

03 February 2020



Water Study

SD Riverwalk LLC

RIVERWALK

Project No. 119003



Prepared by

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February 3, 2020

City of San Diego, Development Services Department
Water and Sewer Development Review
Attn: Irina Itkin
1222 1st Ave MS 301
San Diego, CA 92101

SUBJECT: Riverwalk Water Study

Ms. Itkin,

WCC is pleased to submit the Riverwalk Water System (Study) for your review and approval. The purpose of this study is to present the proposed public water system required to provide potable water service to the proposed Riverwalk Development (Development). The proposed water system presented in this study is based on the City of San Diego Water Department (City) Facility Design Guidelines and California Fire Code. The study determines pipeline sizes for the public water system only. Private development water systems will be developed for each lot and submitted as part of individual site plan development.

BACKGROUND

The Riverwalk project proposes an amendment to the existing Levi-Cushman Specific Plan to replace the 195-acre Riverwalk property with the Riverwalk Specific Plan and redevelop the existing golf course as a walkable, transit-centric, and modern live-work-play mixed-use neighborhood that features an expansive River Park along the San Diego River. The mix and quantity of land uses would change from what is approved in the existing Levi-Cushman Specific Plan to include 4,300 multi-family residential dwelling units; 152,000 square feet of commercial retail space; 1,000,000 square feet of office and non-retail commercial; approximately 95 acres of park, open space, and trails; adaptive reuse of the existing golf clubhouse into a community amenity; and a new Green Line Trolley stop within the development. Improvements to surrounding public infrastructure and roadways would be implemented as part of the Riverwalk project, including improvements to the Fashion Valley Road crossing of the San Diego River as a 10- to 15-year storm event crossing. The project would also include a habitat restoration effort on-site to create and/or enhance 25.16 acres of native habitats along the San Diego River, within and adjacent to the MHPA, and setting aside area for establishing a future wetland habitat mitigation bank.

The project would establish Irrevocable Offers of Dedication (IODs) for two Community Plan Circulation Element roadways envisioned in the Mission Valley Community Plan Update: future Riverwalk Street "J," which would cross the San Diego River in a north-south direction; and future Riverwalk Street "U," which would travel approximately east-west along the southern project site boundary and connect to future Street "J." Street "J" would be an elevated roadway crossing the river valley. Per the City's Planning Department, these roads are regional facilities with uncertain funding, design, and construction timing. While these improvements would not be constructed as part of the

project, the project would grant the City IODs for the required rights-of-way to construct these roads in the future.

WATER SUPPLY

The Development is located in the City's 390 Pressure Zone, as presented on Figure 1 Hydraulic Control Map. Based on a graded elevation range of 15 to 40 feet, the static hydraulic pressure in the City's 390 Pressure Zone is estimated to be 150 and 165 psi.

Domestic potable water supply will be provided for the development by providing multiple connections to the existing water system. A proposed 12 inch diameter northern loop will have four connections to the existing 16 inch diameter main in Friars Road and one connection to the existing 16 inch diameter main on Fashion Valley Road. A proposed 12 inch diameter southern loop will have one connection to the existing 16 inch diameter main in Fashion Valley Road and one connection to a new 12 inch main that will replace the existing 8 inch water main in Hotel Circle North. Domestic water service and fire service will be provided for each lot off of the proposed public mains with metered connections, back flow prevention, and private service mains. The proposed potable water system and connections to the water system are shown on Figure 1.

It should be noted that the City of San Diego Public Works Department is currently in the design phase of the Alvarado 2nd Pipeline Project. It is our current understanding that the Project improvements will pre-date the construction of the Alvarado 2nd Pipeline. However, based on our current understanding of the proposed Alvarado 2nd Pipeline design, the following should be noted as it related to the Project:

- The Alvarado 2nd Pipeline (near the Project) will be on the City's 536 Pressure Zone
- The Alvarado 2nd Pipeline and existing and proposed 390 Pressure Zone piping should not be interconnected.
- The current design of the Alvarado 2nd Pipeline calls for a 48 inch CML&TWC Pipe in an alignment that calls for the removal and relocation of the existing 16 inch AC Pipe with a new PVC Pipe.

DEMAND PROJECTIONS

Average and peak domestic water demands projections were based on planning criteria provided in the City's Facility Design Guidelines. The Project's Development Plan and approved Specific Plan provide for flexibility of development types, quantities, and densities across the site. To accommodate this flexibility, demand projections were developed for two alternatives: EIR and MAX as described below:

- EIR Alternative. Assumes that the land use presented in the Project's EIR document.
- MAX Alternative. Identifies an allowable land use alternative that produces the maximum demand for the Project.

