0	120.0	-27.2	0.2	0.0	0.0
P69	FR-J26	FR-J24	799.4	8.0	120.0	-63.8	0.4	0.1	0.1
P71	FR-J24	J60	309.0	8.0	120.0	-250.1	1.6	0.5	1.6
P73	J60	FR-J62	335.9	8.0	120.0	-425.4	2.7	1.5	4.4

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P75	FR-J62	FR-J68	549.1	12.0	120.0	-717.7	2.0	0.9	1.6
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-882.1	2.5	3.4	2.3
☐	P79	J64	FR-J62	1,090.0	8.0	120.0	-272.7	1.7	2.1	1.9
☐	P81	FR-J66	J60	903.3	8.0	120.0	-155.7	1.0	0.6	0.7
☐	P83	FR-J58	FR-J24	674.4	8.0	120.0	-74.0	0.5	0.1	0.2
☐	P85	FR-J52	FR-J66	869.1	8.0	120.0	-82.0	0.5	0.2	0.2
☐	FR-P87	J42	FR-J54	934.2	8.0	120.0	77.1	0.5	0.2	0.2
☐	FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	29.5	0.2	0.0	0.0
☐	P91	FR-J36	J42	808.3	8.0	120.0	96.7	0.6	0.2	0.3
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	66.1	0.4	0.1	0.1
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	-37.9	0.2	0.0	0.0
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	-77.9	0.5	0.1	0.2
☐	P99	J14	FR-J114	206.1	8.0	120.0	215.7	1.4	0.3	1.2
☐	FR-P300	J9638	J112	7,595.0	16.0	130.0	1,599.7	2.6	11.3	1.5
☐	P318	J9634	FR-J108	416.6	12.0	120.0	-526.2	1.5	0.4	0.9
☐	P320	J9634	J9636	1,125.0	12.0	120.0	0.0	0.0	0.0	0.0
☐	P322	J9636	FR-J128	3,148.4	10.0	120.0	0.0	0.0	0.0	0.0

Run No. 10 - Phase III MDD + 3,500 gpm Comm Fire at FR-J170/FR-J136 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	35.0	606.0	860.4	110.2
J102	2.3	599.0	860.4	113.3
FR-J104	35.0	612.0	860.4	107.6
J106	108.8	625.0	860.4	102.0
FR-J108	0.0	615.0	860.4	106.3
FR-J110	183.6	595.0	860.3	115.0
J112	0.0	530.0	866.1	145.6
FR-J114	0.0	730.0	860.7	56.6
FR-J116	0.0	619.0	860.4	104.6
FR-J118	0.0	785.0	862.4	33.5
J12	3.1	725.0	860.4	58.7
J120	33.4	1,057.0	1,215.3	68.6
FR-J122	5.4	1,066.0	1,215.1	64.6
FR-J128	77.6	1,025.7	1,215.0	82.0
J130	5.4	1,095.7	1,215.3	51.8
FR-J132	5.4	1,100.4	1,215.0	49.7
FR-J134	5.4	1,114.0	1,214.9	43.7
FR-J136	1,755.4	1,050.0	1,214.6	71.3
FR-J138	5.4	1,077.6	1,215.1	59.6
J14	0.0	724.0	860.4	59.1
J140	5.4	1,028.0	1,214.7	80.9
J142	5.4	1,036.5	1,214.7	77.2
FR-J144	5.4	1,108.5	1,214.8	46.1
FR-J146	5.4	1,111.0	1,214.8	45.0
J148	5.4	1,100.0	1,214.7	49.7
FR-J150	5.4	1,076.0	1,214.7	60.1
J152	5.4	1,062.0	1,214.7	66.2
J154	5.4	1,050.0	1,214.7	71.4
J156	5.4	1,057.0	1,214.7	68.3
J158	5.4	1,068.0	1,214.7	63.6
FR-J16	0.0	754.0	860.8	46.3
J160	5.4	1,092.0	1,214.7	53.2
J162	5.4	1,060.5	1,214.7	66.8
J164	5.4	1,098.0	1,214.8	50.6
FR-J166	5.4	1,069.0	1,214.7	63.1
J168	5.4	1,090.0	1,214.8	54.1

Run No. 10 - Phase III MDD + 3,500 gpm Comm Fire at FR-J170/FR-J136 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J170	1,755.4	1,057.0	1,211.0	66.7
FR-J172	5.4	1,072.0	1,213.2	61.2
FR-J174	0.0	1,096.3	1,217.7	52.6
FR-J176	0.0	1,102.3	1,216.7	49.6
FR-J178	5.4	1,039.7	1,215.1	76.0
FR-J18	9.0	726.0	860.9	58.5
J180	5.4	1,056.0	1,215.1	68.9
FR-J182	5.4	1,057.0	1,215.1	68.5
FR-J184	5.4	1,061.5	1,215.1	66.6
FR-J186	5.4	1,072.7	1,215.1	61.7
FR-J188	5.4	1,094.0	1,215.1	52.5
FR-J190	5.4	1,072.0	1,215.1	62.0
FR-J192	5.4	1,046.5	1,215.1	73.1
FR-J194	5.4	1,041.0	1,215.1	75.4
FR-J196	5.4	1,049.2	1,215.1	71.9
FR-J20	0.0	656.0	861.1	88.9
FR-J22	19.6	642.0	861.3	95.0
FR-J220	0.0	1,100.7	1,219.7	51.5
J222	0.0	1,109.0	1,221.2	48.6
FR-J228	5.4	1,148.0	1,214.8	29.0
FR-J230	49.3	1,075.5	1,214.7	60.3
FR-J232	5.4	1,105.0	1,214.9	47.6
FR-J234	24.3	560.0	860.6	130.3
J236	12.0	728.0	859.8	57.1
J238	56.9	684.0	861.0	76.7
FR-J24	57.8	632.0	861.6	99.5
FR-J240	19.6	690.0	861.1	74.1
J242	18.2	679.0	861.1	78.9
FR-J244	0.0	718.0	857.9	60.6
J246	0.0	760.0	1,223.0	200.6
J248	0.0	718.0	1,223.3	219.0
J250	5.4	1,154.0	1,214.8	26.4
FR-J26	19.6	666.0	861.3	84.6
FR-J28	0.0	680.0	861.1	78.5
FR-J30	0.0	731.0	860.9	56.3
FR-J32	9.0	744.0	860.9	50.6

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J34	0.0	721.0	860.9	60.6
FR-J36	9.0	697.0	860.8	71.0
FR-J38	0.0	691.0	860.8	73.6
FR-J40	0.0	650.0	861.0	91.4
J42	9.0	655.0	861.0	89.3
FR-J44	0.0	679.0	861.0	78.9
J46	0.0	703.0	861.0	68.5
J48	6.3	732.0	860.9	55.9
FR-J50	19.6	670.0	861.3	82.9
FR-J52	19.6	646.0	861.3	93.3
FR-J54	19.6	623.0	861.2	103.2
FR-J56	18.2	617.0	861.2	105.8
FR-J58	19.6	644.0	861.6	94.3
J60	19.6	608.0	862.4	110.2
FR-J62	19.6	584.0	864.1	121.4
J64	19.6	596.0	862.1	115.3
FR-J66	19.6	620.0	861.8	104.8
FR-J68	0.0	557.0	865.1	133.5
J70	0.0	557.0	862.2	132.3
J72	0.0	545.0	861.2	137.0
J74	16.9	540.0	860.8	139.0
J76	152.0	555.0	860.5	132.4
FR-J78	0.0	582.0	860.4	120.7
FR-J80	0.0	587.0	860.4	118.5
FR-J82	31.9	592.0	860.4	116.3
FR-J84	0.0	587.0	860.4	118.5
FR-J86	2.3	595.0	860.4	115.0
J88	0.0	599.0	860.4	113.3
FR-J90	35.0	608.0	860.4	109.4
FR-J92	0.0	602.0	860.4	112.0
FR-J94	1.1	617.0	860.4	105.5
FR-J96	1.7	623.0	860.4	102.8
FR-J98	2.3	615.0	860.4	106.3
J9634	0.0	608.8	860.3	109.0
J9636	0.0	768.0	1,215.0	193.7

Run No. 10 - Phase III MDD + 3,500 gpm Comm Fire at FR-J170/FR-J136 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8.0	120.0	-133.5	0.9	0.2	0.5
☐	FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	-79.5	0.5	0.2	0.2
☐	P105	FR-J16	FR-J18	931.7	8.0	120.0	-57.9	0.4	0.1	0.1
☐	FR-P107	J48	FR-J30	148.3	8.0	120.0	-4.0	0.0	0.0	0.0
☐	FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	6.7	0.0	0.0	0.0
☐	P11	332	FR-J118	4,814.1	16.0	130.0	247.3	0.4	0.2	0.0
☐	FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	-49.5	0.3	0.0	0.1
☐	P113	FR-J18	FR-J20	1,249.6	8.0	120.0	-60.2	0.4	0.1	0.1
☐	P115	J72	J74	449.1	12.0	120.0	567.5	1.6	0.5	1.0
☐	FR-P117	J74	J76	983.8	12.0	120.0	305.4	0.9	0.3	0.3
☐	FR-P119	J76	FR-J80	1,411.8	8.0	120.0	24.4	0.2	0.0	0.0
☐	FR-P121	J74	FR-J234	771.1	12.0	120.0	245.3	0.7	0.2	0.2
☐	P123	FR-J78	FR-J80	385.2	8.0	120.0	40.4	0.3	0.0	0.1
☐	P125	FR-J80	FR-J82	272.6	8.0	120.0	64.8	0.4	0.0	0.1
☐	P127	FR-J82	J88	282.9	8.0	120.0	33.5	0.2	0.0	0.0
☐	P129	J88	FR-J90	282.1	8.0	120.0	30.7	0.2	0.0	0.0
☐	P13	J12	J14	254.6	16.0	130.0	-578.2	0.9	0.1	0.2
☐	P131	FR-J90	FR-J94	289.7	8.0	120.0	3.7	0.0	0.0	0.0
☐	P133	FR-J94	FR-J92	655.1	12.0	120.0	-66.8	0.2	0.0	0.0
☐	P135	FR-J92	FR-J86	279.5	12.0	120.0	-98.7	0.3	0.0	0.0
☐	P137	FR-J86	FR-J84	279.6	12.0	120.0	-135.5	0.4	0.0	0.1
☐	P139	FR-J84	FR-J78	275.6	12.0	120.0	-180.6	0.5	0.0	0.1
☐	P141	FR-J82	FR-J84	348.7	8.0	120.0	-45.0	0.3	0.0	0.1
☐	P143	J88	FR-J86	349.5	8.0	120.0	-34.5	0.2	0.0	0.0
☐	P145	FR-J90	FR-J92	353.7	8.0	120.0	-31.9	0.2	0.0	0.0
☐	P147	FR-J82	J102	351.1	8.0	120.0	44.5	0.3	0.0	0.1
☐	P149	J88	J100	351.1	8.0	120.0	37.2	0.2	0.0	0.0
☐	P15	J14	FR-J38	779.2	12.0	120.0	-365.1	1.0	0.4	0.5
☐	P151	FR-J90	FR-J98	347.8	8.0	120.0	24.0	0.2	0.0	0.0
☐	P153	FR-J94	FR-J96	349.5	12.0	120.0	69.3	0.2	0.0	0.0
☐	P155	J102	FR-J104	786.9	8.0	120.0	21.5	0.1	0.0	0.0
☐	P157	FR-J104	FR-J108	225.7	8.0	120.0	7.2	0.0	0.0	0.0
☐	P159	FR-J104	J100	561.9	8.0	120.0	-20.7	0.1	0.0	0.0
☐	P161	FR-J108	FR-J116	303.3	12.0	120.0	-47.4	0.1	0.0	0.0
☐	P163	FR-J116	J106	448.5	12.0	120.0	-27.5	0.1	0.0	0.0
☐	P165	J102	J100	282.9	8.0	120.0	20.7	0.1	0.0	0.0
☐	P167	J100	FR-J98	282.9	8.0	120.0	2.3	0.0	0.0	0.0
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	4.1	0.0	0.0	0.0

Run No. 10 - Phase III MDD + 3,500 gpm Comm Fire at FR-J170/FR-J136 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P17	FR-J38	FR-J40	783.0	12.0	120.0	-276.9	0.8	0.2	0.3
☐	P171	FR-J96	J106	204.2	12.0	120.0	71.7	0.2	0.0	0.0
☐	P173	FR-J98	FR-J116	428.9	8.0	120.0	19.8	0.1	0.0	0.0
☐	P175	J76	FR-J110	1,850.1	12.0	120.0	129.0	0.4	0.1	0.1
☐	P177	FR-J110	J9634	932.1	12.0	120.0	-54.5	0.2	0.0	0.0
☐	P179	J106	J12	1,077.1	16.0	130.0	-64.6	0.1	0.0	0.0
☐	P181	FR-J118	J12	1,373.8	16.0	130.0	1,586.5	2.5	2.0	1.5
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-1,339.2	2.1	0.9	1.1
☐	P185	J12	J236	233.6	16.0	130.0	2,097.0	3.3	0.6	2.5
☐	P187	J120	FR-J136	360.9	16.0	130.0	1,724.0	2.8	0.6	1.7
☐	P189	FR-J136	J142	463.3	8.0	120.0	-62.3	0.4	0.1	0.1
☐	P19	FR-J40	FR-J56	965.3	12.0	120.0	-228.4	0.6	0.2	0.2
☐	P191	J142	J140	504.2	8.0	120.0	-22.6	0.1	0.0	0.0
☐	P193	J140	J154	1,203.3	8.0	120.0	4.4	0.0	0.0	0.0
☐	P195	J154	J156	136.1	8.0	120.0	-24.9	0.2	0.0	0.0
☐	P197	J156	J158	254.4	10.0	120.0	-55.6	0.2	0.0	0.0
☐	P199	J158	J160	304.4	10.0	120.0	-57.2	0.2	0.0	0.0
☐	P201	J160	J148	870.8	10.0	120.0	-46.9	0.2	0.0	0.0
☐	P203	J148	FR-J150	309.6	8.0	120.0	34.9	0.2	0.0	0.0
☐	P205	FR-J150	J152	305.7	8.0	120.0	42.3	0.3	0.0	0.1
☐	P207	J152	J140	308.3	8.0	120.0	32.4	0.2	0.0	0.0
☐	P209	J152	J158	1,101.6	8.0	120.0	3.8	0.0	0.0	0.0
☐	FR-P21	FR-J56	J72	956.4	12.0	120.0	-135.8	0.4	0.1	0.1
☐	P211	FR-J150	J160	875.5	8.0	120.0	15.6	0.1	0.0	0.0
☐	P213	J154	FR-J230	729.8	8.0	120.0	23.9	0.2	0.0	0.0
☐	P215	J148	FR-J144	849.8	10.0	120.0	-87.2	0.4	0.1	0.1
☐	P217	FR-J144	J164	303.3	8.0	120.0	78.5	0.5	0.1	0.2
☐	FR-P219	J162	J142	306.8	8.0	120.0	45.1	0.3	0.0	0.1
☐	P221	J164	J162	312.3	8.0	120.0	63.5	0.4	0.0	0.1
☐	P223	J152	J162	637.3	8.0	120.0	0.6	0.0	0.0	0.0
☐	FR-P225	FR-J150	J164	746.2	8.0	120.0	-28.4	0.2	0.0	0.0
☐	FR-P227	FR-J144	FR-J146	262.7	10.0	120.0	-107.8	0.4	0.0	0.1
☐	P229	FR-J146	FR-J134	376.3	16.0	130.0	-187.2	0.3	0.0	0.0
☐	FR-P23	J72	J70	657.1	12.0	120.0	-703.3	2.0	1.0	1.5
☐	P231	J162	FR-J166	404.6	8.0	120.0	13.6	0.1	0.0	0.0
☐	P233	J164	J168	504.6	8.0	120.0	-18.8	0.1	0.0	0.0
☐	P235	FR-J136	FR-J166	349.6	8.0	120.0	-84.0	0.5	0.1	0.2
☐	P237	FR-J166	J168	280.4	8.0	120.0	-75.7	0.5	0.0	0.2

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P239	J168	FR-J134	308.8	8.0	120.0	-99.9	0.6	0.1	0.3
☐	P241	FR-J134	FR-J232	208.9	16.0	130.0	-292.4	0.5	0.0	0.1
☐	P243	FR-J136	FR-J170	302.4	8.0	120.0	739.6	4.7	3.7	12.1
☐	P245	FR-J170	FR-J138	602.0	8.0	120.0	-540.7	3.5	4.1	6.8
☐	P247	FR-J132	FR-J172	329.0	8.0	120.0	480.4	3.1	1.8	5.5
☐	P249	FR-J172	FR-J170	418.5	8.0	120.0	475.1	3.0	2.2	5.3
☐	FR-P25	J70	J64	570.3	8.0	120.0	94.5	0.6	0.2	0.3
☐	P251	FR-J136	FR-J232	882.1	16.0	130.0	-624.7	1.0	0.2	0.3
☐	P253	FR-J132	J130	247.4	16.0	130.0	-1,408.4	2.2	0.3	1.2
☐	P255	J120	FR-J122	979.3	12.0	120.0	211.0	0.6	0.2	0.2
☐	P257	FR-J122	FR-J138	261.2	12.0	120.0	190.8	0.5	0.0	0.1
☐	P259	FR-J138	J130	540.8	12.0	120.0	-355.4	1.0	0.2	0.4
☐	FR-P265	FR-J122	J180	193.1	8.0	120.0	14.8	0.1	0.0	0.0
☐	FR-P269	J130	FR-J176	798.7	16.0	130.0	-1,769.1	2.8	1.4	1.8
☐	FR-P27	J64	FR-J66	302.4	8.0	120.0	176.7	1.1	0.3	0.9
☐	FR-P271	FR-J176	FR-J174	559.7	16.0	130.0	-1,769.1	2.8	1.0	1.8
☐	FR-P277	FR-J178	FR-J128	301.0	8.0	120.0	77.6	0.5	0.1	0.2
☐	FR-P279	J180	FR-J178	343.9	8.0	120.0	42.6	0.3	0.0	0.1
☐	FR-P281	J120	FR-J190	282.0	8.0	120.0	116.6	0.7	0.1	0.4
☐	P283	FR-J190	FR-J188	347.2	8.0	120.0	51.3	0.3	0.0	0.1
☐	FR-P285	FR-J188	FR-J186	356.7	8.0	120.0	16.1	0.1	0.0	0.0
☐	FR-P287	FR-J186	FR-J192	352.1	8.0	120.0	6.0	0.0	0.0	0.0
☐	FR-P289	FR-J190	FR-J182	807.9	8.0	120.0	37.6	0.2	0.0	0.0
☐	FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	149.5	1.0	0.2	0.6
☐	FR-P291	J180	FR-J182	311.0	8.0	120.0	-33.1	0.2	0.0	0.0
☐	FR-P293	FR-J182	FR-J184	276.9	8.0	120.0	-0.9	0.0	0.0	0.0
☐	FR-P295	FR-J184	FR-J186	775.5	8.0	120.0	-13.6	0.1	0.0	0.0
☐	P297	FR-J184	FR-J188	570.0	8.0	120.0	-20.9	0.1	0.0	0.0
☐	P299	FR-J190	FR-J196	1,748.0	8.0	120.0	22.4	0.1	0.0	0.0
☐	FR-P301	FR-J196	FR-J192	317.5	8.0	120.0	10.9	0.1	0.0	0.0
☐	P303	FR-J196	FR-J192	943.8	8.0	120.0	6.1	0.0	0.0	0.0
☐	FR-P305	FR-J192	FR-J194	1,158.4	8.0	120.0	17.7	0.1	0.0	0.0
☐	FR-P307	FR-J184	FR-J194	307.7	8.0	120.0	28.1	0.2	0.0	0.0
☐	FR-P309	FR-J194	FR-J178	437.0	8.0	120.0	40.4	0.3	0.0	0.1
☐	FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	143.0	0.9	0.4	0.6
☐	P311	FR-J186	FR-J188	1,054.4	8.0	120.0	-8.9	0.1	0.0	0.0
☐	FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	104.6	0.7	0.2	0.3
☐	FR-P35	J46	J48	968.3	8.0	120.0	59.3	0.4	0.1	0.1

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P357	FR-J174	FR-J220	925.0	16.0	120.0	-1,769.1	2.8	1.9	2.1
☐	FR-P359	FR-J220	J222	855.4	16.0	130.0	-1,769.1	2.8	1.5	1.8
☐	FR-P363	J222	T5002	706.1	16.0	130.0	-1,769.1	2.8	1.3	1.8
☐	FR-P365	FR-J146	J250	647.1	12.0	120.0	74.0	0.2	0.0	0.0
☐	FR-P367	FR-J228	FR-J144	576.3	12.0	120.0	63.2	0.2	0.0	0.0
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-1,555.0	2.5	1.0	1.4
☐	FR-P37	J48	FR-J34	262.8	8.0	120.0	57.0	0.4	0.0	0.1
☐	FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	60.3	0.4	0.1	0.1
☐	FR-P373	FR-J230	J156	783.6	8.0	120.0	-25.4	0.2	0.0	0.0
☐	P375	FR-J232	FR-J132	247.6	16.0	130.0	-922.6	1.5	0.1	0.5
☐	FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	221.0	0.6	0.2	0.2
☐	FR-P379	J236	FR-J244	776.6	16.0	130.0	2,085.0	3.3	1.9	2.4
☐	FR-P381	J238	FR-J28	227.5	8.0	120.0	-55.6	0.4	0.0	0.1
☐	FR-P383	FR-J240	J46	228.2	8.0	120.0	84.9	0.5	0.1	0.2
☐	FR-P385	J242	FR-J26	703.2	8.0	120.0	-99.7	0.6	0.2	0.3
☐	FR-P387	J246	J120	3,168.1	16.0	130.0	2,085.0	3.3	7.7	2.4
☐	FR-P389	FR-J244	U7000	14.8	16.0	130.0	2,085.0	3.3	0.0	2.4
☐	FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	91.0	0.6	0.1	0.3
☐	FR-P391	U7000	J248	41.5	16.0	130.0	2,085.0	3.3	0.1	2.4
☐	FR-P397	J248	J246	151.4	16.0	130.0	2,085.0	3.3	0.4	2.4
☐	FR-P399	J250	FR-J228	236.6	12.0	120.0	68.6	0.2	0.0	0.0
☐	FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	88.2	0.6	0.0	0.2
☐	P43	J64	FR-J54	1,109.8	8.0	120.0	166.9	1.1	0.9	0.8
☐	FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	-110.8	0.7	0.1	0.4
☐	P47	FR-J54	FR-J52	314.0	8.0	120.0	-55.4	0.4	0.0	0.1
☐	FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	-18.8	0.1	0.0	0.0
☐	FR-P51	FR-J40	J42	194.9	8.0	120.0	-48.5	0.3	0.0	0.1
☐	P53	J42	FR-J44	320.6	8.0	120.0	-51.3	0.3	0.0	0.1
☐	FR-P55	FR-J44	J46	317.1	8.0	120.0	-24.3	0.2	0.0	0.0
☐	FR-P57	J46	J238	383.6	8.0	120.0	1.3	0.0	0.0	0.0
☐	FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-34.4	0.2	0.0	0.0
☐	P61	FR-J20	FR-J22	776.2	8.0	120.0	-94.6	0.6	0.2	0.3
☐	P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-107.6	0.7	0.4	0.3
☐	P65	FR-J22	FR-J26	303.7	8.0	120.0	-6.6	0.0	0.0	0.0
☐	P67	FR-J28	J242	66.1	8.0	120.0	-81.5	0.5	0.0	0.2
☐	P69	FR-J26	FR-J24	799.4	8.0	120.0	-125.9	0.8	0.4	0.5
☐	P71	FR-J24	J60	309.0	8.0	120.0	-304.5	1.9	0.7	2.3
☐	P73	J60	FR-J62	335.9	8.0	120.0	-468.9	3.0	1.7	5.2

Run No. 10 - Phase III MDD + 3,500 gpm Comm Fire at FR-J170/FR-J136 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P75	FR-J62	FR-J68	549.1	12.0	120.0	-757.2	2.1	1.0	1.8
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-797.8	2.3	2.8	1.9
☐	P79	J64	FR-J62	1,090.0	8.0	120.0	-268.7	1.7	2.0	1.9
☐	P81	FR-J66	J60	903.3	8.0	120.0	-144.8	0.9	0.5	0.6
☐	P83	FR-J58	FR-J24	674.4	8.0	120.0	-13.2	0.1	0.0	0.0
☐	P85	FR-J52	FR-J66	869.1	8.0	120.0	-152.3	1.0	0.6	0.6
☐	FR-P87	J42	FR-J54	934.2	8.0	120.0	-91.9	0.6	0.2	0.3
☐	FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	-96.0	0.6	0.2	0.3
☐	P91	FR-J36	J42	808.3	8.0	120.0	-85.7	0.5	0.2	0.2
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	-69.1	0.4	0.1	0.2
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	35.0	0.2	0.0	0.0
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	75.6	0.5	0.1	0.2
☐	P99	J14	FR-J114	206.1	8.0	120.0	-213.1	1.4	0.2	1.2
☐	FR-P300	J9638	J112	7,595.0	16.0	130.0	1,555.0	2.5	10.7	1.4
☐	P318	J9634	FR-J108	416.6	12.0	120.0	-54.5	0.2	0.0	0.0
☐	P320	J9634	J9636	1,125.0	12.0	120.0	0.0	0.0	0.0	0.0
☐	P322	J9636	FR-J128	3,148.4	10.0	120.0	0.0	0.0	0.0	0.0

Run No. 11 - Phase III MDD + 2,500 gpm SF Fire at J250 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	35.0	606.0	860.9	110.4
J102	2.3	599.0	860.9	113.5
FR-J104	35.0	612.0	860.9	107.8
J106	108.8	625.0	860.9	102.2
FR-J108	0.0	615.0	860.9	106.5
FR-J110	183.6	595.0	860.9	115.2
J112	0.0	530.0	866.6	145.9
FR-J114	0.0	730.0	861.2	56.8
FR-J116	0.0	619.0	860.9	104.8
FR-J118	0.0	785.0	862.8	33.7
J12	3.1	725.0	860.9	58.9
J120	33.4	1,057.0	1,221.6	71.3
FR-J122	5.4	1,066.0	1,221.3	67.3
FR-J128	77.6	1,025.7	1,221.2	84.7
J130	5.4	1,095.7	1,221.1	54.3
FR-J132	5.4	1,100.4	1,220.9	52.2
FR-J134	5.4	1,114.0	1,220.2	46.0
FR-J136	5.4	1,050.0	1,221.1	74.1
FR-J138	5.4	1,077.6	1,221.2	62.2
J14	0.0	724.0	860.9	59.3
J140	5.4	1,028.0	1,219.7	83.1
J142	5.4	1,036.5	1,220.0	79.5
FR-J144	5.4	1,108.5	1,218.8	47.8
FR-J146	5.4	1,111.0	1,219.4	47.0
J148	5.4	1,100.0	1,219.3	51.7
FR-J150	5.4	1,076.0	1,219.5	62.2
J152	5.4	1,062.0	1,219.6	68.3
J154	5.4	1,050.0	1,219.5	73.4
J156	5.4	1,057.0	1,219.4	70.4
J158	5.4	1,068.0	1,219.4	65.6
FR-J16	0.0	754.0	861.4	46.5
J160	5.4	1,092.0	1,219.4	55.2
J162	5.4	1,060.5	1,219.9	69.1
J164	5.4	1,098.0	1,219.6	52.7
FR-J166	5.4	1,069.0	1,220.3	65.5
J168	5.4	1,090.0	1,220.1	56.4

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J170	5.4	1,057.0	1,221.1	71.1
FR-J172	5.4	1,072.0	1,221.0	64.6
FR-J174	0.0	1,096.3	1,221.6	54.3
FR-J176	0.0	1,102.3	1,221.4	51.6
FR-J178	5.4	1,039.7	1,221.3	78.7
FR-J18	9.0	726.0	861.5	58.7
J180	5.4	1,056.0	1,221.3	71.6
FR-J182	5.4	1,057.0	1,221.3	71.2
FR-J184	5.4	1,061.5	1,221.3	69.3
FR-J186	5.4	1,072.7	1,221.4	64.4
FR-J188	5.4	1,094.0	1,221.4	55.2
FR-J190	5.4	1,072.0	1,221.4	64.7
FR-J192	5.4	1,046.5	1,221.4	75.8
FR-J194	5.4	1,041.0	1,221.3	78.1
FR-J196	5.4	1,049.2	1,221.4	74.6
FR-J20	0.0	656.0	861.6	89.1
FR-J22	19.6	642.0	861.8	95.2
FR-J220	0.0	1,100.7	1,222.1	52.6
J222	0.0	1,109.0	1,222.4	49.1
FR-J228	5.4	1,148.0	1,216.7	29.8
FR-J230	49.3	1,075.5	1,219.4	62.4
FR-J232	5.4	1,105.0	1,220.7	50.1
FR-J234	24.3	560.0	861.1	130.5
J236	12.0	728.0	860.3	57.3
J238	56.9	684.0	861.6	76.9
FR-J24	57.8	632.0	862.2	99.7
FR-J240	19.6	690.0	861.6	74.4
J242	18.2	679.0	861.6	79.1
FR-J244	0.0	718.0	858.5	60.9
J246	0.0	760.0	1,229.1	203.3
J248	0.0	718.0	1,229.5	221.6
J250	2,505.4	1,154.0	1,215.9	26.8
FR-J26	19.6	666.0	861.8	84.8
FR-J28	0.0	680.0	861.6	78.7
FR-J30	0.0	731.0	861.5	56.5
FR-J32	9.0	744.0	861.4	50.9

