

December 26, 2022

Ms. Irina Itkin
City of San Diego
Development Services Department –
Water and Sewer Development Review
9192 Topaz Way
San Diego, CA 92123

**SUBJECT: Sharp Metropolitan Medical Campus (SMMC) Modernization & Improvement Project –
Water Study for Conditional Use Permit**

Ms. Itkin,

We are pleased to submit this Water Study in support of the Conditional Use Permit (CUP) for the SMMC Modernization & Improvement Project (Project) for your review. The purpose of this Study is to document the existing and ultimate water systems necessary to provide domestic and fire flow service to the Project in support of the CUP.

I. INTRODUCTION

The Project is a 41-ac site located south of Frost Street and east of Health Center Drive in the City of San Diego (City). Water service will be provided by the City Water Department via the Cabrillo Palisades 540 Pressure Zone. **Figure 1** presents the Project Location.

The Project includes building additions and demolitions to expand, update, and modernize the existing SMMC. The current land use associated with this area is institutional according to the Serra Mesa Community Plan (date), and all uses proposed in the Project are consistent with that use type.

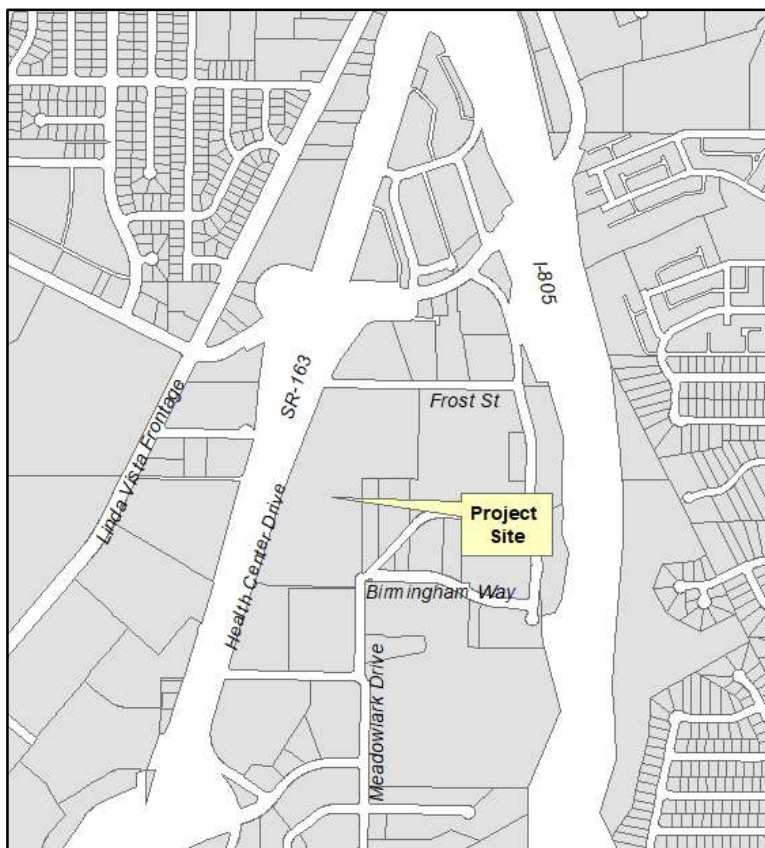


Figure 1 – Project Vicinity

II. POTABLE & IRRIGATION WATER DEMANDS

City of San Diego criteria for Hospital water use is 22,500 gpd/net-acre. Typically for these types of projects the water use would be determined using fixture counts. However, the existing fixture units and water data cards for the site are not available. In the case for this Project, existing billing data was received from the City for the previous three years, resulting in a rolling average annual demand (AAD) of 219,557 gpd (152.5 gpm) as presented in **Table 1**. The City has also requested that the water use be equated to total bed count for the site. The existing bed count is 862, which results in a water use of 275 gpd/bed based on the recorded billing data.

The Administrative Building is the Knollwood Complex at the southeast corner of the project. This building is currently off a separate meter which has not been provided to date. In order to determine the water use for this building, the total project site demand was equated to square footage, which resulted in a water duty factor of 0.423 gpd/sf. Based on the existing building size shown in Table 1, the resulting water use for this building was determined to be 17,148 gpd (11.9 gpm).

Table 1. Potable Water Use

Building Name	Existing			Future				
	Square Footage	AAD		Square Footage	AAD			
		gpd	gpm		gpd	gpm		
Mary Birch	193,526	219,546	152.5	286,361	81,683	56.7		
New Tower	-			251,240	71,665	49.8		
Central Energy Plant (SCR)	-			24,863	7,092	4.9		
Connector Corridor (SCR)	-			5,335	1,522	1.1		
Waste Dock	-			2,754	786	0.5		
Central Engery Plant Mod.	19,732			6,481	1,849	1.3		
Sharp Main Hospital				-	-	-		
Tower	224,080			103,901	29,637	20.6		
Dietary Building	20,567			-	-	0.0		
Service Building	13,707			-	-	0.0		
ED Radiology	47,404			-	-	0.0		
New Concourse Entry	-			28,860	8,232	5.7		
Administrative Building ¹	40,539			17,148	11.9	120,000	34,229	23.8
TOTAL	559,555			236,694	164.4	829,795	236,694	164.4

- 1) The Administrative Building (Knollwood) total square footage was not included in the calculation for gpd/sf as this building is served by a separate water connection.

At the request of the City, the future water use for the Project was determined by the number of proposed beds. However, the Project is proposing a total decrease of 77 beds for a total projected bed count of 785. At this time, it is proposed that the estimated water use for the site remain consistent with currently recorded water use. There will be an increase in floor square footage that is due to a number of

accumulative effects to include more room to provide patient care than was previously allocated in earlier architectural and code compliance practices, as well as a few meeting and training spaces to serve professional development of the staff already on site. Based on these factors, the water use projection is not anticipated to increase.

The Project also includes irrigation area that, in order to be conservative, has been included in the future water estimates, assuming that a recycled water connection would not be available in the future. As provided, the estimated irrigation water use is 9,967 gpd (6.92 gpm) on average. This small increase to the overall demand would not change peaking factors for MDD and PKH of 1.6 and 2.7, respectively. Therefore, the revised future demand totals are:

- Future Demands
 - AAD: 236,694 gpd potable + 9,967 gpd irrigation = 246,661 gpd (171.3 gpm)
 - MDD: 246,661 x 1.6 = 394,658 gpd (274.1 gpm)
 - PKH: 246,661 x 2.7 = 665,985 gpd (462.5 gpm)

Additionally, the City’s Urban Water Management Plan (UWMP, June 2020) included water use factors for different land use classifications, such as hospitals and medical office space, that are not currently in the City’s Water Design Guidelines. These factors are 0.092 gpd/sf for Hospital space and 0.039 gpd/sf for Medical Offices. Using the existing square footage in question of 519,016 sf (less the Knollwood Administrative Building), the total existing demand would be only 47,749 gpd using the higher of the two unit factors. Therefore, the billing data reflects a much higher water use than what the City assumed in the UWMP and will be used as the basis for design.

CITY DESIGN CRITERIA

The City criteria used in this water study was obtained from the January 2021 City of San Diego Water Design Guidelines. The following list summarizes the specific criteria used for this analysis:

Table 2. 2021 City Design Criteria

Minimum Static Pressure	65	psi
Maximum Static Pressure	120	psi
Maximum Pressure Drop – Peak Hour	25	psi
Minimum Pressure – Peak Hour	40	psi
Minimum Pressure – Fire	20	psi
Maximum Pipeline Velocity - Fire	15	fps

The required fire flow for this private development is based on the total fire-rate square footage for each building, as presented below in **Table 3**. These flows are based on the 2019 California Fire Code (CFC). The Project is a non-residential, non Group R-3 and R-4 project and is subject to fire flow requirements per Table B105.1(2) and B105.2 as attached in Appendix A. These building types are allowed, per code, to reduce the fire flow requirement by up to 75% with sprinklered systems to a minimum of 1,000 gpm. However, the duration of the fire remains as indicated in B.105.1(2).

Table 3. Fire Flow

Building Name	Ultimate Square Footage	Construction Type	Maximum Required Fire Flow per CFC	Reduced Fire Flow Allowed per CFC
Mary Birch	286,361	I-A	6,000 gpm / 4 hours	1,500 gpm / 4 hours
New Tower	251,240			
Waste Dock	2,754			
Central Engery Plant Mod.	6,481			
Sharp Main Hospital				
Tower	103,901			
New Concourse Entry	28,860			
Central Energy Plant (SCR)	24,863	II-B	3,250 gpm / 3 hours	1,000 gpm / 3 hours
Administrative Building	120,000	II-B	7,250 gpm / 3 hours	1,813 gpm / 4 hours

III. Model Assumptions

The model was simulated under anticipated Max Day + Fire Flow and Peak Hour conditions. Key Model Assumptions are summarized below.

1. Boundary Conditions – Several fire flows were obtained from the City in the form of fire flow availability conditions. These included:
 - a. Frost Street:
 - Static Pressure = 54 psi
 - Residual Pressure = 45 psi at 1,073 gpm
 - b. Health Center Drive:
 - Static Pressure = 67 psi
 - Residual Pressure = 57 psi at 1,188 gpm
2. Elevations – Project elevations were obtained using both Google Earth and finished floor elevations for existing and proposed buildings.
3. Demands – As discussed in Section II, the existing potable water demands were obtained from recent billing records.
4. Fire Flow – The required fire flow was moved around on the site to ensure that a worst-case scenario was used to size the ultimate system.
5. Roughness - Roughness coefficients were assumed at 130 and 110 for PVC and AC pipelines, respectively. Where pipe material is not known, a coefficient of 120 was used.

The City currently has several service connections to the existing potable water system in both Health Center Drive and in Frost Street, as indication in **Table 4** below. Also indicated in Table 4 are the proposed service connections (Nos. 7 and 8) as provided in previous submittals to the City.

Table 4. Public to Private Service Connections

Location	Ultimate System	Service Lateral, in.	Meter			Backflow Device			
			Quantity	Size, in.	Manufacturer	Quantity	Size, in.	Manufacturer	
Existing Connections									
1 ¹	Frost St east of Health Center Dr	--	10	2	6	UNK	1	10	UNK
2	Frost St at parking structure	DOM	10	2	4	UNK	2	6	UNK
3a	Health Center Dr (Main Hospital)	DOM	8	2	4	UNK	2	6	UNK
3b	Health Center Dr (Main Hospital)	FIRE	8	-	-	-	1	8	UNK
4	Health Center Dr (SRC)	FIRE	8	-	-	-	1	8	UNK
5	Health Center Dr (Mary Birch)	FIRE	8	-	-	-	1	8	UNK
6	Birmingham Drive at Admin.	DOM	UNK						
Proposed Connections									
7	Frost St at parking structure	FIRE	8	-	-	-	1	8	AMES C500
8	Birmingham Way east of Meadlowlark Dr	DOM	8	2	4	UNK	2	6	UNK

1) Service to be removed from service.

Typical headloss for meters and backflows have been included in the model. Where possible, the manufacturer’s cut sheets were used to determine the maximum headloss for the appurtenances. General practice would include a 5-7 psi for a meter and 13 psi for a backflow device for a total of 20 psi for a domestic connection. Domestic connections would require both appropriately sized meters and backflow devices. As the fire system is to be separate from the domestic system, meters are not required and such connections would only require a backflow device. The proposed backflow device at Site 7 is manufactured by Ames and a cut sheet of the device is provided in Appendix B.

IV. PROPOSED WATER SYSTEM

The Project is generally located in the lower elevations of the City’s Cabrillo Palisades Pressure Zone in close proximity to the Cabrillo Palisades Pump Station (PS). Due to the estimated Project elevation of approximately 390 feet, the project site has a static pressure of 65 psi. A hydraulic model was created to represent the existing system to determine what improvements would be necessary.

The purpose of this analysis is to determine how best to separate the site’s existing combination fire, domestic, and irrigation systems into a separate fire system and separate domestic and irrigation system. To the extent possible, existing mains, meters, and backflow devices will be used, but it will be necessary to reroute or eliminate pipeline where buildings will be located.

The Project Team has developed plans for the internal pipe configuration and potential service locations. This analysis used the proposed piping layout, points of connections, and demands and criteria developed in the above sections to analyze the system. **Figure 2** presents the water system used to analyze the Project.

Model Results

In order to separate the two water systems and eliminate pipelines under new buildings, several new pipelines must be constructed for the ultimate system to work as intended.

The onsite system was assessed with a minimum 1,500 gpm fire with the exception of the Administrative Building, which has a public hydrant along Birmingham Drive and is shown below as Scenario 5.

The results of the modeling are shown in **Table 5**, and detailed output results are provided in Appendix C. The results show that the onsite private system will drop below 40 psi during peak hour demands. However, the pressure through the domestic meter (before the backflow device) would remain greater than 40 psi under this scenario. See Appendix C Pipe and Node Map and associated report tables. All fire flow runs are within acceptable criteria. The system as shown on Figure 2 will support the ultimate conditions proposed by the Project and no additional or offsite improvements are necessary.

Table 5. Hydraulic Model Results Summary

Scenario	Minimum Pressure	Maximum Velocity
1 MDD + 1,500 gpm fire at Node J148	28.9 psi at Node J150	7.5 fps at Pipes P11 & P13
2 MDD + 1,500 gpm fire at Node J152	21.3 psi at Node J152	9.6 fps at Pipe P169
3 MDD + 1,500 gpm fire at Node J158	25.3 psi at Node J158	7.5 fps at Pipes P11 & P13
4 MDD + 1,500 gpm fire at Node J170	22.7 psi at Node J170	7.5 fps at Pipes P11 & P13
5 MDD + 1,813 gpm fire at Node J198	25.5 psi at Node J192	8.8 fps at Pipes P11 & P13
6 Peak Hour	33 psi at Node J192 (Priv.) 45 psi after Public Domestic Meter	2.3 fps at Pipes P13 & P11

Please feel free to call me should you have any questions.

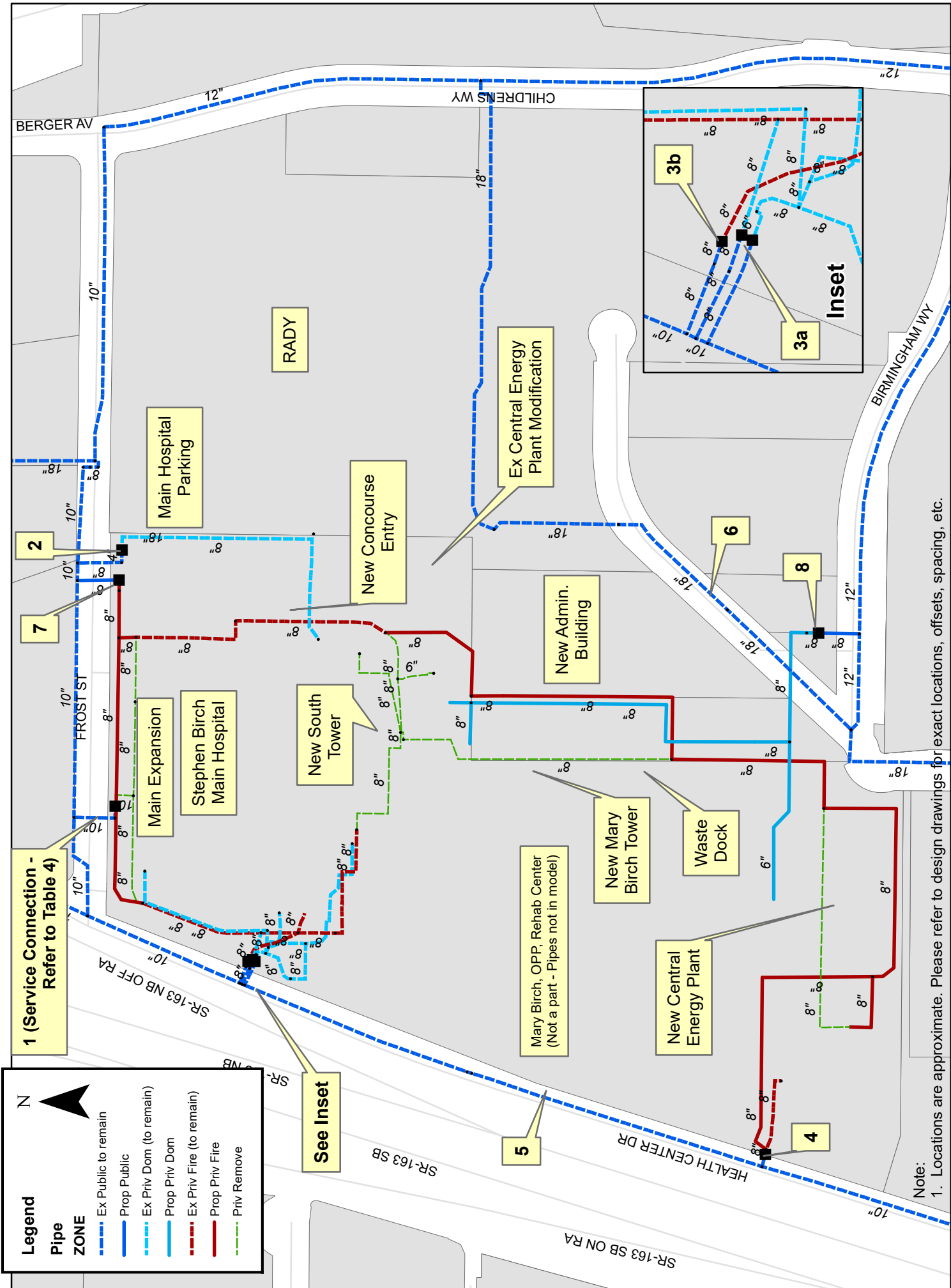
Respectfully Submitted,



Jennifer R. Mael, P.E.
Project Manager



Attachments: Appendix A – Supporting Documentation Model Results
Appendix B – Manufacturer Cut Sheets
Appendix C – Model Results



Note: 1. Locations are approximate. Please refer to design drawings for exact locations, offsets, spacing, etc.

Figure 2 - Ultimate Water System

APPENDIX A – SUPPORTING DOCUMENTATION

Section BB105 Fire-Flow Requirements for Buildings

BB105.1

The minimum fire flow and flow duration for school buildings shall be as specified in Table BB105.1.

Exception: A reduction in required fire flow of up to 75 percent is allowed when the building is provided with an approved automatic sprinkler system. When a reduction in fire flow is used, fire flow shall not be less than 1500 GPM.

TABLE BB105.1

MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE AREA (square feet)					FIRE-FLOW (gallons per minute) ^b	FLOW DURATION (hours)
Type IA and IB ^a	Type IIA and IIIA ^a	Type IV and V-A ^a	Type IIB and IIIB ^a	Type V-B ^a		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m², 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895kPa.

a. Types of construction are based on the California Building Code.

b. Measured at 20 psi.