Estimated demands were based on the City's Facility Design Guidelines and assumptions as listed below.

Residential Dwelling Units:

- RM-4C Zoning with 1.5 persons per Dwelling Unit (DU)
- 150 gallons per day (gpd) per capita
- 1.5 persons/DU x 150 gpd/person = 225 gpd/DU

Non-Residential:

- Retail and Office Space
 - Based on Square Footage
 - Central Business District Zoning Category
 - 6,000 gpd/acre ÷ 43,560 SF/acre = 0.14 gpd/SF
- Parks 4,000 gpd/acre

Table 1 and Table 2 present the estimated average annual demands (AAD) in million gallons per day (mgd) for the EIR and MAX Development land use alternatives.

Table 1. Average Annual Demands (EIR)

Land Use Type	Units	Unit Demand	AAD
Residential	4,300 DUs	225 gpd/DU	0.968 mgd
Office	1,000,000 SF	0.14 gpd/SF	0.140 mgd
Retail	152,000 SF	0.14 gpd/SF	0.021 mgd
Park	106 Acres	4,000 gpd/acre	0.424 mgd
TOTAL	--	--	1.553 mgd

Table 2. Average Annual Demands (MAX)

Land Use Type	Units	Unit Demand	AAD
Residential	5,720 DUs	225 gpd/DU	1.287 mgd
Office	510,000 SF	0.14 gpd/SF	0.071 mgd
Retail	100,000 SF	0.14 gpd/SF	0.014 mgd
Park	106 Acres	4,000 gpd/acre	0.424 mgd
TOTAL	--	--	1.796 mgd

The MAX land use alternative was used for system sizing. Peaking factors for maximum day and peak hour demands were based on the peaking factor curves presented in the design guideline. The development is located in the "Coastal/Downtown" region of the City and the maximum day and

peak hour peaking factors were estimated at 1.5 and 3.5 respectively. Table 3 presents the estimated peak demands.

Table 3. Demand Summary

Demand Category	Peaking Factor	Demand	
MAX Average Annual Demands (AAD)	--	1.796 mgd	1,248 gpm
Maximum Day Demands (MDD)	1.5	2.694 mgd	1,871 gpm
Peak Hour Demands (PHD)	3.5	6.286 mgd	4,368 gpm

DESIGN CONSIDERATIONS

To accommodate for the high pressures in the water system, design considerations are required for the type of pipe, thrust forces, and reduced pressures for costumers as described below.

- Pipe Material, shall be PVC C-900 DR-14 (305 psi) or equivalent.
- Thrust Forces, thrust blocks and/or restrained joint shall be utilized at all bends, tees, and crosses. Thrust blocks sizing and restrained joints length shall be calculated with a minimum pressure equal to 1.5 times the static pressure.
- Customer Pressures, pressure reducing valves shall be installed as part of the backflow preventers per City Standard Drawing SDW-156 and set at a pressure no higher than 105 psi. Fire suppression and/or mechanical engineer to coordinate final relief valve operating pressure. SDW-156 is provided as an Appendix C for reference.

FIRE FLOWS

The fire flows for the development were evaluated by reviewing the City’s Facility Design Guidelines and the California Fire Code. Based on the City’s guidelines, “Condominiums and Apartments” and “Commercial” development types fire flow estimates are 3,000 and 4,000 gallons per minute (gpm), respectively. It is our understanding that the likely building construction types and sizes will require a 4,000 gpm fire flow based on the California Fire Code’s maximum fire flow of 8,000 gpm with a 50 percent reduction for fire sprinklers.

PROPOSED WATER SYSTEM

A hydraulic model was developed to determine appropriate water main sizing under peak hour and maximum day demand conditions. Pipe roughness designated for the system must conform to the City of San Diego Water Design Guide which assign a “C” Value of 120 to any distribution water main. System sizing included a northern 12 inch diameter loop and a southern 12 inch diameter loop. System sizing was based on hydraulic model simulations with the following assumptions and criteria.

Model Simulations:

- MAX Land Use Alternative
 - Peak Hour (Northern Loop)
 - Max Day Plus Fire (Northern Loop)
- MAX Land Use Alternative with 1,500 DUs transferred to the South
 - Peak Hour (Southern Loop)
 - Max Day Plus Fire (Southern Loop)

Peak Hour Conditions:

- Residual Pressure greater than 40 pounds per square inch (psi)

Maximum Day Plus Fire Conditions:

- Residual Pressure greater than 20 psi
- Maximum Velocity of 15 feet per second (fps)

A pipe and node map of the hydraulic model is presented in Figure 3 and Appendix A contains the results of the hydraulic model. Hydraulic model results are summarized in Table 4.