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J34	0.0	721.0	861.4	60.8
FR-J36	9.0	697.0	861.3	71.2
FR-J38	0.0	691.0	861.3	73.8
FR-J40	0.0	650.0	861.5	91.6
J42	9.0	655.0	861.5	89.5
FR-J44	0.0	679.0	861.6	79.1
J46	0.0	703.0	861.6	68.7
J48	6.3	732.0	861.5	56.1
FR-J50	19.6	670.0	861.8	83.1
FR-J52	19.6	646.0	861.8	93.5
FR-J54	19.6	623.0	861.8	103.5
FR-J56	18.2	617.0	861.7	106.0
FR-J58	19.6	644.0	862.2	94.5
J60	19.6	608.0	862.9	110.4
FR-J62	19.6	584.0	864.6	121.6
J64	19.6	596.0	862.6	115.5
FR-J66	19.6	620.0	862.4	105.0
FR-J68	0.0	557.0	865.6	133.7
J70	0.0	557.0	862.8	132.5
J72	0.0	545.0	861.8	137.3
J74	16.9	540.0	861.3	139.2
J76	152.0	555.0	861.0	132.6
FR-J78	0.0	582.0	861.0	120.9
FR-J80	0.0	587.0	861.0	118.7
FR-J82	31.9	592.0	860.9	116.5
FR-J84	0.0	587.0	860.9	118.7
FR-J86	2.3	595.0	860.9	115.2
J88	0.0	599.0	860.9	113.5
FR-J90	35.0	608.0	860.9	109.6
FR-J92	0.0	602.0	860.9	112.2
FR-J94	1.1	617.0	860.9	105.7
FR-J96	1.7	623.0	860.9	103.1
FR-J98	2.3	615.0	860.9	106.5
J9634	0.0	608.8	860.9	109.2
J9636	0.0	768.0	1,221.2	196.4

Run No. 11 - Phase III MDD + 2,500 gpm SF Fire at J250 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8.0	120.0	-133.2	0.9	0.2	0.5
☐	FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	-79.3	0.5	0.2	0.2
☐	P105	FR-J16	FR-J18	931.7	8.0	120.0	-57.8	0.4	0.1	0.1
☐	FR-P107	J48	FR-J30	148.3	8.0	120.0	-4.0	0.0	0.0	0.0
☐	FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	6.7	0.0	0.0	0.0
☐	P11	332	FR-J118	4,814.1	16.0	130.0	235.3	0.4	0.2	0.0
☐	FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	-49.4	0.3	0.0	0.1
☐	P113	FR-J18	FR-J20	1,249.6	8.0	120.0	-60.0	0.4	0.1	0.1
☐	P115	J72	J74	449.1	12.0	120.0	566.5	1.6	0.5	1.0
☐	FR-P117	J74	J76	983.8	12.0	120.0	304.8	0.9	0.3	0.3
☐	FR-P119	J76	FR-J80	1,411.8	8.0	120.0	24.2	0.2	0.0	0.0
☐	FR-P121	J74	FR-J234	771.1	12.0	120.0	244.8	0.7	0.2	0.2
☐	P123	FR-J78	FR-J80	385.2	8.0	120.0	40.4	0.3	0.0	0.1
☐	P125	FR-J80	FR-J82	272.6	8.0	120.0	64.6	0.4	0.0	0.1
☐	P127	FR-J82	J88	282.9	8.0	120.0	33.3	0.2	0.0	0.0
☐	P129	J88	FR-J90	282.1	8.0	120.0	30.6	0.2	0.0	0.0
☐	P13	J12	J14	254.6	16.0	130.0	-576.7	0.9	0.1	0.2
☐	P131	FR-J90	FR-J94	289.7	8.0	120.0	3.6	0.0	0.0	0.0
☐	P133	FR-J94	FR-J92	655.1	12.0	120.0	-66.6	0.2	0.0	0.0
☐	P135	FR-J92	FR-J86	279.5	12.0	120.0	-98.4	0.3	0.0	0.0
☐	P137	FR-J86	FR-J84	279.6	12.0	120.0	-135.1	0.4	0.0	0.1
☐	P139	FR-J84	FR-J78	275.6	12.0	120.0	-180.1	0.5	0.0	0.1
☐	P141	FR-J82	FR-J84	348.7	8.0	120.0	-45.0	0.3	0.0	0.1
☐	P143	J88	FR-J86	349.5	8.0	120.0	-34.4	0.2	0.0	0.0
☐	P145	FR-J90	FR-J92	353.7	8.0	120.0	-31.8	0.2	0.0	0.0
☐	P147	FR-J82	J102	351.1	8.0	120.0	44.3	0.3	0.0	0.1
☐	P149	J88	J100	351.1	8.0	120.0	37.1	0.2	0.0	0.0
☐	P15	J14	FR-J38	779.2	12.0	120.0	-364.2	1.0	0.4	0.5
☐	P151	FR-J90	FR-J98	347.8	8.0	120.0	23.9	0.2	0.0	0.0
☐	P153	FR-J94	FR-J96	349.5	12.0	120.0	69.0	0.2	0.0	0.0
☐	P155	J102	FR-J104	786.9	8.0	120.0	21.4	0.1	0.0	0.0
☐	P157	FR-J104	FR-J108	225.7	8.0	120.0	7.2	0.0	0.0	0.0
☐	P159	FR-J104	J100	561.9	8.0	120.0	-20.7	0.1	0.0	0.0
☐	P161	FR-J108	FR-J116	303.3	12.0	120.0	-47.7	0.1	0.0	0.0
☐	P163	FR-J116	J106	448.5	12.0	120.0	-28.0	0.1	0.0	0.0
☐	P165	J102	J100	282.9	8.0	120.0	20.6	0.1	0.0	0.0
☐	P167	J100	FR-J98	282.9	8.0	120.0	2.0	0.0	0.0	0.0
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	3.8	0.0	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P17	FR-J38	FR-J40	783.0	12.0	120.0	-276.2	0.8	0.2	0.3
☐	P171	FR-J96	J106	204.2	12.0	120.0	71.1	0.2	0.0	0.0
☐	P173	FR-J98	FR-J116	428.9	8.0	120.0	19.8	0.1	0.0	0.0
☐	P175	J76	FR-J110	1,850.1	12.0	120.0	128.7	0.4	0.1	0.1
☐	P177	FR-J110	J9634	932.1	12.0	120.0	-54.9	0.2	0.0	0.0
☐	P179	J106	J12	1,077.1	16.0	130.0	-65.7	0.1	0.0	0.0
☐	P181	FR-J118	J12	1,373.8	16.0	130.0	1,560.0	2.5	2.0	1.4
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-1,324.7	2.1	0.8	1.1
☐	P185	J12	J236	233.6	16.0	130.0	2,067.9	3.3	0.6	2.4
☐	P187	J120	FR-J136	360.9	16.0	130.0	1,547.6	2.5	0.5	1.4
☐	P189	FR-J136	J142	463.3	8.0	120.0	303.1	1.9	1.1	2.3
☐	P19	FR-J40	FR-J56	965.3	12.0	120.0	-227.9	0.6	0.2	0.2
☐	P191	J142	J140	504.2	8.0	120.0	163.1	1.0	0.4	0.7
☐	P193	J140	J154	1,203.3	8.0	120.0	77.6	0.5	0.2	0.2
☐	P195	J154	J156	136.1	8.0	120.0	43.7	0.3	0.0	0.1
☐	P197	J156	J158	254.4	10.0	120.0	17.6	0.1	0.0	0.0
☐	P199	J158	J160	304.4	10.0	120.0	83.0	0.3	0.0	0.1
☐	P201	J160	J148	870.8	10.0	120.0	121.1	0.5	0.1	0.1
☐	P203	J148	FR-J150	309.6	8.0	120.0	-143.6	0.9	0.2	0.6
☐	P205	FR-J150	J152	305.7	8.0	120.0	-125.8	0.8	0.1	0.5
☐	P207	J152	J140	308.3	8.0	120.0	-80.1	0.5	0.1	0.2
☐	P209	J152	J158	1,101.6	8.0	120.0	70.8	0.5	0.2	0.2
☐	FR-P21	FR-J56	J72	956.4	12.0	120.0	-135.6	0.4	0.1	0.1
☐	P211	FR-J150	J160	875.5	8.0	120.0	43.4	0.3	0.1	0.1
☐	P213	J154	FR-J230	729.8	8.0	120.0	28.6	0.2	0.0	0.0
☐	P215	J148	FR-J144	849.8	10.0	120.0	259.3	1.1	0.5	0.6
☐	P217	FR-J144	J164	303.3	8.0	120.0	-321.2	2.0	0.8	2.6
☐	FR-P219	J162	J142	306.8	8.0	120.0	-134.7	0.9	0.2	0.5
☐	P221	J164	J162	312.3	8.0	120.0	-190.9	1.2	0.3	1.0
☐	P223	J152	J162	637.3	8.0	120.0	-121.9	0.8	0.3	0.4
☐	FR-P225	FR-J150	J164	746.2	8.0	120.0	-66.7	0.4	0.1	0.1
☐	FR-P227	FR-J144	FR-J146	262.7	10.0	120.0	-540.9	2.2	0.6	2.3
☐	P229	FR-J146	FR-J134	376.3	16.0	130.0	-1,941.0	3.1	0.8	2.1
☐	FR-P23	J72	J70	657.1	12.0	120.0	-702.0	2.0	1.0	1.5
☐	P231	J162	FR-J166	404.6	8.0	120.0	-183.6	1.2	0.4	0.9
☐	P233	J164	J168	504.6	8.0	120.0	-202.3	1.3	0.6	1.1
☐	P235	FR-J136	FR-J166	349.6	8.0	120.0	313.4	2.0	0.9	2.5
☐	P237	FR-J166	J168	280.4	8.0	120.0	124.4	0.8	0.1	0.4

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P239	J168	FR-J134	308.8	8.0	120.0	-83.3	0.5	0.1	0.2
☐	P241	FR-J134	FR-J232	208.9	16.0	130.0	-2,029.7	3.2	0.5	2.3
☐	P243	FR-J136	FR-J170	302.4	8.0	120.0	40.5	0.3	0.0	0.1
☐	P245	FR-J170	FR-J138	602.0	8.0	120.0	-67.1	0.4	0.1	0.1
☐	P247	FR-J132	FR-J172	329.0	8.0	120.0	-96.9	0.6	0.1	0.3
☐	P249	FR-J172	FR-J170	418.5	8.0	120.0	-102.2	0.7	0.1	0.3
☐	FR-P25	J70	J64	570.3	8.0	120.0	94.4	0.6	0.2	0.3
☐	P251	FR-J136	FR-J232	882.1	16.0	130.0	885.2	1.4	0.4	0.5
☐	P253	FR-J132	J130	247.4	16.0	130.0	-1,058.4	1.7	0.2	0.7
☐	P255	J120	FR-J122	979.3	12.0	120.0	312.5	0.9	0.3	0.3
☐	P257	FR-J122	FR-J138	261.2	12.0	120.0	338.1	1.0	0.1	0.4
☐	P259	FR-J138	J130	540.8	12.0	120.0	265.6	0.8	0.1	0.3
☐	FR-P265	FR-J122	J180	193.1	8.0	120.0	-31.0	0.2	0.0	0.0
☐	FR-P269	J130	FR-J176	798.7	16.0	130.0	-798.2	1.3	0.3	0.4
☐	FR-P27	J64	FR-J66	302.4	8.0	120.0	176.4	1.1	0.3	0.9
☐	FR-P271	FR-J176	FR-J174	559.7	16.0	130.0	-798.2	1.3	0.2	0.4
☐	FR-P277	FR-J178	FR-J128	301.0	8.0	120.0	77.6	0.5	0.1	0.2
☐	FR-P279	J180	FR-J178	343.9	8.0	120.0	28.7	0.2	0.0	0.0
☐	FR-P281	J120	FR-J190	282.0	8.0	120.0	162.5	1.0	0.2	0.7
☐	P283	FR-J190	FR-J188	347.2	8.0	120.0	71.4	0.5	0.1	0.2
☐	FR-P285	FR-J188	FR-J186	356.7	8.0	120.0	21.5	0.1	0.0	0.0
☐	FR-P287	FR-J186	FR-J192	352.1	8.0	120.0	5.3	0.0	0.0	0.0
☐	FR-P289	FR-J190	FR-J182	807.9	8.0	120.0	54.9	0.4	0.1	0.1
☐	FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	149.3	1.0	0.2	0.6
☐	FR-P291	J180	FR-J182	311.0	8.0	120.0	-65.1	0.4	0.0	0.1
☐	FR-P293	FR-J182	FR-J184	276.9	8.0	120.0	-15.6	0.1	0.0	0.0
☐	FR-P295	FR-J184	FR-J186	775.5	8.0	120.0	-22.8	0.1	0.0	0.0
☐	P297	FR-J184	FR-J188	570.0	8.0	120.0	-32.5	0.2	0.0	0.0
☐	P299	FR-J190	FR-J196	1,748.0	8.0	120.0	30.8	0.2	0.1	0.0
☐	FR-P301	FR-J196	FR-J192	317.5	8.0	120.0	16.3	0.1	0.0	0.0
☐	P303	FR-J196	FR-J192	943.8	8.0	120.0	9.1	0.1	0.0	0.0
☐	FR-P305	FR-J192	FR-J194	1,158.4	8.0	120.0	25.3	0.2	0.0	0.0
☐	FR-P307	FR-J184	FR-J194	307.7	8.0	120.0	34.3	0.2	0.0	0.0
☐	FR-P309	FR-J194	FR-J178	437.0	8.0	120.0	54.3	0.3	0.0	0.1
☐	FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	142.7	0.9	0.4	0.6
☐	P311	FR-J186	FR-J188	1,054.4	8.0	120.0	-12.0	0.1	0.0	0.0
☐	FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	104.4	0.7	0.2	0.3
☐	FR-P35	J46	J48	968.3	8.0	120.0	59.1	0.4	0.1	0.1

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P357	FR-J174	FR-J220	925.0	16.0	120.0	-798.2	1.3	0.4	0.5
☐	FR-P359	FR-J220	J222	855.4	16.0	130.0	-798.2	1.3	0.4	0.4
☐	FR-P363	J222	T5002	706.1	16.0	130.0	-798.2	1.3	0.3	0.4
☐	FR-P365	FR-J146	J250	647.1	12.0	120.0	1,394.7	4.0	3.5	5.4
☐	FR-P367	FR-J228	FR-J144	576.3	12.0	120.0	-1,116.1	3.2	2.1	3.6
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-1,552.5	2.5	1.0	1.4
☐	FR-P37	J48	FR-J34	262.8	8.0	120.0	56.8	0.4	0.0	0.1
☐	FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	60.1	0.4	0.1	0.1
☐	FR-P373	FR-J230	J156	783.6	8.0	120.0	-20.7	0.1	0.0	0.0
☐	P375	FR-J232	FR-J132	247.6	16.0	130.0	-1,149.9	1.8	0.2	0.8
☐	FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	220.4	0.6	0.2	0.2
☐	FR-P379	J236	FR-J244	776.6	16.0	130.0	2,055.9	3.3	1.8	2.4
☐	FR-P381	J238	FR-J28	227.5	8.0	120.0	-55.4	0.4	0.0	0.1
☐	FR-P383	FR-J240	J46	228.2	8.0	120.0	84.7	0.5	0.1	0.2
☐	FR-P385	J242	FR-J26	703.2	8.0	120.0	-99.4	0.6	0.2	0.3
☐	FR-P387	J246	J120	3,168.1	16.0	130.0	2,055.9	3.3	7.5	2.4
☐	FR-P389	FR-J244	U7000	14.8	16.0	130.0	2,055.9	3.3	0.0	2.4
☐	FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	90.7	0.6	0.1	0.2
☐	FR-P391	U7000	J248	41.5	16.0	130.0	2,055.9	3.3	0.1	2.4
☐	FR-P397	J248	J246	151.4	16.0	130.0	2,055.9	3.3	0.4	2.4
☐	FR-P399	J250	FR-J228	236.6	12.0	120.0	-1,110.7	3.2	0.8	3.6
☐	FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	88.0	0.6	0.0	0.2
☐	P43	J64	FR-J54	1,109.8	8.0	120.0	166.6	1.1	0.9	0.8
☐	FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	-110.5	0.7	0.1	0.4
☐	P47	FR-J54	FR-J52	314.0	8.0	120.0	-55.2	0.4	0.0	0.1
☐	FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	-18.7	0.1	0.0	0.0
☐	FR-P51	FR-J40	J42	194.9	8.0	120.0	-48.3	0.3	0.0	0.1
☐	P53	J42	FR-J44	320.6	8.0	120.0	-51.1	0.3	0.0	0.1
☐	FR-P55	FR-J44	J46	317.1	8.0	120.0	-24.2	0.2	0.0	0.0
☐	FR-P57	J46	J238	383.6	8.0	120.0	1.5	0.0	0.0	0.0
☐	FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-34.3	0.2	0.0	0.0
☐	P61	FR-J20	FR-J22	776.2	8.0	120.0	-94.4	0.6	0.2	0.3
☐	P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-107.4	0.7	0.4	0.3
☐	P65	FR-J22	FR-J26	303.7	8.0	120.0	-6.6	0.0	0.0	0.0
☐	P67	FR-J28	J242	66.1	8.0	120.0	-81.2	0.5	0.0	0.2
☐	P69	FR-J26	FR-J24	799.4	8.0	120.0	-125.7	0.8	0.4	0.5
☐	P71	FR-J24	J60	309.0	8.0	120.0	-303.9	1.9	0.7	2.3
☐	P73	J60	FR-J62	335.9	8.0	120.0	-468.1	3.0	1.7	5.2

Run No. 11 - Phase III MDD + 2,500 gpm SF Fire at J250 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P75	FR-J62	FR-J68	549.1	12.0	120.0	-756.0	2.1	1.0	1.8
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-796.5	2.3	2.8	1.9
☐	P79	J64	FR-J62	1,090.0	8.0	120.0	-268.2	1.7	2.0	1.9
☐	P81	FR-J66	J60	903.3	8.0	120.0	-144.5	0.9	0.5	0.6
☐	P83	FR-J58	FR-J24	674.4	8.0	120.0	-13.1	0.1	0.0	0.0
☐	P85	FR-J52	FR-J66	869.1	8.0	120.0	-152.0	1.0	0.6	0.6
☐	FR-P87	J42	FR-J54	934.2	8.0	120.0	-91.7	0.6	0.2	0.3
☐	FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	-95.8	0.6	0.2	0.3
☐	P91	FR-J36	J42	808.3	8.0	120.0	-85.5	0.5	0.2	0.2
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	-68.9	0.4	0.1	0.1
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	35.0	0.2	0.0	0.0
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	75.4	0.5	0.1	0.2
☐	P99	J14	FR-J114	206.1	8.0	120.0	-212.5	1.4	0.2	1.2
☐	FR-P300	J9638	J112	7,595.0	16.0	130.0	1,552.5	2.5	10.7	1.4
☐	P318	J9634	FR-J108	416.6	12.0	120.0	-54.9	0.2	0.0	0.0
☐	P320	J9634	J9636	1,125.0	12.0	120.0	0.0	0.0	0.0	0.0
☐	P322	J9636	FR-J128	3,148.4	10.0	120.0	0.0	0.0	0.0	0.0

Run No. 12 - Phase III MDD + 2,500 gpm Brush Fire at J9636 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	35.0	606.0	860.9	110.4
J102	2.3	599.0	860.9	113.5
FR-J104	35.0	612.0	860.9	107.8
J106	108.8	625.0	860.9	102.2
FR-J108	0.0	615.0	860.9	106.5
FR-J110	183.6	595.0	860.9	115.2
J112	0.0	530.0	866.6	145.9
FR-J114	0.0	730.0	861.2	56.8
FR-J116	0.0	619.0	860.9	104.8
FR-J118	0.0	785.0	862.8	33.7
J12	3.1	725.0	860.9	58.9
J120	33.4	1,057.0	1,221.1	71.1
FR-J122	5.4	1,066.0	1,219.8	66.6
FR-J128	77.6	1,025.7	1,159.0	57.8
J130	5.4	1,095.7	1,221.1	54.3
FR-J132	5.4	1,100.4	1,221.1	52.3
FR-J134	5.4	1,114.0	1,221.1	46.4
FR-J136	5.4	1,050.0	1,221.1	74.1
FR-J138	5.4	1,077.6	1,220.3	61.8
J14	0.0	724.0	860.9	59.3
J140	5.4	1,028.0	1,221.0	83.6
J142	5.4	1,036.5	1,221.1	80.0
FR-J144	5.4	1,108.5	1,221.1	48.8
FR-J146	5.4	1,111.0	1,221.1	47.7
J148	5.4	1,100.0	1,221.0	52.4
FR-J150	5.4	1,076.0	1,221.0	62.8
J152	5.4	1,062.0	1,221.0	68.9
J154	5.4	1,050.0	1,221.0	74.1
J156	5.4	1,057.0	1,221.0	71.1
J158	5.4	1,068.0	1,221.0	66.3
FR-J16	0.0	754.0	861.3	46.5
J160	5.4	1,092.0	1,221.0	55.9
J162	5.4	1,060.5	1,221.1	69.6
J164	5.4	1,098.0	1,221.1	53.3
FR-J166	5.4	1,069.0	1,221.1	65.9
J168	5.4	1,090.0	1,221.1	56.8

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J170	5.4	1,057.0	1,220.9	71.0
FR-J172	5.4	1,072.0	1,221.0	64.6
FR-J174	0.0	1,096.3	1,221.6	54.3
FR-J176	0.0	1,102.3	1,221.4	51.6
FR-J178	5.4	1,039.7	1,195.9	67.7
FR-J18	9.0	726.0	861.4	58.7
J180	5.4	1,056.0	1,211.1	67.2
FR-J182	5.4	1,057.0	1,211.1	66.8
FR-J184	5.4	1,061.5	1,210.3	64.5
FR-J186	5.4	1,072.7	1,210.8	59.9
FR-J188	5.4	1,094.0	1,211.2	50.8
FR-J190	5.4	1,072.0	1,213.5	61.3
FR-J192	5.4	1,046.5	1,210.6	71.1
FR-J194	5.4	1,041.0	1,206.7	71.8
FR-J196	5.4	1,049.2	1,210.8	70.0
FR-J20	0.0	656.0	861.6	89.1
FR-J22	19.6	642.0	861.8	95.2
FR-J220	0.0	1,100.7	1,222.1	52.6
J222	0.0	1,109.0	1,222.4	49.1
FR-J228	5.4	1,148.0	1,221.1	31.7
FR-J230	49.3	1,075.5	1,221.0	63.1
FR-J232	5.4	1,105.0	1,221.1	50.3
FR-J234	24.3	560.0	861.1	130.5
J236	12.0	728.0	860.3	57.3
J238	56.9	684.0	861.6	76.9
FR-J24	57.8	632.0	862.2	99.7
FR-J240	19.6	690.0	861.6	74.4
J242	18.2	679.0	861.6	79.1
FR-J244	0.0	718.0	858.5	60.9
J246	0.0	760.0	1,228.6	203.1
J248	0.0	718.0	1,229.0	221.4
J250	5.4	1,154.0	1,221.1	29.1
FR-J26	19.6	666.0	861.8	84.8
FR-J28	0.0	680.0	861.6	78.7
FR-J30	0.0	731.0	861.4	56.5
FR-J32	9.0	744.0	861.4	50.9

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J34	0.0	721.0	861.4	60.8
FR-J36	9.0	697.0	861.3	71.2
FR-J38	0.0	691.0	861.3	73.8
FR-J40	0.0	650.0	861.5	91.6
J42	9.0	655.0	861.5	89.5
FR-J44	0.0	679.0	861.5	79.1
J46	0.0	703.0	861.6	68.7
J48	6.3	732.0	861.4	56.1
FR-J50	19.6	670.0	861.8	83.1
FR-J52	19.6	646.0	861.8	93.5
FR-J54	19.6	623.0	861.8	103.5
FR-J56	18.2	617.0	861.7	106.0
FR-J58	19.6	644.0	862.2	94.5
J60	19.6	608.0	862.9	110.4
FR-J62	19.6	584.0	864.6	121.6
J64	19.6	596.0	862.6	115.5
FR-J66	19.6	620.0	862.4	105.0
FR-J68	0.0	557.0	865.6	133.7
J70	0.0	557.0	862.8	132.5
J72	0.0	545.0	861.8	137.3
J74	16.9	540.0	861.3	139.2
J76	152.0	555.0	861.0	132.6
FR-J78	0.0	582.0	861.0	120.9
FR-J80	0.0	587.0	860.9	118.7
FR-J82	31.9	592.0	860.9	116.5
FR-J84	0.0	587.0	860.9	118.7
FR-J86	2.3	595.0	860.9	115.2
J88	0.0	599.0	860.9	113.5
FR-J90	35.0	608.0	860.9	109.6
FR-J92	0.0	602.0	860.9	112.2
FR-J94	1.1	617.0	860.9	105.7
FR-J96	1.7	623.0	860.9	103.1
FR-J98	2.3	615.0	860.9	106.5
J9634	0.0	608.8	860.9	109.2
J9636	2,500.0	768.0	1,036.3	116.2