SERRA MESA PLANNING GROUP

Meeting: June 16th, 2022, Action Item/Recommendation

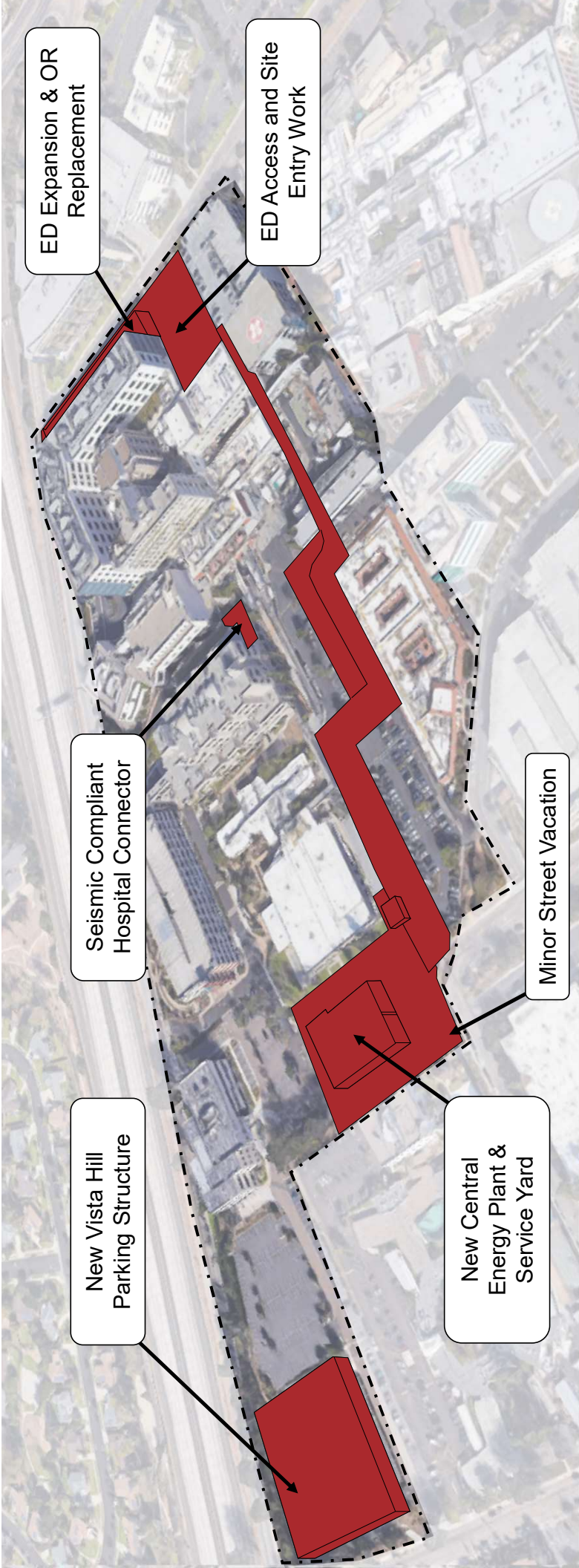
Sharp Medical Campus Improvement & Upgrades
CUP and PDP Amendment and Small Summary Vacation
Process 5 - City Council Approval



EXISTING MEDICAL CAMPUS

Make Ready Under Construction And Commencing Construction Soon

Existing Medical Campus City Approved Substantial Conformance Review 677608 & Parking Structure 679855

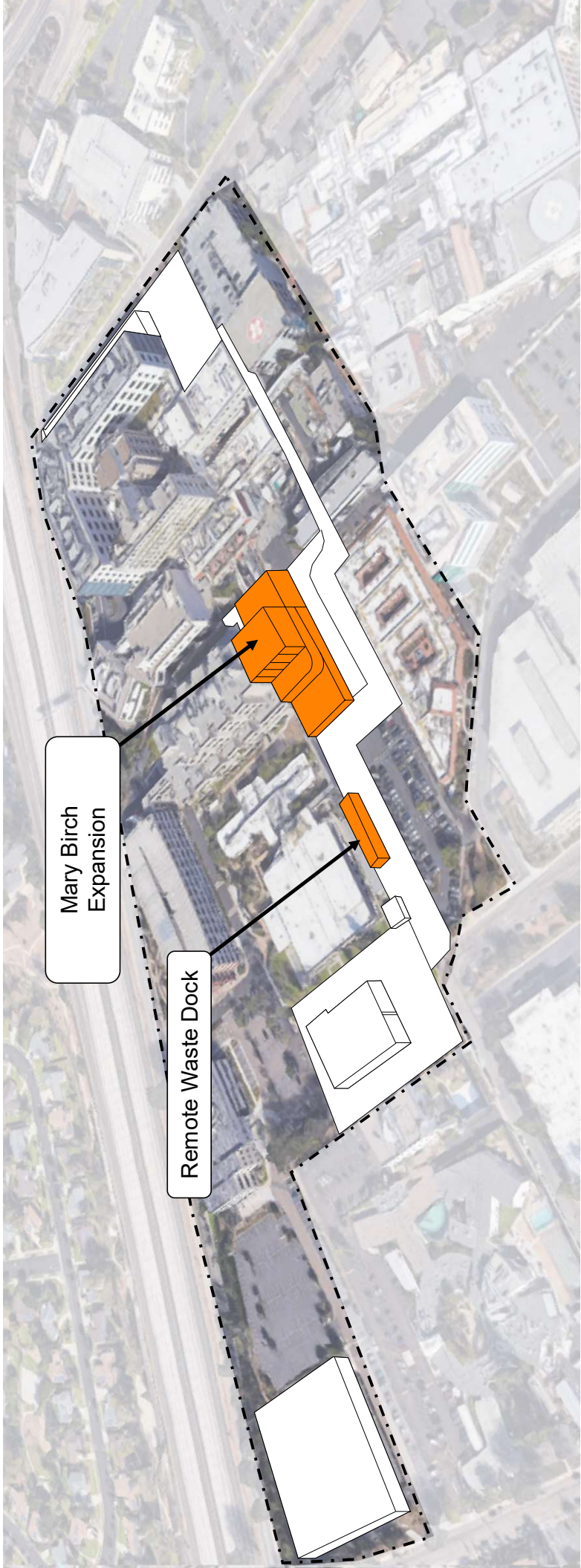


STEPHEN BIRCH EXPANSION

STEPHEN BIRCH
EXPANSION

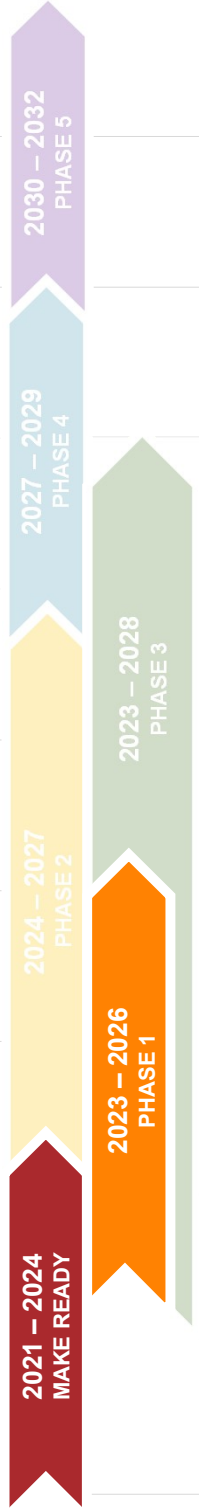


PHASE 1 Mary Birch Expansion & Remote Waste Dock

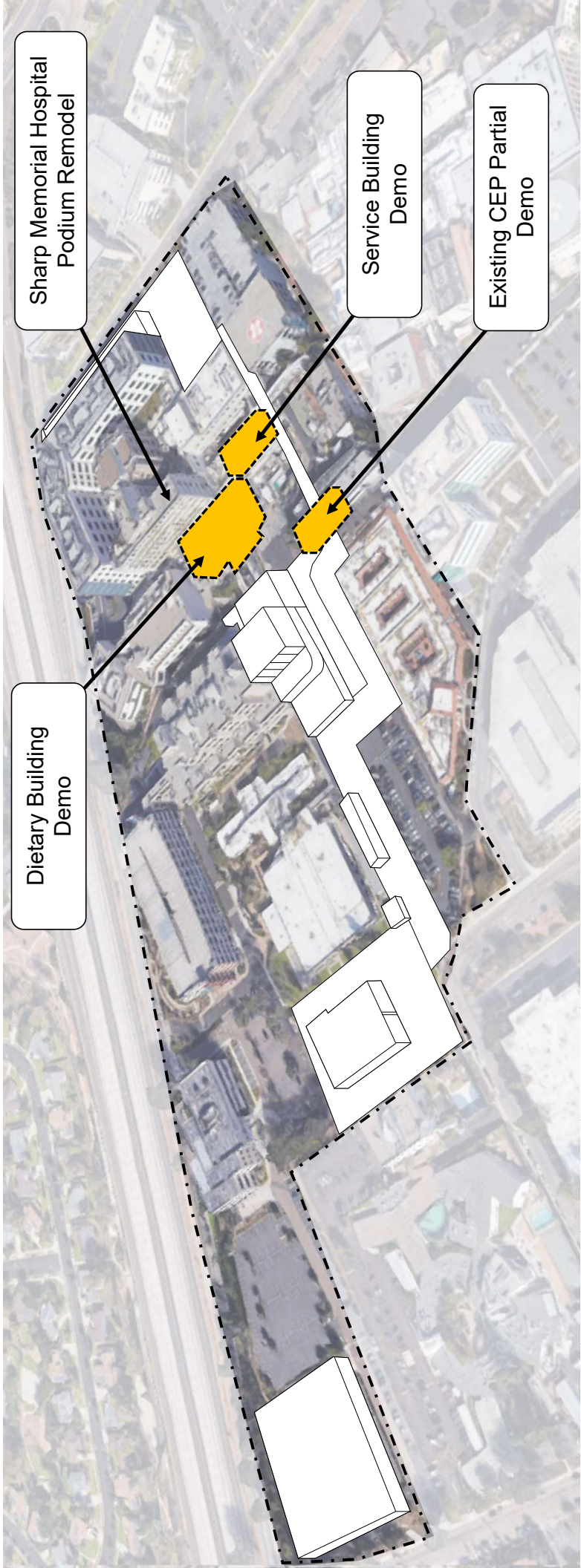


Mary Birch Expansion

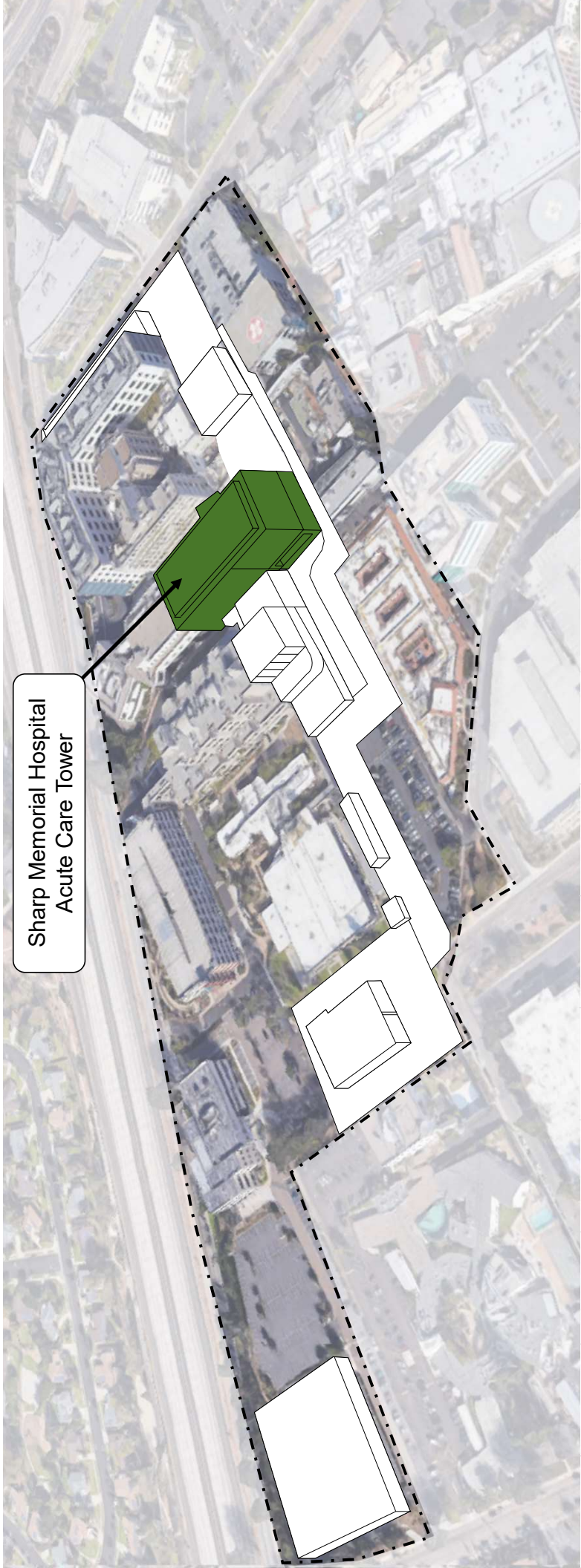
Remote Waste Dock



PHASE 2 Sharp Memorial Hospital Podium Remodel & Proposed Demolition Projects



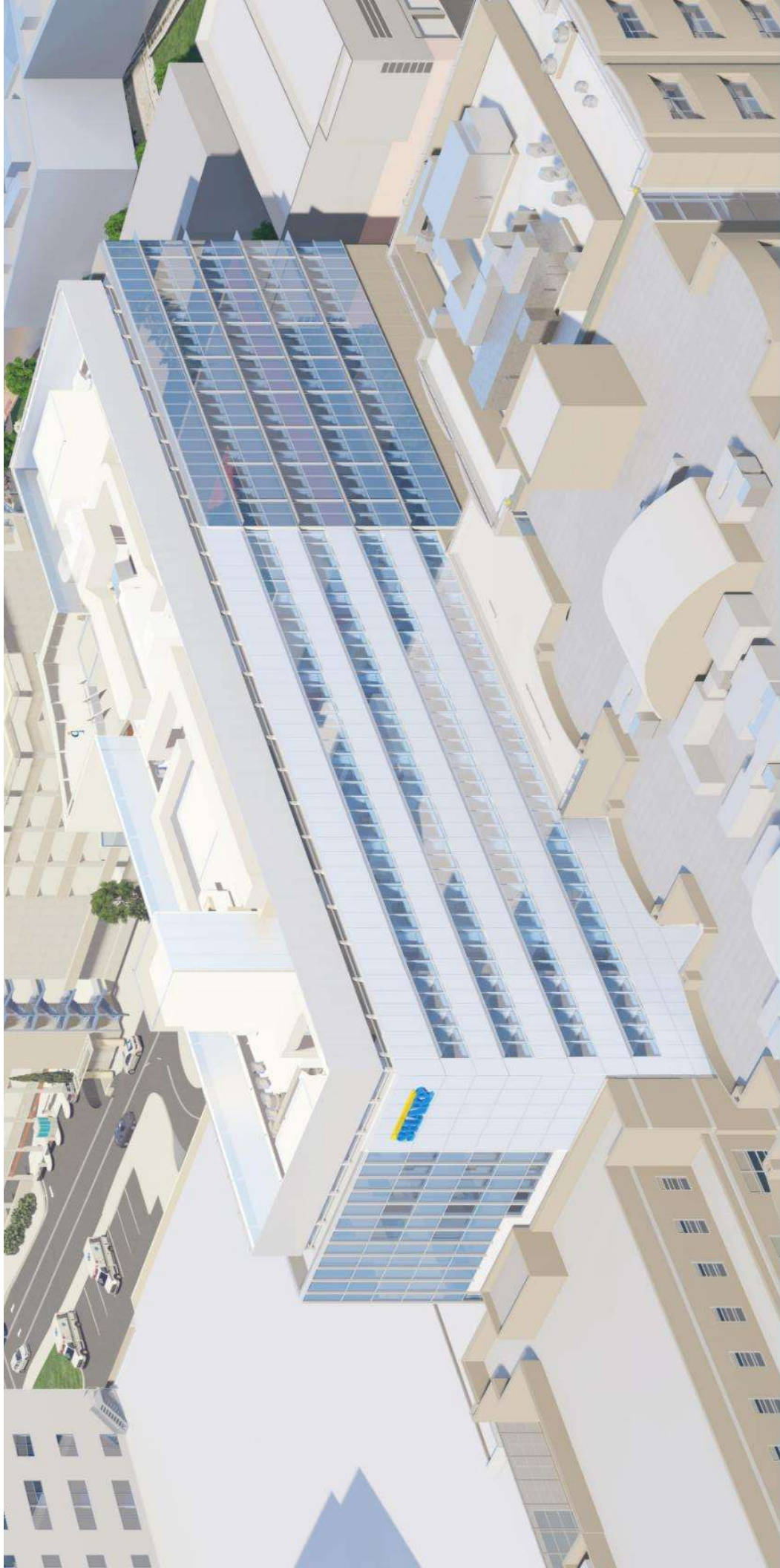
PHASE 3 Sharp Memorial Hospital Acute Care Tower



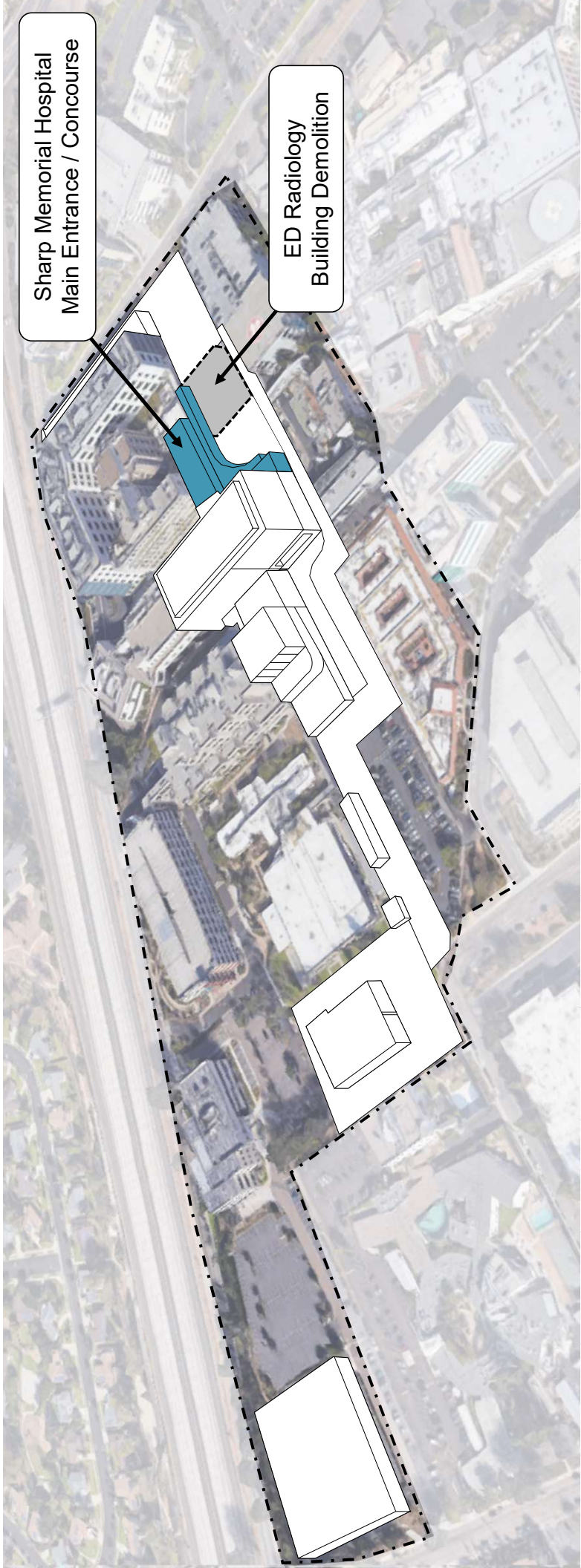
Sharp Memorial Hospital
Acute Care Tower



PHASE 3 Sharp Memorial Hospital Acute Care Tower



PHASE 4 Sharp Memorial Hospital Main Entrance / Concourse & ED Radiology Building Demolition