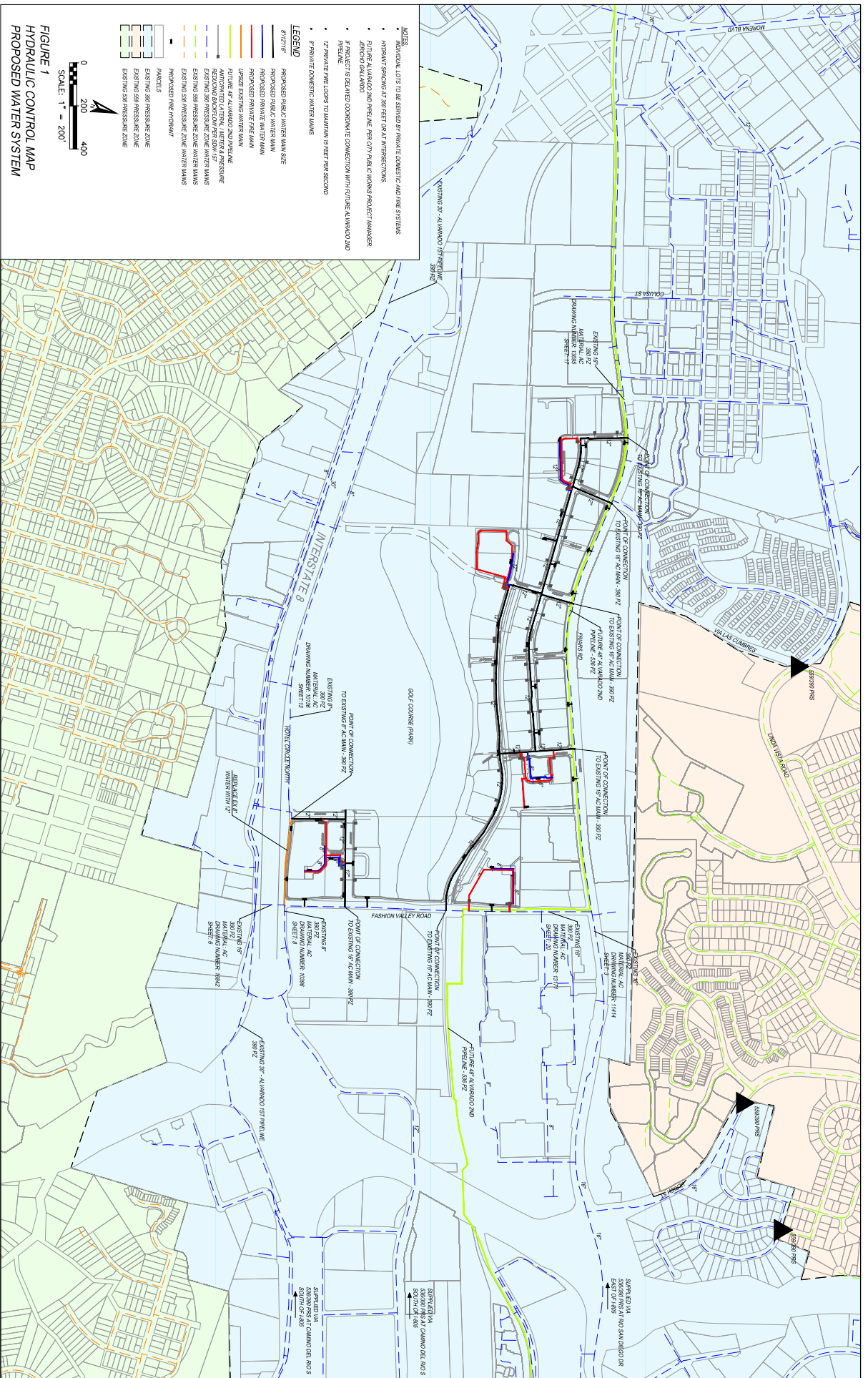
Table 4. Model Result Summary

Model Conditions	Maximum Velocity	Minimum Pressure
Peak Hour (Northern Loop)	5.33 fps @ P1	146.07 psi @ J28
Max Day Plus Fire (Northern Loop)	8.71 fps @ P1	145.83 psi @ J31
Peak Hour (Southern Loop)	7.27 fps @ P1	143.15 psi @ J28
Max Day Plus Fire (Southern Loop)	10.19 fps @ P46	139.67 psi @ J7