Run No. 12 - Phase III MDD + 2,500 gpm Brush Fire at J9636 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8.0	120.0	-133.2	0.9	0.2	0.5
☐	FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	-79.3	0.5	0.2	0.2
☐	P105	FR-J16	FR-J18	931.7	8.0	120.0	-57.8	0.4	0.1	0.1
☐	FR-P107	J48	FR-J30	148.3	8.0	120.0	-4.0	0.0	0.0	0.0
☐	FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	6.7	0.0	0.0	0.0
☐	P11	332	FR-J118	4,814.1	16.0	130.0	234.6	0.4	0.2	0.0
☐	FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	-49.4	0.3	0.0	0.1
☐	P113	FR-J18	FR-J20	1,249.6	8.0	120.0	-60.0	0.4	0.1	0.1
☐	P115	J72	J74	449.1	12.0	120.0	566.5	1.6	0.5	1.0
☐	FR-P117	J74	J76	983.8	12.0	120.0	304.8	0.9	0.3	0.3
☐	FR-P119	J76	FR-J80	1,411.8	8.0	120.0	24.2	0.2	0.0	0.0
☐	FR-P121	J74	FR-J234	771.1	12.0	120.0	244.8	0.7	0.2	0.2
☐	P123	FR-J78	FR-J80	385.2	8.0	120.0	40.4	0.3	0.0	0.1
☐	P125	FR-J80	FR-J82	272.6	8.0	120.0	64.6	0.4	0.0	0.1
☐	P127	FR-J82	J88	282.9	8.0	120.0	33.3	0.2	0.0	0.0
☐	P129	J88	FR-J90	282.1	8.0	120.0	30.6	0.2	0.0	0.0
☐	P13	J12	J14	254.6	16.0	130.0	-576.7	0.9	0.1	0.2
☐	P131	FR-J90	FR-J94	289.7	8.0	120.0	3.6	0.0	0.0	0.0
☐	P133	FR-J94	FR-J92	655.1	12.0	120.0	-66.6	0.2	0.0	0.0
☐	P135	FR-J92	FR-J86	279.5	12.0	120.0	-98.4	0.3	0.0	0.0
☐	P137	FR-J86	FR-J84	279.6	12.0	120.0	-135.1	0.4	0.0	0.1
☐	P139	FR-J84	FR-J78	275.6	12.0	120.0	-180.1	0.5	0.0	0.1
☐	P141	FR-J82	FR-J84	348.7	8.0	120.0	-45.0	0.3	0.0	0.1
☐	P143	J88	FR-J86	349.5	8.0	120.0	-34.4	0.2	0.0	0.0
☐	P145	FR-J90	FR-J92	353.7	8.0	120.0	-31.8	0.2	0.0	0.0
☐	P147	FR-J82	J102	351.1	8.0	120.0	44.3	0.3	0.0	0.1
☐	P149	J88	J100	351.1	8.0	120.0	37.1	0.2	0.0	0.0
☐	P15	J14	FR-J38	779.2	12.0	120.0	-364.2	1.0	0.4	0.5
☐	P151	FR-J90	FR-J98	347.8	8.0	120.0	23.9	0.2	0.0	0.0
☐	P153	FR-J94	FR-J96	349.5	12.0	120.0	69.0	0.2	0.0	0.0
☐	P155	J102	FR-J104	786.9	8.0	120.0	21.4	0.1	0.0	0.0
☐	P157	FR-J104	FR-J108	225.7	8.0	120.0	7.2	0.0	0.0	0.0
☐	P159	FR-J104	J100	561.9	8.0	120.0	-20.7	0.1	0.0	0.0
☐	P161	FR-J108	FR-J116	303.3	12.0	120.0	-47.7	0.1	0.0	0.0
☐	P163	FR-J116	J106	448.5	12.0	120.0	-28.0	0.1	0.0	0.0
☐	P165	J102	J100	282.9	8.0	120.0	20.6	0.1	0.0	0.0
☐	P167	J100	FR-J98	282.9	8.0	120.0	2.0	0.0	0.0	0.0
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	3.8	0.0	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P17	FR-J38	FR-J40	783.0	12.0	120.0	-276.2	0.8	0.2	0.3
☐	P171	FR-J96	J106	204.2	12.0	120.0	71.1	0.2	0.0	0.0
☐	P173	FR-J98	FR-J116	428.9	8.0	120.0	19.8	0.1	0.0	0.0
☐	P175	J76	FR-J110	1,850.1	12.0	120.0	128.7	0.4	0.1	0.1
☐	P177	FR-J110	J9634	932.1	12.0	120.0	-54.9	0.2	0.0	0.0
☐	P179	J106	J12	1,077.1	16.0	130.0	-65.7	0.1	0.0	0.0
☐	P181	FR-J118	J12	1,373.8	16.0	130.0	1,562.7	2.5	2.0	1.4
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-1,328.1	2.1	0.8	1.1
☐	P185	J12	J236	233.6	16.0	130.0	2,070.6	3.3	0.6	2.4
☐	P187	J120	FR-J136	360.9	16.0	130.0	235.4	0.4	0.0	0.0
☐	P189	FR-J136	J142	463.3	8.0	120.0	27.7	0.2	0.0	0.0
☐	P19	FR-J40	FR-J56	965.3	12.0	120.0	-227.9	0.6	0.2	0.2
☐	P191	J142	J140	504.2	8.0	120.0	21.7	0.1	0.0	0.0
☐	P193	J140	J154	1,203.3	8.0	120.0	18.3	0.1	0.0	0.0
☐	P195	J154	J156	136.1	8.0	120.0	-11.9	0.1	0.0	0.0
☐	P197	J156	J158	254.4	10.0	120.0	-41.7	0.2	0.0	0.0
☐	P199	J158	J160	304.4	10.0	120.0	-32.1	0.1	0.0	0.0
☐	P201	J160	J148	870.8	10.0	120.0	-24.3	0.1	0.0	0.0
☐	P203	J148	FR-J150	309.6	8.0	120.0	4.1	0.0	0.0	0.0
☐	P205	FR-J150	J152	305.7	8.0	120.0	3.3	0.0	0.0	0.0
☐	P207	J152	J140	308.3	8.0	120.0	2.0	0.0	0.0	0.0
☐	P209	J152	J158	1,101.6	8.0	120.0	14.9	0.1	0.0	0.0
☐	FR-P21	FR-J56	J72	956.4	12.0	120.0	-135.6	0.4	0.1	0.1
☐	P211	FR-J150	J160	875.5	8.0	120.0	13.2	0.1	0.0	0.0
☐	P213	J154	FR-J230	729.8	8.0	120.0	24.8	0.2	0.0	0.0
☐	P215	J148	FR-J144	849.8	10.0	120.0	-33.8	0.1	0.0	0.0
☐	P217	FR-J144	J164	303.3	8.0	120.0	14.5	0.1	0.0	0.0
☐	FR-P219	J162	J142	306.8	8.0	120.0	-0.7	0.0	0.0	0.0
☐	P221	J164	J162	312.3	8.0	120.0	6.0	0.0	0.0	0.0
☐	P223	J152	J162	637.3	8.0	120.0	-19.0	0.1	0.0	0.0
☐	FR-P225	FR-J150	J164	746.2	8.0	120.0	-17.8	0.1	0.0	0.0
☐	FR-P227	FR-J144	FR-J146	262.7	10.0	120.0	-36.4	0.1	0.0	0.0
☐	P229	FR-J146	FR-J134	376.3	16.0	130.0	-69.8	0.1	0.0	0.0
☐	FR-P23	J72	J70	657.1	12.0	120.0	-702.1	2.0	1.0	1.5
☐	P231	J162	FR-J166	404.6	8.0	120.0	-17.7	0.1	0.0	0.0
☐	P233	J164	J168	504.6	8.0	120.0	-14.7	0.1	0.0	0.0
☐	P235	FR-J136	FR-J166	349.6	8.0	120.0	24.9	0.2	0.0	0.0
☐	P237	FR-J166	J168	280.4	8.0	120.0	1.8	0.0	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P239	J168	FR-J134	308.8	8.0	120.0	-18.3	0.1	0.0	0.0
☐	P241	FR-J134	FR-J232	208.9	16.0	130.0	-93.5	0.1	0.0	0.0
☐	P243	FR-J136	FR-J170	302.4	8.0	120.0	124.3	0.8	0.1	0.4
☐	P245	FR-J170	FR-J138	602.0	8.0	120.0	192.1	1.2	0.6	1.0
☐	P247	FR-J132	FR-J172	329.0	8.0	120.0	78.6	0.5	0.1	0.2
☐	P249	FR-J172	FR-J170	418.5	8.0	120.0	73.2	0.5	0.1	0.2
☐	FR-P25	J70	J64	570.3	8.0	120.0	94.4	0.6	0.2	0.3
☐	P251	FR-J136	FR-J232	882.1	16.0	130.0	53.1	0.1	0.0	0.0
☐	P253	FR-J132	J130	247.4	16.0	130.0	-129.8	0.2	0.0	0.0
☐	P255	J120	FR-J122	979.3	12.0	120.0	655.2	1.9	1.3	1.3
☐	P257	FR-J122	FR-J138	261.2	12.0	120.0	-847.1	2.4	0.6	2.2
☐	P259	FR-J138	J130	540.8	12.0	120.0	-660.3	1.9	0.7	1.4
☐	FR-P265	FR-J122	J180	193.1	8.0	120.0	1,496.9	9.6	8.6	44.7
☐	FR-P269	J130	FR-J176	798.7	16.0	130.0	-795.5	1.3	0.3	0.4
☐	FR-P27	J64	FR-J66	302.4	8.0	120.0	176.4	1.1	0.3	0.9
☐	FR-P271	FR-J176	FR-J174	559.7	16.0	130.0	-795.5	1.3	0.2	0.4
☐	FR-P277	FR-J178	FR-J128	301.0	10.0	120.0	2,577.6	10.5	12.4	41.3
☐	FR-P279	J180	FR-J178	343.9	8.0	120.0	1,491.8	9.5	15.3	44.4
☐	FR-P281	J120	FR-J190	282.0	8.0	120.0	1,134.6	7.2	7.5	26.8
☐	P283	FR-J190	FR-J188	347.2	8.0	120.0	540.2	3.4	2.4	6.8
☐	FR-P285	FR-J188	FR-J186	356.7	8.0	120.0	190.2	1.2	0.3	1.0
☐	FR-P287	FR-J186	FR-J192	352.1	8.0	120.0	139.0	0.9	0.2	0.5
☐	FR-P289	FR-J190	FR-J182	807.9	8.0	120.0	346.4	2.2	2.4	3.0
☐	FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	149.3	1.0	0.2	0.6
☐	FR-P291	J180	FR-J182	311.0	8.0	120.0	-0.3	0.0	0.0	0.0
☐	FR-P293	FR-J182	FR-J184	276.9	8.0	120.0	340.7	2.2	0.8	2.9
☐	FR-P295	FR-J184	FR-J186	775.5	8.0	120.0	-151.8	1.0	0.5	0.6
☐	P297	FR-J184	FR-J188	570.0	8.0	120.0	-238.6	1.5	0.8	1.5
☐	P299	FR-J190	FR-J196	1,748.0	8.0	120.0	242.6	1.5	2.7	1.5
☐	FR-P301	FR-J196	FR-J192	317.5	8.0	120.0	152.5	1.0	0.2	0.7
☐	P303	FR-J196	FR-J192	943.8	8.0	120.0	84.7	0.5	0.2	0.2
☐	FR-P305	FR-J192	FR-J194	1,158.4	8.0	120.0	370.8	2.4	3.9	3.4
☐	FR-P307	FR-J184	FR-J194	307.7	8.0	120.0	725.7	4.6	3.6	11.7
☐	FR-P309	FR-J194	FR-J178	437.0	8.0	120.0	1,091.2	7.0	10.9	24.9
☐	FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	142.7	0.9	0.4	0.6
☐	P311	FR-J186	FR-J188	1,054.4	8.0	120.0	-106.0	0.7	0.3	0.3
☐	FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	104.4	0.7	0.2	0.3
☐	FR-P35	J46	J48	968.3	8.0	120.0	59.1	0.4	0.1	0.1

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P357	FR-J174	FR-J220	925.0	16.0	120.0	-795.5	1.3	0.4	0.5
☐	FR-P359	FR-J220	J222	855.4	16.0	130.0	-795.5	1.3	0.3	0.4
☐	FR-P363	J222	T5002	706.1	16.0	130.0	-795.5	1.3	0.3	0.4
☐	FR-P365	FR-J146	J250	647.1	12.0	120.0	28.0	0.1	0.0	0.0
☐	FR-P367	FR-J228	FR-J144	576.3	12.0	120.0	17.2	0.0	0.0	0.0
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-1,552.5	2.5	1.0	1.4
☐	FR-P37	J48	FR-J34	262.8	8.0	120.0	56.8	0.4	0.0	0.1
☐	FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	60.1	0.4	0.1	0.1
☐	FR-P373	FR-J230	J156	783.6	8.0	120.0	-24.5	0.2	0.0	0.0
☐	P375	FR-J232	FR-J132	247.6	16.0	130.0	-45.8	0.1	0.0	0.0
☐	FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	220.4	0.6	0.2	0.2
☐	FR-P379	J236	FR-J244	776.6	16.0	130.0	2,058.6	3.3	1.8	2.4
☐	FR-P381	J238	FR-J28	227.5	8.0	120.0	-55.4	0.4	0.0	0.1
☐	FR-P383	FR-J240	J46	228.2	8.0	120.0	84.7	0.5	0.1	0.2
☐	FR-P385	J242	FR-J26	703.2	8.0	120.0	-99.5	0.6	0.2	0.3
☐	FR-P387	J246	J120	3,168.1	16.0	130.0	2,058.6	3.3	7.5	2.4
☐	FR-P389	FR-J244	U7000	14.8	16.0	130.0	2,058.6	3.3	0.0	2.4
☐	FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	90.7	0.6	0.1	0.2
☐	FR-P391	U7000	J248	41.5	16.0	130.0	2,058.6	3.3	0.1	2.4
☐	FR-P397	J248	J246	151.4	16.0	130.0	2,058.6	3.3	0.4	2.4
☐	FR-P399	J250	FR-J228	236.6	12.0	120.0	22.6	0.1	0.0	0.0
☐	FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	88.0	0.6	0.0	0.2
☐	P43	J64	FR-J54	1,109.8	8.0	120.0	166.6	1.1	0.9	0.8
☐	FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	-110.5	0.7	0.1	0.4
☐	P47	FR-J54	FR-J52	314.0	8.0	120.0	-55.2	0.4	0.0	0.1
☐	FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	-18.7	0.1	0.0	0.0
☐	FR-P51	FR-J40	J42	194.9	8.0	120.0	-48.3	0.3	0.0	0.1
☐	P53	J42	FR-J44	320.6	8.0	120.0	-51.1	0.3	0.0	0.1
☐	FR-P55	FR-J44	J46	317.1	8.0	120.0	-24.2	0.2	0.0	0.0
☐	FR-P57	J46	J238	383.6	8.0	120.0	1.5	0.0	0.0	0.0
☐	FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-34.3	0.2	0.0	0.0
☐	P61	FR-J20	FR-J22	776.2	8.0	120.0	-94.4	0.6	0.2	0.3
☐	P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-107.4	0.7	0.4	0.3
☐	P65	FR-J22	FR-J26	303.7	8.0	120.0	-6.6	0.0	0.0	0.0
☐	P67	FR-J28	J242	66.1	8.0	120.0	-81.2	0.5	0.0	0.2
☐	P69	FR-J26	FR-J24	799.4	8.0	120.0	-125.7	0.8	0.4	0.5
☐	P71	FR-J24	J60	309.0	8.0	120.0	-304.0	1.9	0.7	2.3
☐	P73	J60	FR-J62	335.9	8.0	120.0	-468.1	3.0	1.7	5.2

Run No. 12 - Phase III MDD + 2,500 gpm Brush Fire at J9636 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P75	FR-J62	FR-J68	549.1	12.0	120.0	-756.0	2.1	1.0	1.8
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-796.5	2.3	2.8	1.9
☐	P79	J64	FR-J62	1,090.0	8.0	120.0	-268.3	1.7	2.0	1.9
☐	P81	FR-J66	J60	903.3	8.0	120.0	-144.5	0.9	0.5	0.6
☐	P83	FR-J58	FR-J24	674.4	8.0	120.0	-13.1	0.1	0.0	0.0
☐	P85	FR-J52	FR-J66	869.1	8.0	120.0	-152.0	1.0	0.6	0.6
☐	FR-P87	J42	FR-J54	934.2	8.0	120.0	-91.7	0.6	0.2	0.3
☐	FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	-95.9	0.6	0.2	0.3
☐	P91	FR-J36	J42	808.3	8.0	120.0	-85.5	0.5	0.2	0.2
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	-68.9	0.4	0.1	0.1
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	35.0	0.2	0.0	0.0
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	75.4	0.5	0.1	0.2
☐	P99	J14	FR-J114	206.1	8.0	120.0	-212.5	1.4	0.2	1.2
☐	FR-P300	J9638	J112	7,595.0	16.0	130.0	1,552.5	2.5	10.7	1.4
☐	P318	J9634	FR-J108	416.6	12.0	120.0	-54.9	0.2	0.0	0.0
☐	P320	J9634	J9636	1,125.0	12.0	120.0	0.0	0.0	0.0	0.0
☐	P322	J9636	FR-J128	3,148.4	10.0	120.0	-2,500.0	10.2	122.8	39.0

Run No. 13 - Phase IV (Buildout) Peak Hour (Node Report)

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1	☐	J100	81.9	606.0	862.6	111.2
2	☐	J102	5.4	599.0	862.6	114.2
3	☐	FR-J104	81.9	612.0	862.6	108.6
4	☐	J106	255.0	625.0	862.8	103.1
5	☐	FR-J108	0.0	615.0	862.6	107.3
6	☐	FR-J110	430.1	595.0	862.2	115.8
7	☐	J112	0.0	530.0	868.0	146.4
8	☐	FR-J114	0.0	730.0	863.3	57.8
9	☐	FR-J116	0.0	619.0	862.7	105.6
10	☐	FR-J118	0.0	785.0	864.1	34.3
11	☐	J12	7.2	725.0	863.3	59.9
12	☐	J120	78.2	1,057.0	1,221.8	71.4
13	☐	FR-J122	12.6	1,066.0	1,221.8	67.5
14	☐	FR-J128	181.9	1,025.7	1,221.4	84.8
15	☐	J130	12.6	1,095.7	1,221.9	54.7
16	☐	FR-J132	12.6	1,100.4	1,221.9	52.6
17	☐	FR-J134	12.6	1,114.0	1,221.8	46.7
18	☐	FR-J136	12.6	1,050.0	1,221.8	74.4
19	☐	FR-J138	12.6	1,077.6	1,221.8	62.5
20	☐	J14	0.0	724.0	863.3	60.4
21	☐	J140	12.6	1,028.0	1,221.7	83.9
22	☐	J142	12.6	1,036.5	1,221.8	80.3
23	☐	FR-J144	12.6	1,108.5	1,221.8	49.1
24	☐	FR-J146	12.6	1,111.0	1,221.8	48.0
25	☐	J148	12.6	1,100.0	1,221.7	52.7
26	☐	FR-J150	12.6	1,076.0	1,221.7	63.1
27	☐	J152	12.6	1,062.0	1,221.7	69.2
28	☐	J154	12.6	1,050.0	1,221.7	74.4
29	☐	J156	12.6	1,057.0	1,221.7	71.3
30	☐	J158	12.6	1,068.0	1,221.7	66.6
31	☐	FR-J16	0.0	754.0	863.3	47.4
32	☐	J160	12.6	1,092.0	1,221.7	56.2
33	☐	J162	12.6	1,060.5	1,221.8	69.9
34	☐	J164	12.6	1,098.0	1,221.8	53.6
35	☐	FR-J166	12.6	1,069.0	1,221.8	66.2
36	☐	J168	12.6	1,090.0	1,221.8	57.1
37	☐	FR-J170	12.6	1,057.0	1,221.8	71.4
38	☐	FR-J172	12.6	1,072.0	1,221.9	64.9

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
39	☐	FR-J174	0.0	1,096.3	1,222.6	54.7
40	☐	FR-J176	0.0	1,102.3	1,222.3	52.0
41	☐	FR-J178	12.6	1,039.7	1,221.5	78.8
42	☐	FR-J18	21.0	726.0	863.3	59.5
43	☐	J180	12.6	1,056.0	1,221.6	71.8
44	☐	FR-J182	12.6	1,057.0	1,221.6	71.3
45	☐	FR-J184	12.6	1,061.5	1,221.6	69.4
46	☐	FR-J186	12.6	1,072.7	1,221.6	64.5
47	☐	FR-J188	12.6	1,094.0	1,221.6	55.3
48	☐	FR-J190	12.6	1,072.0	1,221.6	64.8
49	☐	FR-J192	12.6	1,046.5	1,221.6	75.9
50	☐	FR-J194	12.6	1,041.0	1,221.6	78.2
51	☐	FR-J196	12.6	1,049.2	1,221.6	74.7
52	☐	FR-J20	0.0	656.0	863.3	89.8
53	☐	FR-J22	46.0	642.0	863.3	95.9
54	☐	FR-J220	0.0	1,100.7	1,223.3	53.1
55	☐	J222	0.0	1,109.0	1,224.3	50.0
56	☐	FR-J228	12.6	1,148.0	1,221.8	32.0
57	☐	FR-J230	115.4	1,075.5	1,221.6	63.3
58	☐	FR-J232	12.6	1,105.0	1,221.8	50.6
59	☐	FR-J234	57.0	560.0	862.7	131.2
60	☐	J236	28.2	728.0	863.3	58.6
61	☐	J238	133.3	684.0	863.3	77.7
62	☐	FR-J24	135.3	632.0	863.5	100.3
63	☐	FR-J240	46.0	690.0	863.3	75.1
64	☐	J242	42.6	679.0	863.3	79.9
65	☐	FR-J244	0.0	718.0	863.3	63.0
66	☐	J246	0.0	760.0	1,221.8	200.1
67	☐	J248	0.0	718.0	1,221.8	218.3
68	☐	J250	12.6	1,154.0	1,221.8	29.4
69	☐	FR-J26	46.0	666.0	863.3	85.5
70	☐	FR-J28	0.0	680.0	863.3	79.4
71	☐	FR-J30	0.0	731.0	863.3	57.3
72	☐	FR-J32	21.0	744.0	863.3	51.7
73	☐	FR-J34	0.0	721.0	863.3	61.7
74	☐	FR-J36	21.0	697.0	863.3	72.1
75	☐	FR-J38	0.0	691.0	863.3	74.7
76	☐	FR-J40	0.0	650.0	863.3	92.4

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
77	☐	J42	21.0	655.0	863.3	90.3
78	☐	FR-J44	0.0	679.0	863.3	79.9
79	☐	J46	0.0	703.0	863.3	69.5
80	☐	J48	14.7	732.0	863.3	56.9
81	☐	FR-J50	46.0	670.0	863.4	83.8
82	☐	FR-J52	46.0	646.0	863.4	94.2
83	☐	FR-J54	46.0	623.0	863.4	104.2
84	☐	FR-J56	42.6	617.0	863.4	106.7
85	☐	FR-J58	46.0	644.0	863.5	95.1
86	☐	J60	46.0	608.0	864.2	111.0
87	☐	FR-J62	46.0	584.0	865.9	122.2
88	☐	J64	46.0	596.0	864.0	116.1
89	☐	FR-J66	46.0	620.0	863.7	105.6
90	☐	FR-J68	0.0	557.0	866.9	134.3
91	☐	J70	0.0	557.0	864.3	133.1
92	☐	J72	0.0	545.0	863.4	137.9
93	☐	J74	39.5	540.0	862.8	139.9
94	☐	J76	356.0	555.0	862.3	133.2
95	☐	FR-J78	0.0	582.0	862.7	121.6
96	☐	FR-J80	0.0	587.0	862.6	119.4
97	☐	FR-J82	74.7	592.0	862.6	117.3
98	☐	FR-J84	0.0	587.0	862.7	119.5
99	☐	FR-J86	5.4	595.0	862.7	116.0
100	☐	J88	0.0	599.0	862.6	114.2
101	☐	FR-J90	81.9	608.0	862.7	110.3
102	☐	FR-J92	0.0	602.0	862.7	113.0
103	☐	FR-J94	2.7	617.0	862.7	106.5
104	☐	FR-J96	4.0	623.0	862.8	103.9
105	☐	FR-J98	5.4	615.0	862.7	107.3
106	☐	J9634	0.0	608.8	862.5	109.9
107	☐	J9636	0.0	768.0	1,221.4	196.5
108	☐	FR-J124	67.1	1,076.6	1,221.9	63.0
109	☐	FR-J126	67.1	1,082.5	1,221.9	60.4
110	☐	FR-J198	54.5	1,015.4	1,221.2	89.2
111	☐	FR-J200	54.5	1,017.6	1,221.2	88.2
112	☐	FR-J202	54.5	1,020.0	1,221.2	87.2
113	☐	FR-J204	54.5	1,015.1	1,220.8	89.1
114	☐	J206	54.5	1,008.8	1,220.8	91.9

		ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
115	☐	FR-J208	26.9	1,013.1	1,220.8	90.0
116	☐	FR-J210	54.5	1,011.5	1,220.9	90.7
117	☐	FR-J212	54.5	1,091.9	1,221.9	56.3
118	☐	FR-J214	54.5	1,087.7	1,221.9	58.1
119	☐	FR-J216	97.5	1,096.0	1,222.4	54.8
120	☐	FR-J218	0.5	1,096.0	1,222.5	54.8
121	☐	FR-J224	54.5	1,018.2	1,220.8	87.8
122	☐	FR-J226	54.5	1,016.9	1,220.8	88.4

Run No. 13 - Phase IV (Buildout) Peak Hour (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P101	FR-J114	FR-J16	310.07	8.0	120.0	38.6	0.2	0.0	0.0
FR-P103	FR-J114	FR-J36	785.30	8.0	120.0	-2.5	0.0	0.0	0.0
P105	FR-J16	FR-J18	931.69	8.0	120.0	18.2	0.1	0.0	0.0
FR-P107	J48	FR-J30	148.31	8.0	120.0	17.6	0.1	0.0	0.0
FR-P109	FR-J30	FR-J18	277.95	8.0	120.0	11.3	0.1	0.0	0.0
P11	332	FR-J118	4,814.14	16.0	130.0	-353.7	0.6	0.4	0.1
FR-P111	FR-J32	FR-J30	599.32	8.0	120.0	16.9	0.1	0.0	0.0
P113	FR-J18	FR-J20	1,249.60	8.0	120.0	8.5	0.1	0.0	0.0
P115	J72	J74	449.07	12.0	120.0	618.5	1.8	0.5	1.2
FR-P117	J74	J76	983.83	12.0	120.0	401.5	1.1	0.5	0.5
FR-P119	J76	FR-J80	1,411.75	8.0	120.0	-87.5	0.6	0.3	0.2
FR-P121	J74	FR-J234	771.10	12.0	120.0	177.5	0.5	0.1	0.1
P123	FR-J78	FR-J80	385.16	8.0	120.0	70.5	0.4	0.1	0.2
P125	FR-J80	FR-J82	272.63	8.0	120.0	-17.1	0.1	0.0	0.0
P127	FR-J82	J88	282.91	8.0	120.0	-49.8	0.3	0.0	0.1
P129	J88	FR-J90	282.08	8.0	120.0	-49.9	0.3	0.0	0.1
P13	J12	J14	254.59	16.0	130.0	34.3	0.1	0.0	0.0
P131	FR-J90	FR-J94	289.65	8.0	120.0	-73.8	0.5	0.0	0.2
P133	FR-J94	FR-J92	655.12	12.0	120.0	112.8	0.3	0.0	0.1
P135	FR-J92	FR-J86	279.55	12.0	120.0	77.6	0.2	0.0	0.0
P137	FR-J86	FR-J84	279.55	12.0	120.0	20.0	0.1	0.0	0.0
P139	FR-J84	FR-J78	275.65	12.0	120.0	-50.0	0.1	0.0	0.0
P141	FR-J82	FR-J84	348.69	8.0	120.0	-70.1	0.4	0.1	0.2
P143	J88	FR-J86	349.47	8.0	120.0	-52.2	0.3	0.0	0.1
P145	FR-J90	FR-J92	353.65	8.0	120.0	-35.2	0.2	0.0	0.0
P147	FR-J82	J102	351.12	8.0	120.0	28.1	0.2	0.0	0.0
P149	J88	J100	351.12	8.0	120.0	52.3	0.3	0.0	0.1
P15	J14	FR-J38	779.21	12.0	120.0	-1.8	0.0	0.0	0.0
P151	FR-J90	FR-J98	347.76	8.0	120.0	-22.8	0.1	0.0	0.0
P153	FR-J94	FR-J96	349.47	12.0	120.0	-189.3	0.5	0.0	0.1
P155	J102	FR-J104	786.92	8.0	120.0	34.6	0.2	0.0	0.0
P157	FR-J104	FR-J108	225.66	8.0	120.0	-4.7	0.0	0.0	0.0
P159	FR-J104	J100	561.94	8.0	120.0	-42.6	0.3	0.0	0.1
P161	FR-J108	FR-J116	303.29	12.0	120.0	-301.8	0.9	0.1	0.3
P163	FR-J116	J106	448.55	12.0	120.0	-310.7	0.9	0.2	0.3
P165	J102	J100	282.92	8.0	120.0	-11.9	0.1	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P167	J100	FR-J98	282.92	8.0	120.0	-84.2	0.5	0.1	0.2
☐	P169	FR-J98	FR-J96	282.08	8.0	120.0	-103.5	0.7	0.1	0.3
☐	P17	FR-J38	FR-J40	783.03	12.0	120.0	-38.6	0.1	0.0	0.0
☐	P171	FR-J96	J106	204.15	12.0	120.0	-296.8	0.8	0.1	0.3
☐	P173	FR-J98	FR-J116	428.93	8.0	120.0	-8.9	0.1	0.0	0.0
☐	P175	J76	FR-J110	1,850.07	12.0	120.0	133.0	0.4	0.1	0.1
☐	P177	FR-J110	J9634	932.10	12.0	120.0	-297.0	0.8	0.3	0.3
☐	P179	J106	J12	1,077.13	16.0	130.0	-862.5	1.4	0.5	0.5
☐	P181	FR-J118	J12	1,373.76	16.0	130.0	932.1	1.5	0.8	0.5
☐	P183	FR-J118	T5000	798.27	16.0	130.0	-1,285.8	2.1	0.8	1.0
☐	P185	J12	J236	233.60	16.0	130.0	28.2	0.0	0.0	0.0
☐	P187	J120	FR-J136	360.92	16.0	130.0	-170.0	0.3	0.0	0.0
☐	P189	FR-J136	J142	463.28	8.0	120.0	51.1	0.3	0.0	0.1
☐	P19	FR-J40	FR-J56	965.35	12.0	120.0	-62.9	0.2	0.0	0.0
☐	P191	J142	J140	504.24	8.0	120.0	47.9	0.3	0.0	0.1
☐	P193	J140	J154	1,203.26	8.0	120.0	42.6	0.3	0.1	0.1
☐	P195	J154	J156	136.15	8.0	120.0	-28.1	0.2	0.0	0.0
☐	P197	J156	J158	254.43	10.0	120.0	-98.1	0.4	0.0	0.1
☐	P199	J158	J160	304.42	10.0	120.0	-76.1	0.3	0.0	0.1
☐	P201	J160	J148	870.77	10.0	120.0	-57.9	0.2	0.0	0.0
☐	P203	J148	FR-J150	309.62	8.0	120.0	14.0	0.1	0.0	0.0
☐	P205	FR-J150	J152	305.68	8.0	120.0	12.1	0.1	0.0	0.0
☐	P207	J152	J140	308.33	8.0	120.0	7.3	0.0	0.0	0.0
☐	P209	J152	J158	1,101.61	8.0	120.0	34.6	0.2	0.0	0.0
☐	FR-P21	FR-J56	J72	956.40	12.0	120.0	-37.6	0.1	0.0	0.0
☐	P211	FR-J150	J160	875.54	8.0	120.0	30.8	0.2	0.0	0.0
☐	P213	J154	FR-J230	729.77	8.0	120.0	58.1	0.4	0.1	0.1
☐	P215	J148	FR-J144	849.82	10.0	120.0	-84.5	0.3	0.1	0.1
☐	P217	FR-J144	J164	303.26	8.0	120.0	45.9	0.3	0.0	0.1
☐	FR-P219	J162	J142	306.84	8.0	120.0	9.4	0.1	0.0	0.0
☐	P221	J164	J162	312.31	8.0	120.0	24.1	0.2	0.0	0.0
☐	P223	J152	J162	637.33	8.0	120.0	-42.4	0.3	0.0	0.1
☐	FR-P225	FR-J150	J164	746.19	8.0	120.0	-41.5	0.3	0.0	0.1
☐	FR-P227	FR-J144	FR-J146	262.72	10.0	120.0	-95.8	0.4	0.0	0.1
☐	P229	FR-J146	FR-J134	376.30	16.0	130.0	-180.9	0.3	0.0	0.0
☐	FR-P23	J72	J70	657.10	12.0	120.0	-656.1	1.9	0.9	1.3