Sharp Memorial Hospital
Main Entrance / Concourse

ED Radiology
Building Demolition

2021 – 2024
MAKE READY

2024 – 2027
PHASE 2

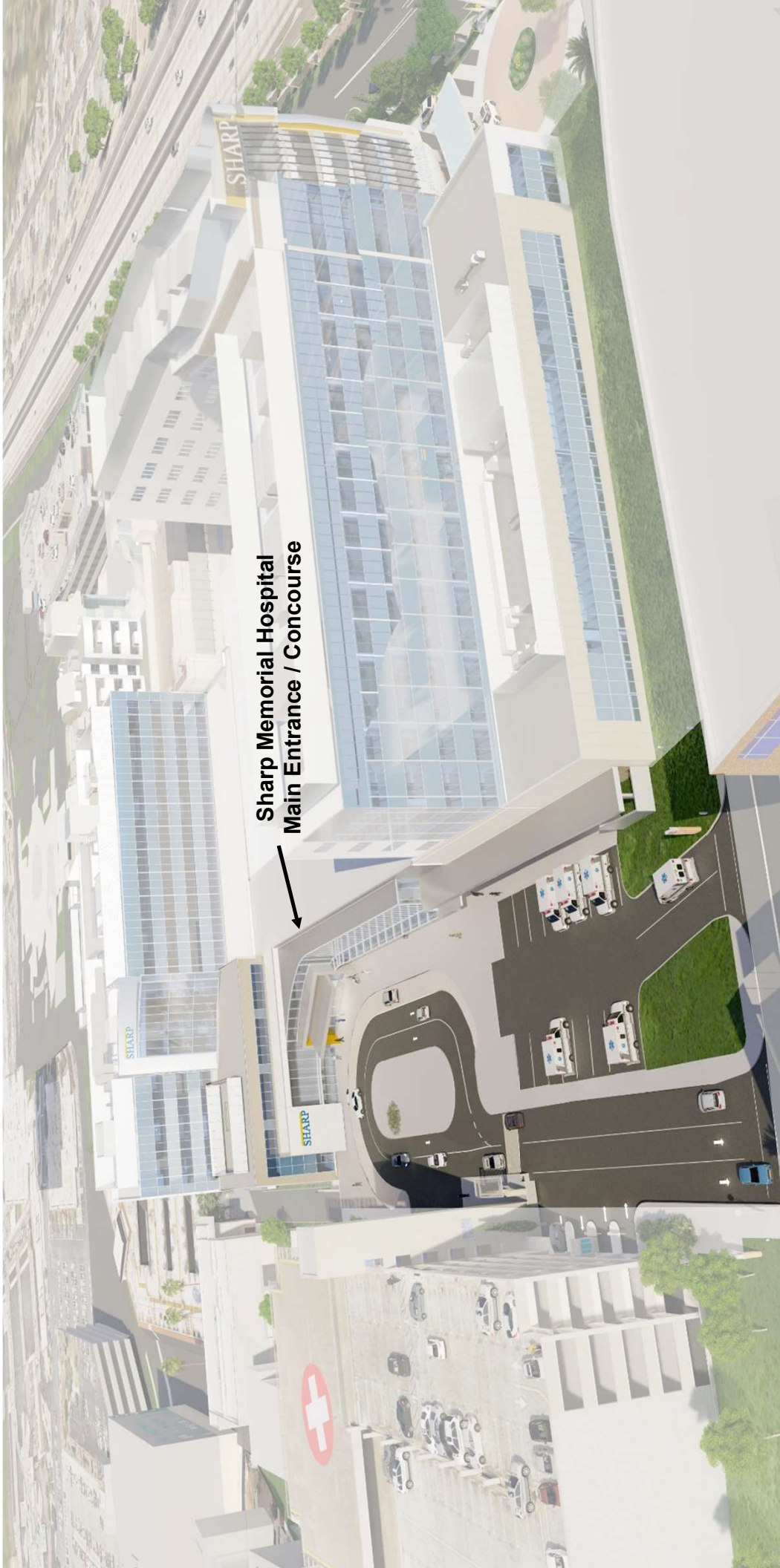
2027 – 2029
PHASE 4

2030 – 2032
PHASE 5

2023 – 2026
PHASE 1

2023 – 2028
PHASE 3

PHASE 4 Sharp Memorial Hospital Main Entrance / Concourse

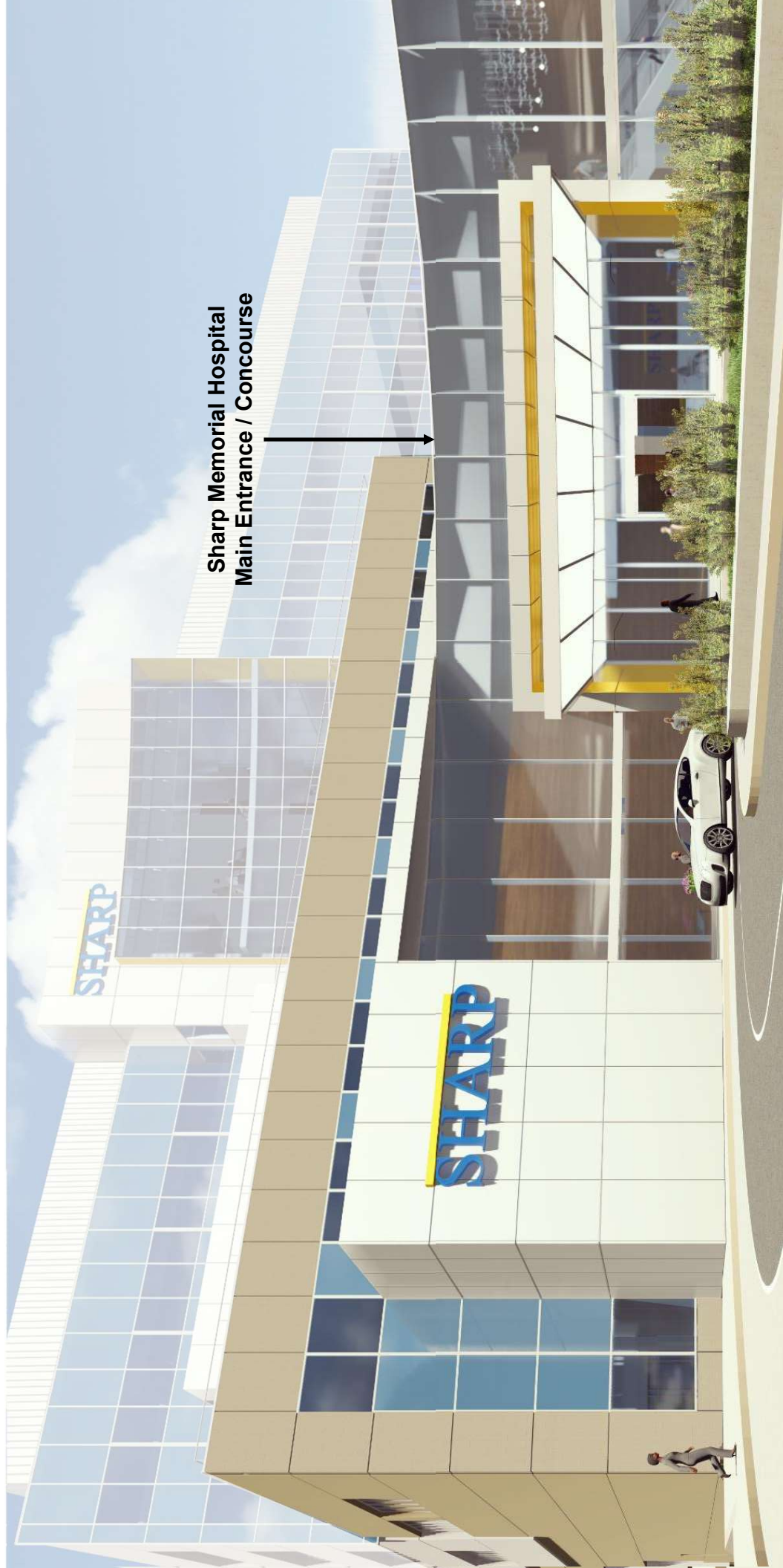


Sharp Memorial Hospital
Main Entrance / Concourse

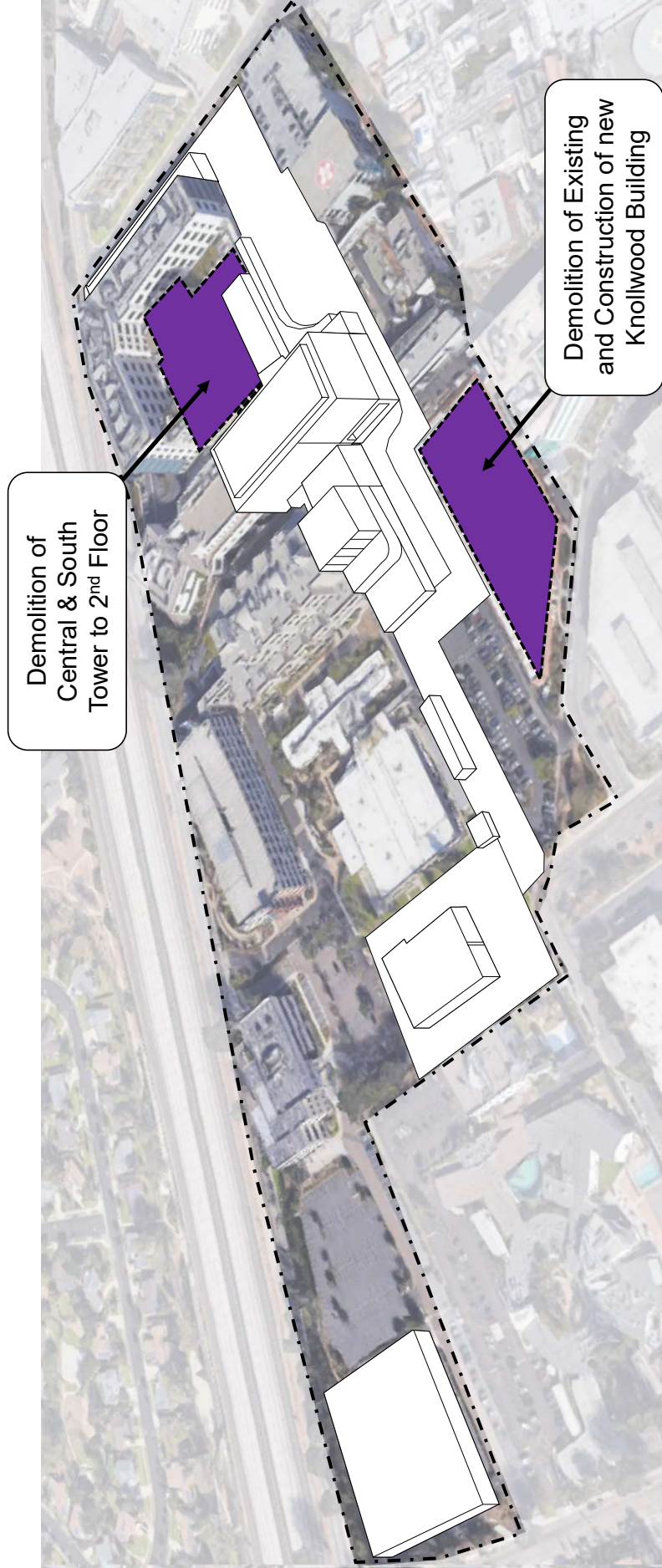
PHASE 4 Sharp Memorial Hospital Main Entrance / Concourse



PHASE 4 Sharp Memorial Hospital Main Entrance / Concourse



PHASE 5 Demolition of Central & South Tower to 2nd Floor



APPENDIX B – MANUFACTURER CUT SHEETS

Engineering Specification

Job Name _____

Contractor _____

Job Location _____

Approval _____

Engineer _____

Contractor's P.O. No. _____

Approval _____

Representative _____

Colt™ Series C500 (Colt 500), C500N (Colt 500N), C500Z (Colt 500Z) Reduced Pressure Detector Assemblies

Sizes: 2½" – 10"

The Colt C500, C500N, C500Z Reduced Pressure Detector Assemblies are designed to protect drinking water supplies from dangerous cross-connections in accordance with national plumbing codes and water authority requirements for health-hazard non-potable service applications such as irrigation, fire line, or industrial processing. The Colt C500, C500N, C500Z are used to monitor unauthorized use of water from the fire protection system.

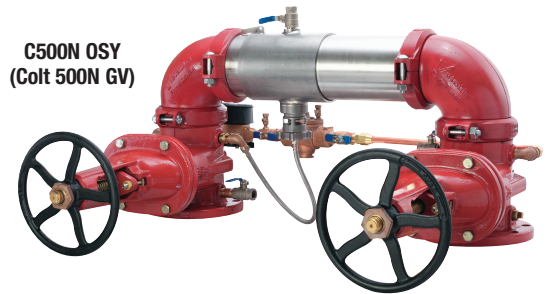
Features

- Extremely Compact Design
- 70% Lighter than Traditional Designs
- 304 (Schedule 40) Stainless Steel Housing & Sleeve
- Groove Fittings Allow Integral Pipeline Adjustment
- Patented Link Check Provides Lowest Pressure Loss
- Unmatched Ease of Serviceability
- Replaceable Check Disc Rubber
- Available with Grooved Butterfly Valve Shutoffs
- Bottom Mounted Cast Stainless Steel Relief Valve
- Metered Bypass to Detect Leakage or Theft of Water from the Fire Sprinkler System

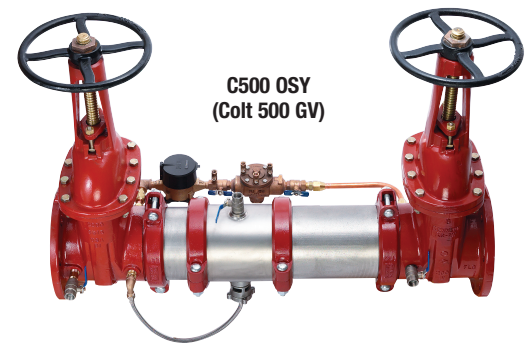
Specifications

The Colt C500, C500N, C500Z Reduced Pressure Detector Assemblies shall consist of two independent Link Check modules, a differential pressure relief valve located between and below the two modules, two drip tight shutoff valves, and required test cocks. Link Check modules and relief valve shall be contained within a sleeve accessible single housing constructed from 304 (Schedule 40) stainless steel pipe with groove end connections. Link Checks shall have reversible elastomer discs and in operation produce drip tight closure against the reverse flow of liquid caused by backpressure or backsiphonage. The bypass assembly consists of a meter registering either gallon or cubic measurements, a reduced pressure zone assembly and required test cocks. Assembly shall be Colt C500, C500N, C500Z as manufactured by the Ames Fire & Waterworks.

C500N OSY
(Colt 500N GV)



C500 OSY
(Colt 500 GV)



WARNING

It is illegal to use this product in any plumbing system providing water for human consumption, such as drinking or dishwashing, in the United States. Before installing standard material product, consult your local water authority, building and plumbing codes.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Ames Fire & Waterworks product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Ames Fire & Waterworks Technical Service. Ames Fire & Waterworks reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Ames Fire & Waterworks products previously or subsequently sold.


AMES
 FIRE & WATERWORKS
 A WATTS Brand

Configurations

- Horizontal
- “Z” pattern horizontal
- “N” pattern horizontal

Materials

- Housing & Sleeve: 304 (Schedule 40) Stainless Steel
- Elastomers: EPDM, Silicone and Buna ‘N’
- Link Checks: Noryl®, Stainless Steel
- Check Discs: Reversible Silicone or EPDM
- Test Cocks: Lead Free* Bronze Body
- Pins & Fasteners: 300 Series Stainless Steel
- Springs: Stainless Steel

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Pressure – Temperature

Temperature Range: 33°F – 140°F (0.5°C – 60°C)

Maximum Working Pressure: 175 psi (12.1 bar)

Available Models

Suffix:

OSY — UL/FM outside stem and yoke resilient seated gate valves

BFG — UL/FM grooved gear operated butterfly valves w/ tamper switch

*OSY FxG — Flanged inlet gate connection and grooved outlet gate connection

*OSY GxG — Grooved inlet gate connection and flanged outlet gate connection

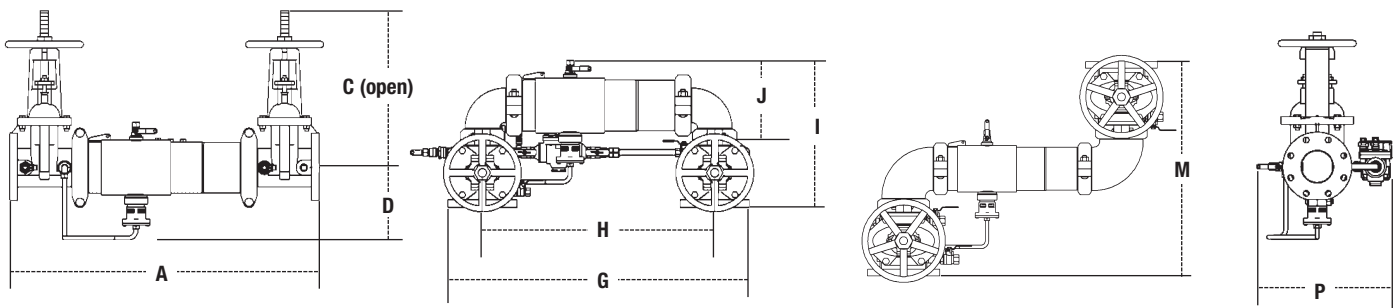
*OSY GxG — Grooved inlet gate connection and grooved outlet gate connection

Available with grooved NRS gate valves — consult factory*

Post indicator plate and operating nut available — consult factory*

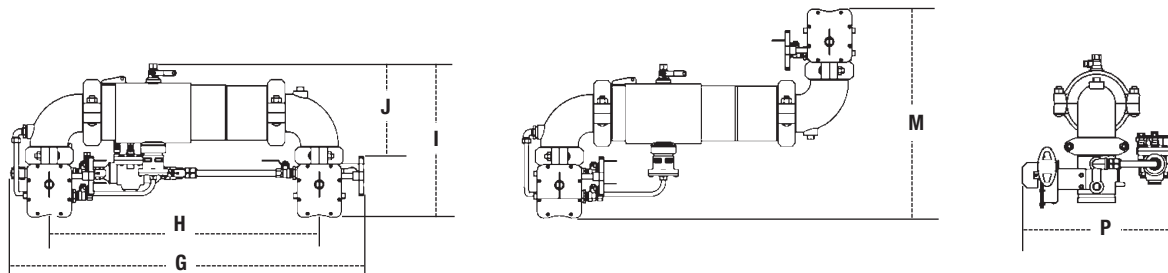
*Consult factory for dimensions

Dimensions – Weights



C500, C500N, C500Z

SIZE	DIMENSIONS												WEIGHT									
	A		C (OSY)		D		G		H		I		J		M		P		C500		C500N	
in.	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.	lbs.	kgs.
2½	30¾	781	16⅞	416	6½	165	29¼	738	21½	546	15½	393	8⅜	223	21¼	540	13⅜	335	118	54	126	57
3	31¾	806	18⅞	479	6⅞	170	30¼	768	22¼	565	17⅞	435	9⅞	233	23	584	14½	368	134	61	147	67
4	33¾	857	22¼	578	7	178	35⅝	905	23½	597	18½	470	9⅞	252	26¼	667	15⅜	386	164	74	187	85
6	43½	1105	30⅞	765	8½	216	44¾	1137	33¼	845	23⅞	589	13⅞	332	34¼	870	19	483	276	125	317	144
8	49¾	1264	37¼	959	9⅞	246	54⅞	1375	40⅞	1019	27⅞	697	15⅞	399	36⅞	937	21⅞	538	441	200	516	234
10	57¾	1467	45¾	1162	11⅞	285	66	1676	49½	1257	32½	826	17⅞	440	44½	1124	24	610	723	328	893	405