PHASING

It is our understanding that development phasing has not been fully established at this point. However, as project phasing occurs, the recommended pipelines sizes shall be installed surrounding the phase with a minimum 12 inch diameter main loop with 2 connections to the existing 390 Pressure Zone

Figure 1
Hydraulic Control Map
Proposed Water System



NOTES

- INDIVIDUAL LOTS TO BE SERVED BY PRIVATE DOMESTIC AND FIRE SYSTEMS
- WASTEWATER SHOWN AT 300 FEET ON ALL INTERSECTIONS
- FUTURE ALVARADO AND PINE LINE PER CITY PUBLIC WORKS PROJECT MANAGER APPROVED (12/13/20)
- PROJECT IS RELATED DOMESTIC CONNECTION WITH FUTURE ALVARADO AND PINE LINE PROJECTS
- IF PRIVATE FIRE LOTS TO MAINTAIN 1/2 FEET PER SECOND
- IF PRIVATE DOMESTIC WATER MAINS

LEGEND

- PROPOSED PUBLIC WATER MAIN SIZE
- PROPOSED PUBLIC WATER MAIN
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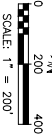
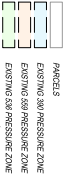
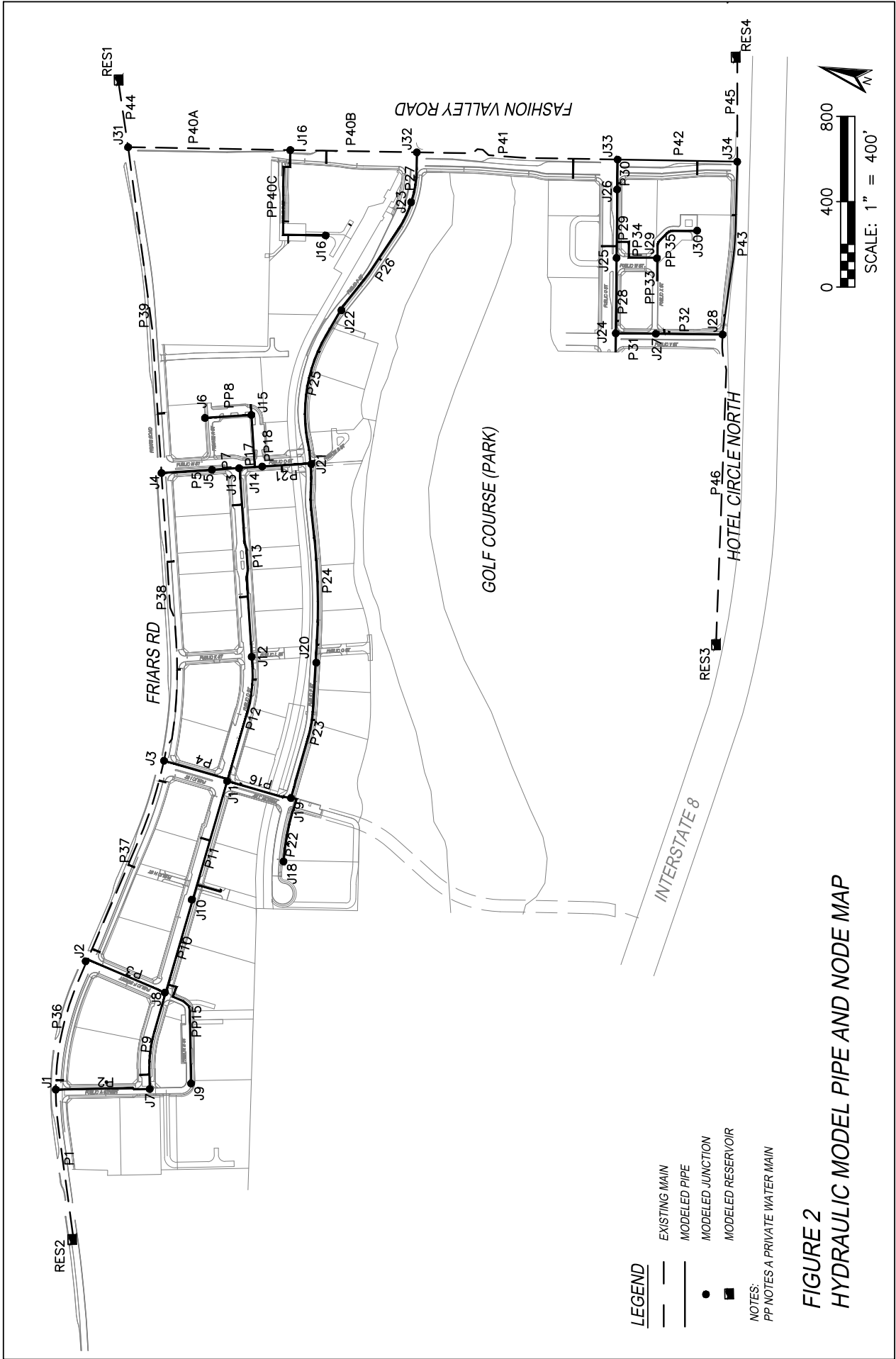