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P231	J162	FR-J166	404.60	8.0	120.0	-40.3	0.3	0.0	0.1
P233	J164	J168	504.59	8.0	120.0	-32.4	0.2	0.0	0.0
P235	FR-J136	FR-J166	349.61	8.0	120.0	36.7	0.2	0.0	0.0
P237	FR-J166	J168	280.38	8.0	120.0	-16.2	0.1	0.0	0.0
P239	J168	FR-J134	308.79	8.0	120.0	-61.2	0.4	0.0	0.1
P241	FR-J134	FR-J232	208.94	16.0	130.0	-254.7	0.4	0.0	0.0
P243	FR-J136	FR-J170	302.36	8.0	120.0	-48.2	0.3	0.0	0.1
P245	FR-J170	FR-J138	602.00	8.0	120.0	-21.3	0.1	0.0	0.0
P247	FR-J132	FR-J172	329.02	8.0	120.0	52.2	0.3	0.0	0.1
P249	FR-J172	FR-J170	418.51	8.0	120.0	39.6	0.3	0.0	0.1
FR-P25	J70	J64	570.29	8.0	120.0	115.8	0.7	0.2	0.4
P251	FR-J136	FR-J232	882.12	16.0	130.0	-222.2	0.4	0.0	0.0
P253	FR-J132	J130	247.40	16.0	130.0	-554.3	0.9	0.1	0.2
P255	J120	FR-J122	979.33	12.0	120.0	-44.7	0.1	0.0	0.0
P257	FR-J122	FR-J138	261.24	12.0	120.0	-182.5	0.5	0.0	0.1
P259	FR-J138	J130	540.84	12.0	120.0	-216.4	0.6	0.1	0.2
FR-P265	FR-J122	J180	193.06	8.0	120.0	177.8	1.1	0.2	0.9
FR-P269	J130	FR-J176	798.73	16.0	130.0	-783.3	1.2	0.3	0.4
FR-P27	J64	FR-J66	302.43	8.0	120.0	185.9	1.2	0.3	0.9
FR-P271	FR-J176	FR-J174	559.70	16.0	130.0	-926.4	1.5	0.3	0.5
FR-P277	FR-J178	FR-J128	301.01	10.0	120.0	188.2	0.8	0.1	0.3
FR-P279	J180	FR-J178	343.89	8.0	120.0	125.9	0.8	0.2	0.5
FR-P281	J120	FR-J190	281.96	8.0	120.0	136.6	0.9	0.1	0.5
P283	FR-J190	FR-J188	347.17	8.0	120.0	64.5	0.4	0.0	0.1
FR-P285	FR-J188	FR-J186	356.70	8.0	120.0	22.2	0.1	0.0	0.0
FR-P287	FR-J186	FR-J192	352.08	8.0	120.0	21.8	0.1	0.0	0.0
FR-P289	FR-J190	FR-J182	807.90	8.0	120.0	29.2	0.2	0.0	0.0
FR-P29	FR-J66	FR-J58	309.93	8.0	120.0	152.8	1.0	0.2	0.7
FR-P291	J180	FR-J182	311.02	8.0	120.0	39.2	0.3	0.0	0.1
FR-P293	FR-J182	FR-J184	276.91	8.0	120.0	55.8	0.4	0.0	0.1
FR-P295	FR-J184	FR-J186	775.48	8.0	120.0	-0.3	0.0	0.0	0.0
P297	FR-J184	FR-J188	570.05	8.0	120.0	-17.3	0.1	0.0	0.0
P299	FR-J190	FR-J196	1,747.97	8.0	120.0	30.3	0.2	0.1	0.0
FR-P301	FR-J196	FR-J192	317.46	8.0	120.0	11.4	0.1	0.0	0.0
P303	FR-J196	FR-J192	943.76	8.0	120.0	6.3	0.0	0.0	0.0
FR-P305	FR-J192	FR-J194	1,158.36	8.0	120.0	26.8	0.2	0.0	0.0

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
FR-P307	FR-J184	FR-J194	307.75	8.0	120.0	60.7	0.4	0.0	0.1
FR-P309	FR-J194	FR-J178	437.01	8.0	120.0	74.9	0.5	0.1	0.2
FR-P31	FR-J58	FR-J50	632.63	8.0	120.0	90.6	0.6	0.2	0.2
P311	FR-J186	FR-J188	1,054.41	8.0	120.0	-12.4	0.1	0.0	0.0
FR-P33	FR-J50	FR-J240	583.48	8.0	120.0	63.0	0.4	0.1	0.1
FR-P35	J46	J48	968.28	8.0	120.0	-2.2	0.0	0.0	0.0
FR-P357	FR-J174	FR-J220	924.96	16.0	120.0	-1,094.0	1.7	0.8	0.9
FR-P359	FR-J220	J222	855.38	16.0	130.0	-1,382.8	2.2	1.0	1.1
FR-P363	J222	T5002	706.14	16.0	130.0	-1,633.2	2.6	1.1	1.5
FR-P365	FR-J146	J250	647.09	12.0	120.0	72.4	0.2	0.0	0.0
FR-P367	FR-J228	FR-J144	576.29	12.0	120.0	47.2	0.1	0.0	0.0
FR-P369	FR-J68	J112	738.09	16.0	130.0	-1,543.1	2.5	1.0	1.4
FR-P37	J48	FR-J34	262.83	8.0	120.0	-34.6	0.2	0.0	0.0
FR-P371	FR-J28	FR-J30	1,132.42	8.0	120.0	-23.2	0.1	0.0	0.0
FR-P373	FR-J230	J156	783.63	8.0	120.0	-57.3	0.4	0.1	0.1
P375	FR-J232	FR-J132	247.64	16.0	130.0	-489.5	0.8	0.0	0.2
FR-P377	FR-J234	FR-J78	907.29	12.0	120.0	120.5	0.3	0.1	0.1
FR-P379	J236	FR-J244	776.60	16.0	130.0	0.0	0.0	0.0	0.0
FR-P381	J238	FR-J28	227.50	8.0	120.0	-66.5	0.4	0.0	0.1
FR-P383	FR-J240	J46	228.24	8.0	120.0	17.0	0.1	0.0	0.0
FR-P385	J242	FR-J26	703.24	8.0	120.0	-44.7	0.3	0.0	0.1
FR-P387	J246	J120	3,168.13	16.0	130.0	0.0	0.0	0.0	0.0
FR-P389	FR-J244	U7000	14.75	16.0	130.0	0.0	0.0	0.0	0.0
FR-P39	FR-J34	FR-J36	314.01	8.0	120.0	-31.6	0.2	0.0	0.0
FR-P391	U7000	J248	41.46	16.0	130.0	0.0	0.0	0.0	0.0
FR-P397	J248	J246	151.45	16.0	130.0	0.0	0.0	0.0	0.0
FR-P399	J250	FR-J228	236.60	12.0	120.0	59.8	0.2	0.0	0.0
FR-P41	FR-J36	FR-J38	201.63	8.0	120.0	-36.8	0.2	0.0	0.0
P43	J64	FR-J54	1,109.79	8.0	120.0	142.9	0.9	0.6	0.6
FR-P45	FR-J56	FR-J54	191.73	8.0	120.0	-68.0	0.4	0.0	0.1
P47	FR-J54	FR-J52	314.01	8.0	120.0	-10.2	0.1	0.0	0.0
FR-P49	FR-J52	FR-J50	324.73	8.0	120.0	18.5	0.1	0.0	0.0
FR-P51	FR-J40	J42	194.91	8.0	120.0	24.3	0.2	0.0	0.0
P53	J42	FR-J44	320.60	8.0	120.0	24.1	0.2	0.0	0.0
FR-P55	FR-J44	J46	317.14	8.0	120.0	47.6	0.3	0.0	0.1
FR-P57	J46	J238	383.59	8.0	120.0	66.8	0.4	0.1	0.1

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
FR-P59	FR-J28	FR-J20	305.03	8.0	120.0	-41.3	0.3	0.0	0.1
P61	FR-J20	FR-J22	776.18	8.0	120.0	-32.8	0.2	0.0	0.0
P63	FR-J22	FR-J24	1,070.33	8.0	120.0	-78.1	0.5	0.2	0.2
P65	FR-J22	FR-J26	303.69	8.0	120.0	-0.8	0.0	0.0	0.0
P67	FR-J28	J242	66.14	8.0	120.0	-2.0	0.0	0.0	0.0
P69	FR-J26	FR-J24	799.40	8.0	120.0	-91.4	0.6	0.2	0.3
P71	FR-J24	J60	309.00	8.0	120.0	-288.7	1.8	0.7	2.1
P73	J60	FR-J62	335.87	8.0	120.0	-466.1	3.0	1.7	5.2
P75	FR-J62	FR-J68	549.08	12.0	120.0	-771.2	2.2	1.0	1.8
P77	J70	FR-J68	1,466.13	12.0	120.0	-771.9	2.2	2.7	1.8
P79	J64	FR-J62	1,090.04	8.0	120.0	-259.1	1.7	1.9	1.7
P81	FR-J66	J60	903.29	8.0	120.0	-131.4	0.8	0.4	0.5
P83	FR-J58	FR-J24	674.36	8.0	120.0	16.2	0.1	0.0	0.0
P85	FR-J52	FR-J66	869.10	8.0	120.0	-118.6	0.8	0.4	0.4
FR-P87	J42	FR-J54	934.21	8.0	120.0	-39.1	0.2	0.0	0.1
FR-P89	FR-J44	FR-J52	873.81	8.0	120.0	-44.0	0.3	0.1	0.1
P91	FR-J36	J42	808.31	8.0	120.0	-18.4	0.1	0.0	0.0
FR-P93	FR-J34	FR-J44	867.58	8.0	120.0	-20.4	0.1	0.0	0.0
P95	FR-J34	FR-J32	488.46	8.0	120.0	17.5	0.1	0.0	0.0
P97	FR-J32	FR-J16	297.66	8.0	120.0	-20.4	0.1	0.0	0.0
P99	J14	FR-J114	206.06	8.0	120.0	36.1	0.2	0.0	0.0
FR-P300	J9638	J112	7,594.97	16.0	130.0	1,543.1	2.5	10.6	1.4
P318	J9634	FR-J108	416.60	12.0	120.0	-297.0	0.8	0.1	0.3
P320	J9634	J9636	1,124.95	12.0	120.0	0.0	0.0	0.0	0.0
P322	J9636	FR-J128	3,148.45	10.0	120.0	0.0	0.0	0.0	0.0
FR-P261	FR-J122	FR-J124	820.77	8.0	120.0	-52.6	0.3	0.1	0.1
FR-P263	FR-J124	FR-J126	390.65	8.0	120.0	23.4	0.1	0.0	0.0
FR-P267	FR-J128	FR-J126	1,021.99	8.0	120.0	-129.0	0.8	0.5	0.5
FR-P273	FR-J174	FR-J126	877.66	8.0	120.0	167.6	1.1	0.7	0.8
FR-P275	FR-J176	FR-J124	637.84	8.0	120.0	143.1	0.9	0.4	0.6
FR-P313	FR-J128	FR-J198	380.27	8.0	120.0	135.4	0.9	0.2	0.5
FR-P315	FR-J198	FR-J200	222.46	8.0	120.0	-12.0	0.1	0.0	0.0
P317	FR-J200	FR-J202	201.84	8.0	120.0	-24.8	0.2	0.0	0.0
FR-P319	FR-J198	J206	1,358.95	8.0	120.0	92.9	0.6	0.4	0.3
FR-P321	J206	FR-J208	233.87	8.0	120.0	11.9	0.1	0.0	0.0
FR-P323	FR-J208	FR-J204	210.14	8.0	120.0	-10.6	0.1	0.0	0.0

Run No. 13 - Phase IV (Buildout) Peak Hour (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P325	FR-J202	FR-J204	1,425.80	8.0	120.0	91.4	0.6	0.4	0.3
☐	FR-P327	FR-J208	FR-J210	662.73	8.0	120.0	-60.5	0.4	0.1	0.1
☐	FR-P329	FR-J210	FR-J200	721.29	8.0	120.0	-114.9	0.7	0.3	0.4
☐	FR-P331	FR-J202	FR-J212	850.38	8.0	120.0	-170.6	1.1	0.7	0.8
☐	FR-P333	FR-J204	FR-J224	804.44	8.0	120.0	26.4	0.2	0.0	0.0
☐	FR-P335	FR-J224	FR-J226	188.42	8.0	120.0	-0.2	0.0	0.0	0.0
☐	FR-P337	FR-J226	J206	810.25	8.0	120.0	-26.5	0.2	0.0	0.0
☐	FR-P339	FR-J208	FR-J224	687.47	8.0	120.0	27.9	0.2	0.0	0.0
☐	FR-P341	FR-J208	FR-J226	679.49	8.0	120.0	28.1	0.2	0.0	0.0
☐	FR-P343	FR-J200	FR-J214	1,003.79	8.0	120.0	-156.6	1.0	0.7	0.7
☐	FR-P345	FR-J126	FR-J214	474.44	8.0	120.0	-5.1	0.0	0.0	0.0
☐	FR-P347	FR-J214	FR-J212	220.14	8.0	120.0	-2.4	0.0	0.0	0.0
☐	FR-P349	FR-J214	FR-J218	496.21	8.0	120.0	-213.7	1.4	0.6	1.2
☐	P351	FR-J212	FR-J216	421.42	8.0	120.0	-227.5	1.5	0.6	1.4
☐	FR-P353	FR-J216	FR-J218	160.85	8.0	120.0	-74.6	0.5	0.0	0.2
☐	FR-P355	FR-J218	FR-J220	408.42	8.0	120.0	-288.8	1.8	0.9	2.1
☐	FR-P361	FR-J216	J222	1,145.70	8.0	120.0	-250.4	1.6	1.9	1.6

Run No. 14 - Phase IV (Buildout) MDD + 3,500 gpm MF Fire at FR-J234 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	J250	5.4	1,154.0	1,220.8	28.9
☐	FR-J228	5.4	1,148.0	1,220.8	31.5
☐	FR-J118	0.0	785.0	859.5	32.3
☐	FR-J134	5.4	1,114.0	1,220.8	46.3
☐	FR-J16	0.0	754.0	852.7	42.7
☐	FR-J146	5.4	1,111.0	1,220.8	47.6
☐	FR-J144	5.4	1,108.5	1,220.8	48.7
☐	J222	0.0	1,109.0	1,221.3	48.7
☐	FR-J232	5.4	1,105.0	1,220.8	50.2
☐	FR-J32	9.0	744.0	852.6	47.1
☐	FR-J176	0.0	1,102.3	1,220.9	51.4
☐	FR-J132	5.4	1,100.4	1,220.8	52.2
☐	J148	5.4	1,100.0	1,220.8	52.3
☐	FR-J220	0.0	1,100.7	1,221.1	52.2
☐	J164	5.4	1,098.0	1,220.8	53.2
☐	J130	5.4	1,095.7	1,220.8	54.2
☐	FR-J174	0.0	1,096.3	1,220.9	54.0
☐	FR-J216	41.6	1,096.0	1,220.9	54.1
☐	FR-J218	0.2	1,096.0	1,220.9	54.1
☐	FR-J188	5.4	1,094.0	1,220.7	54.9
☐	J160	5.4	1,092.0	1,220.8	55.8
☐	FR-J212	23.2	1,091.9	1,220.8	55.9
☐	J48	6.3	732.0	852.6	52.2
☐	J168	5.4	1,090.0	1,220.8	56.7
☐	FR-J30	0.0	731.0	852.6	52.7
☐	FR-J114	0.0	730.0	852.8	53.2
☐	FR-J214	23.2	1,087.7	1,220.8	57.7
☐	J236	12.0	728.0	853.1	54.2
☐	FR-J18	9.0	726.0	852.6	54.9
☐	J12	3.1	725.0	853.1	55.5
☐	J14	0.0	724.0	853.0	55.9
☐	FR-J126	28.6	1,082.5	1,220.8	59.9
☐	FR-J34	0.0	721.0	852.6	57.0
☐	FR-J138	5.4	1,077.6	1,220.8	62.0
☐	FR-J124	28.6	1,076.6	1,220.8	62.5
☐	FR-J244	0.0	718.0	853.1	58.5
☐	FR-J150	5.4	1,076.0	1,220.8	62.7
☐	FR-J230	49.3	1,075.5	1,220.7	62.9

Run No. 14 - Phase IV (Buildout) MDD + 3,500 gpm MF Fire at FR-J234 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J186	5.4	1,072.7	1,220.7	64.1
☐	FR-J190	5.4	1,072.0	1,220.8	64.5
☐	FR-J172	5.4	1,072.0	1,220.8	64.5
☐	FR-J166	5.4	1,069.0	1,220.8	65.8
☐	J158	5.4	1,068.0	1,220.8	66.2
☐	FR-J122	5.4	1,066.0	1,220.8	67.1
☐	J152	5.4	1,062.0	1,220.8	68.8
☐	FR-J184	5.4	1,061.5	1,220.7	69.0
☐	J46	0.0	703.0	852.5	64.8
☐	J162	5.4	1,060.5	1,220.8	69.4
☐	FR-J182	5.4	1,057.0	1,220.7	71.0
☐	J156	5.4	1,057.0	1,220.8	71.0
☐	J120	33.4	1,057.0	1,220.8	71.0
☐	FR-J170	5.4	1,057.0	1,220.8	71.0
☐	J180	5.4	1,056.0	1,220.8	71.4
☐	FR-J36	9.0	697.0	852.6	67.4
☐	J154	5.4	1,050.0	1,220.8	74.0
☐	FR-J136	5.4	1,050.0	1,220.8	74.0
☐	FR-J38	0.0	691.0	852.6	70.0
☐	FR-J196	5.4	1,049.2	1,220.7	74.3
☐	FR-J240	19.6	690.0	852.5	70.4
☐	FR-J192	5.4	1,046.5	1,220.7	75.5
☐	J238	56.9	684.0	852.5	73.0
☐	FR-J194	5.4	1,041.0	1,220.7	77.9
☐	FR-J178	5.4	1,039.7	1,220.7	78.4
☐	FR-J28	0.0	680.0	852.6	74.8
☐	J242	18.2	679.0	852.6	75.2
☐	FR-J44	0.0	679.0	852.5	75.2
☐	J142	5.4	1,036.5	1,220.8	79.8
☐	FR-J50	19.6	670.0	852.5	79.1
☐	J140	5.4	1,028.0	1,220.8	83.5
☐	FR-J128	77.6	1,025.7	1,220.7	84.5
☐	FR-J26	19.6	666.0	852.6	80.9
☐	FR-J202	23.2	1,020.0	1,220.7	86.9
☐	FR-J224	23.2	1,018.2	1,220.6	87.7
☐	FR-J200	23.2	1,017.6	1,220.7	88.0
☐	FR-J226	23.2	1,016.9	1,220.6	88.3
☐	FR-J204	23.2	1,015.1	1,220.6	89.0

Run No. 14 - Phase IV (Buildout) MDD + 3,500 gpm MF Fire at FR-J234 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J198	23.2	1,015.4	1,220.7	88.9
☐	FR-J20	0.0	656.0	852.6	85.2
☐	FR-J208	11.5	1,013.1	1,220.6	89.9
☐	J42	9.0	655.0	852.4	85.5
☐	FR-J210	23.2	1,011.5	1,220.6	90.6
☐	J206	23.2	1,008.8	1,220.6	91.8
☐	FR-J40	0.0	650.0	852.3	87.7
☐	FR-J52	19.6	646.0	852.4	89.4
☐	FR-J58	19.6	644.0	852.6	90.4
☐	FR-J22	19.6	642.0	852.6	91.3
☐	FR-J24	57.8	632.0	852.7	95.6
☐	J106	108.8	625.0	849.9	97.5
☐	FR-J96	1.7	623.0	849.0	97.9
☐	FR-J54	19.6	623.0	852.2	99.3
☐	FR-J116	0.0	619.0	848.6	99.5
☐	FR-J66	19.6	620.0	852.6	100.8
☐	FR-J94	1.1	617.0	848.2	100.2
☐	FR-J56	18.2	617.0	851.7	101.7
☐	FR-J108	0.0	615.0	848.1	101.0
☐	FR-J98	2.3	615.0	848.2	101.0
☐	FR-J104	35.0	612.0	847.7	102.1
☐	J9634	0.0	608.8	847.7	103.5
☐	FR-J90	35.0	608.0	847.7	103.9
☐	J60	19.6	608.0	853.2	106.3
☐	J100	35.0	606.0	847.5	104.7
☐	FR-J92	0.0	602.0	847.4	106.3
☐	J102	2.3	599.0	847.3	107.6
☐	J88	0.0	599.0	847.2	107.5
☐	FR-J110	183.6	595.0	846.9	109.1
☐	FR-J86	2.3	595.0	846.8	109.1
☐	J64	19.6	596.0	852.6	111.2
☐	FR-J82	31.9	592.0	846.6	110.3
☐	FR-J80	0.0	587.0	846.0	112.2
☐	FR-J84	0.0	587.0	846.0	112.2
☐	FR-J78	0.0	582.0	844.8	113.9
☐	FR-J62	19.6	584.0	854.7	117.3
☐	FR-J234	3,524.3	560.0	838.4	120.6
☐	J70	0.0	557.0	852.1	127.9

Run No. 14 - Phase IV (Buildout) MDD + 3,500 gpm MF Fire at FR-J234 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	J76	152.0	555.0	846.1	126.1
☐	FR-J68	0.0	557.0	855.6	129.4
☐	J72	0.0	545.0	850.0	132.2
☐	J74	16.9	540.0	846.1	132.6
☐	J112	0.0	530.0	856.7	141.5
☐	J9636	0.0	768.0	1,220.7	196.2
☐	J246	0.0	760.0	1,220.8	199.7
☐	J248	0.0	718.0	1,220.8	217.9

Run No. 14 - Phase IV (Buildout) MDD + 3,500 gpm MF Fire at FR-J234 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P73	J60	FR-J62	335.87	8.0	120.0	-426.2	2.7	1.5	4.4
FR-P363	J222	T5002	706.14	16.0	130.0	-697.2	1.1	0.2	0.3
FR-P369	FR-J68	J112	738.09	16.0	130.0	-1,602.2	2.6	1.1	1.5
FR-P300	J9638	J112	7,594.97	16.0	130.0	1,602.2	2.6	11.4	1.5
FR-P359	FR-J220	J222	855.38	16.0	130.0	-590.3	0.9	0.2	0.2
P77	J70	FR-J68	1,466.13	12.0	120.0	-883.2	2.5	3.4	2.3
P75	FR-J62	FR-J68	549.08	12.0	120.0	-719.0	2.0	0.9	1.6
P183	FR-J118	T5000	798.27	16.0	130.0	-2,431.1	3.9	2.6	3.2
FR-P23	J72	J70	657.10	12.0	120.0	-1,054.5	3.0	2.1	3.2
FR-P355	FR-J218	FR-J220	408.42	8.0	120.0	-123.3	0.8	0.2	0.4
P71	FR-J24	J60	309.00	8.0	120.0	-250.7	1.6	0.5	1.6
P115	J72	J74	449.07	12.0	120.0	1,809.6	5.1	4.0	8.8
FR-P357	FR-J174	FR-J220	924.96	16.0	120.0	-467.0	0.7	0.2	0.2
P79	J64	FR-J62	1,090.04	8.0	120.0	-273.2	1.7	2.1	1.9
FR-P361	FR-J216	J222	1,145.70	8.0	120.0	-106.9	0.7	0.4	0.3
P181	FR-J118	J12	1,373.76	16.0	130.0	2,954.4	4.7	6.4	4.6
FR-P271	FR-J176	FR-J174	559.70	16.0	130.0	-395.5	0.6	0.1	0.1
P351	FR-J212	FR-J216	421.42	8.0	120.0	-97.1	0.6	0.1	0.3
P179	J106	J12	1,077.13	16.0	130.0	-2,322.6	3.7	3.2	3.0
FR-P349	FR-J214	FR-J218	496.21	8.0	120.0	-91.2	0.6	0.1	0.3
FR-P269	J130	FR-J176	798.73	16.0	130.0	-334.4	0.5	0.1	0.1
FR-P27	J64	FR-J66	302.43	8.0	120.0	-28.6	0.2	0.0	0.0
FR-P117	J74	J76	983.83	12.0	120.0	-132.7	0.4	0.1	0.1
FR-P265	FR-J122	J180	193.06	8.0	120.0	75.9	0.5	0.0	0.2
FR-P331	FR-J202	FR-J212	850.38	8.0	120.0	-72.8	0.5	0.1	0.2
FR-P273	FR-J174	FR-J126	877.66	8.0	120.0	71.5	0.5	0.1	0.2
FR-P343	FR-J200	FR-J214	1,003.79	8.0	120.0	-66.8	0.4	0.1	0.1
FR-P29	FR-J66	FR-J58	309.93	8.0	120.0	25.4	0.2	0.0	0.0
FR-P275	FR-J176	FR-J124	637.84	8.0	120.0	61.1	0.4	0.1	0.1
P43	J64	FR-J54	1,109.79	8.0	120.0	110.8	0.7	0.4	0.4
P253	FR-J132	J130	247.40	16.0	130.0	-236.6	0.4	0.0	0.0
P163	FR-J116	J106	448.55	12.0	120.0	-979.5	2.8	1.3	2.8
FR-P281	J120	FR-J190	281.96	8.0	120.0	58.3	0.4	0.0	0.1
FR-P313	FR-J128	FR-J198	380.27	8.0	120.0	57.8	0.4	0.0	0.1
P161	FR-J108	FR-J116	303.29	12.0	120.0	-783.4	2.2	0.6	1.9
P177	FR-J110	J9634	932.10	12.0	120.0	-526.0	1.5	0.8	0.9