C500NBFG/C500ZBFG

SIZE	DIMENSIONS												WEIGHT			
	G		H		I		J		M		P		C500BFG			
in.	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.		
2½	32½	826	23	584	15½	394	9½	241	19¾	502	15⅜	402	81	37		
3	34	864	24	610	16⅞	414	10⅞	256	21¼	540	16⅞	410	84	38		
4	35⅞	905	25½	648	17⅞	437	10⅞	279	23½	597	16⅞	422	101	46		
6	46½	1181	35¼	895	20½	521	13½	343	27¼	692	19	483	174	79		

Approvals

- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at The University of Southern California (FCCCHR-USC) (Excluding 10" 'N' and 'Z' configurations)
- AWWA C511-97



For additional approval information please contact the factory or visit our website at www.amesfirewater.com

Capacity

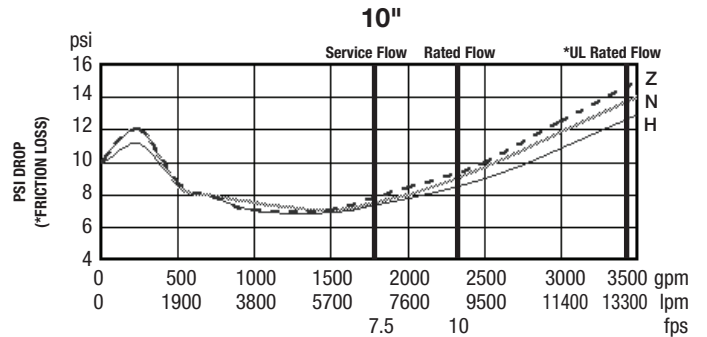
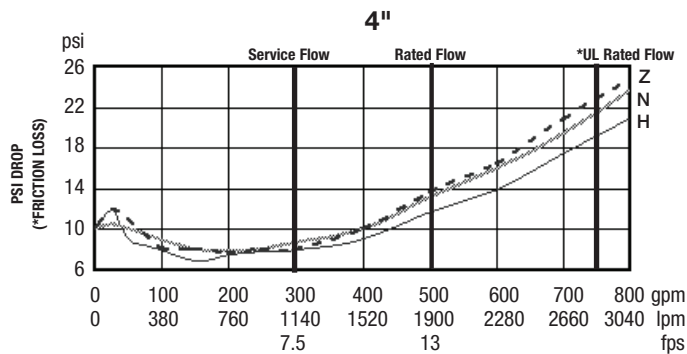
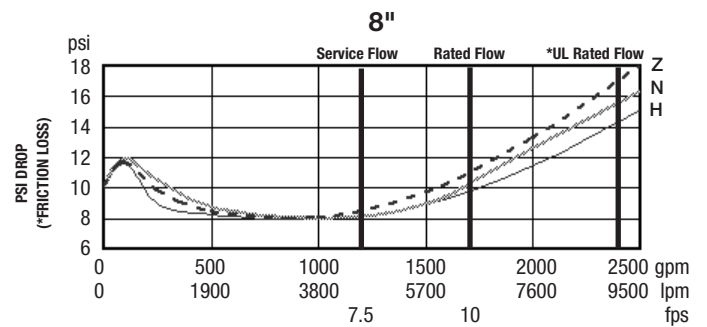
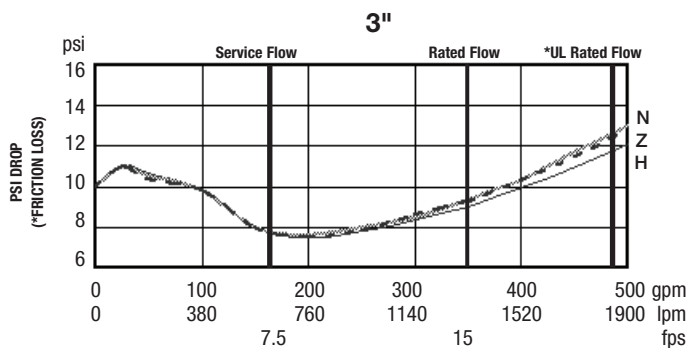
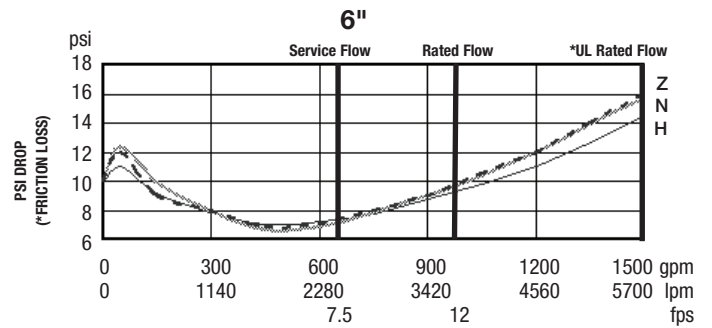
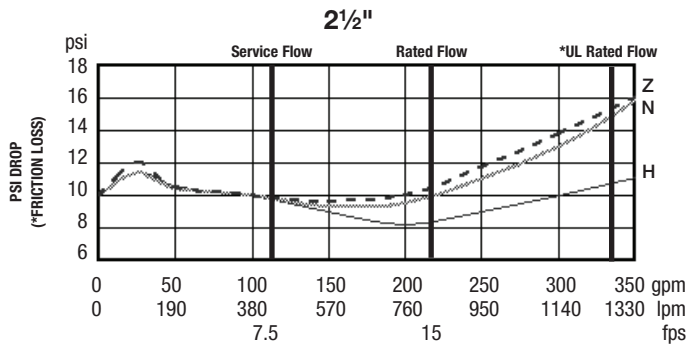
UL/FM Certified Flow Characteristics

N&Z Flow characteristics collected using butterfly shutoff valves.

Flow capacity chart identifies valve performance based upon rated water velocity up to 25fps

- Service Flow is typically determined by a rated velocity of 7.5fps based upon schedule 40 pipe.
- Rated Flow identifies maximum continuous duty performance determined by AWWA.
- UL Flow Rate is 150% of Rated Flow and is not recommended for continuous duty.
- AWWA Manual M22 [Appendix C] recommends that the maximum water velocity in services be not more than 10fps.

— Horizontal — N - Pattern - - - - Z - Pattern



NOTICE

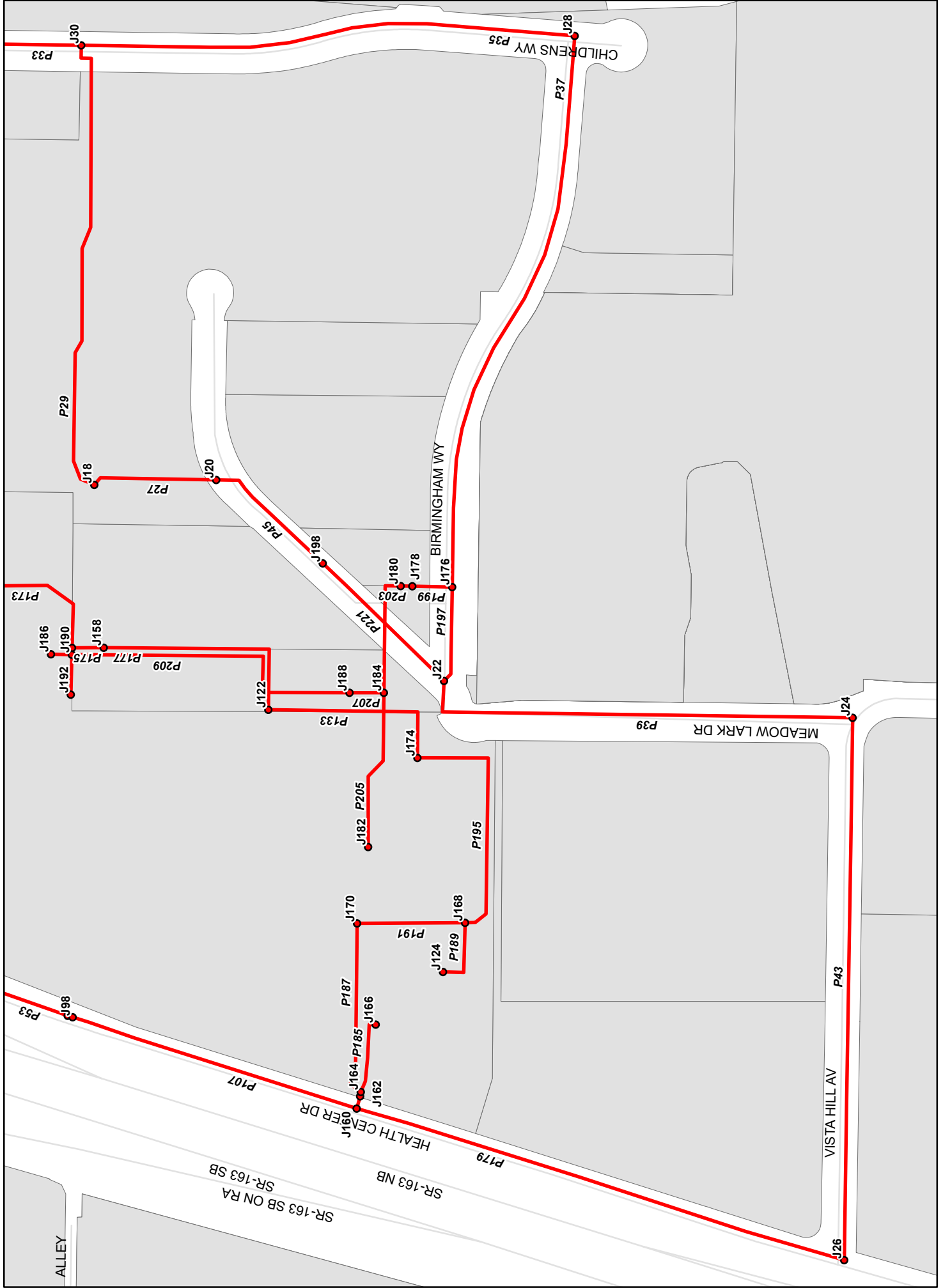
Inquire with governing authorities for local installation requirements



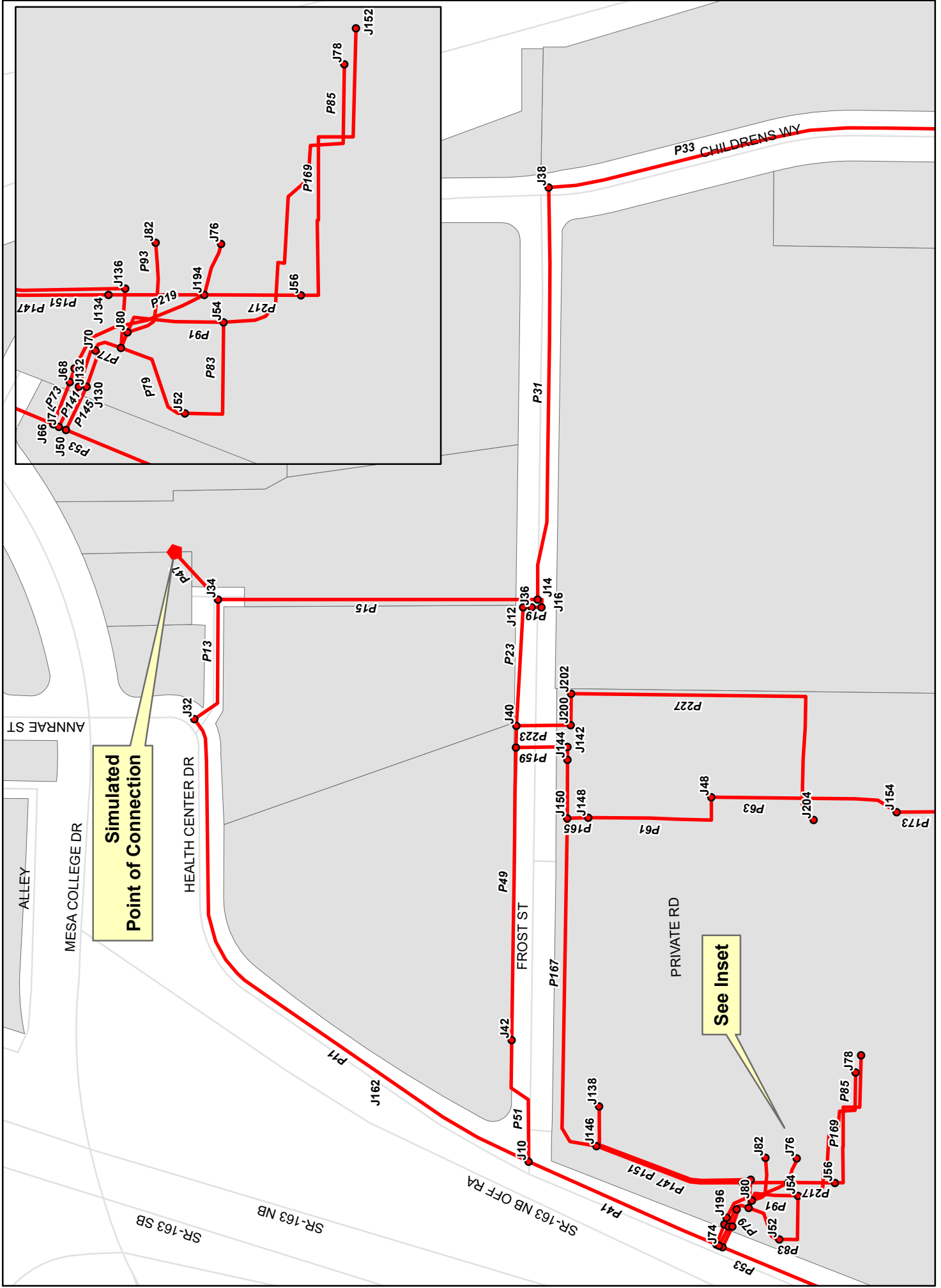
A WATTS Brand

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USA: Control Valves Tel: (713) 943-0688 • Fax: (713) 944-9445 • AmesFireWater.com
Canada: Tel: (888) 208-8927 • Fax: (905) 481-2316 • AmesFireWater.ca
Latin America: Tel: (52) 55-4122-0138 • AmesFireWater.com

APPENDIX C – MODEL RESULTS



1 - Pipe & Node Map



**Simulated
Point of Connection**

See Inset

1: MDD + 1,500 gpm fire at Node J148 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J10	0.00	396.00	517.78	52.77
<input type="checkbox"/>	J12	0.00	423.00	513.86	39.37
<input type="checkbox"/>	J122	0.00	392.00	484.26	39.98
<input type="checkbox"/>	J124	0.00	392.00	488.25	41.71
<input type="checkbox"/>	J130	0.00	392.00	515.52	53.52
<input type="checkbox"/>	J132	0.00	392.00	515.51	53.52
<input type="checkbox"/>	J134	0.00	390.00	484.18	40.81
<input type="checkbox"/>	J136	0.00	390.00	500.33	47.81
<input type="checkbox"/>	J138	16.48	390.00	500.33	47.81
<input type="checkbox"/>	J14	0.00	423.00	513.82	39.35
<input type="checkbox"/>	J140	0.00	413.49	514.55	43.79
<input type="checkbox"/>	J142	0.00	414.34	514.45	43.38
<input type="checkbox"/>	J144	0.00	414.34	481.15	28.95
<input type="checkbox"/>	J146	0.00	390.00	481.20	39.52
<input type="checkbox"/>	J148	1,500.00	398.00	480.60	35.79
<input type="checkbox"/>	J150	0.00	414.34	481.05	28.90
<input type="checkbox"/>	J152	0.00	388.12	487.16	42.91
<input type="checkbox"/>	J154	0.00	389.03	483.95	41.13
<input type="checkbox"/>	J156	0.00	414.34	484.05	30.21
<input type="checkbox"/>	J158	0.00	414.34	484.15	30.25
<input type="checkbox"/>	J16	0.00	423.00	513.82	39.35
<input type="checkbox"/>	J160	0.00	379.18	512.98	57.98
<input type="checkbox"/>	J162	0.00	414.34	512.88	42.70
<input type="checkbox"/>	J164	0.00	414.34	488.45	32.11
<input type="checkbox"/>	J166	0.00	414.34	488.45	32.11
<input type="checkbox"/>	J168	0.00	414.34	488.25	32.02
<input type="checkbox"/>	J170	0.00	414.34	488.35	32.07
<input type="checkbox"/>	J174	0.00	392.00	488.14	41.66
<input type="checkbox"/>	J176	0.00	383.15	513.10	56.31
<input type="checkbox"/>	J178	0.00	414.34	513.08	42.78
<input type="checkbox"/>	J18	0.00	404.00	513.16	47.30
<input type="checkbox"/>	J180	0.00	414.34	497.19	35.90
<input type="checkbox"/>	J182	9.60	414.34	497.17	35.89
<input type="checkbox"/>	J184	0.00	414.34	497.17	35.89
<input type="checkbox"/>	J186	79.68	414.34	497.13	35.87
<input type="checkbox"/>	J188	0.80	414.34	497.15	35.88
<input type="checkbox"/>	J190	2.08	414.34	497.14	35.88
<input type="checkbox"/>	J192	90.75	414.34	497.13	35.87
<input type="checkbox"/>	J194	0.00	392.00	487.16	41.23
<input type="checkbox"/>	J196	0.00	392.00	488.25	41.71

1: MDD + 1,500 gpm fire at Node J148 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J198	38.08	386.82	513.14	54.74
<input type="checkbox"/>	J20	0.00	390.00	513.15	53.36
<input type="checkbox"/>	J200	38.08	390.00	513.97	53.72
<input type="checkbox"/>	J202	38.08	390.00	495.44	45.69
<input type="checkbox"/>	J204	19.42	390.00	495.43	45.68
<input type="checkbox"/>	J22	0.00	383.00	513.13	56.39
<input type="checkbox"/>	J24	0.00	363.00	513.13	65.05
<input type="checkbox"/>	J26	0.00	367.00	513.10	63.30
<input type="checkbox"/>	J28	0.00	384.00	513.14	55.96
<input type="checkbox"/>	J30	0.00	397.00	513.17	50.34
<input type="checkbox"/>	J32	0.00	436.00	536.08	43.36
<input type="checkbox"/>	J34	0.00	440.00	540.00	43.33
<input type="checkbox"/>	J36	0.00	423.00	513.86	39.37
<input type="checkbox"/>	J38	0.00	405.00	513.38	46.96
<input type="checkbox"/>	J40	0.00	414.34	513.99	43.18
<input type="checkbox"/>	J42	0.00	401.99	516.83	49.76
<input type="checkbox"/>	J48	0.00	398.00	482.18	36.48
<input type="checkbox"/>	J50	0.00	392.00	515.51	53.52
<input type="checkbox"/>	J52	0.00	392.00	500.33	46.94
<input type="checkbox"/>	J54	0.00	392.00	500.33	46.94
<input type="checkbox"/>	J56	0.00	390.00	487.16	42.10
<input type="checkbox"/>	J66	0.00	392.12	515.53	53.47
<input type="checkbox"/>	J68	0.00	392.00	515.31	53.43
<input type="checkbox"/>	J70	0.00	392.00	500.33	46.94
<input type="checkbox"/>	J72	0.00	392.00	500.33	46.94
<input type="checkbox"/>	J74	0.00	392.06	515.52	53.49
<input type="checkbox"/>	J76	0.00	392.00	487.16	41.23
<input type="checkbox"/>	J78	11.07	390.00	500.33	47.81
<input type="checkbox"/>	J80	0.00	392.00	500.33	46.94
<input type="checkbox"/>	J82	0.00	392.00	500.33	46.94
<input type="checkbox"/>	J96	0.00	386.42	514.95	55.69
<input type="checkbox"/>	J98	0.00	386.30	514.94	55.74