FIGURE 1
HYDRAULIC CONTROL MAP
PROPOSED WATER SYSTEM

Figure 2
Hydraulic Model Pipe and Node Map



Appendix A Model Results

A1 - Ultimate Peak Hour North Loophole Flow Model

Junction	Elevation (ft)	Demand (gpm)	Head (ft)	Pressure (psi)	Link #	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (fps)	Unit Headloss (ft/Kft)
J1	36	229	350.28	136.18	P1	500.00	12	-1878.12	5.33	9.45
J2	36	229	349.00	135.62	P2	425.00	12	834.72	2.37	2.10
J3	42	54	348.79	132.93	P3	393.60	12	-338.79	0.96	0.40
J4	56	74	350.61	127.65	P4	306.40	12	-842.60	2.39	2.14
J5	38	74	347.34	134.04	P5	180.00	12	Pipe Closed		
J6	43	74	347.19	131.80	P7	180.00	12	74.00	0.21	0.02
J7	20	229	349.38	142.72	PP8	211.10	8	74.00	0.47	0.17
J8	24	229	348.85	140.76	P9	460.60	12	-605.72	1.72	1.16
J9	20	229	348.75	142.45	P10	512.75	12	-486.52	1.38	0.77
J10	26.5	54	348.45	139.50	P11	512.75	12	-432.52	1.23	0.62
J11	33	54	348.13	136.55	P12	743.70	12	421.25	1.20	0.59
J12	37	54	347.69	134.62	P13	743.70	12	367.25	1.04	0.46
J13	41	259	347.35	132.74	PP15	532.00	12	229.00	0.65	0.19
J14	46	74	347.35	130.57	P16	341.40	12	799.87	2.27	1.94
J15	43	54	347.22	131.82	P17	170.00	12	34.25	0.10	0.01
J16	38	148	351.36	135.78	PP18	263.60	8	128.00	0.82	0.47
J17	30	0	351.77	139.42	P21	170.00	12	-167.75	0.48	0.11
J18	24	259	347.38	140.12	P22	357.10	12	259.00	0.73	0.24
J19	29	344	347.47	137.99	P23	797.20	12	196.87	0.56	0.14
J20	32.5	259	347.35	136.43	P24	797.20	12	-62.13	0.18	0.02
J21	36	259	347.37	134.92	P25	800.00	12	488.88	1.39	0.78
J22	30	259	347.99	137.79	P26	800.00	12	747.88	2.12	1.72
J23	25	344	349.36	140.55	P27	483.60	12	-1091.88	3.10	3.46
J24	23	344	351.76	142.45	P28	360.00	12	-46.86	0.13	0.01
J25	25	45	351.75	141.58	P29	480.00	12	75.24	0.21	0.02
J26	27	45	351.74	140.71	P30	10.00	12	30.24	0.09	0.01
J27	19	45	351.85	144.22	P31	180.00	12	390.86	1.11	0.52
J28	15	45	352.10	146.07	P32	300.00	12	509.24	1.44	0.84
J29	20	0	351.79	143.76	PP33	375.00	8	73.38	0.47	0.17
J30	20	0	351.79	143.76	PP34	200.00	8	-73.38	0.47	0.17
J31	60	0	353.10	127.00	PP35	200.00	8	0.00	0.00	0.00
J32	25	0	351.04	141.27	P36	633.50	12	814.40	2.31	2.01
J33	27	0	351.74	140.71	P37	982.60	12	246.61	0.70	0.22
J34	24	0	352.12	142.17	P38	1377.00	12	-649.99	1.84	1.32
RES1	355	-1717	355.00	0.00	P39	1538.10	12	-723.99	2.05	1.62
RES2	355	-1921	355.00	0.00	P40A	741.33	12	764.39	2.17	1.79
RES3	355	-361	355.00	0.00	P40B	612.00	12	616.39	1.75	1.20
RES4	355	-367	355.00	0.00	PP40C	668.80	8	-148.00	0.94	0.62
					P41	950.00	12	-475.49	1.35	0.74
					P42	570.00	12	-445.26	1.26	0.66
					P43	900.00	12	57.69	0.16	0.01
					P44	310.00	12	-1488.38	4.22	6.14
					P45	486.00	8	-502.95	3.21	5.93
					P46	500.00	8	-496.54	3.17	5.79