Run No. 14 - Phase IV (Buildout) MDD + 3,500 gpm MF Fire at FR-J234 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P318	J9634	FR-J108	416.60	12.0	120.0	-526.0	1.5	0.4	0.9
P171	FR-J96	J106	204.15	12.0	120.0	-1,234.2	3.5	0.9	4.3
P81	FR-J66	J60	903.29	8.0	120.0	-155.9	1.0	0.6	0.7
FR-P267	FR-J128	FR-J126	1,021.99	8.0	120.0	-55.1	0.4	0.1	0.1
FR-P279	J180	FR-J178	343.89	8.0	120.0	53.8	0.3	0.0	0.1
P375	FR-J232	FR-J132	247.64	16.0	130.0	-208.9	0.3	0.0	0.0
FR-P277	FR-J178	FR-J128	301.01	10.0	120.0	80.3	0.3	0.0	0.1
P85	FR-J52	FR-J66	869.10	8.0	120.0	-82.4	0.5	0.2	0.2
FR-P25	J70	J64	570.29	8.0	120.0	-171.3	1.1	0.5	0.8
FR-P329	FR-J210	FR-J200	721.29	8.0	120.0	-49.1	0.3	0.1	0.1
P169	FR-J98	FR-J96	282.08	8.0	120.0	-343.8	2.2	0.8	2.9
P259	FR-J138	J130	540.84	12.0	120.0	-92.4	0.3	0.0	0.0
FR-P319	FR-J198	J206	1,358.95	8.0	120.0	39.7	0.3	0.1	0.1
P69	FR-J26	FR-J24	799.40	8.0	120.0	-64.2	0.4	0.1	0.1
FR-P325	FR-J202	FR-J204	1,425.80	8.0	120.0	39.0	0.2	0.1	0.1
FR-P31	FR-J58	FR-J50	632.63	8.0	120.0	79.7	0.5	0.1	0.2
P11	332	FR-J118	4,814.14	16.0	130.0	523.2	0.8	0.9	0.2
FR-P119	J76	FR-J80	1,411.75	8.0	120.0	57.8	0.4	0.2	0.1
P167	J100	FR-J98	282.92	8.0	120.0	-304.6	1.9	0.7	2.3
P153	FR-J94	FR-J96	349.47	12.0	120.0	-888.6	2.5	0.8	2.4
P257	FR-J122	FR-J138	261.24	12.0	120.0	-77.9	0.2	0.0	0.0
FR-P121	J74	FR-J234	771.10	12.0	120.0	1,925.4	5.5	7.6	9.9
P63	FR-J22	FR-J24	1,070.33	8.0	120.0	-54.8	0.3	0.1	0.1
FR-P309	FR-J194	FR-J178	437.01	8.0	120.0	32.0	0.2	0.0	0.0
FR-P353	FR-J216	FR-J218	160.85	8.0	120.0	-31.8	0.2	0.0	0.0
P131	FR-J90	FR-J94	289.65	8.0	120.0	-257.8	1.6	0.5	1.7
P123	FR-J78	FR-J80	385.16	8.0	120.0	-352.3	2.2	1.2	3.1
P141	FR-J82	FR-J84	348.69	8.0	120.0	249.3	1.6	0.6	1.6
FR-P45	FR-J56	FR-J54	191.73	8.0	120.0	-329.8	2.1	0.5	2.7
FR-P57	J46	J238	383.59	8.0	120.0	-34.6	0.2	0.0	0.0
FR-P381	J238	FR-J28	227.50	8.0	120.0	-91.5	0.6	0.1	0.3
P283	FR-J190	FR-J188	347.17	8.0	120.0	27.5	0.2	0.0	0.0
P241	FR-J134	FR-J232	208.94	16.0	130.0	-108.7	0.2	0.0	0.0
FR-P33	FR-J50	FR-J240	583.48	8.0	120.0	-9.8	0.1	0.0	0.0
P197	J156	J158	254.43	10.0	120.0	-41.9	0.2	0.0	0.0
FR-P227	FR-J144	FR-J146	262.72	10.0	120.0	-40.9	0.2	0.0	0.0

Run No. 14 - Phase IV (Buildout) MDD + 3,500 gpm MF Fire at FR-J234 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P239	J168	FR-J134	308.79	8.0	120.0	-26.1	0.2	0.0	0.0
FR-P307	FR-J184	FR-J194	307.75	8.0	120.0	25.9	0.2	0.0	0.0
FR-P327	FR-J208	FR-J210	662.73	8.0	120.0	-25.8	0.2	0.0	0.0
P175	J76	FR-J110	1,850.07	12.0	120.0	-342.4	1.0	0.7	0.4
P213	J154	FR-J230	729.77	8.0	120.0	24.8	0.2	0.0	0.0
FR-P373	FR-J230	J156	783.63	8.0	120.0	-24.5	0.2	0.0	0.0
FR-P293	FR-J182	FR-J184	276.91	8.0	120.0	23.8	0.2	0.0	0.0
P251	FR-J136	FR-J232	882.12	16.0	130.0	-94.9	0.2	0.0	0.0
P215	J148	FR-J144	849.82	10.0	120.0	-36.1	0.1	0.0	0.0
FR-P377	FR-J234	FR-J78	907.29	12.0	120.0	-1,598.9	4.5	6.4	7.0
FR-P261	FR-J122	FR-J124	820.77	8.0	120.0	-22.5	0.1	0.0	0.0
P149	J88	J100	351.12	8.0	120.0	-199.7	1.3	0.4	1.1
P247	FR-J132	FR-J172	329.02	8.0	120.0	22.3	0.1	0.0	0.0
P143	J88	FR-J86	349.47	8.0	120.0	187.9	1.2	0.3	1.0
P189	FR-J136	J142	463.28	8.0	120.0	21.8	0.1	0.0	0.0
P133	FR-J94	FR-J92	655.12	12.0	120.0	629.7	1.8	0.8	1.2
P129	J88	FR-J90	282.08	8.0	120.0	-273.9	1.7	0.5	1.9
P127	FR-J82	J88	282.91	8.0	120.0	-285.7	1.8	0.6	2.1
P199	J158	J160	304.42	10.0	120.0	-32.5	0.1	0.0	0.0
P243	FR-J136	FR-J170	302.36	8.0	120.0	-20.6	0.1	0.0	0.0
P191	J142	J140	504.24	8.0	120.0	20.4	0.1	0.0	0.0
FR-P55	FR-J44	J46	317.14	8.0	120.0	-56.2	0.4	0.0	0.1
P217	FR-J144	J164	303.26	8.0	120.0	19.6	0.1	0.0	0.0
P229	FR-J146	FR-J134	376.30	16.0	130.0	-77.2	0.1	0.0	0.0
FR-P385	J242	FR-J26	703.24	8.0	120.0	-45.7	0.3	0.0	0.1
FR-P89	FR-J44	FR-J52	873.81	8.0	120.0	29.2	0.2	0.0	0.0
P159	FR-J104	J100	561.94	8.0	120.0	95.2	0.6	0.2	0.3
P193	J140	J154	1,203.26	8.0	120.0	18.2	0.1	0.0	0.0
P187	J120	FR-J136	360.92	16.0	130.0	-72.6	0.1	0.0	0.0
P223	J152	J162	637.33	8.0	120.0	-18.1	0.1	0.0	0.0
FR-P225	FR-J150	J164	746.19	8.0	120.0	-17.7	0.1	0.0	0.0
FR-P59	FR-J28	FR-J20	305.03	8.0	120.0	-43.9	0.3	0.0	0.1
P231	J162	FR-J166	404.60	8.0	120.0	-17.2	0.1	0.0	0.0
P249	FR-J172	FR-J170	418.51	8.0	120.0	16.9	0.1	0.0	0.0
FR-P291	J180	FR-J182	311.02	8.0	120.0	16.7	0.1	0.0	0.0
FR-P87	J42	FR-J54	934.21	8.0	120.0	76.9	0.5	0.2	0.2

Run No. 14 - Phase IV (Buildout) MDD + 3,500 gpm MF Fire at FR-J234 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P101	FR-J114	FR-J16	310.07	8.0	120.0	124.3	0.8	0.1	0.4
P201	J160	J148	870.77	10.0	120.0	-24.7	0.1	0.0	0.0
FR-P41	FR-J36	FR-J38	201.63	8.0	120.0	-61.8	0.4	0.0	0.1
P235	FR-J136	FR-J166	349.61	8.0	120.0	15.7	0.1	0.0	0.0
P99	J14	FR-J114	206.06	8.0	120.0	214.9	1.4	0.3	1.2
P145	FR-J90	FR-J92	353.65	8.0	120.0	182.0	1.2	0.3	0.9
P209	J152	J158	1,101.61	8.0	120.0	14.8	0.1	0.0	0.0
P155	J102	FR-J104	786.92	8.0	120.0	-127.3	0.8	0.4	0.5
FR-P37	J48	FR-J34	262.83	8.0	120.0	-18.9	0.1	0.0	0.0
P135	FR-J92	FR-J86	279.55	12.0	120.0	811.7	2.3	0.6	2.0
P61	FR-J20	FR-J22	776.18	8.0	120.0	-33.9	0.2	0.0	0.0
P233	J164	J168	504.59	8.0	120.0	-13.8	0.1	0.0	0.0
FR-P365	FR-J146	J250	647.09	12.0	120.0	30.9	0.1	0.0	0.0
FR-P39	FR-J34	FR-J36	314.01	8.0	120.0	-46.9	0.3	0.0	0.1
P211	FR-J150	J160	875.54	8.0	120.0	13.1	0.1	0.0	0.0
P299	FR-J190	FR-J196	1,747.97	8.0	120.0	12.9	0.1	0.0	0.0
FR-P289	FR-J190	FR-J182	807.90	8.0	120.0	12.4	0.1	0.0	0.0
FR-P341	FR-J208	FR-J226	679.49	8.0	120.0	12.0	0.1	0.0	0.0
P195	J154	J156	136.15	8.0	120.0	-12.0	0.1	0.0	0.0
P147	FR-J82	J102	351.12	8.0	120.0	-290.1	1.9	0.8	2.1
P19	FR-J40	FR-J56	965.35	12.0	120.0	443.5	1.3	0.6	0.7
FR-P339	FR-J208	FR-J224	687.47	8.0	120.0	11.9	0.1	0.0	0.0
FR-P305	FR-J192	FR-J194	1,158.36	8.0	120.0	11.4	0.1	0.0	0.0
FR-P399	J250	FR-J228	236.60	12.0	120.0	25.5	0.1	0.0	0.0
FR-P337	FR-J226	J206	810.25	8.0	120.0	-11.3	0.1	0.0	0.0
FR-P333	FR-J204	FR-J224	804.44	8.0	120.0	11.2	0.1	0.0	0.0
P317	FR-J200	FR-J202	201.84	8.0	120.0	-10.6	0.1	0.0	0.0
FR-P51	FR-J40	J42	194.91	8.0	120.0	-103.6	0.7	0.1	0.3
P221	J164	J162	312.31	8.0	120.0	10.3	0.1	0.0	0.0
P53	J42	FR-J44	320.60	8.0	120.0	-92.9	0.6	0.1	0.3
FR-P263	FR-J124	FR-J126	390.65	8.0	120.0	10.0	0.1	0.0	0.0
FR-P371	FR-J28	FR-J30	1,132.42	8.0	120.0	-20.1	0.1	0.0	0.0
P151	FR-J90	FR-J98	347.76	8.0	120.0	-233.1	1.5	0.5	1.4
FR-P285	FR-J188	FR-J186	356.70	8.0	120.0	9.5	0.1	0.0	0.0
P139	FR-J84	FR-J78	275.65	12.0	120.0	1,246.6	3.5	1.2	4.4
FR-P287	FR-J186	FR-J192	352.08	8.0	120.0	9.3	0.1	0.0	0.0

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P245	FR-J170	FR-J138	602.00	8.0	120.0	-9.1	0.1	0.0	0.0
FR-P367	FR-J228	FR-J144	576.29	12.0	120.0	20.1	0.1	0.0	0.0
FR-P93	FR-J34	FR-J44	867.58	8.0	120.0	65.9	0.4	0.1	0.1
P97	FR-J32	FR-J16	297.66	8.0	120.0	-77.6	0.5	0.1	0.2
P255	J120	FR-J122	979.33	12.0	120.0	-19.1	0.1	0.0	0.0
FR-P49	FR-J52	FR-J50	324.73	8.0	120.0	-69.8	0.4	0.0	0.2
P91	FR-J36	J42	808.31	8.0	120.0	96.5	0.6	0.2	0.3
P105	FR-J16	FR-J18	931.69	8.0	120.0	46.7	0.3	0.1	0.1
FR-P107	J48	FR-J30	148.31	8.0	120.0	-38.5	0.2	0.0	0.1
P95	FR-J34	FR-J32	488.46	8.0	120.0	-37.9	0.2	0.0	0.0
P297	FR-J184	FR-J188	570.05	8.0	120.0	-7.4	0.0	0.0	0.0
P17	FR-J38	FR-J40	783.03	12.0	120.0	340.0	1.0	0.3	0.4
P125	FR-J80	FR-J82	272.63	8.0	120.0	-294.6	1.9	0.6	2.2
FR-P383	FR-J240	J46	228.24	8.0	120.0	-29.4	0.2	0.0	0.0
FR-P111	FR-J32	FR-J30	599.32	8.0	120.0	30.8	0.2	0.0	0.0
FR-P21	FR-J56	J72	956.40	12.0	120.0	755.1	2.1	1.7	1.7
P237	FR-J166	J168	280.38	8.0	120.0	-6.9	0.0	0.0	0.0
P83	FR-J58	FR-J24	674.36	8.0	120.0	-73.9	0.5	0.1	0.2
P203	J148	FR-J150	309.62	8.0	120.0	6.0	0.0	0.0	0.0
P311	FR-J186	FR-J188	1,054.41	8.0	120.0	-5.3	0.0	0.0	0.0
P205	FR-J150	J152	305.68	8.0	120.0	5.2	0.0	0.0	0.0
FR-P315	FR-J198	FR-J200	222.46	8.0	120.0	-5.1	0.0	0.0	0.0
P165	J102	J100	282.92	8.0	120.0	-165.1	1.1	0.2	0.8
FR-P321	J206	FR-J208	233.87	8.0	120.0	5.1	0.0	0.0	0.0
FR-P301	FR-J196	FR-J192	317.46	8.0	120.0	4.9	0.0	0.0	0.0
FR-P109	FR-J30	FR-J18	277.95	8.0	120.0	-27.8	0.2	0.0	0.0
FR-P323	FR-J208	FR-J204	210.14	8.0	120.0	-4.5	0.0	0.0	0.0
P47	FR-J54	FR-J52	314.01	8.0	120.0	-161.7	1.0	0.2	0.7
FR-P219	J162	J142	306.84	8.0	120.0	4.0	0.0	0.0	0.0
P173	FR-J98	FR-J116	428.93	8.0	120.0	-196.1	1.3	0.4	1.0
P137	FR-J86	FR-J84	279.55	12.0	120.0	997.3	2.8	0.8	2.9
P13	J12	J14	254.59	16.0	130.0	616.7	1.0	0.1	0.3
P113	FR-J18	FR-J20	1,249.60	8.0	120.0	10.0	0.1	0.0	0.0
P207	J152	J140	308.33	8.0	120.0	3.1	0.0	0.0	0.0
P185	J12	J236	233.60	16.0	130.0	12.0	0.0	0.0	0.0
P303	FR-J196	FR-J192	943.76	8.0	120.0	2.7	0.0	0.0	0.0

Run No. 14 - Phase IV (Buildout) MDD + 3,500 gpm MF Fire at FR-J234 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P345	FR-J126	FR-J214	474.44	8.0	120.0	-2.2	0.0	0.0	0.0
☐	P157	FR-J104	FR-J108	225.66	8.0	120.0	-257.4	1.6	0.4	1.7
☐	FR-P103	FR-J114	FR-J36	785.30	8.0	120.0	90.6	0.6	0.2	0.2
☐	FR-P347	FR-J214	FR-J212	220.14	8.0	120.0	-1.0	0.0	0.0	0.0
☐	FR-P35	J46	J48	968.28	8.0	120.0	-51.1	0.3	0.1	0.1
☐	P67	FR-J28	J242	66.14	8.0	120.0	-27.5	0.2	0.0	0.0
☐	P15	J14	FR-J38	779.21	12.0	120.0	401.8	1.1	0.4	0.5
☐	P65	FR-J22	FR-J26	303.69	8.0	120.0	1.2	0.0	0.0	0.0
☐	FR-P295	FR-J184	FR-J186	775.48	8.0	120.0	-0.1	0.0	0.0	0.0
☐	FR-P335	FR-J224	FR-J226	188.42	8.0	120.0	-0.1	0.0	0.0	0.0
☐	FR-P389	FR-J244	U7000	14.75	16.0	130.0	0.0	0.0	0.0	0.0
☐	FR-P379	J236	FR-J244	776.60	16.0	130.0	0.0	0.0	0.0	0.0
☐	FR-P387	J246	J120	3,168.13	16.0	130.0	0.0	0.0	0.0	0.0
☐	P322	J9636	FR-J128	3,148.45	10.0	120.0	0.0	0.0	0.0	0.0
☐	P320	J9634	J9636	1,124.95	12.0	120.0	0.0	0.0	0.0	0.0
☐	FR-P391	U7000	J248	41.46	16.0	130.0	0.0	0.0	0.0	0.0
☐	FR-P397	J248	J246	151.45	16.0	130.0	0.0	0.0	0.0	0.0

Run No. 15 - Phase IV (Buildout) MDD + 3,500 gpm Comm Fire at FR-J124 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	J100	35.0	606.0	859.9	110.0
☐	J102	2.3	599.0	859.9	113.0
☐	FR-J104	35.0	612.0	859.8	107.4
☐	J106	108.8	625.0	859.8	101.8
☐	FR-J108	0.0	615.0	859.8	106.1
☐	FR-J110	183.6	595.0	859.8	114.7
☐	J112	0.0	530.0	865.6	145.4
☐	FR-J114	0.0	730.0	860.2	56.4
☐	FR-J116	0.0	619.0	859.8	104.4
☐	FR-J118	0.0	785.0	861.8	33.3
☐	J12	3.1	725.0	859.9	58.4
☐	J120	33.4	1,057.0	1,216.0	68.9
☐	FR-J122	5.4	1,066.0	1,214.8	64.5
☐	FR-J128	77.6	1,025.7	1,213.5	81.4
☐	J130	5.4	1,095.7	1,215.3	51.8
☐	FR-J132	5.4	1,100.4	1,215.4	49.8
☐	FR-J134	5.4	1,114.0	1,215.5	44.0
☐	FR-J136	5.4	1,050.0	1,215.7	71.8
☐	FR-J138	5.4	1,077.6	1,215.0	59.5
☐	J14	0.0	724.0	859.9	58.9
☐	J140	5.4	1,028.0	1,215.5	81.3
☐	J142	5.4	1,036.5	1,215.6	77.6
☐	FR-J144	5.4	1,108.5	1,215.5	46.4
☐	FR-J146	5.4	1,111.0	1,215.5	45.3
☐	J148	5.4	1,100.0	1,215.5	50.0
☐	FR-J150	5.4	1,076.0	1,215.5	60.5
☐	J152	5.4	1,062.0	1,215.5	66.5
☐	J154	5.4	1,050.0	1,215.5	71.7
☐	J156	5.4	1,057.0	1,215.5	68.7
☐	J158	5.4	1,068.0	1,215.5	63.9
☐	FR-J16	0.0	754.0	860.3	46.1
☐	J160	5.4	1,092.0	1,215.5	53.5
☐	J162	5.4	1,060.5	1,215.6	67.2
☐	J164	5.4	1,098.0	1,215.5	50.9
☐	FR-J166	5.4	1,069.0	1,215.6	63.5
☐	J168	5.4	1,090.0	1,215.5	54.4
☐	FR-J170	5.4	1,057.0	1,215.4	68.7
☐	FR-J172	5.4	1,072.0	1,215.4	62.1

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J174	0.0	1,096.3	1,215.6	51.7
☐	FR-J176	0.0	1,102.3	1,215.3	49.0
☐	FR-J178	5.4	1,039.7	1,214.0	75.5
☐	FR-J18	9.0	726.0	860.4	58.2
☐	J180	5.4	1,056.0	1,214.6	68.7
☐	FR-J182	5.4	1,057.0	1,214.7	68.3
☐	FR-J184	5.4	1,061.5	1,214.7	66.4
☐	FR-J186	5.4	1,072.7	1,214.8	61.6
☐	FR-J188	5.4	1,094.0	1,214.8	52.4
☐	FR-J190	5.4	1,072.0	1,215.1	62.0
☐	FR-J192	5.4	1,046.5	1,214.8	72.9
☐	FR-J194	5.4	1,041.0	1,214.6	75.2
☐	FR-J196	5.4	1,049.2	1,214.8	71.8
☐	FR-J20	0.0	656.0	860.6	88.6
☐	FR-J22	19.6	642.0	860.8	94.8
☐	FR-J220	0.0	1,100.7	1,216.7	50.3
☐	J222	0.0	1,109.0	1,218.3	47.4
☐	FR-J228	5.4	1,148.0	1,215.5	29.2
☐	FR-J230	49.3	1,075.5	1,215.5	60.7
☐	FR-J232	5.4	1,105.0	1,215.5	47.9
☐	FR-J234	24.3	560.0	860.1	130.0
☐	J236	12.0	728.0	859.3	56.9
☐	J238	56.9	684.0	860.5	76.5
☐	FR-J24	57.8	632.0	861.1	99.3
☐	FR-J240	19.6	690.0	860.6	73.9
☐	J242	18.2	679.0	860.6	78.7
☐	FR-J244	0.0	718.0	857.4	60.4
☐	J246	0.0	760.0	1,223.7	200.9
☐	J248	0.0	718.0	1,224.0	219.3
☐	J250	5.4	1,154.0	1,215.5	26.6
☐	FR-J26	19.6	666.0	860.8	84.4
☐	FR-J28	0.0	680.0	860.6	78.2
☐	FR-J30	0.0	731.0	860.4	56.1
☐	FR-J32	9.0	744.0	860.4	50.4
☐	FR-J34	0.0	721.0	860.4	60.4
☐	FR-J36	9.0	697.0	860.3	70.8
☐	FR-J38	0.0	691.0	860.3	73.3
☐	FR-J40	0.0	650.0	860.5	91.2

Run No. 15 - Phase IV (Buildout) MDD + 3,500 gpm Comm Fire at FR-J124 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J42	9.0	655.0	860.5	89.0
FR-J44	0.0	679.0	860.5	78.7
J46	0.0	703.0	860.5	68.3
J48	6.3	732.0	860.4	55.6
FR-J50	19.6	670.0	860.8	82.7
FR-J52	19.6	646.0	860.8	93.1
FR-J54	19.6	623.0	860.7	103.0
FR-J56	18.2	617.0	860.7	105.6
FR-J58	19.6	644.0	861.1	94.1
J60	19.6	608.0	861.9	110.0
FR-J62	19.6	584.0	863.6	121.2
J64	19.6	596.0	861.6	115.1
FR-J66	19.6	620.0	861.3	104.6
FR-J68	0.0	557.0	864.6	133.3
J70	0.0	557.0	861.7	132.0
J72	0.0	545.0	860.7	136.8
J74	16.9	540.0	860.3	138.8
J76	152.0	555.0	859.9	132.1
FR-J78	0.0	582.0	859.9	120.4
FR-J80	0.0	587.0	859.9	118.3
FR-J82	31.9	592.0	859.9	116.1
FR-J84	0.0	587.0	859.9	118.2
FR-J86	2.3	595.0	859.9	114.8
J88	0.0	599.0	859.9	113.0
FR-J90	35.0	608.0	859.9	109.1
FR-J92	0.0	602.0	859.9	111.7
FR-J94	1.1	617.0	859.9	105.2
FR-J96	1.7	623.0	859.9	102.6
FR-J98	2.3	615.0	859.9	106.1
J9634	0.0	608.8	859.8	108.8
J9636	0.0	768.0	1,213.5	193.0
FR-J124	3,528.6	1,076.6	1,196.7	52.0
FR-J126	28.6	1,082.5	1,210.5	55.5
FR-J198	23.2	1,015.4	1,213.5	85.8
FR-J200	23.2	1,017.6	1,213.5	84.9
FR-J202	23.2	1,020.0	1,213.5	83.8
FR-J204	23.2	1,015.1	1,213.4	85.9
J206	23.2	1,008.8	1,213.4	88.6

Run No. 15 - Phase IV (Buildout) MDD + 3,500 gpm Comm Fire at FR-J124 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J208	11.5	1,013.1	1,213.4	86.8
☐	FR-J210	23.2	1,011.5	1,213.4	87.5
☐	FR-J212	23.2	1,091.9	1,213.8	52.8
☐	FR-J214	23.2	1,087.7	1,213.5	54.5
☐	FR-J216	41.6	1,096.0	1,215.1	51.6
☐	FR-J218	0.2	1,096.0	1,215.1	51.6
☐	FR-J224	23.2	1,018.2	1,213.4	84.6
☐	FR-J226	23.2	1,016.9	1,213.4	85.1

Run No. 15 - Phase IV (Buildout) MDD + 3,500 gpm Comm Fire at FR-J124 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P101	FR-J114	FR-J16	310.1	8.0	120.0	-133.9	0.9	0.2	0.5
☐	FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	-79.7	0.5	0.2	0.2
☐	P105	FR-J16	FR-J18	931.7	8.0	120.0	-58.1	0.4	0.1	0.1
☐	FR-P107	J48	FR-J30	148.3	8.0	120.0	-4.0	0.0	0.0	0.0
☐	FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	6.7	0.0	0.0	0.0
☐	P11	332	FR-J118	4,814.1	16.0	130.0	262.4	0.4	0.3	0.1
☐	FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	-49.7	0.3	0.0	0.1
☐	P113	FR-J18	FR-J20	1,249.6	8.0	120.0	-60.3	0.4	0.1	0.1
☐	P115	J72	J74	449.1	12.0	120.0	568.6	1.6	0.5	1.0
☐	FR-P117	J74	J76	983.8	12.0	120.0	305.9	0.9	0.3	0.3
☐	FR-P119	J76	FR-J80	1,411.8	8.0	120.0	24.5	0.2	0.0	0.0
☐	FR-P121	J74	FR-J234	771.1	12.0	120.0	245.8	0.7	0.2	0.2
☐	P123	FR-J78	FR-J80	385.2	8.0	120.0	40.4	0.3	0.0	0.1
☐	P125	FR-J80	FR-J82	272.6	8.0	120.0	65.0	0.4	0.0	0.1
☐	P127	FR-J82	J88	282.9	8.0	120.0	33.6	0.2	0.0	0.0
☐	P129	J88	FR-J90	282.1	8.0	120.0	30.8	0.2	0.0	0.0
☐	P13	J12	J14	254.6	16.0	130.0	-579.6	0.9	0.1	0.2
☐	P131	FR-J90	FR-J94	289.7	8.0	120.0	3.8	0.0	0.0	0.0
☐	P133	FR-J94	FR-J92	655.1	12.0	120.0	-67.0	0.2	0.0	0.0
☐	P135	FR-J92	FR-J86	279.5	12.0	120.0	-99.0	0.3	0.0	0.0
☐	P137	FR-J86	FR-J84	279.6	12.0	120.0	-135.9	0.4	0.0	0.1
☐	P139	FR-J84	FR-J78	275.6	12.0	120.0	-181.0	0.5	0.0	0.1
☐	P141	FR-J82	FR-J84	348.7	8.0	120.0	-45.1	0.3	0.0	0.1
☐	P143	J88	FR-J86	349.5	8.0	120.0	-34.6	0.2	0.0	0.0
☐	P145	FR-J90	FR-J92	353.7	8.0	120.0	-32.0	0.2	0.0	0.0
☐	P147	FR-J82	J102	351.1	8.0	120.0	44.6	0.3	0.0	0.1
☐	P149	J88	J100	351.1	8.0	120.0	37.4	0.2	0.0	0.0
☐	P15	J14	FR-J38	779.2	12.0	120.0	-366.0	1.0	0.4	0.5
☐	P151	FR-J90	FR-J98	347.8	8.0	120.0	24.1	0.2	0.0	0.0
☐	P153	FR-J94	FR-J96	349.5	12.0	120.0	69.7	0.2	0.0	0.0
☐	P155	J102	FR-J104	786.9	8.0	120.0	21.5	0.1	0.0	0.0
☐	P157	FR-J104	FR-J108	225.7	8.0	120.0	7.2	0.0	0.0	0.0
☐	P159	FR-J104	J100	561.9	8.0	120.0	-20.7	0.1	0.0	0.0
☐	P161	FR-J108	FR-J116	303.3	12.0	120.0	-47.0	0.1	0.0	0.0
☐	P163	FR-J116	J106	448.5	12.0	120.0	-27.1	0.1	0.0	0.0
☐	P165	J102	J100	282.9	8.0	120.0	20.8	0.1	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P167	J100	FR-J98	282.9	8.0	120.0	2.5	0.0	0.0	0.0
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	4.3	0.0	0.0	0.0
☐	P17	FR-J38	FR-J40	783.0	12.0	120.0	-277.5	0.8	0.2	0.3
☐	P171	FR-J96	J106	204.2	12.0	120.0	72.3	0.2	0.0	0.0
☐	P173	FR-J98	FR-J116	428.9	8.0	120.0	19.9	0.1	0.0	0.0
☐	P175	J76	FR-J110	1,850.1	12.0	120.0	129.4	0.4	0.1	0.1
☐	P177	FR-J110	J9634	932.1	12.0	120.0	-54.2	0.2	0.0	0.0
☐	P179	J106	J12	1,077.1	16.0	130.0	-63.6	0.1	0.0	0.0
☐	P181	FR-J118	J12	1,373.8	16.0	130.0	1,577.9	2.5	2.0	1.5
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-1,315.5	2.1	0.8	1.0
☐	P185	J12	J236	233.6	16.0	130.0	2,090.9	3.3	0.6	2.4
☐	P187	J120	FR-J136	360.9	16.0	130.0	1,056.0	1.7	0.2	0.7
☐	P189	FR-J136	J142	463.3	8.0	120.0	107.2	0.7	0.2	0.3
☐	P19	FR-J40	FR-J56	965.3	12.0	120.0	-228.8	0.6	0.2	0.2
☐	P191	J142	J140	504.2	8.0	120.0	53.0	0.3	0.0	0.1
☐	P193	J140	J154	1,203.3	8.0	120.0	25.7	0.2	0.0	0.0
☐	P195	J154	J156	136.1	8.0	120.0	-4.7	0.0	0.0	0.0
☐	P197	J156	J158	254.4	10.0	120.0	-34.3	0.1	0.0	0.0
☐	P199	J158	J160	304.4	10.0	120.0	-17.8	0.1	0.0	0.0
☐	P201	J160	J148	870.8	10.0	120.0	-7.2	0.0	0.0	0.0
☐	P203	J148	FR-J150	309.6	8.0	120.0	-26.9	0.2	0.0	0.0
☐	P205	FR-J150	J152	305.7	8.0	120.0	-29.9	0.2	0.0	0.0
☐	P207	J152	J140	308.3	8.0	120.0	-21.9	0.1	0.0	0.0
☐	P209	J152	J158	1,101.6	8.0	120.0	21.9	0.1	0.0	0.0
☐	FR-P21	FR-J56	J72	956.4	12.0	120.0	-135.9	0.4	0.1	0.1
☐	P211	FR-J150	J160	875.5	8.0	120.0	16.0	0.1	0.0	0.0
☐	P213	J154	FR-J230	729.8	8.0	120.0	25.1	0.2	0.0	0.0
☐	P215	J148	FR-J144	849.8	10.0	120.0	14.3	0.1	0.0	0.0
☐	P217	FR-J144	J164	303.3	8.0	120.0	-44.4	0.3	0.0	0.1
☐	FR-P219	J162	J142	306.8	8.0	120.0	-48.8	0.3	0.0	0.1
☐	P221	J164	J162	312.3	8.0	120.0	-52.0	0.3	0.0	0.1
☐	P223	J152	J162	637.3	8.0	120.0	-35.3	0.2	0.0	0.0
☐	FR-P225	FR-J150	J164	746.2	8.0	120.0	-18.4	0.1	0.0	0.0
☐	FR-P227	FR-J144	FR-J146	262.7	10.0	120.0	29.4	0.1	0.0	0.0
☐	P229	FR-J146	FR-J134	376.3	16.0	130.0	37.2	0.1	0.0	0.0
☐	FR-P23	J72	J70	657.1	12.0	120.0	-704.5	2.0	1.0	1.5