1: MDD + 1,500 gpm fire at Node J148 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P105	J96	J98	8.7	10.0	120.0	383.9	1.6	0.0	1.2
<input type="checkbox"/>	P107	J98	J160	1,373.4	10.0	110.0	383.9	1.6	2.0	1.4
<input type="checkbox"/>	P11	J32	J10	824.5	10.0	120.0	1,844.1	7.5	18.3	22.2
<input type="checkbox"/>	P13	J32	J34	176.7	10.0	120.0	-1,844.1	7.5	3.9	22.2
<input type="checkbox"/>	P133	J122	J174	746.4	8.0	120.0	-468.7	3.0	3.9	5.2
<input type="checkbox"/>	P139	J70	J130	28.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P141	J130	J74	29.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P143	J70	J132	25.9	6.0	120.0	-27.6	0.3	15.2	587.1
<input type="checkbox"/>	P145	J132	J50	30.8	8.0	120.0	-27.6	0.2	0.0	0.0
<input type="checkbox"/>	P147	J134	J146	394.8	8.0	120.0	573.0	3.7	3.0	7.6
<input type="checkbox"/>	P149	J72	J136	19.8	8.0	120.0	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P15	J34	J14	430.0	18.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P151	J136	J138	19.8	8.0	120.0	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P153	J140	J40	422.5	10.0	120.0	401.4	1.6	0.6	1.3
<input type="checkbox"/>	P159	J140	J142	19.8	8.0	120.0	458.2	2.9	0.1	5.0
<input type="checkbox"/>	P161	J142	J144	19.8	8.0	120.0	458.2	2.9	33.3	1,685.2
<input type="checkbox"/>	P163	J144	J150	19.8	8.0	120.0	458.2	2.9	0.1	5.0
<input type="checkbox"/>	P165	J150	J148	19.8	8.0	120.0	1,031.3	6.6	0.4	22.4
<input type="checkbox"/>	P167	J150	J146	19.8	8.0	120.0	-573.0	3.7	0.1	7.6
<input type="checkbox"/>	P169	J152	J56	437.9	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P17	J14	J16	16.3	18.0	120.0	-305.8	0.4	0.0	0.0
<input type="checkbox"/>	P173	J154	J156	19.8	8.0	120.0	-468.7	3.0	0.1	5.2
<input type="checkbox"/>	P175	J156	J158	19.8	8.0	120.0	-468.7	3.0	0.1	5.2
<input type="checkbox"/>	P177	J158	J122	19.8	8.0	120.0	-468.7	3.0	0.1	5.2
<input type="checkbox"/>	P179	J160	J26	1,373.4	10.0	110.0	-84.8	0.3	0.1	0.1
<input type="checkbox"/>	P181	J160	J162	19.8	8.0	120.0	468.7	3.0	0.1	5.2
<input type="checkbox"/>	P183	J162	J164	19.8	8.0	120.0	468.7	3.0	24.4	1,235.8
<input type="checkbox"/>	P185	J164	J166	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P187	J164	J170	19.8	8.0	120.0	468.7	3.0	0.1	5.2
<input type="checkbox"/>	P189	J124	J168	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P19	J16	J36	13.4	8.0	120.0	-305.8	2.0	0.0	2.4
<input type="checkbox"/>	P191	J170	J168	19.8	8.0	120.0	468.7	3.0	0.1	5.2
<input type="checkbox"/>	P195	J168	J174	19.8	8.0	120.0	468.7	3.0	0.1	5.2
<input type="checkbox"/>	P197	J176	J22	1,137.2	12.0	120.0	-85.7	0.2	0.0	0.0
<input type="checkbox"/>	P199	J176	J178	19.8	8.0	120.0	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P201	J178	J180	19.8	8.0	120.0	182.9	1.2	15.9	804.0
<input type="checkbox"/>	P203	J180	J184	19.8	8.0	120.0	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P205	J184	J182	19.8	6.0	120.0	9.6	0.1	0.0	0.0
<input type="checkbox"/>	P207	J184	J188	19.8	8.0	120.0	173.3	1.1	0.0	0.8
<input type="checkbox"/>	P209	J188	J190	19.8	8.0	120.0	172.5	1.1	0.0	0.8
<input type="checkbox"/>	P21	J36	J12	11.5	10.0	120.0	-305.8	1.2	0.0	0.8
<input type="checkbox"/>	P211	J190	J186	19.8	8.0	120.0	79.7	0.5	0.0	0.2

1: MDD + 1,500 gpm fire at Node J148 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P213	J190	J192	19.8	8.0	120.0	90.8	0.6	0.0	0.2
<input type="checkbox"/>	P215	J194	J76	144.6	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P217	J194	J56	394.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P219	J196	J194	144.6	8.0	120.0	573.0	3.7	1.1	7.6
<input type="checkbox"/>	P221	J198	J22	525.7	18.0	120.0	170.6	0.2	0.0	0.0
<input type="checkbox"/>	P223	J40	J200	73.3	8.0	120.0	95.6	0.6	0.0	0.3
<input type="checkbox"/>	P225	J200	J202	42.4	4.0	120.0	57.5	1.5	18.5	437.3
<input type="checkbox"/>	P227	J202	J204	486.6	8.0	120.0	19.4	0.1	0.0	0.0
<input type="checkbox"/>	P23	J12	J40	159.2	10.0	120.0	-305.8	1.2	0.1	0.8
<input type="checkbox"/>	P27	J18	J20	212.1	18.0	120.0	208.6	0.3	0.0	0.0
<input type="checkbox"/>	P29	J18	J30	786.6	18.0	120.0	-208.6	0.3	0.0	0.0
<input type="checkbox"/>	P31	J14	J38	555.4	10.0	120.0	305.8	1.2	0.4	0.8
<input type="checkbox"/>	P33	J30	J38	635.7	12.0	120.0	-305.8	0.9	0.2	0.3
<input type="checkbox"/>	P35	J30	J28	842.8	12.0	120.0	97.2	0.3	0.0	0.0
<input type="checkbox"/>	P37	J28	J176	1,137.2	12.0	120.0	97.2	0.3	0.0	0.0
<input type="checkbox"/>	P39	J22	J24	749.3	18.0	120.0	84.8	0.1	0.0	0.0
<input type="checkbox"/>	P41	J10	J66	276.2	10.0	110.0	984.5	4.0	2.3	8.2
<input type="checkbox"/>	P43	J26	J24	919.6	12.0	120.0	-84.8	0.2	0.0	0.0
<input type="checkbox"/>	P45	J20	J198	525.7	18.0	120.0	208.6	0.3	0.0	0.0
<input type="checkbox"/>	P47	POC	J34	1.0	99.0	200.0	1,844.1	0.1	0.0	0.0
<input type="checkbox"/>	P49	J42	J140	422.5	10.0	120.0	859.6	3.5	2.3	5.4
<input type="checkbox"/>	P51	J10	J42	175.9	10.0	120.0	859.6	3.5	0.9	5.4
<input type="checkbox"/>	P53	J50	J96	396.9	10.0	110.0	383.9	1.6	0.6	1.4
<input type="checkbox"/>	P61	J48	J148	303.4	8.0	120.0	468.7	3.0	1.6	5.2
<input type="checkbox"/>	P63	J48	J154	339.2	8.0	120.0	-468.7	3.0	1.8	5.2
<input type="checkbox"/>	P69	J66	J74	3.9	10.0	120.0	411.5	1.7	0.0	1.4
<input type="checkbox"/>	P71	J74	J50	4.9	10.0	120.0	411.5	1.7	0.0	1.4
<input type="checkbox"/>	P73	J66	J68	29.1	8.0	120.0	573.0	3.7	0.2	7.6
<input type="checkbox"/>	P75	J68	J196	144.6	8.0	120.0	573.0	3.7	27.1	187.1
<input type="checkbox"/>	P77	J70	J72	19.8	8.0	120.0	27.6	0.2	0.0	0.0
<input type="checkbox"/>	P79	J72	J52	65.5	8.0	120.0	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P81	J194	J134	394.8	8.0	120.0	573.0	3.7	3.0	7.6
<input type="checkbox"/>	P83	J52	J54	83.2	8.0	120.0	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P85	J54	J78	222.1	8.0	120.0	11.1	0.1	0.0	0.0
<input type="checkbox"/>	P89	J72	J80	10.8	8.0	120.0	6.1	0.0	0.0	0.0
<input type="checkbox"/>	P91	J54	J80	68.3	8.0	120.0	-6.1	0.0	0.0	0.0
<input type="checkbox"/>	P93	J80	J82	69.1	8.0	120.0	0.0	0.0	0.0	0.0

2: MDD + 1,500 gpm fire at Node J152 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J10	0.00	396.00	517.78	52.77
<input type="checkbox"/>	J12	0.00	423.00	514.22	39.53
<input type="checkbox"/>	J122	0.00	392.00	490.94	42.87
<input type="checkbox"/>	J124	0.00	392.00	494.10	44.24
<input type="checkbox"/>	J130	0.00	392.00	515.30	53.43
<input type="checkbox"/>	J132	0.00	392.00	515.30	53.43
<input type="checkbox"/>	J134	0.00	390.00	481.81	39.78
<input type="checkbox"/>	J136	0.00	390.00	500.12	47.71
<input type="checkbox"/>	J138	16.48	390.00	500.12	47.71
<input type="checkbox"/>	J14	0.00	423.00	514.18	39.51
<input type="checkbox"/>	J140	0.00	413.49	514.89	43.94
<input type="checkbox"/>	J142	0.00	414.34	514.81	43.53
<input type="checkbox"/>	J144	0.00	414.34	488.04	31.93
<input type="checkbox"/>	J146	0.00	390.00	487.66	42.32
<input type="checkbox"/>	J148	0.00	398.00	488.04	39.01
<input type="checkbox"/>	J150	0.00	414.34	487.96	31.90
<input type="checkbox"/>	J152	1,500.00	388.12	438.58	21.86
<input type="checkbox"/>	J154	0.00	389.03	490.69	44.05
<input type="checkbox"/>	J156	0.00	414.34	490.77	33.12
<input type="checkbox"/>	J158	0.00	414.34	490.85	33.15
<input type="checkbox"/>	J16	0.00	423.00	514.18	39.51
<input type="checkbox"/>	J160	0.00	379.18	513.36	58.14
<input type="checkbox"/>	J162	0.00	414.34	513.28	42.87
<input type="checkbox"/>	J164	0.00	414.34	494.26	34.63
<input type="checkbox"/>	J166	0.00	414.34	494.26	34.63
<input type="checkbox"/>	J168	0.00	414.34	494.10	34.56
<input type="checkbox"/>	J170	0.00	414.34	494.18	34.59
<input type="checkbox"/>	J174	0.00	392.00	494.02	44.21
<input type="checkbox"/>	J176	0.00	383.15	513.46	56.47
<input type="checkbox"/>	J178	0.00	414.34	513.45	42.94
<input type="checkbox"/>	J18	0.00	404.00	513.52	47.46
<input type="checkbox"/>	J180	0.00	414.34	497.56	36.06
<input type="checkbox"/>	J182	9.60	414.34	497.54	36.05
<input type="checkbox"/>	J184	0.00	414.34	497.54	36.05
<input type="checkbox"/>	J186	79.68	414.34	497.50	36.03
<input type="checkbox"/>	J188	0.80	414.34	497.52	36.04
<input type="checkbox"/>	J190	2.08	414.34	497.51	36.04
<input type="checkbox"/>	J192	90.75	414.34	497.50	36.03
<input type="checkbox"/>	J194	0.00	392.00	475.96	36.38
<input type="checkbox"/>	J196	0.00	392.00	477.44	37.02

2: MDD + 1,500 gpm fire at Node J152 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J198	38.08	386.82	513.51	54.90
<input type="checkbox"/>	J20	0.00	390.00	513.52	53.52
<input type="checkbox"/>	J200	38.08	390.00	514.32	53.87
<input type="checkbox"/>	J202	38.08	390.00	495.79	45.84
<input type="checkbox"/>	J204	19.42	390.00	495.78	45.83
<input type="checkbox"/>	J22	0.00	383.00	513.50	56.55
<input type="checkbox"/>	J24	0.00	363.00	513.50	65.21
<input type="checkbox"/>	J26	0.00	367.00	513.47	63.47
<input type="checkbox"/>	J28	0.00	384.00	513.51	56.12
<input type="checkbox"/>	J30	0.00	397.00	513.54	50.50
<input type="checkbox"/>	J32	0.00	436.00	536.08	43.36
<input type="checkbox"/>	J34	0.00	440.00	540.00	43.33
<input type="checkbox"/>	J36	0.00	423.00	514.21	39.52
<input type="checkbox"/>	J38	0.00	405.00	513.75	47.12
<input type="checkbox"/>	J40	0.00	414.34	514.34	43.33
<input type="checkbox"/>	J42	0.00	401.99	516.93	49.80
<input type="checkbox"/>	J48	0.00	398.00	489.29	39.56
<input type="checkbox"/>	J50	0.00	392.00	515.30	53.43
<input type="checkbox"/>	J52	0.00	392.00	500.12	46.85
<input type="checkbox"/>	J54	0.00	392.00	500.12	46.85
<input type="checkbox"/>	J56	0.00	390.00	458.24	29.57
<input type="checkbox"/>	J66	0.00	392.12	515.31	53.38
<input type="checkbox"/>	J68	0.00	392.00	515.01	53.30
<input type="checkbox"/>	J70	0.00	392.00	500.12	46.85
<input type="checkbox"/>	J72	0.00	392.00	500.12	46.85
<input type="checkbox"/>	J74	0.00	392.06	515.30	53.40
<input type="checkbox"/>	J76	0.00	392.00	475.96	36.38
<input type="checkbox"/>	J78	11.07	390.00	500.12	47.71
<input type="checkbox"/>	J80	0.00	392.00	500.12	46.85
<input type="checkbox"/>	J82	0.00	392.00	500.12	46.85
<input type="checkbox"/>	J96	0.00	386.42	514.86	55.66
<input type="checkbox"/>	J98	0.00	386.30	514.86	55.71

2: MDD + 1,500 gpm fire at Node J152 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P105	J96	J98	8.7	10.0	120.0	332.1	1.4	0.0	0.9
<input type="checkbox"/>	P107	J98	J160	1,373.4	10.0	110.0	332.1	1.4	1.5	1.1
<input type="checkbox"/>	P11	J32	J10	824.5	10.0	120.0	1,844.1	7.5	18.3	22.2
<input type="checkbox"/>	P13	J32	J34	176.7	10.0	120.0	-1,844.1	7.5	3.9	22.2
<input type="checkbox"/>	P133	J122	J174	746.4	8.0	120.0	-413.6	2.6	3.1	4.1
<input type="checkbox"/>	P139	J70	J130	28.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P141	J130	J74	29.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P143	J70	J132	25.9	6.0	120.0	-27.6	0.3	15.2	587.1
<input type="checkbox"/>	P145	J132	J50	30.8	8.0	120.0	-27.6	0.2	0.0	0.0
<input type="checkbox"/>	P147	J134	J146	394.8	8.0	120.0	-824.4	5.3	5.9	14.8
<input type="checkbox"/>	P149	J72	J136	19.8	8.0	120.0	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P15	J34	J14	430.0	18.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P151	J136	J138	19.8	8.0	120.0	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P153	J140	J40	422.5	10.0	120.0	398.1	1.6	0.5	1.3
<input type="checkbox"/>	P159	J140	J142	19.8	8.0	120.0	410.9	2.6	0.1	4.1
<input type="checkbox"/>	P161	J142	J144	19.8	8.0	120.0	410.9	2.6	26.8	1,354.8
<input type="checkbox"/>	P163	J144	J150	19.8	8.0	120.0	410.9	2.6	0.1	4.1
<input type="checkbox"/>	P165	J150	J148	19.8	8.0	120.0	-413.6	2.6	0.1	4.1
<input type="checkbox"/>	P167	J150	J146	19.8	8.0	120.0	824.4	5.3	0.3	14.8
<input type="checkbox"/>	P169	J152	J56	437.9	8.0	120.0	-1,500.0	9.6	19.7	44.9
<input type="checkbox"/>	P17	J14	J16	16.3	18.0	120.0	-302.5	0.4	0.0	0.0
<input type="checkbox"/>	P173	J154	J156	19.8	8.0	120.0	-413.6	2.6	0.1	4.1
<input type="checkbox"/>	P175	J156	J158	19.8	8.0	120.0	-413.6	2.6	0.1	4.1
<input type="checkbox"/>	P177	J158	J122	19.8	8.0	120.0	-413.6	2.6	0.1	4.1
<input type="checkbox"/>	P179	J160	J26	1,373.4	10.0	110.0	-81.5	0.3	0.1	0.1
<input type="checkbox"/>	P181	J160	J162	19.8	8.0	120.0	413.6	2.6	0.1	4.1
<input type="checkbox"/>	P183	J162	J164	19.8	8.0	120.0	413.6	2.6	19.0	962.2
<input type="checkbox"/>	P185	J164	J166	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P187	J164	J170	19.8	8.0	120.0	413.6	2.6	0.1	4.1
<input type="checkbox"/>	P189	J124	J168	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P19	J16	J36	13.4	8.0	120.0	-302.5	1.9	0.0	2.3
<input type="checkbox"/>	P191	J170	J168	19.8	8.0	120.0	413.6	2.6	0.1	4.1
<input type="checkbox"/>	P195	J168	J174	19.8	8.0	120.0	413.6	2.6	0.1	4.1
<input type="checkbox"/>	P197	J176	J22	1,137.2	12.0	120.0	-86.2	0.2	0.0	0.0
<input type="checkbox"/>	P199	J176	J178	19.8	8.0	120.0	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P201	J178	J180	19.8	8.0	120.0	182.9	1.2	15.9	804.0
<input type="checkbox"/>	P203	J180	J184	19.8	8.0	120.0	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P205	J184	J182	19.8	6.0	120.0	9.6	0.1	0.0	0.0
<input type="checkbox"/>	P207	J184	J188	19.8	8.0	120.0	173.3	1.1	0.0	0.8
<input type="checkbox"/>	P209	J188	J190	19.8	8.0	120.0	172.5	1.1	0.0	0.8
<input type="checkbox"/>	P21	J36	J12	11.5	10.0	120.0	-302.5	1.2	0.0	0.8
<input type="checkbox"/>	P211	J190	J186	19.8	8.0	120.0	79.7	0.5	0.0	0.2