A2 - Ultimate Max. Day Demand + Fire North Loophole Model

Junction	Elevation (ft)	Demand (gpm)	Head (ft)	Pressure (psi)	Link #	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (fps)	Unit Headloss (ft/Kft)
J1	36	355	354.77	138.12	P1	10.00	12	-3069.02	8.71	23.45
J2	36	350	350.44	136.25	P2	425.00	12	1395.51	3.96	5.45
J3	42	347	346.98	132.15	P3	393.60	12	-374.30	1.06	0.48
J4	56	350	349.51	127.18	P4	306.40	12	-1856.31	5.27	9.24
J5	38	332	331.55	127.20	P5	180.00	12		Pipe Closed	
J6	43	326	326.04	122.64	P7	180.00	12	1032.00	2.93	3.12
J7	20	352	352.45	144.05	PP8	211.10	8	32.00	0.20	0.04
J8	24	350	350.26	141.37	P9	460.60	12	-1297.51	3.68	4.76
J9	20	350	350.24	143.09	P10	512.75	12	-1475.81	4.19	6.04
J10	26.5	347	347.16	138.94	P11	512.75	12	-1452.81	4.12	5.87
J11	33	344	344.15	134.82	P12	743.70	12	1739.06	4.93	8.19
J12	37	338	338.06	130.45	P13	743.70	12	1716.06	4.87	7.99
J13	41	332	332.11	126.14	PP15	532.10	12	98.00	0.28	0.04
J14	46	332	332.22	124.02	P16	341.40	12	1547.06	4.39	6.60
J15	43	326	326.05	122.64	P17	170.00	12	-426.94	1.21	0.61
J16	38	350	349.98	135.18	PP18	263.60	8	1055.00	6.73	23.39
J17	30	350	350.07	138.69	P21	170.00	12	-2513.94	7.13	16.21
J18	24	342	341.88	137.74	P22	357.10	12	111.00	0.31	0.05
J19	29	342	341.90	135.58	P23	797.20	12	1289.06	3.66	4.70
J20	32.5	338	338.14	132.44	P24	797.20	12	1178.06	3.34	3.98
J21	36	335	334.97	129.54	P25	800.00	12	1446.88	4.10	5.83
J22	30	340	339.63	134.16	P26	800.00	12	1557.88	4.42	6.68
J23	25	345	344.98	138.65	P27	483.60	12	-1704.88	4.84	7.90
J24	23	351	351.22	142.22	P28	360.00	12	-241.89	0.69	0.21
J25	25	351	351.15	141.32	P29	480.00	12	321.99	0.91	0.36
J26	27	351	350.97	140.38	P30	10.00	12	302.99	0.86	0.32
J27	19	351	351.32	143.99	P31	180.00	12	388.89	1.10	0.51
J28	15	352	351.57	145.83	P32	300.00	12	506.99	1.44	0.84
J29	20	351	351.21	143.51	PP33	375.00	8	99.10	0.63	0.29
J30	20	351	351.21	143.51	PP34	200.00	8	-99.10	0.63	0.29
J31	60	353	352.56	126.77	PP35	200.00	8	0.00	0.00	0.00
J32	25	349	348.80	140.30	P36	633.50	12	1575.51	4.47	6.82
J33	27	351	350.97	140.38	P37	982.60	12	1103.21	3.13	3.53
J34	24	352	351.57	141.93	P38	1377.00	12	-776.10	2.20	1.84
RES1	355	-1743	355.00	0.00	P39	1538.10	12	-808.10	2.29	1.98
RES2	355	-3228	355.00	0.00	P40A	741.33	12	894.82	2.54	3.35
RES3	355	-443	355.00	0.00	P40B	612.00	12	830.82	2.36	2.09
RES4	355	-454.87	355.00	0.00	PP40C	668.80	8	-64.00	0.41	0.13
					P41	950.00	12	-874.07	2.48	2.29
					P42	570.00	12	-571.08	1.62	1.04
					P43	900.00	12	-18.27	0.05	0.00
					P44	310.00	12	-1702.92	4.83	7.88
					P45	486.00	8	-552.81	3.53	7.07
					P46	500.00	8	-544.26	3.47	6.87