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P231	J162	FR-J166	404.6	8.0	120.0	-43.8	0.3	0.0	0.1
☐	P233	J164	J168	504.6	8.0	120.0	-16.2	0.1	0.0	0.0
☐	P235	FR-J136	FR-J166	349.6	8.0	120.0	123.9	0.8	0.2	0.4
☐	P237	FR-J166	J168	280.4	8.0	120.0	74.7	0.5	0.0	0.2
☐	P239	J168	FR-J134	308.8	8.0	120.0	53.1	0.3	0.0	0.1
☐	P241	FR-J134	FR-J232	208.9	16.0	130.0	84.9	0.1	0.0	0.0
☐	P243	FR-J136	FR-J170	302.4	8.0	120.0	190.2	1.2	0.3	1.0
☐	P245	FR-J170	FR-J138	602.0	8.0	120.0	156.1	1.0	0.4	0.7
☐	P247	FR-J132	FR-J172	329.0	8.0	120.0	-23.3	0.1	0.0	0.0
☐	P249	FR-J172	FR-J170	418.5	8.0	120.0	-28.7	0.2	0.0	0.0
☐	FR-P25	J70	J64	570.3	8.0	120.0	94.6	0.6	0.2	0.3
☐	P251	FR-J136	FR-J232	882.1	16.0	130.0	629.3	1.0	0.2	0.3
☐	P253	FR-J132	J130	247.4	16.0	130.0	726.8	1.2	0.1	0.3
☐	P255	J120	FR-J122	979.3	12.0	120.0	628.3	1.8	1.2	1.2
☐	P257	FR-J122	FR-J138	261.2	12.0	120.0	-560.6	1.6	0.3	1.0
☐	P259	FR-J138	J130	540.8	12.0	120.0	-409.8	1.2	0.3	0.6
☐	FR-P265	FR-J122	J180	193.1	8.0	120.0	162.7	1.0	0.1	0.7
☐	FR-P269	J130	FR-J176	798.7	16.0	130.0	311.6	0.5	0.1	0.1
☐	FR-P27	J64	FR-J66	302.4	8.0	120.0	176.9	1.1	0.3	0.9
☐	FR-P271	FR-J176	FR-J174	559.7	16.0	130.0	-875.9	1.4	0.3	0.5
☐	FR-P277	FR-J178	FR-J128	301.0	10.0	120.0	469.9	1.9	0.5	1.8
☐	FR-P279	J180	FR-J178	343.9	8.0	120.0	261.0	1.7	0.6	1.8
☐	FR-P281	J120	FR-J190	282.0	8.0	120.0	361.1	2.3	0.9	3.2
☐	P283	FR-J190	FR-J188	347.2	8.0	120.0	162.1	1.0	0.3	0.7
☐	FR-P285	FR-J188	FR-J186	356.7	8.0	120.0	51.6	0.3	0.0	0.1
☐	FR-P287	FR-J186	FR-J192	352.1	8.0	120.0	21.5	0.1	0.0	0.0
☐	FR-P289	FR-J190	FR-J182	807.9	8.0	120.0	123.2	0.8	0.4	0.4
☐	FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	149.7	1.0	0.2	0.6
☐	FR-P291	J180	FR-J182	311.0	8.0	120.0	-103.7	0.7	0.1	0.3
☐	FR-P293	FR-J182	FR-J184	276.9	8.0	120.0	14.1	0.1	0.0	0.0
☐	FR-P295	FR-J184	FR-J186	775.5	8.0	120.0	-53.4	0.3	0.1	0.1
☐	P297	FR-J184	FR-J188	570.0	8.0	120.0	-76.5	0.5	0.1	0.2
☐	P299	FR-J190	FR-J196	1,748.0	8.0	120.0	70.4	0.4	0.3	0.2
☐	FR-P301	FR-J196	FR-J192	317.5	8.0	120.0	41.8	0.3	0.0	0.1
☐	P303	FR-J196	FR-J192	943.8	8.0	120.0	23.2	0.1	0.0	0.0
☐	FR-P305	FR-J192	FR-J194	1,158.4	8.0	120.0	81.1	0.5	0.2	0.2

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P307	FR-J184	FR-J194	307.7	8.0	120.0	138.6	0.9	0.2	0.5
☐	FR-P309	FR-J194	FR-J178	437.0	8.0	120.0	214.4	1.4	0.5	1.2
☐	FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	143.3	0.9	0.4	0.6
☐	P311	FR-J186	FR-J188	1,054.4	8.0	120.0	-28.7	0.2	0.0	0.0
☐	FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	104.8	0.7	0.2	0.3
☐	FR-P35	J46	J48	968.3	8.0	120.0	59.4	0.4	0.1	0.1
☐	FR-P357	FR-J174	FR-J220	925.0	16.0	120.0	-1,368.2	2.2	1.2	1.3
☐	FR-P359	FR-J220	J222	855.4	16.0	130.0	-1,780.7	2.8	1.6	1.8
☐	FR-P363	J222	T5002	706.1	16.0	130.0	-2,118.3	3.4	1.8	2.5
☐	FR-P365	FR-J146	J250	647.1	12.0	120.0	-13.1	0.0	0.0	0.0
☐	FR-P367	FR-J228	FR-J144	576.3	12.0	120.0	-23.9	0.1	0.0	0.0
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-1,557.5	2.5	1.0	1.4
☐	FR-P37	J48	FR-J34	262.8	8.0	120.0	57.2	0.4	0.0	0.1
☐	FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	60.4	0.4	0.1	0.1
☐	FR-P373	FR-J230	J156	783.6	8.0	120.0	-24.2	0.2	0.0	0.0
☐	P375	FR-J232	FR-J132	247.6	16.0	130.0	708.8	1.1	0.1	0.3
☐	FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	221.5	0.6	0.2	0.2
☐	FR-P379	J236	FR-J244	776.6	16.0	130.0	2,078.8	3.3	1.9	2.4
☐	FR-P381	J238	FR-J28	227.5	8.0	120.0	-55.7	0.4	0.0	0.1
☐	FR-P383	FR-J240	J46	228.2	8.0	120.0	85.1	0.5	0.1	0.2
☐	FR-P385	J242	FR-J26	703.2	8.0	120.0	-99.9	0.6	0.2	0.3
☐	FR-P387	J246	J120	3,168.1	16.0	130.0	2,078.8	3.3	7.7	2.4
☐	FR-P389	FR-J244	U7000	14.8	16.0	130.0	2,078.8	3.3	0.0	2.4
☐	FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	91.3	0.6	0.1	0.3
☐	FR-P391	U7000	J248	41.5	16.0	130.0	2,078.8	3.3	0.1	2.4
☐	FR-P397	J248	J246	151.4	16.0	130.0	2,078.8	3.3	0.4	2.4
☐	FR-P399	J250	FR-J228	236.6	12.0	120.0	-18.5	0.1	0.0	0.0
☐	FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	88.5	0.6	0.0	0.2
☐	P43	J64	FR-J54	1,109.8	8.0	120.0	167.2	1.1	0.9	0.8
☐	FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	-111.1	0.7	0.1	0.4
☐	P47	FR-J54	FR-J52	314.0	8.0	120.0	-55.6	0.4	0.0	0.1
☐	FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	-18.9	0.1	0.0	0.0
☐	FR-P51	FR-J40	J42	194.9	8.0	120.0	-48.7	0.3	0.0	0.1
☐	P53	J42	FR-J44	320.6	8.0	120.0	-51.5	0.3	0.0	0.1
☐	FR-P55	FR-J44	J46	317.1	8.0	120.0	-24.5	0.2	0.0	0.0
☐	FR-P57	J46	J238	383.6	8.0	120.0	1.2	0.0	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-34.5	0.2	0.0	0.0
☐	P61	FR-J20	FR-J22	776.2	8.0	120.0	-94.8	0.6	0.2	0.3
☐	P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-107.8	0.7	0.4	0.3
☐	P65	FR-J22	FR-J26	303.7	8.0	120.0	-6.6	0.0	0.0	0.0
☐	P67	FR-J28	J242	66.1	8.0	120.0	-81.7	0.5	0.0	0.2
☐	P69	FR-J26	FR-J24	799.4	8.0	120.0	-126.1	0.8	0.4	0.5
☐	P71	FR-J24	J60	309.0	8.0	120.0	-304.9	1.9	0.7	2.3
☐	P73	J60	FR-J62	335.9	8.0	120.0	-469.6	3.0	1.8	5.2
☐	P75	FR-J62	FR-J68	549.1	12.0	120.0	-758.4	2.2	1.0	1.8
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-799.1	2.3	2.8	1.9
☐	P79	J64	FR-J62	1,090.0	8.0	120.0	-269.1	1.7	2.0	1.9
☐	P81	FR-J66	J60	903.3	8.0	120.0	-145.0	0.9	0.5	0.6
☐	P83	FR-J58	FR-J24	674.4	8.0	120.0	-13.2	0.1	0.0	0.0
☐	P85	FR-J52	FR-J66	869.1	8.0	120.0	-152.6	1.0	0.6	0.7
☐	FR-P87	J42	FR-J54	934.2	8.0	120.0	-92.1	0.6	0.2	0.3
☐	FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	-96.2	0.6	0.2	0.3
☐	P91	FR-J36	J42	808.3	8.0	120.0	-85.9	0.5	0.2	0.2
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	-69.2	0.4	0.1	0.2
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	35.1	0.2	0.0	0.0
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	75.8	0.5	0.1	0.2
☐	P99	J14	FR-J114	206.1	8.0	120.0	-213.6	1.4	0.3	1.2
☐	FR-P300	J9638	J112	7,595.0	16.0	130.0	1,557.5	2.5	10.8	1.4
☐	P318	J9634	FR-J108	416.6	12.0	120.0	-54.2	0.2	0.0	0.0
☐	P320	J9634	J9636	1,125.0	12.0	120.0	0.0	0.0	0.0	0.0
☐	P322	J9636	FR-J128	3,148.4	10.0	120.0	0.0	0.0	0.0	0.0
☐	FR-P261	FR-J122	FR-J124	820.8	8.0	120.0	1,020.9	6.5	18.1	22.0
☐	FR-P263	FR-J124	FR-J126	390.6	8.0	120.0	-1,320.3	8.4	13.8	35.4
☐	FR-P267	FR-J128	FR-J126	1,022.0	8.0	120.0	340.4	2.2	2.9	2.9
☐	FR-P273	FR-J174	FR-J126	877.7	8.0	120.0	492.3	3.1	5.0	5.7
☐	FR-P275	FR-J176	FR-J124	637.8	8.0	120.0	1,187.5	7.6	18.6	29.1
☐	FR-P313	FR-J128	FR-J198	380.3	8.0	120.0	51.9	0.3	0.0	0.1
☐	FR-P315	FR-J198	FR-J200	222.5	8.0	120.0	-9.7	0.1	0.0	0.0
☐	P317	FR-J200	FR-J202	201.8	8.0	120.0	-45.6	0.3	0.0	0.1
☐	FR-P319	FR-J198	J206	1,358.9	8.0	120.0	38.3	0.2	0.1	0.1
☐	FR-P321	J206	FR-J208	233.9	8.0	120.0	4.0	0.0	0.0	0.0
☐	FR-P323	FR-J208	FR-J204	210.1	8.0	120.0	-6.7	0.0	0.0	0.0

Run No. 15 - Phase IV (Buildout) MDD + 3,500 gpm Comm Fire at FR-J124 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P325	FR-J202	FR-J204	1,425.8	8.0	120.0	41.5	0.3	0.1	0.1
☐	FR-P327	FR-J208	FR-J210	662.7	8.0	120.0	-24.6	0.2	0.0	0.0
☐	FR-P329	FR-J210	FR-J200	721.3	8.0	120.0	-47.9	0.3	0.1	0.1
☐	FR-P331	FR-J202	FR-J212	850.4	8.0	120.0	-110.3	0.7	0.3	0.4
☐	FR-P333	FR-J204	FR-J224	804.4	8.0	120.0	11.5	0.1	0.0	0.0
☐	FR-P335	FR-J224	FR-J226	188.4	8.0	120.0	0.2	0.0	0.0	0.0
☐	FR-P337	FR-J226	J206	810.2	8.0	120.0	-11.1	0.1	0.0	0.0
☐	FR-P339	FR-J208	FR-J224	687.5	8.0	120.0	11.9	0.1	0.0	0.0
☐	FR-P341	FR-J208	FR-J226	679.5	8.0	120.0	12.0	0.1	0.0	0.0
☐	FR-P343	FR-J200	FR-J214	1,003.8	8.0	120.0	-35.2	0.2	0.0	0.0
☐	FR-P345	FR-J126	FR-J214	474.4	8.0	120.0	-516.2	3.3	3.0	6.2
☐	FR-P347	FR-J214	FR-J212	220.1	8.0	120.0	-216.6	1.4	0.3	1.2
☐	FR-P349	FR-J214	FR-J218	496.2	8.0	120.0	-358.0	2.3	1.6	3.2
☐	P351	FR-J212	FR-J216	421.4	8.0	120.0	-350.2	2.2	1.3	3.0
☐	FR-P353	FR-J216	FR-J218	160.8	8.0	120.0	-54.3	0.3	0.0	0.1
☐	FR-P355	FR-J218	FR-J220	408.4	8.0	120.0	-412.5	2.6	1.7	4.1
☐	FR-P361	FR-J216	J222	1,145.7	8.0	120.0	-337.6	2.2	3.2	2.8

Run No. 16 - Phase IV (Buildout) MDD + 2,500 gpm SF Fire at J250 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	35.0	606.0	860.3	110.2
J102	2.3	599.0	860.3	113.2
FR-J104	35.0	612.0	860.3	107.6
J106	108.8	625.0	860.3	102.0
FR-J108	0.0	615.0	860.3	106.3
FR-J110	183.6	595.0	860.3	115.0
J112	0.0	530.0	866.1	145.6
FR-J114	0.0	730.0	860.6	56.6
FR-J116	0.0	619.0	860.3	104.6
FR-J118	0.0	785.0	862.3	33.5
J12	3.1	725.0	860.3	58.6
J120	33.4	1,057.0	1,218.9	70.2
FR-J122	5.4	1,066.0	1,218.6	66.1
FR-J128	77.6	1,025.7	1,218.6	83.6
J130	5.4	1,095.7	1,218.3	53.1
FR-J132	5.4	1,100.4	1,218.1	51.0
FR-J134	5.4	1,114.0	1,217.5	44.8
FR-J136	5.4	1,050.0	1,218.4	73.0
FR-J138	5.4	1,077.6	1,218.5	61.0
J14	0.0	724.0	860.4	59.1
J140	5.4	1,028.0	1,216.9	81.9
J142	5.4	1,036.5	1,217.3	78.3
FR-J144	5.4	1,108.5	1,216.1	46.6
FR-J146	5.4	1,111.0	1,216.7	45.8
J148	5.4	1,100.0	1,216.6	50.5
FR-J150	5.4	1,076.0	1,216.7	61.0
J152	5.4	1,062.0	1,216.9	67.1
J154	5.4	1,050.0	1,216.7	72.2
J156	5.4	1,057.0	1,216.7	69.2
J158	5.4	1,068.0	1,216.7	64.4
FR-J16	0.0	754.0	860.8	46.3
J160	5.4	1,092.0	1,216.7	54.0
J162	5.4	1,060.5	1,217.2	67.9
J164	5.4	1,098.0	1,216.8	51.5
FR-J166	5.4	1,069.0	1,217.5	64.4
J168	5.4	1,090.0	1,217.4	55.2
FR-J170	5.4	1,057.0	1,218.4	69.9
FR-J172	5.4	1,072.0	1,218.2	63.4

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J174	0.0	1,096.3	1,218.8	53.1
FR-J176	0.0	1,102.3	1,218.6	50.4
FR-J178	5.4	1,039.7	1,218.6	77.5
FR-J18	9.0	726.0	860.9	58.4
J180	5.4	1,056.0	1,218.6	70.5
FR-J182	5.4	1,057.0	1,218.6	70.0
FR-J184	5.4	1,061.5	1,218.6	68.1
FR-J186	5.4	1,072.7	1,218.7	63.2
FR-J188	5.4	1,094.0	1,218.7	54.0
FR-J190	5.4	1,072.0	1,218.7	63.6
FR-J192	5.4	1,046.5	1,218.7	74.6
FR-J194	5.4	1,041.0	1,218.6	77.0
FR-J196	5.4	1,049.2	1,218.7	73.4
FR-J20	0.0	656.0	861.0	88.8
FR-J22	19.6	642.0	861.2	95.0
FR-J220	0.0	1,100.7	1,219.3	51.4
J222	0.0	1,109.0	1,219.8	48.0
FR-J228	5.4	1,148.0	1,214.0	28.6
FR-J230	49.3	1,075.5	1,216.7	61.2
FR-J232	5.4	1,105.0	1,217.9	48.9
FR-J234	24.3	560.0	860.6	130.2
J236	12.0	728.0	859.8	57.1
J238	56.9	684.0	861.0	76.7
FR-J24	57.8	632.0	861.6	99.5
FR-J240	19.6	690.0	861.0	74.1
J242	18.2	679.0	861.0	78.9
FR-J244	0.0	718.0	857.9	60.6
J246	0.0	760.0	1,226.5	202.1
J248	0.0	718.0	1,226.9	220.5
J250	2,505.4	1,154.0	1,213.1	25.6
FR-J26	19.6	666.0	861.2	84.6
FR-J28	0.0	680.0	861.0	78.4
FR-J30	0.0	731.0	860.9	56.3
FR-J32	9.0	744.0	860.8	50.6
FR-J34	0.0	721.0	860.9	60.6
FR-J36	9.0	697.0	860.8	71.0
FR-J38	0.0	691.0	860.7	73.5
FR-J40	0.0	650.0	860.9	91.4

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J42	9.0	655.0	861.0	89.2
FR-J44	0.0	679.0	861.0	78.9
J46	0.0	703.0	861.0	68.5
J48	6.3	732.0	860.9	55.8
FR-J50	19.6	670.0	861.2	82.9
FR-J52	19.6	646.0	861.2	93.3
FR-J54	19.6	623.0	861.2	103.2
FR-J56	18.2	617.0	861.1	105.8
FR-J58	19.6	644.0	861.6	94.3
J60	19.6	608.0	862.3	110.2
FR-J62	19.6	584.0	864.1	121.4
J64	19.6	596.0	862.1	115.3
FR-J66	19.6	620.0	861.8	104.8
FR-J68	0.0	557.0	865.0	133.5
J70	0.0	557.0	862.2	132.2
J72	0.0	545.0	861.2	137.0
J74	16.9	540.0	860.7	139.0
J76	152.0	555.0	860.4	132.3
FR-J78	0.0	582.0	860.4	120.6
FR-J80	0.0	587.0	860.4	118.5
FR-J82	31.9	592.0	860.4	116.3
FR-J84	0.0	587.0	860.4	118.5
FR-J86	2.3	595.0	860.4	115.0
J88	0.0	599.0	860.3	113.2
FR-J90	35.0	608.0	860.3	109.3
FR-J92	0.0	602.0	860.3	111.9
FR-J94	1.1	617.0	860.3	105.4
FR-J96	1.7	623.0	860.3	102.8
FR-J98	2.3	615.0	860.3	106.3
J9634	0.0	608.8	860.3	109.0
J9636	0.0	768.0	1,218.6	195.2
FR-J124	28.6	1,076.6	1,218.6	61.5
FR-J126	28.6	1,082.5	1,218.7	59.0
FR-J198	23.2	1,015.4	1,218.6	88.0
FR-J200	23.2	1,017.6	1,218.6	87.1
FR-J202	23.2	1,020.0	1,218.6	86.0
FR-J204	23.2	1,015.1	1,218.5	88.1
J206	23.2	1,008.8	1,218.5	90.9

Run No. 16 - Phase IV (Buildout) MDD + 2,500 gpm SF Fire at J250 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J208	11.5	1,013.1	1,218.5	89.0
☐	FR-J210	23.2	1,011.5	1,218.5	89.7
☐	FR-J212	23.2	1,091.9	1,218.7	55.0
☐	FR-J214	23.2	1,087.7	1,218.7	56.8
☐	FR-J216	41.6	1,096.0	1,219.0	53.3
☐	FR-J218	0.2	1,096.0	1,219.0	53.3
☐	FR-J224	23.2	1,018.2	1,218.5	86.8
☐	FR-J226	23.2	1,016.9	1,218.5	87.3

Run No. 16 - Phase IV (Buildout) MDD + 2,500 gpm SF Fire at J250 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P101	FR-J114	FR-J16	310.1	8.0	120.0	-133.6	0.9	0.2	0.5
FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	-79.5	0.5	0.2	0.2
P105	FR-J16	FR-J18	931.7	8.0	120.0	-57.9	0.4	0.1	0.1
FR-P107	J48	FR-J30	148.3	8.0	120.0	-4.0	0.0	0.0	0.0
FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	6.7	0.0	0.0	0.0
P11	332	FR-J118	4,814.1	16.0	130.0	251.2	0.4	0.2	0.0
FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	-49.6	0.3	0.0	0.1
P113	FR-J18	FR-J20	1,249.6	8.0	120.0	-60.2	0.4	0.1	0.1
P115	J72	J74	449.1	12.0	120.0	567.6	1.6	0.5	1.0
FR-P117	J74	J76	983.8	12.0	120.0	305.4	0.9	0.3	0.3
FR-P119	J76	FR-J80	1,411.8	8.0	120.0	24.4	0.2	0.0	0.0
FR-P121	J74	FR-J234	771.1	12.0	120.0	245.3	0.7	0.2	0.2
P123	FR-J78	FR-J80	385.2	8.0	120.0	40.4	0.3	0.0	0.1
P125	FR-J80	FR-J82	272.6	8.0	120.0	64.8	0.4	0.0	0.1
P127	FR-J82	J88	282.9	8.0	120.0	33.5	0.2	0.0	0.0
P129	J88	FR-J90	282.1	8.0	120.0	30.7	0.2	0.0	0.0
P13	J12	J14	254.6	16.0	130.0	-578.3	0.9	0.1	0.2
P131	FR-J90	FR-J94	289.7	8.0	120.0	3.7	0.0	0.0	0.0
P133	FR-J94	FR-J92	655.1	12.0	120.0	-66.8	0.2	0.0	0.0
P135	FR-J92	FR-J86	279.5	12.0	120.0	-98.7	0.3	0.0	0.0
P137	FR-J86	FR-J84	279.6	12.0	120.0	-135.5	0.4	0.0	0.1
P139	FR-J84	FR-J78	275.6	12.0	120.0	-180.6	0.5	0.0	0.1
P141	FR-J82	FR-J84	348.7	8.0	120.0	-45.1	0.3	0.0	0.1
P143	J88	FR-J86	349.5	8.0	120.0	-34.5	0.2	0.0	0.0
P145	FR-J90	FR-J92	353.7	8.0	120.0	-31.9	0.2	0.0	0.0
P147	FR-J82	J102	351.1	8.0	120.0	44.5	0.3	0.0	0.1
P149	J88	J100	351.1	8.0	120.0	37.3	0.2	0.0	0.0
P15	J14	FR-J38	779.2	12.0	120.0	-365.2	1.0	0.4	0.5
P151	FR-J90	FR-J98	347.8	8.0	120.0	24.0	0.2	0.0	0.0
P153	FR-J94	FR-J96	349.5	12.0	120.0	69.4	0.2	0.0	0.0
P155	J102	FR-J104	786.9	8.0	120.0	21.5	0.1	0.0	0.0
P157	FR-J104	FR-J108	225.7	8.0	120.0	7.2	0.0	0.0	0.0
P159	FR-J104	J100	561.9	8.0	120.0	-20.7	0.1	0.0	0.0
P161	FR-J108	FR-J116	303.3	12.0	120.0	-47.3	0.1	0.0	0.0
P163	FR-J116	J106	448.5	12.0	120.0	-27.5	0.1	0.0	0.0
P165	J102	J100	282.9	8.0	120.0	20.7	0.1	0.0	0.0

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P167	J100	FR-J98	282.9	8.0	120.0	2.3	0.0	0.0	0.0
P169	FR-J98	FR-J96	282.1	8.0	120.0	4.1	0.0	0.0	0.0
P17	FR-J38	FR-J40	783.0	12.0	120.0	-276.9	0.8	0.2	0.3
P171	FR-J96	J106	204.2	12.0	120.0	71.8	0.2	0.0	0.0
P173	FR-J98	FR-J116	428.9	8.0	120.0	19.8	0.1	0.0	0.0
P175	J76	FR-J110	1,850.1	12.0	120.0	129.1	0.4	0.1	0.1
P177	FR-J110	J9634	932.1	12.0	120.0	-54.5	0.2	0.0	0.0
P179	J106	J12	1,077.1	16.0	130.0	-64.5	0.1	0.0	0.0
P181	FR-J118	J12	1,373.8	16.0	130.0	1,568.0	2.5	2.0	1.4
P183	FR-J118	T5000	798.3	16.0	130.0	-1,316.8	2.1	0.8	1.0
P185	J12	J236	233.6	16.0	130.0	2,078.7	3.3	0.6	2.4
P187	J120	FR-J136	360.9	16.0	130.0	1,565.0	2.5	0.5	1.4
P189	FR-J136	J142	463.3	8.0	120.0	304.0	1.9	1.1	2.3
P19	FR-J40	FR-J56	965.3	12.0	120.0	-228.4	0.6	0.2	0.2
P191	J142	J140	504.2	8.0	120.0	163.4	1.0	0.4	0.7
P193	J140	J154	1,203.3	8.0	120.0	77.8	0.5	0.2	0.2
P195	J154	J156	136.1	8.0	120.0	43.8	0.3	0.0	0.1
P197	J156	J158	254.4	10.0	120.0	17.7	0.1	0.0	0.0
P199	J158	J160	304.4	10.0	120.0	83.3	0.3	0.0	0.1
P201	J160	J148	870.8	10.0	120.0	121.3	0.5	0.1	0.1
P203	J148	FR-J150	309.6	8.0	120.0	-143.8	0.9	0.2	0.6
P205	FR-J150	J152	305.7	8.0	120.0	-126.0	0.8	0.1	0.5
P207	J152	J140	308.3	8.0	120.0	-80.3	0.5	0.1	0.2
P209	J152	J158	1,101.6	8.0	120.0	70.9	0.5	0.2	0.2
FR-P21	FR-J56	J72	956.4	12.0	120.0	-135.8	0.4	0.1	0.1
P211	FR-J150	J160	875.5	8.0	120.0	43.4	0.3	0.1	0.1
P213	J154	FR-J230	729.8	8.0	120.0	28.6	0.2	0.0	0.0
P215	J148	FR-J144	849.8	10.0	120.0	259.7	1.1	0.5	0.6
P217	FR-J144	J164	303.3	8.0	120.0	-321.5	2.1	0.8	2.6
FR-P219	J162	J142	306.8	8.0	120.0	-135.2	0.9	0.2	0.5
P221	J164	J162	312.3	8.0	120.0	-191.4	1.2	0.3	1.0
P223	J152	J162	637.3	8.0	120.0	-122.0	0.8	0.3	0.4
FR-P225	FR-J150	J164	746.2	8.0	120.0	-66.6	0.4	0.1	0.1
FR-P227	FR-J144	FR-J146	262.7	10.0	120.0	-540.4	2.2	0.6	2.3
P229	FR-J146	FR-J134	376.3	16.0	130.0	-1,940.3	3.1	0.8	2.1
FR-P23	J72	J70	657.1	12.0	120.0	-703.4	2.0	1.0	1.5