2: MDD + 1,500 gpm fire at Node J152 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P213	J190	J192	19.8	8.0	120.0	90.8	0.6	0.0	0.3
<input type="checkbox"/>	P215	J194	J76	144.6	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P217	J194	J56	394.8	8.0	120.0	1,500.0	9.6	17.7	44.9
<input type="checkbox"/>	P219	J196	J194	144.6	8.0	120.0	675.6	4.3	1.5	10.2
<input type="checkbox"/>	P221	J198	J22	525.7	18.0	120.0	167.8	0.2	0.0	0.0
<input type="checkbox"/>	P223	J40	J200	73.3	8.0	120.0	95.6	0.6	0.0	0.3
<input type="checkbox"/>	P225	J200	J202	42.4	4.0	120.0	57.5	1.5	18.5	437.3
<input type="checkbox"/>	P227	J202	J204	486.6	8.0	120.0	19.4	0.1	0.0	0.0
<input type="checkbox"/>	P23	J12	J40	159.2	10.0	120.0	-302.5	1.2	0.1	0.8
<input type="checkbox"/>	P27	J18	J20	212.1	18.0	120.0	205.8	0.3	0.0	0.0
<input type="checkbox"/>	P29	J18	J30	786.6	18.0	120.0	-205.8	0.3	0.0	0.0
<input type="checkbox"/>	P31	J14	J38	555.4	10.0	120.0	302.5	1.2	0.4	0.8
<input type="checkbox"/>	P33	J30	J38	635.7	12.0	120.0	-302.5	0.9	0.2	0.3
<input type="checkbox"/>	P35	J30	J28	842.8	12.0	120.0	96.7	0.3	0.0	0.0
<input type="checkbox"/>	P37	J28	J176	1,137.2	12.0	120.0	96.7	0.3	0.0	0.0
<input type="checkbox"/>	P39	J22	J24	749.3	18.0	120.0	81.5	0.1	0.0	0.0
<input type="checkbox"/>	P41	J10	J66	276.2	10.0	110.0	1,035.2	4.2	2.5	8.9
<input type="checkbox"/>	P43	J26	J24	919.6	12.0	120.0	-81.5	0.2	0.0	0.0
<input type="checkbox"/>	P45	J20	J198	525.7	18.0	120.0	205.8	0.3	0.0	0.0
<input type="checkbox"/>	P47	POC	J34	1.0	99.0	200.0	1,844.1	0.1	0.0	0.0
<input type="checkbox"/>	P49	J42	J140	422.5	10.0	120.0	809.0	3.3	2.0	4.8
<input type="checkbox"/>	P51	J10	J42	175.9	10.0	120.0	809.0	3.3	0.8	4.8
<input type="checkbox"/>	P53	J50	J96	396.9	10.0	110.0	332.1	1.4	0.4	1.1
<input type="checkbox"/>	P61	J48	J148	303.4	8.0	120.0	413.6	2.6	1.3	4.1
<input type="checkbox"/>	P63	J48	J154	339.2	8.0	120.0	-413.6	2.6	1.4	4.1
<input type="checkbox"/>	P69	J66	J74	3.9	10.0	120.0	359.6	1.5	0.0	1.1
<input type="checkbox"/>	P71	J74	J50	4.9	10.0	120.0	359.6	1.5	0.0	1.1
<input type="checkbox"/>	P73	J66	J68	29.1	8.0	120.0	675.6	4.3	0.3	10.2
<input type="checkbox"/>	P75	J68	J196	144.6	8.0	120.0	675.6	4.3	37.6	259.8
<input type="checkbox"/>	P77	J70	J72	19.8	8.0	120.0	27.6	0.2	0.0	0.0
<input type="checkbox"/>	P79	J72	J52	65.5	8.0	120.0	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P81	J194	J134	394.8	8.0	120.0	-824.4	5.3	5.9	14.8
<input type="checkbox"/>	P83	J52	J54	83.2	8.0	120.0	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P85	J54	J78	222.1	8.0	120.0	11.1	0.1	0.0	0.0
<input type="checkbox"/>	P89	J72	J80	10.8	8.0	120.0	6.1	0.0	0.0	0.0
<input type="checkbox"/>	P91	J54	J80	68.3	8.0	120.0	-6.1	0.0	0.0	0.0
<input type="checkbox"/>	P93	J80	J82	69.1	8.0	120.0	0.0	0.0	0.0	0.0

3: MDD + 1,500 gpm fire at Node J158 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J10	0.00	396.00	517.78	52.77
<input type="checkbox"/>	J12	0.00	423.00	513.70	39.30
<input type="checkbox"/>	J122	0.00	392.00	472.88	35.05
<input type="checkbox"/>	J124	0.00	392.00	478.26	37.38
<input type="checkbox"/>	J130	0.00	392.00	515.54	53.53
<input type="checkbox"/>	J132	0.00	392.00	515.53	53.53
<input type="checkbox"/>	J134	0.00	390.00	488.91	42.86
<input type="checkbox"/>	J136	0.00	390.00	500.35	47.81
<input type="checkbox"/>	J138	16.48	390.00	500.35	47.81
<input type="checkbox"/>	J14	0.00	423.00	513.65	39.28
<input type="checkbox"/>	J140	0.00	413.49	514.52	43.78
<input type="checkbox"/>	J142	0.00	414.34	514.44	43.37
<input type="checkbox"/>	J144	0.00	414.34	486.31	31.18
<input type="checkbox"/>	J146	0.00	390.00	486.35	41.75
<input type="checkbox"/>	J148	0.00	398.00	485.84	38.06
<input type="checkbox"/>	J150	0.00	414.34	486.22	31.15
<input type="checkbox"/>	J152	0.00	388.12	491.47	44.78
<input type="checkbox"/>	J154	0.00	389.03	473.50	36.60
<input type="checkbox"/>	J156	0.00	414.34	473.12	25.47
<input type="checkbox"/>	J158	1,500.00	414.34	472.74	25.30
<input type="checkbox"/>	J16	0.00	423.00	513.65	39.28
<input type="checkbox"/>	J160	0.00	379.18	512.46	57.75
<input type="checkbox"/>	J162	0.00	414.34	512.32	42.45
<input type="checkbox"/>	J164	0.00	414.34	478.54	27.82
<input type="checkbox"/>	J166	0.00	414.34	478.54	27.82
<input type="checkbox"/>	J168	0.00	414.34	478.26	27.70
<input type="checkbox"/>	J170	0.00	414.34	478.40	27.76
<input type="checkbox"/>	J174	0.00	392.00	478.12	37.32
<input type="checkbox"/>	J176	0.00	383.15	512.74	56.15
<input type="checkbox"/>	J178	0.00	414.34	512.72	42.63
<input type="checkbox"/>	J18	0.00	404.00	512.80	47.14
<input type="checkbox"/>	J180	0.00	414.34	496.83	35.74
<input type="checkbox"/>	J182	9.60	414.34	496.81	35.73
<input type="checkbox"/>	J184	0.00	414.34	496.81	35.73
<input type="checkbox"/>	J186	79.68	414.34	496.78	35.72
<input type="checkbox"/>	J188	0.80	414.34	496.80	35.73
<input type="checkbox"/>	J190	2.08	414.34	496.78	35.72
<input type="checkbox"/>	J192	90.75	414.34	496.78	35.72
<input type="checkbox"/>	J194	0.00	392.00	491.47	43.10
<input type="checkbox"/>	J196	0.00	392.00	492.41	43.51

3: MDD + 1,500 gpm fire at Node J158 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J198	38.08	386.82	512.78	54.58
<input type="checkbox"/>	J20	0.00	390.00	512.80	53.21
<input type="checkbox"/>	J200	38.08	390.00	513.84	53.66
<input type="checkbox"/>	J202	38.08	390.00	495.30	45.63
<input type="checkbox"/>	J204	19.42	390.00	495.29	45.62
<input type="checkbox"/>	J22	0.00	383.00	512.77	56.23
<input type="checkbox"/>	J24	0.00	363.00	512.76	64.89
<input type="checkbox"/>	J26	0.00	367.00	512.70	63.13
<input type="checkbox"/>	J28	0.00	384.00	512.79	55.80
<input type="checkbox"/>	J30	0.00	397.00	512.83	50.19
<input type="checkbox"/>	J32	0.00	436.00	536.08	43.36
<input type="checkbox"/>	J34	0.00	440.00	540.00	43.33
<input type="checkbox"/>	J36	0.00	423.00	513.69	39.29
<input type="checkbox"/>	J38	0.00	405.00	513.09	46.83
<input type="checkbox"/>	J40	0.00	414.34	513.86	43.12
<input type="checkbox"/>	J42	0.00	401.99	516.82	49.76
<input type="checkbox"/>	J48	0.00	398.00	480.01	35.54
<input type="checkbox"/>	J50	0.00	392.00	515.53	53.53
<input type="checkbox"/>	J52	0.00	392.00	500.35	46.95
<input type="checkbox"/>	J54	0.00	392.00	500.35	46.95
<input type="checkbox"/>	J56	0.00	390.00	491.47	43.97
<input type="checkbox"/>	J66	0.00	392.12	515.54	53.48
<input type="checkbox"/>	J68	0.00	392.00	515.35	53.45
<input type="checkbox"/>	J70	0.00	392.00	500.35	46.95
<input type="checkbox"/>	J72	0.00	392.00	500.35	46.95
<input type="checkbox"/>	J74	0.00	392.06	515.54	53.50
<input type="checkbox"/>	J76	0.00	392.00	491.47	43.10
<input type="checkbox"/>	J78	11.07	390.00	500.35	47.81
<input type="checkbox"/>	J80	0.00	392.00	500.35	46.95
<input type="checkbox"/>	J82	0.00	392.00	500.35	46.95
<input type="checkbox"/>	J96	0.00	386.42	514.84	55.65
<input type="checkbox"/>	J98	0.00	386.30	514.83	55.69

3: MDD + 1,500 gpm fire at Node J158 (Node Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P105	J96	J98	8.7	10.0	120.0	425.8	1.7	0.0	1.5
<input type="checkbox"/>	P107	J98	J160	1,373.4	10.0	110.0	425.8	1.7	2.4	1.7
<input type="checkbox"/>	P11	J32	J10	824.5	10.0	120.0	1,844.1	7.5	18.3	22.2
<input type="checkbox"/>	P13	J32	J34	176.7	10.0	120.0	-1,844.1	7.5	3.9	22.2
<input type="checkbox"/>	P133	J122	J174	746.4	8.0	120.0	-551.3	3.5	5.2	7.0
<input type="checkbox"/>	P139	J70	J130	28.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P141	J130	J74	29.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P143	J70	J132	25.9	6.0	120.0	-27.6	0.3	15.2	587.1
<input type="checkbox"/>	P145	J132	J50	30.8	8.0	120.0	-27.6	0.2	0.0	0.0
<input type="checkbox"/>	P147	J134	J146	394.8	8.0	120.0	527.6	3.4	2.6	6.5
<input type="checkbox"/>	P149	J72	J136	19.8	8.0	120.0	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P15	J34	J14	430.0	18.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P151	J136	J138	19.8	8.0	120.0	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P153	J140	J40	422.5	10.0	120.0	442.1	1.8	0.7	1.6
<input type="checkbox"/>	P159	J140	J142	19.8	8.0	120.0	421.1	2.7	0.1	4.3
<input type="checkbox"/>	P161	J142	J144	19.8	8.0	120.0	421.1	2.7	28.1	1,423.4
<input type="checkbox"/>	P163	J144	J150	19.8	8.0	120.0	421.1	2.7	0.1	4.3
<input type="checkbox"/>	P165	J150	J148	19.8	8.0	120.0	948.7	6.1	0.4	19.2
<input type="checkbox"/>	P167	J150	J146	19.8	8.0	120.0	-527.6	3.4	0.1	6.5
<input type="checkbox"/>	P169	J152	J56	437.9	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P17	J14	J16	16.3	18.0	120.0	-346.5	0.4	0.0	0.1
<input type="checkbox"/>	P173	J154	J156	19.8	8.0	120.0	948.7	6.1	0.4	19.2
<input type="checkbox"/>	P175	J156	J158	19.8	8.0	120.0	948.7	6.1	0.4	19.2
<input type="checkbox"/>	P177	J158	J122	19.8	8.0	120.0	-551.3	3.5	0.1	7.0
<input type="checkbox"/>	P179	J160	J26	1,373.4	10.0	110.0	-125.5	0.5	0.2	0.2
<input type="checkbox"/>	P181	J160	J162	19.8	8.0	120.0	551.3	3.5	0.1	7.0
<input type="checkbox"/>	P183	J162	J164	19.8	8.0	120.0	551.3	3.5	33.8	1,709.2
<input type="checkbox"/>	P185	J164	J166	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P187	J164	J170	19.8	8.0	120.0	551.3	3.5	0.1	7.0
<input type="checkbox"/>	P189	J124	J168	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P19	J16	J36	13.4	8.0	120.0	-346.5	2.2	0.0	3.0
<input type="checkbox"/>	P191	J170	J168	19.8	8.0	120.0	551.3	3.5	0.1	7.0
<input type="checkbox"/>	P195	J168	J174	19.8	8.0	120.0	551.3	3.5	0.1	7.0
<input type="checkbox"/>	P197	J176	J22	1,137.2	12.0	120.0	-79.4	0.2	0.0	0.0
<input type="checkbox"/>	P199	J176	J178	19.8	8.0	120.0	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P201	J178	J180	19.8	8.0	120.0	182.9	1.2	15.9	804.0
<input type="checkbox"/>	P203	J180	J184	19.8	8.0	120.0	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P205	J184	J182	19.8	6.0	120.0	9.6	0.1	0.0	0.0
<input type="checkbox"/>	P207	J184	J188	19.8	8.0	120.0	173.3	1.1	0.0	0.8
<input type="checkbox"/>	P209	J188	J190	19.8	8.0	120.0	172.5	1.1	0.0	0.8
<input type="checkbox"/>	P21	J36	J12	11.5	10.0	120.0	-346.5	1.4	0.0	1.0
<input type="checkbox"/>	P211	J190	J186	19.8	8.0	120.0	79.7	0.5	0.0	0.2

3: MDD + 1,500 gpm fire at Node J158 (Node Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P213	J190	J192	19.8	8.0	120.0	90.8	0.6	0.0	0.2
<input type="checkbox"/>	P215	J194	J76	144.6	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P217	J194	J56	394.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P219	J196	J194	144.6	8.0	120.0	527.6	3.4	0.9	6.5
<input type="checkbox"/>	P221	J198	J22	525.7	18.0	120.0	204.9	0.3	0.0	0.0
<input type="checkbox"/>	P223	J40	J200	73.3	8.0	120.0	95.6	0.6	0.0	0.3
<input type="checkbox"/>	P225	J200	J202	42.4	4.0	120.0	57.5	1.5	18.5	437.3
<input type="checkbox"/>	P227	J202	J204	486.6	8.0	120.0	19.4	0.1	0.0	0.0
<input type="checkbox"/>	P23	J12	J40	159.2	10.0	120.0	-346.5	1.4	0.2	1.0
<input type="checkbox"/>	P27	J18	J20	212.1	18.0	120.0	243.0	0.3	0.0	0.0
<input type="checkbox"/>	P29	J18	J30	786.6	18.0	120.0	-243.0	0.3	0.0	0.0
<input type="checkbox"/>	P31	J14	J38	555.4	10.0	120.0	346.5	1.4	0.6	1.0
<input type="checkbox"/>	P33	J30	J38	635.7	12.0	120.0	-346.5	1.0	0.3	0.4
<input type="checkbox"/>	P35	J30	J28	842.8	12.0	120.0	103.5	0.3	0.0	0.0
<input type="checkbox"/>	P37	J28	J176	1,137.2	12.0	120.0	103.5	0.3	0.1	0.0
<input type="checkbox"/>	P39	J22	J24	749.3	18.0	120.0	125.5	0.2	0.0	0.0
<input type="checkbox"/>	P41	J10	J66	276.2	10.0	110.0	980.9	4.0	2.2	8.1
<input type="checkbox"/>	P43	J26	J24	919.6	12.0	120.0	-125.5	0.4	0.1	0.1
<input type="checkbox"/>	P45	J20	J198	525.7	18.0	120.0	243.0	0.3	0.0	0.0
<input type="checkbox"/>	P47	POC	J34	1.0	99.0	200.0	1,844.1	0.1	0.0	0.0
<input type="checkbox"/>	P49	J42	J140	422.5	10.0	120.0	863.2	3.5	2.3	5.4
<input type="checkbox"/>	P51	J10	J42	175.9	10.0	120.0	863.2	3.5	1.0	5.4
<input type="checkbox"/>	P53	J50	J96	396.9	10.0	110.0	425.8	1.7	0.7	1.7
<input type="checkbox"/>	P61	J48	J148	303.4	8.0	120.0	-948.7	6.1	5.8	19.2
<input type="checkbox"/>	P63	J48	J154	339.2	8.0	120.0	948.7	6.1	6.5	19.2
<input type="checkbox"/>	P69	J66	J74	3.9	10.0	120.0	453.3	1.9	0.0	1.7
<input type="checkbox"/>	P71	J74	J50	4.9	10.0	120.0	453.3	1.9	0.0	1.6
<input type="checkbox"/>	P73	J66	J68	29.1	8.0	120.0	527.6	3.4	0.2	6.5
<input type="checkbox"/>	P75	J68	J196	144.6	8.0	120.0	527.6	3.4	22.9	158.7
<input type="checkbox"/>	P77	J70	J72	19.8	8.0	120.0	27.6	0.2	0.0	0.0
<input type="checkbox"/>	P79	J72	J52	65.5	8.0	120.0	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P81	J194	J134	394.8	8.0	120.0	527.6	3.4	2.6	6.5
<input type="checkbox"/>	P83	J52	J54	83.2	8.0	120.0	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P85	J54	J78	222.1	8.0	120.0	11.1	0.1	0.0	0.0
<input type="checkbox"/>	P89	J72	J80	10.8	8.0	120.0	6.1	0.0	0.0	0.0
<input type="checkbox"/>	P91	J54	J80	68.3	8.0	120.0	-6.1	0.0	0.0	0.0
<input type="checkbox"/>	P93	J80	J82	69.1	8.0	120.0	0.0	0.0	0.0	0.0

4: MDD + 1,500 gpm fire at Node J170 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J10	0.00	396.00	517.78	52.77
<input type="checkbox"/>	J12	0.00	423.00	513.53	39.22
<input type="checkbox"/>	J122	0.00	392.00	479.38	37.86
<input type="checkbox"/>	J124	0.00	392.00	466.97	32.49
<input type="checkbox"/>	J130	0.00	392.00	515.55	53.53
<input type="checkbox"/>	J132	0.00	392.00	515.53	53.53
<input type="checkbox"/>	J134	0.00	390.00	493.32	44.77
<input type="checkbox"/>	J136	0.00	390.00	500.36	47.82
<input type="checkbox"/>	J138	16.48	390.00	500.36	47.82
<input type="checkbox"/>	J14	0.00	423.00	513.46	39.20
<input type="checkbox"/>	J140	0.00	413.49	514.50	43.77
<input type="checkbox"/>	J142	0.00	414.34	514.43	43.37
<input type="checkbox"/>	J144	0.00	414.34	491.13	33.27
<input type="checkbox"/>	J146	0.00	390.00	491.16	43.83
<input type="checkbox"/>	J148	0.00	398.00	490.74	40.18
<input type="checkbox"/>	J150	0.00	414.34	491.06	33.24
<input type="checkbox"/>	J152	0.00	388.12	495.48	46.52
<input type="checkbox"/>	J154	0.00	389.03	480.34	39.56
<input type="checkbox"/>	J156	0.00	414.34	480.02	28.46
<input type="checkbox"/>	J158	0.00	414.34	479.70	28.32
<input type="checkbox"/>	J16	0.00	423.00	513.46	39.20
<input type="checkbox"/>	J160	0.00	379.18	511.86	57.49
<input type="checkbox"/>	J162	0.00	414.34	511.68	42.18
<input type="checkbox"/>	J164	0.00	414.34	466.83	22.75
<input type="checkbox"/>	J166	0.00	414.34	466.83	22.75
<input type="checkbox"/>	J168	0.00	414.34	466.97	22.81
<input type="checkbox"/>	J170	1,500.00	414.34	466.65	22.67
<input type="checkbox"/>	J174	0.00	392.00	467.29	32.63
<input type="checkbox"/>	J176	0.00	383.15	512.36	55.99
<input type="checkbox"/>	J178	0.00	414.34	512.34	42.46
<input type="checkbox"/>	J18	0.00	404.00	512.43	46.98
<input type="checkbox"/>	J180	0.00	414.34	496.45	35.58
<input type="checkbox"/>	J182	9.60	414.34	496.43	35.57
<input type="checkbox"/>	J184	0.00	414.34	496.43	35.57
<input type="checkbox"/>	J186	79.68	414.34	496.39	35.55
<input type="checkbox"/>	J188	0.80	414.34	496.41	35.56
<input type="checkbox"/>	J190	2.08	414.34	496.40	35.56
<input type="checkbox"/>	J192	90.75	414.34	496.39	35.55
<input type="checkbox"/>	J194	0.00	392.00	495.48	44.84
<input type="checkbox"/>	J196	0.00	392.00	496.28	45.18