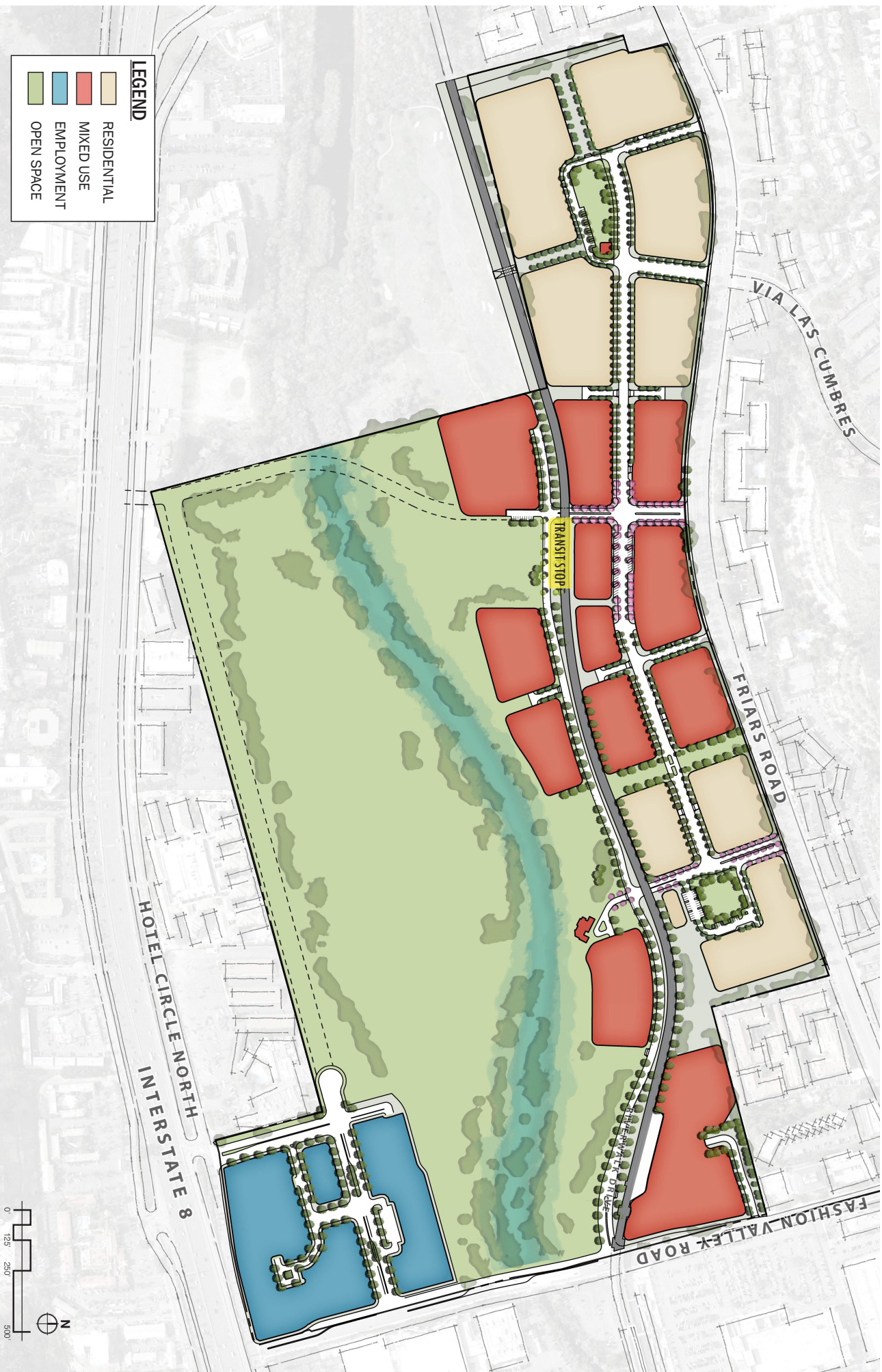
A3 - Ultimate Peak Hour South Loophole Flow Model