Run No. 16 - Phase IV (Buildout) MDD + 2,500 gpm SF Fire at J250 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P231	J162	FR-J166	404.6	8.0	120.0	-183.6	1.2	0.4	0.9
P233	J164	J168	504.6	8.0	120.0	-202.1	1.3	0.6	1.1
P235	FR-J136	FR-J166	349.6	8.0	120.0	314.7	2.0	0.9	2.5
P237	FR-J166	J168	280.4	8.0	120.0	125.7	0.8	0.1	0.5
P239	J168	FR-J134	308.8	8.0	120.0	-81.8	0.5	0.1	0.2
P241	FR-J134	FR-J232	208.9	16.0	130.0	-2,027.5	3.2	0.5	2.3
P243	FR-J136	FR-J170	302.4	8.0	120.0	42.6	0.3	0.0	0.1
P245	FR-J170	FR-J138	602.0	8.0	120.0	-68.8	0.4	0.1	0.1
P247	FR-J132	FR-J172	329.0	8.0	120.0	-100.6	0.6	0.1	0.3
P249	FR-J172	FR-J170	418.5	8.0	120.0	-105.9	0.7	0.1	0.3
FR-P25	J70	J64	570.3	8.0	120.0	94.5	0.6	0.2	0.3
P251	FR-J136	FR-J232	882.1	16.0	130.0	898.4	1.4	0.5	0.5
P253	FR-J132	J130	247.4	16.0	130.0	-1,039.3	1.7	0.2	0.7
P255	J120	FR-J122	979.3	12.0	120.0	308.7	0.9	0.3	0.3
P257	FR-J122	FR-J138	261.2	12.0	120.0	365.1	1.0	0.1	0.5
P259	FR-J138	J130	540.8	12.0	120.0	291.0	0.8	0.2	0.3
FR-P265	FR-J122	J180	193.1	8.0	120.0	-37.1	0.2	0.0	0.0
FR-P269	J130	FR-J176	798.7	16.0	130.0	-753.7	1.2	0.3	0.4
FR-P27	J64	FR-J66	302.4	8.0	120.0	176.7	1.1	0.3	0.9
FR-P271	FR-J176	FR-J174	559.7	16.0	130.0	-742.3	1.2	0.2	0.4
FR-P277	FR-J178	FR-J128	301.0	10.0	120.0	68.6	0.3	0.0	0.0
FR-P279	J180	FR-J178	343.9	8.0	120.0	22.1	0.1	0.0	0.0
FR-P281	J120	FR-J190	282.0	8.0	120.0	159.5	1.0	0.2	0.7
P283	FR-J190	FR-J188	347.2	8.0	120.0	70.0	0.4	0.1	0.2
FR-P285	FR-J188	FR-J186	356.7	8.0	120.0	21.1	0.1	0.0	0.0
FR-P287	FR-J186	FR-J192	352.1	8.0	120.0	5.1	0.0	0.0	0.0
FR-P289	FR-J190	FR-J182	807.9	8.0	120.0	53.9	0.3	0.1	0.1
FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	149.5	1.0	0.2	0.6
FR-P291	J180	FR-J182	311.0	8.0	120.0	-64.6	0.4	0.0	0.1
FR-P293	FR-J182	FR-J184	276.9	8.0	120.0	-16.0	0.1	0.0	0.0
FR-P295	FR-J184	FR-J186	775.5	8.0	120.0	-22.4	0.1	0.0	0.0
P297	FR-J184	FR-J188	570.0	8.0	120.0	-31.8	0.2	0.0	0.0
P299	FR-J190	FR-J196	1,748.0	8.0	120.0	30.2	0.2	0.1	0.0
FR-P301	FR-J196	FR-J192	317.5	8.0	120.0	16.0	0.1	0.0	0.0
P303	FR-J196	FR-J192	943.8	8.0	120.0	8.9	0.1	0.0	0.0
FR-P305	FR-J192	FR-J194	1,158.4	8.0	120.0	24.5	0.2	0.0	0.0

Run No. 16 - Phase IV (Buildout) MDD + 2,500 gpm SF Fire at J250 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
FR-P307	FR-J184	FR-J194	307.7	8.0	120.0	32.7	0.2	0.0	0.0
FR-P309	FR-J194	FR-J178	437.0	8.0	120.0	51.9	0.3	0.0	0.1
FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	143.0	0.9	0.4	0.6
P311	FR-J186	FR-J188	1,054.4	8.0	120.0	-11.7	0.1	0.0	0.0
FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	104.6	0.7	0.2	0.3
FR-P35	J46	J48	968.3	8.0	120.0	59.3	0.4	0.1	0.1
FR-P357	FR-J174	FR-J220	925.0	16.0	120.0	-815.3	1.3	0.5	0.5
FR-P359	FR-J220	J222	855.4	16.0	130.0	-972.8	1.6	0.5	0.6
FR-P363	J222	T5002	706.1	16.0	130.0	-1,130.5	1.8	0.6	0.8
FR-P365	FR-J146	J250	647.1	12.0	120.0	1,394.6	4.0	3.5	5.4
FR-P367	FR-J228	FR-J144	576.3	12.0	120.0	-1,116.2	3.2	2.1	3.6
FR-P369	FR-J68	J112	738.1	16.0	130.0	-1,555.2	2.5	1.0	1.4
FR-P37	J48	FR-J34	262.8	8.0	120.0	57.0	0.4	0.0	0.1
FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	60.3	0.4	0.1	0.1
FR-P373	FR-J230	J156	783.6	8.0	120.0	-20.7	0.1	0.0	0.0
P375	FR-J232	FR-J132	247.6	16.0	130.0	-1,134.5	1.8	0.2	0.8
FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	221.0	0.6	0.2	0.2
FR-P379	J236	FR-J244	776.6	16.0	130.0	2,066.6	3.3	1.9	2.4
FR-P381	J238	FR-J28	227.5	8.0	120.0	-55.6	0.4	0.0	0.1
FR-P383	FR-J240	J46	228.2	8.0	120.0	84.9	0.5	0.1	0.2
FR-P385	J242	FR-J26	703.2	8.0	120.0	-99.7	0.6	0.2	0.3
FR-P387	J246	J120	3,168.1	16.0	130.0	2,066.6	3.3	7.6	2.4
FR-P389	FR-J244	U7000	14.8	16.0	130.0	2,066.6	3.3	0.0	2.4
FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	91.0	0.6	0.1	0.3
FR-P391	U7000	J248	41.5	16.0	130.0	2,066.6	3.3	0.1	2.4
FR-P397	J248	J246	151.4	16.0	130.0	2,066.6	3.3	0.4	2.4
FR-P399	J250	FR-J228	236.6	12.0	120.0	-1,110.8	3.2	0.8	3.6
FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	88.3	0.6	0.0	0.2
P43	J64	FR-J54	1,109.8	8.0	120.0	167.0	1.1	0.9	0.8
FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	-110.8	0.7	0.1	0.4
P47	FR-J54	FR-J52	314.0	8.0	120.0	-55.4	0.4	0.0	0.1
FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	-18.8	0.1	0.0	0.0
FR-P51	FR-J40	J42	194.9	8.0	120.0	-48.5	0.3	0.0	0.1
P53	J42	FR-J44	320.6	8.0	120.0	-51.3	0.3	0.0	0.1
FR-P55	FR-J44	J46	317.1	8.0	120.0	-24.3	0.2	0.0	0.0
FR-P57	J46	J238	383.6	8.0	120.0	1.3	0.0	0.0	0.0

Run No. 16 - Phase IV (Buildout) MDD + 2,500 gpm SF Fire at J250 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-34.4	0.2	0.0	0.0
P61	FR-J20	FR-J22	776.2	8.0	120.0	-94.6	0.6	0.2	0.3
P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-107.6	0.7	0.4	0.3
P65	FR-J22	FR-J26	303.7	8.0	120.0	-6.6	0.0	0.0	0.0
P67	FR-J28	J242	66.1	8.0	120.0	-81.5	0.5	0.0	0.2
P69	FR-J26	FR-J24	799.4	8.0	120.0	-125.9	0.8	0.4	0.5
P71	FR-J24	J60	309.0	8.0	120.0	-304.5	1.9	0.7	2.3
P73	J60	FR-J62	335.9	8.0	120.0	-468.9	3.0	1.8	5.2
P75	FR-J62	FR-J68	549.1	12.0	120.0	-757.3	2.1	1.0	1.8
P77	J70	FR-J68	1,466.1	12.0	120.0	-797.9	2.3	2.8	1.9
P79	J64	FR-J62	1,090.0	8.0	120.0	-268.7	1.7	2.0	1.9
P81	FR-J66	J60	903.3	8.0	120.0	-144.8	0.9	0.5	0.6
P83	FR-J58	FR-J24	674.4	8.0	120.0	-13.2	0.1	0.0	0.0
P85	FR-J52	FR-J66	869.1	8.0	120.0	-152.3	1.0	0.6	0.6
FR-P87	J42	FR-J54	934.2	8.0	120.0	-91.9	0.6	0.2	0.3
FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	-96.1	0.6	0.2	0.3
P91	FR-J36	J42	808.3	8.0	120.0	-85.7	0.5	0.2	0.2
FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	-69.1	0.4	0.1	0.2
P95	FR-J34	FR-J32	488.5	8.0	120.0	35.1	0.2	0.0	0.0
P97	FR-J32	FR-J16	297.7	8.0	120.0	75.6	0.5	0.1	0.2
P99	J14	FR-J114	206.1	8.0	120.0	-213.1	1.4	0.2	1.2
FR-P300	J9638	J112	7,595.0	16.0	130.0	1,555.2	2.5	10.7	1.4
P318	J9634	FR-J108	416.6	12.0	120.0	-54.5	0.2	0.0	0.0
P320	J9634	J9636	1,125.0	12.0	120.0	0.0	0.0	0.0	0.0
P322	J9636	FR-J128	3,148.4	10.0	120.0	0.0	0.0	0.0	0.0
FR-P261	FR-J122	FR-J124	820.8	8.0	120.0	-24.7	0.2	0.0	0.0
FR-P263	FR-J124	FR-J126	390.6	8.0	120.0	-64.7	0.4	0.1	0.1
FR-P267	FR-J128	FR-J126	1,022.0	8.0	120.0	-49.4	0.3	0.1	0.1
FR-P273	FR-J174	FR-J126	877.7	8.0	120.0	72.9	0.5	0.1	0.2
FR-P275	FR-J176	FR-J124	637.8	8.0	120.0	-11.4	0.1	0.0	0.0
FR-P313	FR-J128	FR-J198	380.3	8.0	120.0	40.4	0.3	0.0	0.1
FR-P315	FR-J198	FR-J200	222.5	8.0	120.0	-21.6	0.1	0.0	0.0
P317	FR-J200	FR-J202	201.8	8.0	120.0	-19.8	0.1	0.0	0.0
FR-P319	FR-J198	J206	1,358.9	8.0	120.0	38.8	0.2	0.1	0.1
FR-P321	J206	FR-J208	233.9	8.0	120.0	4.3	0.0	0.0	0.0
FR-P323	FR-J208	FR-J204	210.1	8.0	120.0	-5.1	0.0	0.0	0.0

Run No. 16 - Phase IV (Buildout) MDD + 2,500 gpm SF Fire at J250 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P325	FR-J202	FR-J204	1,425.8	8.0	120.0	39.7	0.3	0.1	0.1
☐	FR-P327	FR-J208	FR-J210	662.7	8.0	120.0	-26.0	0.2	0.0	0.0
☐	FR-P329	FR-J210	FR-J200	721.3	8.0	120.0	-49.2	0.3	0.1	0.1
☐	FR-P331	FR-J202	FR-J212	850.4	8.0	120.0	-82.8	0.5	0.2	0.2
☐	FR-P333	FR-J204	FR-J224	804.4	8.0	120.0	11.3	0.1	0.0	0.0
☐	FR-P335	FR-J224	FR-J226	188.4	8.0	120.0	0.0	0.0	0.0	0.0
☐	FR-P337	FR-J226	J206	810.2	8.0	120.0	-11.2	0.1	0.0	0.0
☐	FR-P339	FR-J208	FR-J224	687.5	8.0	120.0	11.9	0.1	0.0	0.0
☐	FR-P341	FR-J208	FR-J226	679.5	8.0	120.0	12.0	0.1	0.0	0.0
☐	FR-P343	FR-J200	FR-J214	1,003.8	8.0	120.0	-74.3	0.5	0.2	0.2
☐	FR-P345	FR-J126	FR-J214	474.4	8.0	120.0	-69.8	0.4	0.1	0.2
☐	FR-P347	FR-J214	FR-J212	220.1	8.0	120.0	-34.7	0.2	0.0	0.0
☐	FR-P349	FR-J214	FR-J218	496.2	8.0	120.0	-132.6	0.8	0.2	0.5
☐	P351	FR-J212	FR-J216	421.4	8.0	120.0	-140.8	0.9	0.2	0.6
☐	FR-P353	FR-J216	FR-J218	160.8	8.0	120.0	-24.7	0.2	0.0	0.0
☐	FR-P355	FR-J218	FR-J220	408.4	8.0	120.0	-157.6	1.0	0.3	0.7
☐	FR-P361	FR-J216	J222	1,145.7	8.0	120.0	-157.7	1.0	0.8	0.7

Run No. 17 - Phase IV (Buildout) MDD + 2,500 gpm Brush Fire at J9636 (Node Report)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J100	35.0	606.0	860.3	110.2
J102	2.3	599.0	860.3	113.2
FR-J104	35.0	612.0	860.3	107.6
J106	108.8	625.0	860.3	102.0
FR-J108	0.0	615.0	860.3	106.3
FR-J110	183.6	595.0	860.3	115.0
J112	0.0	530.0	866.1	145.6
FR-J114	0.0	730.0	860.6	56.6
FR-J116	0.0	619.0	860.3	104.6
FR-J118	0.0	785.0	862.3	33.5
J12	3.1	725.0	860.3	58.6
J120	33.4	1,057.0	1,219.7	70.5
FR-J122	5.4	1,066.0	1,218.9	66.2
FR-J128	77.6	1,025.7	1,207.8	78.9
J130	5.4	1,095.7	1,219.3	53.5
FR-J132	5.4	1,100.4	1,219.3	51.5
FR-J134	5.4	1,114.0	1,219.4	45.7
FR-J136	5.4	1,050.0	1,219.6	73.5
FR-J138	5.4	1,077.6	1,219.1	61.3
J14	0.0	724.0	860.4	59.1
J140	5.4	1,028.0	1,219.4	82.9
J142	5.4	1,036.5	1,219.4	79.3
FR-J144	5.4	1,108.5	1,219.4	48.0
FR-J146	5.4	1,111.0	1,219.4	47.0
J148	5.4	1,100.0	1,219.4	51.7
FR-J150	5.4	1,076.0	1,219.4	62.1
J152	5.4	1,062.0	1,219.4	68.2
J154	5.4	1,050.0	1,219.4	73.4
J156	5.4	1,057.0	1,219.4	70.4
J158	5.4	1,068.0	1,219.4	65.6
FR-J16	0.0	754.0	860.8	46.3
J160	5.4	1,092.0	1,219.4	55.2
J162	5.4	1,060.5	1,219.4	68.9
J164	5.4	1,098.0	1,219.4	52.6
FR-J166	5.4	1,069.0	1,219.4	65.2
J168	5.4	1,090.0	1,219.4	56.1
FR-J170	5.4	1,057.0	1,219.3	70.3
FR-J172	5.4	1,072.0	1,219.3	63.8

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FR-J174	0.0	1,096.3	1,219.2	53.3
FR-J176	0.0	1,102.3	1,219.2	50.7
FR-J178	5.4	1,039.7	1,211.6	74.5
FR-J18	9.0	726.0	860.9	58.5
J180	5.4	1,056.0	1,216.3	69.5
FR-J182	5.4	1,057.0	1,216.3	69.0
FR-J184	5.4	1,061.5	1,216.1	67.0
FR-J186	5.4	1,072.7	1,216.2	62.2
FR-J188	5.4	1,094.0	1,216.3	53.0
FR-J190	5.4	1,072.0	1,217.1	62.9
FR-J192	5.4	1,046.5	1,216.2	73.5
FR-J194	5.4	1,041.0	1,214.9	75.4
FR-J196	5.4	1,049.2	1,216.2	72.4
FR-J20	0.0	656.0	861.0	88.8
FR-J22	19.6	642.0	861.3	95.0
FR-J220	0.0	1,100.7	1,219.4	51.4
J222	0.0	1,109.0	1,219.8	48.0
FR-J228	5.4	1,148.0	1,219.4	30.9
FR-J230	49.3	1,075.5	1,219.4	62.3
FR-J232	5.4	1,105.0	1,219.4	49.6
FR-J234	24.3	560.0	860.6	130.2
J236	12.0	728.0	859.8	57.1
J238	56.9	684.0	861.0	76.7
FR-J24	57.8	632.0	861.6	99.5
FR-J240	19.6	690.0	861.1	74.1
J242	18.2	679.0	861.0	78.9
FR-J244	0.0	718.0	857.9	60.6
J246	0.0	760.0	1,227.3	202.5
J248	0.0	718.0	1,227.6	220.8
J250	5.4	1,154.0	1,219.4	28.3
FR-J26	19.6	666.0	861.3	84.6
FR-J28	0.0	680.0	861.0	78.4
FR-J30	0.0	731.0	860.9	56.3
FR-J32	9.0	744.0	860.9	50.6
FR-J34	0.0	721.0	860.9	60.6
FR-J36	9.0	697.0	860.8	71.0
FR-J38	0.0	691.0	860.7	73.6
FR-J40	0.0	650.0	861.0	91.4

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J42	9.0	655.0	861.0	89.3
FR-J44	0.0	679.0	861.0	78.9
J46	0.0	703.0	861.0	68.5
J48	6.3	732.0	860.9	55.9
FR-J50	19.6	670.0	861.3	82.9
FR-J52	19.6	646.0	861.2	93.3
FR-J54	19.6	623.0	861.2	103.2
FR-J56	18.2	617.0	861.1	105.8
FR-J58	19.6	644.0	861.6	94.3
J60	19.6	608.0	862.3	110.2
FR-J62	19.6	584.0	864.1	121.4
J64	19.6	596.0	862.1	115.3
FR-J66	19.6	620.0	861.8	104.8
FR-J68	0.0	557.0	865.1	133.5
J70	0.0	557.0	862.2	132.3
J72	0.0	545.0	861.2	137.0
J74	16.9	540.0	860.8	139.0
J76	152.0	555.0	860.4	132.3
FR-J78	0.0	582.0	860.4	120.6
FR-J80	0.0	587.0	860.4	118.5
FR-J82	31.9	592.0	860.4	116.3
FR-J84	0.0	587.0	860.4	118.5
FR-J86	2.3	595.0	860.4	115.0
J88	0.0	599.0	860.4	113.2
FR-J90	35.0	608.0	860.3	109.3
FR-J92	0.0	602.0	860.4	111.9
FR-J94	1.1	617.0	860.3	105.4
FR-J96	1.7	623.0	860.3	102.8
FR-J98	2.3	615.0	860.3	106.3
J9634	0.0	608.8	860.3	109.0
J9636	2,500.0	768.0	1,085.0	137.4
FR-J124	28.6	1,076.6	1,218.1	61.3
FR-J126	28.6	1,082.5	1,216.4	58.0
FR-J198	23.2	1,015.4	1,211.0	84.7
FR-J200	23.2	1,017.6	1,212.2	84.3
FR-J202	23.2	1,020.0	1,212.6	83.4
FR-J204	23.2	1,015.1	1,211.8	85.2
J206	23.2	1,008.8	1,211.7	87.9

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
☐	FR-J208	11.5	1,013.1	1,211.7	86.1
☐	FR-J210	23.2	1,011.5	1,211.9	86.8
☐	FR-J212	23.2	1,091.9	1,216.0	53.8
☐	FR-J214	23.2	1,087.7	1,216.0	55.6
☐	FR-J216	41.6	1,096.0	1,217.4	52.6
☐	FR-J218	0.2	1,096.0	1,217.4	52.6
☐	FR-J224	23.2	1,018.2	1,211.7	83.9
☐	FR-J226	23.2	1,016.9	1,211.7	84.4

Run No. 17 - Phase IV (Buildout) MDD + 2,500 gpm Brush Fire at J9636 (Pipe Report)

ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
P101	FR-J114	FR-J16	310.1	8.0	120.0	-133.6	0.9	0.2	0.5
FR-P103	FR-J114	FR-J36	785.3	8.0	120.0	-79.5	0.5	0.2	0.2
P105	FR-J16	FR-J18	931.7	8.0	120.0	-57.9	0.4	0.1	0.1
FR-P107	J48	FR-J30	148.3	8.0	120.0	-4.0	0.0	0.0	0.0
FR-P109	FR-J30	FR-J18	277.9	8.0	120.0	6.7	0.0	0.0	0.0
P11	332	FR-J118	4,814.1	16.0	130.0	250.4	0.4	0.2	0.0
FR-P111	FR-J32	FR-J30	599.3	8.0	120.0	-49.6	0.3	0.0	0.1
P113	FR-J18	FR-J20	1,249.6	8.0	120.0	-60.2	0.4	0.1	0.1
P115	J72	J74	449.1	12.0	120.0	567.6	1.6	0.5	1.0
FR-P117	J74	J76	983.8	12.0	120.0	305.4	0.9	0.3	0.3
FR-P119	J76	FR-J80	1,411.8	8.0	120.0	24.4	0.2	0.0	0.0
FR-P121	J74	FR-J234	771.1	12.0	120.0	245.3	0.7	0.2	0.2
P123	FR-J78	FR-J80	385.2	8.0	120.0	40.4	0.3	0.0	0.1
P125	FR-J80	FR-J82	272.6	8.0	120.0	64.8	0.4	0.0	0.1
P127	FR-J82	J88	282.9	8.0	120.0	33.5	0.2	0.0	0.0
P129	J88	FR-J90	282.1	8.0	120.0	30.7	0.2	0.0	0.0
P13	J12	J14	254.6	16.0	130.0	-578.3	0.9	0.1	0.2
P131	FR-J90	FR-J94	289.7	8.0	120.0	3.7	0.0	0.0	0.0
P133	FR-J94	FR-J92	655.1	12.0	120.0	-66.8	0.2	0.0	0.0
P135	FR-J92	FR-J86	279.5	12.0	120.0	-98.7	0.3	0.0	0.0
P137	FR-J86	FR-J84	279.6	12.0	120.0	-135.5	0.4	0.0	0.1
P139	FR-J84	FR-J78	275.6	12.0	120.0	-180.6	0.5	0.0	0.1
P141	FR-J82	FR-J84	348.7	8.0	120.0	-45.1	0.3	0.0	0.1
P143	J88	FR-J86	349.5	8.0	120.0	-34.5	0.2	0.0	0.0
P145	FR-J90	FR-J92	353.7	8.0	120.0	-31.9	0.2	0.0	0.0
P147	FR-J82	J102	351.1	8.0	120.0	44.5	0.3	0.0	0.1
P149	J88	J100	351.1	8.0	120.0	37.2	0.2	0.0	0.0
P15	J14	FR-J38	779.2	12.0	120.0	-365.2	1.0	0.4	0.5
P151	FR-J90	FR-J98	347.8	8.0	120.0	24.0	0.2	0.0	0.0
P153	FR-J94	FR-J96	349.5	12.0	120.0	69.4	0.2	0.0	0.0
P155	J102	FR-J104	786.9	8.0	120.0	21.5	0.1	0.0	0.0
P157	FR-J104	FR-J108	225.7	8.0	120.0	7.2	0.0	0.0	0.0
P159	FR-J104	J100	561.9	8.0	120.0	-20.7	0.1	0.0	0.0
P161	FR-J108	FR-J116	303.3	12.0	120.0	-47.3	0.1	0.0	0.0
P163	FR-J116	J106	448.5	12.0	120.0	-27.5	0.1	0.0	0.0
P165	J102	J100	282.9	8.0	120.0	20.7	0.1	0.0	0.0

Run No. 17 - Phase IV (Buildout) MDD + 2,500 gpm Brush Fire at J9636 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P167	J100	FR-J98	282.9	8.0	120.0	2.3	0.0	0.0	0.0
☐	P169	FR-J98	FR-J96	282.1	8.0	120.0	4.1	0.0	0.0	0.0
☐	P17	FR-J38	FR-J40	783.0	12.0	120.0	-276.9	0.8	0.2	0.3
☐	P171	FR-J96	J106	204.2	12.0	120.0	71.8	0.2	0.0	0.0
☐	P173	FR-J98	FR-J116	428.9	8.0	120.0	19.8	0.1	0.0	0.0
☐	P175	J76	FR-J110	1,850.1	12.0	120.0	129.1	0.4	0.1	0.1
☐	P177	FR-J110	J9634	932.1	12.0	120.0	-54.5	0.2	0.0	0.0
☐	P179	J106	J12	1,077.1	16.0	130.0	-64.6	0.1	0.0	0.0
☐	P181	FR-J118	J12	1,373.8	16.0	130.0	1,564.1	2.5	2.0	1.4
☐	P183	FR-J118	T5000	798.3	16.0	130.0	-1,313.7	2.1	0.8	1.0
☐	P185	J12	J236	233.6	16.0	130.0	2,074.7	3.3	0.6	2.4
☐	P187	J120	FR-J136	360.9	16.0	130.0	876.5	1.4	0.2	0.5
☐	P189	FR-J136	J142	463.3	8.0	120.0	90.5	0.6	0.1	0.2
☐	P19	FR-J40	FR-J56	965.3	12.0	120.0	-228.4	0.6	0.2	0.2
☐	P191	J142	J140	504.2	8.0	120.0	45.0	0.3	0.0	0.1
☐	P193	J140	J154	1,203.3	8.0	120.0	22.7	0.1	0.0	0.0
☐	P195	J154	J156	136.1	8.0	120.0	-7.6	0.0	0.0	0.0
☐	P197	J156	J158	254.4	10.0	120.0	-37.3	0.2	0.0	0.0
☐	P199	J158	J160	304.4	10.0	120.0	-23.7	0.1	0.0	0.0
☐	P201	J160	J148	870.8	10.0	120.0	-14.8	0.1	0.0	0.0
☐	P203	J148	FR-J150	309.6	8.0	120.0	-19.8	0.1	0.0	0.0
☐	P205	FR-J150	J152	305.7	8.0	120.0	-22.8	0.1	0.0	0.0
☐	P207	J152	J140	308.3	8.0	120.0	-16.9	0.1	0.0	0.0
☐	P209	J152	J158	1,101.6	8.0	120.0	19.0	0.1	0.0	0.0
☐	FR-P21	FR-J56	J72	956.4	12.0	120.0	-135.8	0.4	0.1	0.1
☐	P211	FR-J150	J160	875.5	8.0	120.0	14.3	0.1	0.0	0.0
☐	P213	J154	FR-J230	729.8	8.0	120.0	25.0	0.2	0.0	0.0
☐	P215	J148	FR-J144	849.8	10.0	120.0	-0.4	0.0	0.0	0.0
☐	P217	FR-J144	J164	303.3	8.0	120.0	-34.6	0.2	0.0	0.0
☐	FR-P219	J162	J142	306.8	8.0	120.0	-40.2	0.3	0.0	0.1
☐	P221	J164	J162	312.3	8.0	120.0	-41.9	0.3	0.0	0.1
☐	P223	J152	J162	637.3	8.0	120.0	-30.3	0.2	0.0	0.0
☐	FR-P225	FR-J150	J164	746.2	8.0	120.0	-16.7	0.1	0.0	0.0
☐	FR-P227	FR-J144	FR-J146	262.7	10.0	120.0	14.8	0.1	0.0	0.0
☐	P229	FR-J146	FR-J134	376.3	16.0	130.0	12.6	0.0	0.0	0.0
☐	FR-P23	J72	J70	657.1	12.0	120.0	-703.3	2.0	1.0	1.5