4: MDD + 1,500 gpm fire at Node J170 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J198	38.08	386.82	512.40	54.41
<input type="checkbox"/>	J20	0.00	390.00	512.42	53.04
<input type="checkbox"/>	J200	38.08	390.00	513.70	53.60
<input type="checkbox"/>	J202	38.08	390.00	495.17	45.57
<input type="checkbox"/>	J204	19.42	390.00	495.16	45.57
<input type="checkbox"/>	J22	0.00	383.00	512.38	56.06
<input type="checkbox"/>	J24	0.00	363.00	512.37	64.72
<input type="checkbox"/>	J26	0.00	367.00	512.27	62.95
<input type="checkbox"/>	J28	0.00	384.00	512.41	55.64
<input type="checkbox"/>	J30	0.00	397.00	512.46	50.03
<input type="checkbox"/>	J32	0.00	436.00	536.08	43.36
<input type="checkbox"/>	J34	0.00	440.00	540.00	43.33
<input type="checkbox"/>	J36	0.00	423.00	513.51	39.22
<input type="checkbox"/>	J38	0.00	405.00	512.78	46.70
<input type="checkbox"/>	J40	0.00	414.34	513.72	43.06
<input type="checkbox"/>	J42	0.00	401.99	516.82	49.76
<input type="checkbox"/>	J48	0.00	398.00	485.83	38.05
<input type="checkbox"/>	J50	0.00	392.00	515.54	53.53
<input type="checkbox"/>	J52	0.00	392.00	500.36	46.95
<input type="checkbox"/>	J54	0.00	392.00	500.36	46.95
<input type="checkbox"/>	J56	0.00	390.00	495.48	45.71
<input type="checkbox"/>	J66	0.00	392.12	515.55	53.48
<input type="checkbox"/>	J68	0.00	392.00	515.39	53.47
<input type="checkbox"/>	J70	0.00	392.00	500.36	46.95
<input type="checkbox"/>	J72	0.00	392.00	500.36	46.95
<input type="checkbox"/>	J74	0.00	392.06	515.55	53.50
<input type="checkbox"/>	J76	0.00	392.00	495.48	44.84
<input type="checkbox"/>	J78	11.07	390.00	500.35	47.82
<input type="checkbox"/>	J80	0.00	392.00	500.36	46.95
<input type="checkbox"/>	J82	0.00	392.00	500.36	46.95
<input type="checkbox"/>	J96	0.00	386.42	514.71	55.59
<input type="checkbox"/>	J98	0.00	386.30	514.70	55.64

4: MDD + 1,500 gpm fire at Node J170 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P105	J96	J98	8.7	10	120	469.2	1.9	0.0	1.8
<input type="checkbox"/>	P107	J98	J160	1,373.4	10	110	469.2	1.9	2.8	2.1
<input type="checkbox"/>	P11	J32	J10	824.5	10	120	1,844.1	7.5	18.3	22.2
<input type="checkbox"/>	P13	J32	J34	176.7	10	120	-1,844.1	7.5	3.9	22.2
<input type="checkbox"/>	P133	J122	J174	746.4	8	120	864.8	5.5	12.1	16.2
<input type="checkbox"/>	P139	J70	J130	28.0	8	120	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P141	J130	J74	29.0	8	120	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P143	J70	J132	25.9	6	120	-27.6	0.3	15.2	587.1
<input type="checkbox"/>	P145	J132	J50	30.8	8	120	-27.6	0.2	0.0	0.0
<input type="checkbox"/>	P147	J134	J146	394.8	8	120	481.4	3.1	2.2	5.5
<input type="checkbox"/>	P149	J72	J136	19.8	8	120	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P15	J34	J14	430.0	18	120	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P151	J136	J138	19.8	8	120	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P153	J140	J40	422.5	10	120	482.6	2.0	0.8	1.9
<input type="checkbox"/>	P159	J140	J142	19.8	8	120	383.3	2.4	0.1	3.6
<input type="checkbox"/>	P161	J142	J144	19.8	8	120	383.3	2.4	23.3	1,179.3
<input type="checkbox"/>	P163	J144	J150	19.8	8	120	383.3	2.4	0.1	3.6
<input type="checkbox"/>	P165	J150	J148	19.8	8	120	864.8	5.5	0.3	16.2
<input type="checkbox"/>	P167	J150	J146	19.8	8	120	-481.4	3.1	0.1	5.5
<input type="checkbox"/>	P169	J152	J56	437.9	8	120	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P17	J14	J16	16.3	18	120	-387.0	0.5	0.0	0.1
<input type="checkbox"/>	P173	J154	J156	19.8	8	120	864.8	5.5	0.3	16.2
<input type="checkbox"/>	P175	J156	J158	19.8	8	120	864.8	5.5	0.3	16.2
<input type="checkbox"/>	P177	J158	J122	19.8	8	120	864.8	5.5	0.3	16.2
<input type="checkbox"/>	P179	J160	J26	1,373.4	10	110	-166.0	0.7	0.4	0.3
<input type="checkbox"/>	P181	J160	J162	19.8	8	120	635.2	4.1	0.2	9.1
<input type="checkbox"/>	P183	J162	J164	19.8	8	120	635.2	4.1	44.8	2,269.2
<input type="checkbox"/>	P185	J164	J166	19.8	8	120	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P187	J164	J170	19.8	8	120	635.2	4.1	0.2	9.1
<input type="checkbox"/>	P189	J124	J168	19.8	8	120	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P19	J16	J36	13.4	8	120	-387.0	2.5	0.0	3.7
<input type="checkbox"/>	P191	J170	J168	19.8	8	120	-864.8	5.5	0.3	16.2
<input type="checkbox"/>	P195	J168	J174	19.8	8	120	-864.8	5.5	0.3	16.2
<input type="checkbox"/>	P197	J176	J22	1,137.2	12	120	-72.4	0.2	0.0	0.0
<input type="checkbox"/>	P199	J176	J178	19.8	8	120	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P201	J178	J180	19.8	8	120	182.9	1.2	15.9	804.0
<input type="checkbox"/>	P203	J180	J184	19.8	8	120	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P205	J184	J182	19.8	6	120	9.6	0.1	0.0	0.0
<input type="checkbox"/>	P207	J184	J188	19.8	8	120	173.3	1.1	0.0	0.8
<input type="checkbox"/>	P209	J188	J190	19.8	8	120	172.5	1.1	0.0	0.8
<input type="checkbox"/>	P21	J36	J12	11.5	10	120	-387.0	1.6	0.0	1.2
<input type="checkbox"/>	P211	J190	J186	19.8	8	120	79.7	0.5	0.0	0.2

4: MDD + 1,500 gpm fire at Node J170 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P213	J190	J192	19.8	8	120	90.8	0.6	0.0	0.2
<input type="checkbox"/>	P215	J194	J76	144.6	8	120	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P217	J194	J56	394.8	8	120	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P219	J196	J194	144.6	8	120	481.4	3.1	0.8	5.5
<input type="checkbox"/>	P221	J198	J22	525.7	18	120	238.4	0.3	0.0	0.0
<input type="checkbox"/>	P223	J40	J200	73.3	8	120	95.6	0.6	0.0	0.3
<input type="checkbox"/>	P225	J200	J202	42.4	4	120	57.5	1.5	18.5	437.3
<input type="checkbox"/>	P227	J202	J204	486.6	8	120	19.4	0.1	0.0	0.0
<input type="checkbox"/>	P23	J12	J40	159.2	10	120	-387.0	1.6	0.2	1.2
<input type="checkbox"/>	P27	J18	J20	212.1	18	120	276.5	0.3	0.0	0.0
<input type="checkbox"/>	P29	J18	J30	786.6	18	120	-276.5	0.3	0.0	0.0
<input type="checkbox"/>	P31	J14	J38	555.4	10	120	387.0	1.6	0.7	1.2
<input type="checkbox"/>	P33	J30	J38	635.7	12	120	-387.0	1.1	0.3	0.5
<input type="checkbox"/>	P35	J30	J28	842.8	12	120	110.5	0.3	0.0	0.0
<input type="checkbox"/>	P37	J28	J176	1,137.2	12	120	110.5	0.3	0.1	0.0
<input type="checkbox"/>	P39	J22	J24	749.3	18	120	166.0	0.2	0.0	0.0
<input type="checkbox"/>	P41	J10	J66	276.2	10	110	978.2	4.0	2.2	8.1
<input type="checkbox"/>	P43	J26	J24	919.6	12	120	-166.0	0.5	0.1	0.1
<input type="checkbox"/>	P45	J20	J198	525.7	18	120	276.5	0.3	0.0	0.0
<input type="checkbox"/>	P47	POC	J34	1.0	99	200	1,844.1	0.1	0.0	0.0
<input type="checkbox"/>	P49	J42	J140	422.5	10	120	865.9	3.5	2.3	5.5
<input type="checkbox"/>	P51	J10	J42	175.9	10	120	865.9	3.5	1.0	5.5
<input type="checkbox"/>	P53	J50	J96	396.9	10	110	469.2	1.9	0.8	2.1
<input type="checkbox"/>	P61	J48	J148	303.4	8	120	-864.8	5.5	4.9	16.2
<input type="checkbox"/>	P63	J48	J154	339.2	8	120	864.8	5.5	5.5	16.2
<input type="checkbox"/>	P69	J66	J74	3.9	10	120	496.8	2.0	0.0	1.9
<input type="checkbox"/>	P71	J74	J50	4.9	10	120	496.8	2.0	0.0	2.0
<input type="checkbox"/>	P73	J66	J68	29.1	8	120	481.4	3.1	0.2	5.5
<input type="checkbox"/>	P75	J68	J196	144.6	8	120	481.4	3.1	19.1	132.2
<input type="checkbox"/>	P77	J70	J72	19.8	8	120	27.6	0.2	0.0	0.0
<input type="checkbox"/>	P79	J72	J52	65.5	8	120	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P81	J194	J134	394.8	8	120	481.4	3.1	2.2	5.5
<input type="checkbox"/>	P83	J52	J54	83.2	8	120	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P85	J54	J78	222.1	8	120	11.1	0.1	0.0	0.0
<input type="checkbox"/>	P89	J72	J80	10.8	8	120	6.1	0.0	0.0	0.0
<input type="checkbox"/>	P91	J54	J80	68.3	8	120	-6.1	0.0	0.0	0.0
<input type="checkbox"/>	P93	J80	J82	69.1	8	120	0.0	0.0	0.0	0.0

5: MDD + 1,813 gpm fire at Node J198 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J10	0.00	396.00	510.29	49.52
<input type="checkbox"/>	J12	0.00	423.00	497.71	32.37
<input type="checkbox"/>	J122	0.00	392.00	504.52	48.76
<input type="checkbox"/>	J124	0.00	392.00	503.90	48.49
<input type="checkbox"/>	J130	0.00	392.00	508.36	50.42
<input type="checkbox"/>	J132	0.00	392.00	508.34	50.41
<input type="checkbox"/>	J134	0.00	390.00	505.45	50.02
<input type="checkbox"/>	J136	0.00	390.00	493.16	44.70
<input type="checkbox"/>	J138	16.48	390.00	493.16	44.70
<input type="checkbox"/>	J14	0.00	423.00	497.22	32.16
<input type="checkbox"/>	J140	0.00	413.49	503.79	39.13
<input type="checkbox"/>	J142	0.00	414.34	505.11	39.33
<input type="checkbox"/>	J144	0.00	414.34	505.11	39.33
<input type="checkbox"/>	J146	0.00	390.00	505.13	49.89
<input type="checkbox"/>	J148	0.00	398.00	505.10	46.40
<input type="checkbox"/>	J150	0.00	414.34	505.11	39.33
<input type="checkbox"/>	J152	0.00	388.12	505.77	50.98
<input type="checkbox"/>	J154	0.00	389.03	504.57	50.06
<input type="checkbox"/>	J156	0.00	414.34	504.56	39.09
<input type="checkbox"/>	J158	0.00	414.34	504.54	39.08
<input type="checkbox"/>	J16	0.00	423.00	497.23	32.16
<input type="checkbox"/>	J160	0.00	379.18	500.56	52.59
<input type="checkbox"/>	J162	0.00	414.34	500.57	37.36
<input type="checkbox"/>	J164	0.00	414.34	503.87	38.79
<input type="checkbox"/>	J166	0.00	414.34	503.87	38.79
<input type="checkbox"/>	J168	0.00	414.34	503.90	38.81
<input type="checkbox"/>	J170	0.00	414.34	503.88	38.80
<input type="checkbox"/>	J174	0.00	392.00	503.92	48.50
<input type="checkbox"/>	J176	0.00	383.15	489.20	45.95
<input type="checkbox"/>	J178	0.00	414.34	489.18	32.43
<input type="checkbox"/>	J18	0.00	404.00	489.27	36.95
<input type="checkbox"/>	J180	0.00	414.34	473.29	25.54
<input type="checkbox"/>	J182	9.60	414.34	473.27	25.53
<input type="checkbox"/>	J184	0.00	414.34	473.27	25.53
<input type="checkbox"/>	J186	79.68	414.34	473.24	25.52
<input type="checkbox"/>	J188	0.80	414.34	473.26	25.53
<input type="checkbox"/>	J190	2.08	414.34	473.24	25.52
<input type="checkbox"/>	J192	90.75	414.34	473.23	25.52
<input type="checkbox"/>	J194	0.00	392.00	505.77	49.30
<input type="checkbox"/>	J196	0.00	392.00	505.89	49.35

5: MDD + 1,813 gpm fire at Node J198 (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J198	1,851.08	386.82	489.01	44.28
<input type="checkbox"/>	J20	0.00	390.00	489.20	42.98
<input type="checkbox"/>	J200	38.08	390.00	499.18	47.31
<input type="checkbox"/>	J202	38.08	390.00	480.65	39.28
<input type="checkbox"/>	J204	19.42	390.00	480.64	39.27
<input type="checkbox"/>	J22	0.00	383.00	489.19	46.01
<input type="checkbox"/>	J24	0.00	363.00	489.43	54.78
<input type="checkbox"/>	J26	0.00	367.00	491.54	53.96
<input type="checkbox"/>	J28	0.00	384.00	489.40	45.67
<input type="checkbox"/>	J30	0.00	397.00	489.56	40.10
<input type="checkbox"/>	J32	0.00	436.00	534.76	42.79
<input type="checkbox"/>	J34	0.00	440.00	540.00	43.33
<input type="checkbox"/>	J36	0.00	423.00	497.60	32.32
<input type="checkbox"/>	J38	0.00	405.00	492.01	37.70
<input type="checkbox"/>	J40	0.00	414.34	499.20	36.77
<input type="checkbox"/>	J42	0.00	401.99	508.38	46.10
<input type="checkbox"/>	J48	0.00	398.00	504.85	46.30
<input type="checkbox"/>	J50	0.00	392.00	508.34	50.41
<input type="checkbox"/>	J52	0.00	392.00	493.16	43.83
<input type="checkbox"/>	J54	0.00	392.00	493.16	43.83
<input type="checkbox"/>	J56	0.00	390.00	505.77	50.16
<input type="checkbox"/>	J66	0.00	392.12	508.37	50.37
<input type="checkbox"/>	J68	0.00	392.00	508.35	50.42
<input type="checkbox"/>	J70	0.00	392.00	493.16	43.83
<input type="checkbox"/>	J72	0.00	392.00	493.16	43.83
<input type="checkbox"/>	J74	0.00	392.06	508.36	50.39
<input type="checkbox"/>	J76	0.00	392.00	505.77	49.30
<input type="checkbox"/>	J78	11.07	390.00	493.16	44.70
<input type="checkbox"/>	J80	0.00	392.00	493.16	43.83
<input type="checkbox"/>	J82	0.00	392.00	493.16	43.83
<input type="checkbox"/>	J96	0.00	386.42	506.60	52.07
<input type="checkbox"/>	J98	0.00	386.30	506.57	52.11

5: MDD + 1,813 gpm fire at Node J198 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P105	J96	J98	8.7	10.0	120.0	703.5	2.9	0.0	3.7
<input type="checkbox"/>	P107	J98	J160	1,373.4	10.0	110.0	703.5	2.9	6.0	4.4
<input type="checkbox"/>	P11	J32	J10	824.5	10.0	120.0	2,157.1	8.8	24.5	29.7
<input type="checkbox"/>	P13	J32	J34	176.7	10.0	120.0	-2,157.1	8.8	5.2	29.7
<input type="checkbox"/>	P133	J122	J174	746.4	8.0	120.0	172.1	1.1	0.6	0.8
<input type="checkbox"/>	P139	J70	J130	28.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P141	J130	J74	29.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P143	J70	J132	25.9	6.0	120.0	-27.6	0.3	15.2	587.1
<input type="checkbox"/>	P145	J132	J50	30.8	8.0	120.0	-27.6	0.2	0.0	0.0
<input type="checkbox"/>	P147	J134	J146	394.8	8.0	120.0	172.1	1.1	0.3	0.8
<input type="checkbox"/>	P149	J72	J136	19.8	8.0	120.0	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P15	J34	J14	430.0	18.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P151	J136	J138	19.8	8.0	120.0	16.5	0.1	0.0	0.0
<input type="checkbox"/>	P153	J140	J40	422.5	10.0	120.0	1,253.9	5.1	4.6	10.9
<input type="checkbox"/>	P159	J140	J142	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P161	J142	J144	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P163	J144	J150	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P165	J150	J148	19.8	8.0	120.0	172.1	1.1	0.0	0.8
<input type="checkbox"/>	P167	J150	J146	19.8	8.0	120.0	-172.1	1.1	0.0	0.8
<input type="checkbox"/>	P169	J152	J56	437.9	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P17	J14	J16	16.3	18.0	120.0	-1,158.3	1.5	0.0	0.5
<input type="checkbox"/>	P173	J154	J156	19.8	8.0	120.0	172.1	1.1	0.0	0.8
<input type="checkbox"/>	P175	J156	J158	19.8	8.0	120.0	172.1	1.1	0.0	0.8
<input type="checkbox"/>	P177	J158	J122	19.8	8.0	120.0	172.1	1.1	0.0	0.8
<input type="checkbox"/>	P179	J160	J26	1,373.4	10.0	110.0	875.7	3.6	9.0	6.6
<input type="checkbox"/>	P181	J160	J162	19.8	8.0	120.0	-172.1	1.1	0.0	0.8
<input type="checkbox"/>	P183	J162	J164	19.8	8.0	120.0	-172.1	1.1	3.3	166.7
<input type="checkbox"/>	P185	J164	J166	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P187	J164	J170	19.8	8.0	120.0	-172.1	1.1	0.0	0.8
<input type="checkbox"/>	P189	J124	J168	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P19	J16	J36	13.4	8.0	120.0	-1,158.3	7.4	0.4	27.8
<input type="checkbox"/>	P191	J170	J168	19.8	8.0	120.0	-172.1	1.1	0.0	0.8
<input type="checkbox"/>	P195	J168	J174	19.8	8.0	120.0	-172.1	1.1	0.0	0.8
<input type="checkbox"/>	P197	J176	J22	1,137.2	12.0	120.0	39.5	0.1	0.0	0.0
<input type="checkbox"/>	P199	J176	J178	19.8	8.0	120.0	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P201	J178	J180	19.8	8.0	120.0	182.9	1.2	15.9	804.0
<input type="checkbox"/>	P203	J180	J184	19.8	8.0	120.0	182.9	1.2	0.0	0.9
<input type="checkbox"/>	P205	J184	J182	19.8	6.0	120.0	9.6	0.1	0.0	0.0
<input type="checkbox"/>	P207	J184	J188	19.8	8.0	120.0	173.3	1.1	0.0	0.8
<input type="checkbox"/>	P209	J188	J190	19.8	8.0	120.0	172.5	1.1	0.0	0.8
<input type="checkbox"/>	P21	J36	J12	11.5	10.0	120.0	-1,158.3	4.7	0.1	9.4
<input type="checkbox"/>	P211	J190	J186	19.8	8.0	120.0	79.7	0.5	0.0	0.2

5: MDD + 1,813 gpm fire at Node J198 (Pipe Report)

	ID	From Node	To Node	Length (ft)	Diameter (in)	Roughness	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)
<input type="checkbox"/>	P213	J190	J192	19.8	8.0	120.0	90.8	0.6	0.0	0.3
<input type="checkbox"/>	P215	J194	J76	144.6	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P217	J194	J56	394.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P219	J196	J194	144.6	8.0	120.0	172.1	1.1	0.1	0.8
<input type="checkbox"/>	P221	J198	J22	525.7	18.0	120.0	-915.2	1.2	0.2	0.3
<input type="checkbox"/>	P223	J40	J200	73.3	8.0	120.0	95.6	0.6	0.0	0.3
<input type="checkbox"/>	P225	J200	J202	42.4	4.0	120.0	57.5	1.5	18.5	437.3
<input type="checkbox"/>	P227	J202	J204	486.6	8.0	120.0	19.4	0.1	0.0	0.0
<input type="checkbox"/>	P23	J12	J40	159.2	10.0	120.0	-1,158.3	4.7	1.5	9.4
<input type="checkbox"/>	P27	J18	J20	212.1	18.0	120.0	935.9	1.2	0.1	0.4
<input type="checkbox"/>	P29	J18	J30	786.6	18.0	120.0	-935.9	1.2	0.3	0.4
<input type="checkbox"/>	P31	J14	J38	555.4	10.0	120.0	1,158.3	4.7	5.2	9.4
<input type="checkbox"/>	P33	J30	J38	635.7	12.0	120.0	-1,158.3	3.3	2.5	3.9
<input type="checkbox"/>	P35	J30	J28	842.8	12.0	120.0	222.4	0.6	0.2	0.2
<input type="checkbox"/>	P37	J28	J176	1,137.2	12.0	120.0	222.4	0.6	0.2	0.2
<input type="checkbox"/>	P39	J22	J24	749.3	18.0	120.0	-875.7	1.1	0.2	0.3
<input type="checkbox"/>	P41	J10	J66	276.2	10.0	110.0	903.2	3.7	1.9	7.0
<input type="checkbox"/>	P43	J26	J24	919.6	12.0	120.0	875.7	2.5	2.1	2.3
<input type="checkbox"/>	P45	J20	J198	525.7	18.0	120.0	935.9	1.2	0.2	0.4
<input type="checkbox"/>	P47	POC	J34	1.0	99.0	200.0	2,157.1	0.1	0.0	0.0
<input type="checkbox"/>	P49	J42	J140	422.5	10.0	120.0	1,253.9	5.1	4.6	10.9
<input type="checkbox"/>	P51	J10	J42	175.9	10.0	120.0	1,253.9	5.1	1.9	10.9
<input type="checkbox"/>	P53	J50	J96	396.9	10.0	110.0	703.5	2.9	1.7	4.4
<input type="checkbox"/>	P61	J48	J148	303.4	8.0	120.0	-172.1	1.1	0.2	0.8
<input type="checkbox"/>	P63	J48	J154	339.2	8.0	120.0	172.1	1.1	0.3	0.8
<input type="checkbox"/>	P69	J66	J74	3.9	10.0	120.0	731.1	3.0	0.0	4.0
<input type="checkbox"/>	P71	J74	J50	4.9	10.0	120.0	731.1	3.0	0.0	4.0
<input type="checkbox"/>	P73	J66	J68	29.1	8.0	120.0	172.1	1.1	0.0	0.8
<input type="checkbox"/>	P75	J68	J196	144.6	8.0	120.0	172.1	1.1	2.5	17.0
<input type="checkbox"/>	P77	J70	J72	19.8	8.0	120.0	27.6	0.2	0.0	0.0
<input type="checkbox"/>	P79	J72	J52	65.5	8.0	120.0	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P81	J194	J134	394.8	8.0	120.0	172.1	1.1	0.3	0.8
<input type="checkbox"/>	P83	J52	J54	83.2	8.0	120.0	4.9	0.0	0.0	0.0
<input type="checkbox"/>	P85	J54	J78	222.1	8.0	120.0	11.1	0.1	0.0	0.0
<input type="checkbox"/>	P89	J72	J80	10.8	8.0	120.0	6.1	0.0	0.0	0.0
<input type="checkbox"/>	P91	J54	J80	68.3	8.0	120.0	-6.1	0.0	0.0	0.0
<input type="checkbox"/>	P93	J80	J82	69.1	8.0	120.0	0.0	0.0	0.0	0.0

6: Peak Hour (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J10	0.00	396.00	537.44	61.29
<input type="checkbox"/>	J12	0.00	423.00	536.43	49.15
<input type="checkbox"/>	J122	0.00	392.00	537.06	62.85
<input type="checkbox"/>	J124	0.00	392.00	537.01	62.84
<input type="checkbox"/>	J130	0.00	392.00	537.28	62.95
<input type="checkbox"/>	J132	0.00	392.00	537.28	62.95
<input type="checkbox"/>	J134	0.00	390.00	537.12	63.75
<input type="checkbox"/>	J136	0.00	390.00	494.05	45.09
<input type="checkbox"/>	J138	27.81	390.00	494.05	45.09
<input type="checkbox"/>	J14	0.00	423.00	536.41	49.14
<input type="checkbox"/>	J140	0.00	413.49	536.88	53.46
<input type="checkbox"/>	J142	0.00	414.34	537.09	53.19
<input type="checkbox"/>	J144	0.00	414.34	537.09	53.19
<input type="checkbox"/>	J146	0.00	390.00	537.10	63.74
<input type="checkbox"/>	J148	0.00	398.00	537.09	60.27
<input type="checkbox"/>	J150	0.00	414.34	537.09	53.19
<input type="checkbox"/>	J152	0.00	388.12	537.14	64.57
<input type="checkbox"/>	J154	0.00	389.03	537.06	64.14
<input type="checkbox"/>	J156	0.00	414.34	537.06	53.17
<input type="checkbox"/>	J158	0.00	414.34	537.06	53.17
<input type="checkbox"/>	J16	0.00	423.00	536.41	49.14
<input type="checkbox"/>	J160	0.00	379.18	536.83	68.31
<input type="checkbox"/>	J162	0.00	414.34	536.83	53.08
<input type="checkbox"/>	J164	0.00	414.34	537.01	53.15
<input type="checkbox"/>	J166	0.00	414.34	537.01	53.15
<input type="checkbox"/>	J168	0.00	414.34	537.01	53.15
<input type="checkbox"/>	J170	0.00	414.34	537.01	53.15
<input type="checkbox"/>	J174	0.00	392.00	537.01	62.84
<input type="checkbox"/>	J176	0.00	383.15	536.02	66.24
<input type="checkbox"/>	J178	0.00	414.34	535.98	52.70
<input type="checkbox"/>	J18	0.00	404.00	536.16	57.26
<input type="checkbox"/>	J180	0.00	414.34	490.73	33.10
<input type="checkbox"/>	J182	16.20	414.34	490.68	33.08
<input type="checkbox"/>	J184	0.00	414.34	490.68	33.08
<input type="checkbox"/>	J186	134.46	414.34	490.59	33.04
<input type="checkbox"/>	J188	1.35	414.34	490.64	33.06
<input type="checkbox"/>	J190	3.51	414.34	490.60	33.04
<input type="checkbox"/>	J192	153.14	414.34	490.58	33.04
<input type="checkbox"/>	J194	0.00	392.00	537.14	62.89
<input type="checkbox"/>	J196	0.00	392.00	537.15	62.89

6: Peak Hour (Node Report)

	ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
<input type="checkbox"/>	J198	64.26	386.82	536.16	64.71
<input type="checkbox"/>	J20	0.00	390.00	536.16	63.33
<input type="checkbox"/>	J200	64.26	390.00	536.43	63.45
<input type="checkbox"/>	J202	64.26	390.00	491.08	43.80
<input type="checkbox"/>	J204	25.69	390.00	491.07	43.79
<input type="checkbox"/>	J22	0.00	383.00	536.16	66.36
<input type="checkbox"/>	J24	0.00	363.00	536.17	75.04
<input type="checkbox"/>	J26	0.00	367.00	536.30	73.36
<input type="checkbox"/>	J28	0.00	384.00	536.10	65.91
<input type="checkbox"/>	J30	0.00	397.00	536.16	60.30
<input type="checkbox"/>	J32	0.00	436.00	539.55	44.87
<input type="checkbox"/>	J34	0.00	440.00	540.00	43.33
<input type="checkbox"/>	J36	0.00	423.00	536.42	49.15
<input type="checkbox"/>	J38	0.00	405.00	536.24	56.87
<input type="checkbox"/>	J40	0.00	414.34	536.47	52.92
<input type="checkbox"/>	J42	0.00	401.99	537.28	58.62
<input type="checkbox"/>	J48	0.00	398.00	537.08	60.26
<input type="checkbox"/>	J50	0.00	392.00	537.28	62.95
<input type="checkbox"/>	J52	0.00	392.00	494.05	44.22
<input type="checkbox"/>	J54	0.00	392.00	494.05	44.22
<input type="checkbox"/>	J56	0.00	390.00	537.14	63.76
<input type="checkbox"/>	J66	0.00	392.12	537.28	62.90
<input type="checkbox"/>	J68	0.00	392.00	537.28	62.95
<input type="checkbox"/>	J70	0.00	392.00	494.05	44.22
<input type="checkbox"/>	J72	0.00	392.00	494.05	44.22
<input type="checkbox"/>	J74	0.00	392.06	537.28	62.92
<input type="checkbox"/>	J76	0.00	392.00	537.14	62.89
<input type="checkbox"/>	J78	18.68	390.00	494.05	45.08
<input type="checkbox"/>	J80	0.00	392.00	494.05	44.22
<input type="checkbox"/>	J82	0.00	392.00	494.05	44.22
<input type="checkbox"/>	J96	0.00	386.42	537.18	65.33
<input type="checkbox"/>	J98	0.00	386.30	537.18	65.38

6: 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)
<input type="checkbox"/>	P105	J96	J98	8.7	10.0	120.0	150.6	0.6	0.0	0.2
<input type="checkbox"/>	P107	J98	J160	1,373.4	10.0	110.0	150.6	0.6	0.3	0.3
<input type="checkbox"/>	P11	J32	J10	824.5	10.0	120.0	573.6	2.3	2.1	2.6
<input type="checkbox"/>	P13	J32	J34	176.7	10.0	120.0	-573.6	2.3	0.5	2.6
<input type="checkbox"/>	P133	J122	J174	746.4	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P139	J70	J130	28.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P141	J130	J74	29.0	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P143	J70	J132	25.9	6.0	120.0	-46.5	0.5	43.2	1,671.8
<input type="checkbox"/>	P145	J132	J50	30.8	8.0	120.0	-46.5	0.3	0.0	0.1
<input type="checkbox"/>	P147	J134	J146	394.8	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P149	J72	J136	19.8	8.0	120.0	27.8	0.2	0.0	0.0
<input type="checkbox"/>	P15	J34	J14	430.0	18.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P151	J136	J138	19.8	8.0	120.0	27.8	0.2	0.0	0.0
<input type="checkbox"/>	P153	J140	J40	422.5	10.0	120.0	336.5	1.4	0.4	1.0
<input type="checkbox"/>	P159	J140	J142	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P161	J142	J144	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P163	J144	J150	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P165	J150	J148	19.8	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P167	J150	J146	19.8	8.0	120.0	-40.0	0.3	0.0	0.1
<input type="checkbox"/>	P169	J152	J56	437.9	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P17	J14	J16	16.3	18.0	120.0	-182.3	0.2	0.0	0.0
<input type="checkbox"/>	P173	J154	J156	19.8	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P175	J156	J158	19.8	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P177	J158	J122	19.8	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P179	J160	J26	1,373.4	10.0	110.0	190.6	0.8	0.5	0.4
<input type="checkbox"/>	P181	J160	J162	19.8	8.0	120.0	-40.0	0.3	0.0	0.1
<input type="checkbox"/>	P183	J162	J164	19.8	8.0	120.0	-40.0	0.3	0.2	9.0
<input type="checkbox"/>	P185	J164	J166	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P187	J164	J170	19.8	8.0	120.0	-40.0	0.3	0.0	0.1
<input type="checkbox"/>	P189	J124	J168	19.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P19	J16	J36	13.4	8.0	120.0	-182.3	1.2	0.0	0.9
<input type="checkbox"/>	P191	J170	J168	19.8	8.0	120.0	-40.0	0.3	0.0	0.1
<input type="checkbox"/>	P195	J168	J174	19.8	8.0	120.0	-40.0	0.3	0.0	0.1
<input type="checkbox"/>	P197	J176	J22	1,137.2	12.0	120.0	-176.6	0.5	0.1	0.1
<input type="checkbox"/>	P199	J176	J178	19.8	8.0	120.0	308.7	2.0	0.0	2.4
<input type="checkbox"/>	P201	J178	J180	19.8	8.0	120.0	308.7	2.0	45.2	2,289.4
<input type="checkbox"/>	P203	J180	J184	19.8	8.0	120.0	308.7	2.0	0.0	2.4
<input type="checkbox"/>	P205	J184	J182	19.8	6.0	120.0	16.2	0.2	0.0	0.0
<input type="checkbox"/>	P207	J184	J188	19.8	8.0	120.0	292.5	1.9	0.0	2.2
<input type="checkbox"/>	P209	J188	J190	19.8	8.0	120.0	291.1	1.9	0.0	2.2
<input type="checkbox"/>	P21	J36	J12	11.5	10.0	120.0	-182.3	0.7	0.0	0.3
<input type="checkbox"/>	P211	J190	J186	19.8	8.0	120.0	134.5	0.9	0.0	0.5

6: 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)
<input type="checkbox"/>	P213	J190	J192	19.8	8.0	120.0	153.1	1.0	0.0	0.7
<input type="checkbox"/>	P215	J194	J76	144.6	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P217	J194	J56	394.8	8.0	120.0	0.0	0.0	0.0	0.0
<input type="checkbox"/>	P219	J196	J194	144.6	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P221	J198	J22	525.7	18.0	120.0	-14.0	0.0	0.0	0.0
<input type="checkbox"/>	P223	J40	J200	73.3	8.0	120.0	154.2	1.0	0.0	0.7
<input type="checkbox"/>	P225	J200	J202	42.4	4.0	120.0	89.9	2.3	45.3	1,069.7
<input type="checkbox"/>	P227	J202	J204	486.6	8.0	120.0	25.7	0.2	0.0	0.0
<input type="checkbox"/>	P23	J12	J40	159.2	10.0	120.0	-182.3	0.7	0.0	0.3
<input type="checkbox"/>	P27	J18	J20	212.1	18.0	120.0	50.2	0.1	0.0	0.0
<input type="checkbox"/>	P29	J18	J30	786.6	18.0	120.0	-50.2	0.1	0.0	0.0
<input type="checkbox"/>	P31	J14	J38	555.4	10.0	120.0	182.3	0.7	0.2	0.3
<input type="checkbox"/>	P33	J30	J38	635.7	12.0	120.0	-182.3	0.5	0.1	0.1
<input type="checkbox"/>	P35	J30	J28	842.8	12.0	120.0	132.1	0.4	0.1	0.1
<input type="checkbox"/>	P37	J28	J176	1,137.2	12.0	120.0	132.1	0.4	0.1	0.1
<input type="checkbox"/>	P39	J22	J24	749.3	18.0	120.0	-190.6	0.2	0.0	0.0
<input type="checkbox"/>	P41	J10	J66	276.2	10.0	110.0	237.1	1.0	0.2	0.6
<input type="checkbox"/>	P43	J26	J24	919.6	12.0	120.0	190.6	0.5	0.1	0.1
<input type="checkbox"/>	P45	J20	J198	525.7	18.0	120.0	50.2	0.1	0.0	0.0
<input type="checkbox"/>	P47	POC	J34	1.0	99.0	200.0	573.6	0.0	0.0	0.0
<input type="checkbox"/>	P49	J42	J140	422.5	10.0	120.0	336.5	1.4	0.4	1.0
<input type="checkbox"/>	P51	J10	J42	175.9	10.0	120.0	336.5	1.4	0.2	1.0
<input type="checkbox"/>	P53	J50	J96	396.9	10.0	110.0	150.6	0.6	0.1	0.3
<input type="checkbox"/>	P61	J48	J148	303.4	8.0	120.0	-40.0	0.3	0.0	0.1
<input type="checkbox"/>	P63	J48	J154	339.2	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P69	J66	J74	3.9	10.0	120.0	197.1	0.8	0.0	0.4
<input type="checkbox"/>	P71	J74	J50	4.9	10.0	120.0	197.1	0.8	0.0	0.3
<input type="checkbox"/>	P73	J66	J68	29.1	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P75	J68	J196	144.6	8.0	120.0	40.0	0.3	0.1	0.9
<input type="checkbox"/>	P77	J70	J72	19.8	8.0	120.0	46.5	0.3	0.0	0.1
<input type="checkbox"/>	P79	J72	J52	65.5	8.0	120.0	7.8	0.0	0.0	0.0
<input type="checkbox"/>	P81	J194	J134	394.8	8.0	120.0	40.0	0.3	0.0	0.1
<input type="checkbox"/>	P83	J52	J54	83.2	8.0	120.0	7.8	0.0	0.0	0.0
<input type="checkbox"/>	P85	J54	J78	222.1	8.0	120.0	18.7	0.1	0.0	0.0
<input type="checkbox"/>	P89	J72	J80	10.8	8.0	120.0	10.9	0.1	0.0	0.0
<input type="checkbox"/>	P91	J54	J80	68.3	8.0	120.0	-10.9	0.1	0.0	0.0
<input type="checkbox"/>	P93	J80	J82	69.1	8.0	120.0	0.0	0.0	0.0	0.0