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	P231	J162	FR-J166	404.6	8.0	120.0	-37.4	0.2	0.0	0.0
☐	P233	J164	J168	504.6	8.0	120.0	-14.7	0.1	0.0	0.0
☐	P235	FR-J136	FR-J166	349.6	8.0	120.0	104.1	0.7	0.1	0.3
☐	P237	FR-J166	J168	280.4	8.0	120.0	61.3	0.4	0.0	0.1
☐	P239	J168	FR-J134	308.8	8.0	120.0	41.2	0.3	0.0	0.1
☐	P241	FR-J134	FR-J232	208.9	16.0	130.0	48.5	0.1	0.0	0.0
☐	P243	FR-J136	FR-J170	302.4	8.0	120.0	156.1	1.0	0.2	0.7
☐	P245	FR-J170	FR-J138	602.0	8.0	120.0	127.5	0.8	0.3	0.5
☐	P247	FR-J132	FR-J172	329.0	8.0	120.0	-17.8	0.1	0.0	0.0
☐	P249	FR-J172	FR-J170	418.5	8.0	120.0	-23.2	0.1	0.0	0.0
☐	FR-P25	J70	J64	570.3	8.0	120.0	94.5	0.6	0.2	0.3
☐	P251	FR-J136	FR-J232	882.1	16.0	130.0	520.4	0.8	0.2	0.2
☐	P253	FR-J132	J130	247.4	16.0	130.0	575.9	0.9	0.1	0.2
☐	P255	J120	FR-J122	979.3	12.0	120.0	516.0	1.5	0.8	0.9
☐	P257	FR-J122	FR-J138	261.2	12.0	120.0	-460.2	1.3	0.2	0.7
☐	P259	FR-J138	J130	540.8	12.0	120.0	-338.1	1.0	0.2	0.4
☐	FR-P265	FR-J122	J180	193.1	8.0	120.0	780.8	5.0	2.6	13.4
☐	FR-P269	J130	FR-J176	798.7	16.0	130.0	232.4	0.4	0.0	0.0
☐	FR-P27	J64	FR-J66	302.4	8.0	120.0	176.7	1.1	0.3	0.9
☐	FR-P271	FR-J176	FR-J174	559.7	16.0	130.0	-33.8	0.1	0.0	0.0
☐	FR-P277	FR-J178	FR-J128	301.0	10.0	120.0	1,363.7	5.6	3.8	12.7
☐	FR-P279	J180	FR-J178	343.9	8.0	120.0	790.4	5.0	4.7	13.7
☐	FR-P281	J120	FR-J190	282.0	8.0	120.0	636.7	4.1	2.6	9.2
☐	P283	FR-J190	FR-J188	347.2	8.0	120.0	300.4	1.9	0.8	2.3
☐	FR-P285	FR-J188	FR-J186	356.7	8.0	120.0	104.9	0.7	0.1	0.3
☐	FR-P287	FR-J186	FR-J192	352.1	8.0	120.0	74.3	0.5	0.1	0.2
☐	FR-P289	FR-J190	FR-J182	807.9	8.0	120.0	196.4	1.3	0.8	1.0
☐	FR-P29	FR-J66	FR-J58	309.9	8.0	120.0	149.5	1.0	0.2	0.6
☐	FR-P291	J180	FR-J182	311.0	8.0	120.0	-15.0	0.1	0.0	0.0
☐	FR-P293	FR-J182	FR-J184	276.9	8.0	120.0	176.1	1.1	0.2	0.8
☐	FR-P295	FR-J184	FR-J186	775.5	8.0	120.0	-83.7	0.5	0.2	0.2
☐	P297	FR-J184	FR-J188	570.0	8.0	120.0	-131.6	0.8	0.3	0.5
☐	P299	FR-J190	FR-J196	1,748.0	8.0	120.0	134.6	0.9	0.9	0.5
☐	FR-P301	FR-J196	FR-J192	317.5	8.0	120.0	83.1	0.5	0.1	0.2
☐	P303	FR-J196	FR-J192	943.8	8.0	120.0	46.1	0.3	0.1	0.1
☐	FR-P305	FR-J192	FR-J194	1,158.4	8.0	120.0	198.1	1.3	1.2	1.1

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P307	FR-J184	FR-J194	307.7	8.0	120.0	386.0	2.5	1.1	3.6
☐	FR-P309	FR-J194	FR-J178	437.0	8.0	120.0	578.7	3.7	3.4	7.7
☐	FR-P31	FR-J58	FR-J50	632.6	8.0	120.0	143.0	0.9	0.4	0.6
☐	P311	FR-J186	FR-J188	1,054.4	8.0	120.0	-58.5	0.4	0.1	0.1
☐	FR-P33	FR-J50	FR-J240	583.5	8.0	120.0	104.6	0.7	0.2	0.3
☐	FR-P35	J46	J48	968.3	8.0	120.0	59.3	0.4	0.1	0.1
☐	FR-P357	FR-J174	FR-J220	925.0	16.0	120.0	-399.2	0.6	0.1	0.1
☐	FR-P359	FR-J220	J222	855.4	16.0	130.0	-847.2	1.4	0.4	0.5
☐	FR-P363	J222	T5002	706.1	16.0	130.0	-1,134.5	1.8	0.6	0.8
☐	FR-P365	FR-J146	J250	647.1	12.0	120.0	-3.2	0.0	0.0	0.0
☐	FR-P367	FR-J228	FR-J144	576.3	12.0	120.0	-14.0	0.0	0.0	0.0
☐	FR-P369	FR-J68	J112	738.1	16.0	130.0	-1,555.1	2.5	1.0	1.4
☐	FR-P37	J48	FR-J34	262.8	8.0	120.0	57.0	0.4	0.0	0.1
☐	FR-P371	FR-J28	FR-J30	1,132.4	8.0	120.0	60.3	0.4	0.1	0.1
☐	FR-P373	FR-J230	J156	783.6	8.0	120.0	-24.3	0.2	0.0	0.0
☐	P375	FR-J232	FR-J132	247.6	16.0	130.0	563.5	0.9	0.1	0.2
☐	FR-P377	FR-J234	FR-J78	907.3	12.0	120.0	221.0	0.6	0.2	0.2
☐	FR-P379	J236	FR-J244	776.6	16.0	130.0	2,062.6	3.3	1.9	2.4
☐	FR-P381	J238	FR-J28	227.5	8.0	120.0	-55.6	0.4	0.0	0.1
☐	FR-P383	FR-J240	J46	228.2	8.0	120.0	84.9	0.5	0.1	0.2
☐	FR-P385	J242	FR-J26	703.2	8.0	120.0	-99.7	0.6	0.2	0.3
☐	FR-P387	J246	J120	3,168.1	16.0	130.0	2,062.6	3.3	7.6	2.4
☐	FR-P389	FR-J244	U7000	14.8	16.0	130.0	2,062.6	3.3	0.0	2.4
☐	FR-P39	FR-J34	FR-J36	314.0	8.0	120.0	91.0	0.6	0.1	0.3
☐	FR-P391	U7000	J248	41.5	16.0	130.0	2,062.6	3.3	0.1	2.4
☐	FR-P397	J248	J246	151.4	16.0	130.0	2,062.6	3.3	0.4	2.4
☐	FR-P399	J250	FR-J228	236.6	12.0	120.0	-8.6	0.0	0.0	0.0
☐	FR-P41	FR-J36	FR-J38	201.6	8.0	120.0	88.3	0.6	0.0	0.2
☐	P43	J64	FR-J54	1,109.8	8.0	120.0	167.0	1.1	0.9	0.8
☐	FR-P45	FR-J56	FR-J54	191.7	8.0	120.0	-110.8	0.7	0.1	0.4
☐	P47	FR-J54	FR-J52	314.0	8.0	120.0	-55.4	0.4	0.0	0.1
☐	FR-P49	FR-J52	FR-J50	324.7	8.0	120.0	-18.8	0.1	0.0	0.0
☐	FR-P51	FR-J40	J42	194.9	8.0	120.0	-48.5	0.3	0.0	0.1
☐	P53	J42	FR-J44	320.6	8.0	120.0	-51.3	0.3	0.0	0.1
☐	FR-P55	FR-J44	J46	317.1	8.0	120.0	-24.3	0.2	0.0	0.0
☐	FR-P57	J46	J238	383.6	8.0	120.0	1.3	0.0	0.0	0.0

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P59	FR-J28	FR-J20	305.0	8.0	120.0	-34.4	0.2	0.0	0.0
☐	P61	FR-J20	FR-J22	776.2	8.0	120.0	-94.6	0.6	0.2	0.3
☐	P63	FR-J22	FR-J24	1,070.3	8.0	120.0	-107.6	0.7	0.4	0.3
☐	P65	FR-J22	FR-J26	303.7	8.0	120.0	-6.6	0.0	0.0	0.0
☐	P67	FR-J28	J242	66.1	8.0	120.0	-81.5	0.5	0.0	0.2
☐	P69	FR-J26	FR-J24	799.4	8.0	120.0	-125.9	0.8	0.4	0.5
☐	P71	FR-J24	J60	309.0	8.0	120.0	-304.5	1.9	0.7	2.3
☐	P73	J60	FR-J62	335.9	8.0	120.0	-468.9	3.0	1.8	5.2
☐	P75	FR-J62	FR-J68	549.1	12.0	120.0	-757.3	2.1	1.0	1.8
☐	P77	J70	FR-J68	1,466.1	12.0	120.0	-797.9	2.3	2.8	1.9
☐	P79	J64	FR-J62	1,090.0	8.0	120.0	-268.7	1.7	2.0	1.9
☐	P81	FR-J66	J60	903.3	8.0	120.0	-144.8	0.9	0.5	0.6
☐	P83	FR-J58	FR-J24	674.4	8.0	120.0	-13.2	0.1	0.0	0.0
☐	P85	FR-J52	FR-J66	869.1	8.0	120.0	-152.3	1.0	0.6	0.6
☐	FR-P87	J42	FR-J54	934.2	8.0	120.0	-91.9	0.6	0.2	0.3
☐	FR-P89	FR-J44	FR-J52	873.8	8.0	120.0	-96.1	0.6	0.2	0.3
☐	P91	FR-J36	J42	808.3	8.0	120.0	-85.7	0.5	0.2	0.2
☐	FR-P93	FR-J34	FR-J44	867.6	8.0	120.0	-69.1	0.4	0.1	0.2
☐	P95	FR-J34	FR-J32	488.5	8.0	120.0	35.1	0.2	0.0	0.0
☐	P97	FR-J32	FR-J16	297.7	8.0	120.0	75.6	0.5	0.1	0.2
☐	P99	J14	FR-J114	206.1	8.0	120.0	-213.1	1.4	0.2	1.2
☐	FR-P300	J9638	J112	7,595.0	16.0	130.0	1,555.1	2.5	10.7	1.4
☐	P318	J9634	FR-J108	416.6	12.0	120.0	-54.5	0.2	0.0	0.0
☐	P320	J9634	J9636	1,125.0	12.0	120.0	0.0	0.0	0.0	0.0
☐	P322	J9636	FR-J128	3,148.4	10.0	120.0	-2,500.0	10.2	122.8	39.0
☐	FR-P261	FR-J122	FR-J124	820.8	8.0	120.0	190.0	1.2	0.8	1.0
☐	FR-P263	FR-J124	FR-J126	390.6	8.0	120.0	427.6	2.7	1.7	4.4
☐	FR-P267	FR-J128	FR-J126	1,022.0	8.0	120.0	-607.4	3.9	8.6	8.4
☐	FR-P273	FR-J174	FR-J126	877.7	8.0	120.0	365.4	2.3	2.9	3.3
☐	FR-P275	FR-J176	FR-J124	637.8	8.0	120.0	266.2	1.7	1.2	1.8
☐	FR-P313	FR-J128	FR-J198	380.3	8.0	120.0	-606.5	3.9	3.2	8.4
☐	FR-P315	FR-J198	FR-J200	222.5	8.0	120.0	-495.6	3.2	1.3	5.8
☐	P317	FR-J200	FR-J202	201.8	8.0	120.0	-246.4	1.6	0.3	1.6
☐	FR-P319	FR-J198	J206	1,358.9	8.0	120.0	-134.1	0.9	0.7	0.5
☐	FR-P321	J206	FR-J208	233.9	8.0	120.0	-109.9	0.7	0.1	0.4
☐	FR-P323	FR-J208	FR-J204	210.1	8.0	120.0	-74.4	0.5	0.0	0.2

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
☐	FR-P325	FR-J202	FR-J204	1,425.8	8.0	120.0	139.6	0.9	0.8	0.6
☐	FR-P327	FR-J208	FR-J210	662.7	8.0	120.0	-98.9	0.6	0.2	0.3
☐	FR-P329	FR-J210	FR-J200	721.3	8.0	120.0	-122.2	0.8	0.3	0.4
☐	FR-P331	FR-J202	FR-J212	850.4	8.0	120.0	-409.3	2.6	3.4	4.1
☐	FR-P333	FR-J204	FR-J224	804.4	8.0	120.0	42.0	0.3	0.0	0.1
☐	FR-P335	FR-J224	FR-J226	188.4	8.0	120.0	40.3	0.3	0.0	0.1
☐	FR-P337	FR-J226	J206	810.2	8.0	120.0	47.4	0.3	0.1	0.1
☐	FR-P339	FR-J208	FR-J224	687.5	8.0	120.0	21.5	0.1	0.0	0.0
☐	FR-P341	FR-J208	FR-J226	679.5	8.0	120.0	30.4	0.2	0.0	0.0
☐	FR-P343	FR-J200	FR-J214	1,003.8	8.0	120.0	-394.6	2.5	3.8	3.8
☐	FR-P345	FR-J126	FR-J214	474.4	8.0	120.0	156.9	1.0	0.3	0.7
☐	FR-P347	FR-J214	FR-J212	220.1	8.0	120.0	72.3	0.5	0.0	0.2
☐	FR-P349	FR-J214	FR-J218	496.2	8.0	120.0	-333.2	2.1	1.4	2.8
☐	P351	FR-J212	FR-J216	421.4	8.0	120.0	-360.3	2.3	1.3	3.2
☐	FR-P353	FR-J216	FR-J218	160.8	8.0	120.0	-114.6	0.7	0.1	0.4
☐	FR-P355	FR-J218	FR-J220	408.4	8.0	120.0	-448.0	2.9	2.0	4.8
☐	FR-P361	FR-J216	J222	1,145.7	8.0	120.0	-287.3	1.8	2.4	2.1

APPENDIX B – Fire Flow Tabular Results

Fanita Ranch Global Fire Flow Availability (BUILDOUT) - 2,500 gpm MINIMUM

	ID	Static Demand (gpm)	Static Pressure (psi)	Residual Pressure (psi)	Available Flow at Hydrant (gpm)	Available Flow Pressure (psi)	Critical Pipe ID	Critical Pipe Velocity (ft/s)
☐	J100	35.0	111.9	106.3	4,878.1	92.4	P167	10.0
☐	J102	2.3	115.0	107.8	3,971.8	97.9	P165	10.0
☐	FR-J104	35.0	109.3	102.2	3,214.3	98.2	P157	10.0
☐	J106	108.8	103.7	100.5	7,986.5	74.8	P179	10.0
☐	FR-J108	0.0	108.0	103.2	5,894.3	84.1	P161	10.0
☐	FR-J110	183.6	116.7	108.9	6,252.1	77.4	P177	10.0
☐	J112	0.0	147.3	141.2	8,438.3	81.4	FR-P369	10.0
☐	FR-J114	0.0	58.3	53.1	3,085.6	50.5	P99	10.0
☐	FR-J116	0.0	106.3	102.0	6,357.9	81.6	P163	10.0
☐	FR-J118	0.0	34.3	33.7	8,127.5	27.8	P183	10.0
☐	J12	3.1	60.4	58.3	6,926.6	44.5	P181	10.0
☐	J120	33.4	71.0	70.4	11,178.5	20.0	P187	8.3
☐	FR-J122	5.4	67.1	65.9	8,482.6	35.7	FR-P265	10.0
☐	FR-J128	77.6	84.5	79.4	4,827.7	65.2	FR-P277	10.0
☐	J130	5.4	54.2	53.6	9,657.1	20.0	FR-P269	9.1
☐	FR-J132	5.4	52.2	51.5	9,193.7	20.0	P253	9.4
☐	FR-J134	5.4	46.3	45.3	7,331.6	24.5	P241	10.0
☐	FR-J136	5.4	74.0	73.3	11,510.5	20.0	P187	8.5
☐	FR-J138	5.4	62.0	60.8	7,851.0	34.8	P257	10.0
☐	J14	0.0	60.8	58.6	7,524.4	40.2	P13	10.0
☐	J140	5.4	83.5	76.5	3,703.8	67.3	P207	10.0
☐	J142	5.4	79.8	75.2	4,065.6	65.8	P189	10.0
☐	FR-J144	5.4	48.7	46.6	5,882.5	30.3	FR-P227	10.0
☐	FR-J146	5.4	47.6	46.2	7,637.7	20.9	P229	10.0

Fanita Ranch Global Fire Flow Availability (BUILDOUT) - 2,500 gpm MINIMUM

	ID	Static Demand (gpm)	Static Pressure (psi)	Residual Pressure (psi)	Available Flow at Hydrant (gpm)	Available Flow Pressure (psi)	Critical Pipe ID	Critical Pipe Velocity (ft/s)
☐	J148	5.4	52.3	47.2	5,274.0	25.9	P215	10.0
☐	FR-J150	5.4	62.7	57.5	5,345.5	35.3	P205	10.0
☐	J152	5.4	68.8	63.4	5,080.6	43.6	P205	10.0
☐	J154	5.4	74.0	62.6	2,893.2	58.7	P195	10.0
☐	J156	5.4	71.0	61.1	3,299.1	53.6	P197	10.0
☐	J158	5.4	66.2	58.3	4,390.1	40.7	P199	10.0
☐	FR-J16	0.0	48.0	40.8	3,527.1	34.1	P101	10.0
☐	J160	5.4	55.8	48.8	5,454.1	20.0	P201	9.4
☐	J162	5.4	69.4	65.9	5,435.0	47.8	P221	10.0
☐	J164	5.4	53.2	49.9	4,821.2	37.3	P217	10.0
☐	FR-J166	5.4	65.8	62.2	4,099.0	54.0	P235	10.0
☐	J168	5.4	56.7	53.0	3,923.1	45.9	P239	10.0
☐	FR-J170	5.4	71.0	67.2	3,600.5	61.8	P243	10.0
☐	FR-J172	5.4	64.5	58.2	2,781.8	56.5	P247	10.0
☐	FR-J174	0.0	54.0	53.5	9,394.2	28.8	FR-P357	10.0
☐	FR-J176	0.0	51.4	50.8	9,778.8	20.3	FR-P271	10.0
☐	FR-J178	5.4	78.4	73.9	4,485.0	62.5	FR-P279	10.0
☐	FR-J18	9.0	60.2	51.0	3,187.7	45.7	FR-P109	10.0
☐	J180	5.4	71.4	67.9	3,064.2	65.7	FR-P265	10.0
☐	FR-J182	5.4	71.0	65.4	3,627.3	58.5	FR-P291	10.0
☐	FR-J184	5.4	69.0	63.1	4,202.5	51.1	FR-P293	10.0
☐	FR-J186	5.4	64.1	56.6	5,156.2	30.5	FR-P285	10.0
☐	FR-J188	5.4	54.9	48.1	3,938.2	37.2	P283	10.0
☐	FR-J190	5.4	64.5	59.8	2,977.7	57.5	FR-P281	10.0

Fanita Ranch Global Fire Flow Availability (BUILDOUT) - 2,500 gpm MINIMUM

	ID	Static Demand (gpm)	Static Pressure (psi)	Residual Pressure (psi)	Available Flow at Hydrant (gpm)	Available Flow Pressure (psi)	Critical Pipe ID	Critical Pipe Velocity (ft/s)
☐	FR-J192	5.4	75.5	65.4	3,286.7	57.8	FR-P287	10.0
☐	FR-J194	5.4	77.9	71.0	3,766.1	61.6	FR-P309	10.0
☐	FR-J196	5.4	74.3	61.5	3,465.9	49.7	FR-P301	10.0
☐	FR-J20	0.0	90.6	80.2	3,406.4	72.0	FR-P59	10.0
☐	FR-J22	19.6	96.7	85.5	3,839.8	72.0	P65	10.0
☐	FR-J220	0.0	52.2	51.8	8,535.2	38.2	FR-P359	10.1
☐	J222	0.0	48.7	47.1	7,640.8	43.1	FR-P363	9.9
☐	FR-J228	5.4	31.5	28.7	4,385.5	20.0	FR-P367	6.5
☐	FR-J230	49.3	62.9	42.2	3,106.9	32.3	P213	10.0
☐	FR-J232	5.4	50.2	49.4	8,790.3	20.0	P375	8.4
☐	FR-J234	24.3	132.0	126.4	6,530.4	98.1	FR-P121	10.0
☐	J236	12.0	59.1	56.7	6,266.9	44.2	P185	10.0
☐	J238	56.9	78.4	68.2	2,995.7	64.6	FR-P381	10.0
☐	FR-J24	57.8	101.2	93.1	3,945.9	82.6	P71	10.0
☐	FR-J240	19.6	75.8	65.5	2,565.2	65.2	FR-P383	10.0
☐	J242	18.2	80.6	70.8	2,138.6	73.4	P67	10.0
☐	FR-J244	0.0	63.4	59.9	6,266.9	42.2	FR-P379	10.0
☐	J246	0.0	199.7	199.0	8,876.1	145.1	FR-P387	9.9
☐	J248	0.0	217.9	217.2	8,888.0	162.1	FR-P397	9.9
☐	J250	5.4	28.9	26.1	3,950.0	20.0	FR-P365	6.2
☐	FR-J26	19.6	86.3	75.5	4,190.7	58.2	P65	10.0
☐	FR-J28	0.0	80.2	71.9	5,080.6	48.6	FR-P381	10.0
☐	FR-J30	0.0	58.0	51.4	4,147.5	40.6	FR-P107	10.0
☐	FR-J32	9.0	52.4	44.6	4,064.1	32.8	P97	10.0

Fanita Ranch Global Fire Flow Availability (BUILDOUT) - 2,500 gpm MINIMUM

	ID	Static Demand (gpm)	Static Pressure (psi)	Residual Pressure (psi)	Available Flow at Hydrant (gpm)	Available Flow Pressure (psi)	Critical Pipe ID	Critical Pipe Velocity (ft/s)
☐	FR-J34	0.0	62.3	56.6	4,451.5	44.8	FR-P39	10.0
☐	FR-J36	9.0	72.7	67.9	4,042.8	60.6	FR-P41	10.0
☐	FR-J38	0.0	75.3	71.6	7,143.2	47.0	P15	10.0
☐	FR-J40	0.0	93.1	89.0	6,341.2	67.5	FR-P51	10.0
☐	J42	9.0	91.0	86.0	4,116.6	77.8	FR-P51	10.0
☐	FR-J44	0.0	80.6	74.8	4,601.9	61.8	P53	10.0
☐	J46	0.0	70.2	63.5	4,331.3	51.1	FR-P55	10.0
☐	J48	6.3	57.6	50.7	3,769.7	42.6	FR-P107	10.0
☐	FR-J50	19.6	84.6	76.5	3,639.8	68.2	FR-P49	10.0
☐	FR-J52	19.6	95.0	88.9	4,446.6	76.6	P47	10.0
☐	FR-J54	19.6	104.9	99.7	3,937.2	92.4	FR-P45	10.0
☐	FR-J56	18.2	107.5	103.2	6,092.1	83.1	FR-P45	10.0
☐	FR-J58	19.6	96.0	87.8	3,663.7	79.3	FR-P29	10.0
☐	J60	19.6	111.9	104.1	3,641.6	96.5	P73	10.0
☐	FR-J62	19.6	123.1	116.9	5,913.2	91.1	P73	10.0
☐	J64	19.6	117.0	110.7	4,775.1	95.2	FR-P27	10.0
☐	FR-J66	19.6	106.5	100.0	4,492.6	86.9	FR-P27	10.0
☐	FR-J68	0.0	135.2	129.7	8,896.9	68.3	P77	10.1
☐	J70	0.0	134.0	129.2	7,032.9	98.1	FR-P23	10.1
☐	J72	0.0	138.7	134.8	9,129.7	89.5	P115	10.1
☐	J74	16.9	140.7	136.3	6,766.9	111.5	P115	10.1
☐	J76	152.0	134.1	127.8	6,453.4	99.3	FR-P117	10.0
☐	FR-J78	0.0	122.4	117.5	7,020.3	87.8	P139	10.0
☐	FR-J80	0.0	120.2	112.9	3,679.0	105.2	P125	10.0

Fanita Ranch Global Fire Flow Availability (BUILDOUT) - 2,500 gpm MINIMUM

	ID	Static Demand (gpm)	Static Pressure (psi)	Residual Pressure (psi)	Available Flow at Hydrant (gpm)	Available Flow Pressure (psi)	Critical Pipe ID	Critical Pipe Velocity (ft/s)
☐	FR-J82	31.9	118.0	112.5	5,632.5	92.9	P127	10.0
☐	FR-J84	0.0	120.2	115.5	7,797.4	79.7	P137	10.0
☐	FR-J86	2.3	116.7	112.0	8,421.5	70.5	P135	10.0
☐	J88	0.0	115.0	109.7	5,756.6	89.5	P129	10.0
☐	FR-J90	35.0	111.1	105.9	5,898.6	85.3	P131	10.0
☐	FR-J92	0.0	113.7	109.0	7,990.5	71.5	P135	10.0
☐	FR-J94	1.1	107.2	102.8	6,454.7	80.6	P153	10.0
☐	FR-J96	1.7	104.6	100.8	5,486.6	87.5	P171	10.0
☐	FR-J98	2.3	108.0	103.1	5,363.5	87.2	P169	10.0
☐	J9634	0.0	110.7	104.6	4,897.6	89.4	P318	10.0
☐	J9636	0.0	196.2	137.9	2,448.0	140.1	P322	10.0
☐	FR-J124	28.6	62.5	57.9	4,164.3	48.5	FR-P263	10.0
☐	FR-J126	28.6	59.9	56.3	5,241.6	41.9	FR-P263	10.0
☐	FR-J198	23.2	88.9	80.2	3,022.9	76.5	FR-P313	10.0
☐	FR-J200	23.2	88.0	79.3	4,490.7	61.7	FR-P315	10.0
☐	FR-J202	23.2	86.9	76.8	3,227.9	70.6	P317	10.0
☐	FR-J204	23.2	89.0	69.7	3,597.0	51.6	FR-P323	10.0
☐	J206	23.2	91.8	72.4	3,735.7	51.6	FR-P321	10.0
☐	FR-J208	11.5	89.9	71.8	4,498.8	36.4	FR-P327	10.0
☐	FR-J210	23.2	90.6	70.1	2,804.7	65.6	FR-P329	10.0
☐	FR-J212	23.2	55.9	49.7	3,508.2	43.9	FR-P347	10.0
☐	FR-J214	23.2	57.7	53.0	4,786.2	40.3	FR-P345	10.0
☐	FR-J216	41.6	54.1	49.0	3,400.7	44.9	FR-P353	10.0
☐	FR-J218	0.2	54.1	49.8	3,708.5	44.3	FR-P355	10.0

Fanita Ranch Global Fire Flow Availability (BUILDOUT) - 2,500 gpm MINIMUM

	ID	Static Demand (gpm)	Static Pressure (psi)	Residual Pressure (psi)	Available Flow at Hydrant (gpm)	Available Flow Pressure (psi)	Critical Pipe ID	Critical Pipe Velocity (ft/s)
☐	FR-J224	23.2	87.7	66.2	3,774.6	42.1	FR-P335	10.0
☐	FR-J226	23.2	88.3	66.7	3,792.2	42.3	FR-P335	10.0

APPENDIX C – Miscellaneous Documentation