Junction	Elevation (ft)	Demand (gpm)	Head (ft)	Pressure (psi)	Link #	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (fps)	Unit Headloss (ft/Kft)
J1	36	174	346.60	134.58	P1	500.00	12	-2562.48	7.27	16.79
J2	36	174	343.81	133.37	P2	425.00	12	1142.57	3.24	3.76
J3	42	26	341.71	129.87	P3	393.60	12	-231.74	0.66	0.20
J4	56	52	340.92	123.46	P4	306.40	12	-399.70	1.13	0.54
J5	38	52	340.86	131.23	P5	180.00	12	-306.97	0.87	0.33
J6	43	52	340.65	128.97	P7	180.00	12	-254.97	0.72	0.23
J7	20	174	345.00	140.82	PP8	211.10	8	52.00	0.33	0.09
J8	24	174	343.73	138.54	P9	460.60	12	-968.57	2.75	2.77
J9	20	174	343.67	140.24	P10	512.75	12	-852.31	2.42	2.19
J10	26.5	26	342.61	136.97	P11	512.75	12	-826.31	2.34	2.06
J11	33	26	341.55	133.69	P12	743.70	12	392.89	1.11	0.52
J12	37	26	341.16	131.79	P13	743.70	12	366.89	1.04	0.46
J13	41	204	340.82	129.91	PP15	532.00	12	174.00	0.49	0.12
J14	46	52	340.72	127.70	P16	341.40	12	807.12	2.29	1.98
J15	43	26	340.67	128.98	P17	170.00	12	417.86	1.19	0.58
J16	38	104	340.68	131.15	PP18	263.60	8	78.00	0.50	0.19
J17	30	0	340.89	134.71	P21	170.00	12	287.86	0.82	0.29
J18	24	204	340.82	137.28	P22	357.10	12	204.00	0.58	0.15
J19	29	344	340.87	135.13	P23	797.20	12	259.12	0.74	0.24
J20	32.5	204	340.68	133.54	P24	797.20	12	55.12	0.16	0.01
J21	36	204	340.67	132.01	P25	800.00	12	-138.98	0.39	0.08
J22	30	204	340.61	134.59	P26	800.00	12	65.02	0.18	0.02
J23	25	344	340.62	136.76	P27	483.60	12	-409.02	1.16	0.56
J24	23	344	342.83	138.58	P28	360.00	12	-686.37	1.95	1.46
J25	25	250	342.30	137.49	P29	480.00	12	707.52	2.01	1.55
J26	27	250	341.56	136.30	P30	10.00	12	457.52	1.30	0.69
J27	19	250	343.39	140.56	P31	180.00	12	1030.37	2.92	3.11
J28	15	250	345.38	143.15	P32	300.00	12	1551.52	4.40	6.63
J29	20	0	342.68	139.82	PP33	375.00	8	271.14	1.73	1.89
J30	20	0	342.68	139.82	PP34	200.00	8	-271.14	1.73	1.89
J31	60	0	340.90	121.71	PP35	200.00	8	0.00	0.00	0.00
J32	25	0	340.90	136.88	P36	633.50	12	1245.91	3.53	4.42
J33	27	0	341.55	136.30	P37	982.60	12	840.17	2.38	2.13
J34	24	0	347.35	140.11	P38	1377.00	12	414.47	1.18	0.58
RES1	355	-1850	355.00	0.00	P39	1538.10	12	55.50	0.16	0.01
RES2	355	-1745	355.00	0.00	P40A	741.33	12	55.50	0.16	0.01
RES3	355	-406	355.00	0.00	P40B	612.00	12	-48.50	0.14	0.01
RES4	355	-364	355.00	0.00	PP40C	668.80	8	-104.00	0.66	0.32
					P41	950.00	12	-457.52	1.30	0.69
					P42	570.00	12	0.00	0.00	0.00
					P43	900.00	12	852.10	2.42	2.19
					P44	310.00	12	Pipe Closed		
					P45	486.00	8	-852.10	5.44	15.75
					P46	500.00	8	-949.42	6.06	19.24

A4 - Ultimate Max. Day Demand + Fire South Loophole Model

Junction	Elevation (ft)	Demand (gpm)	Head (ft)	Pressure (psi)	Link #	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (fps)	Unit Headloss (ft/Kft)
J1	36	75	344.83	133.82	P1	500.00	12	-2841.88	8.06	20.34
J2	36	75	341.74	132.48	P2	425.00	12	1451.57	4.12	5.86
J3	42	11	337.49	128.04	P3	393.60	12	-9.44	0.03	0.00
J4	56	22	334.84	120.82	P4	306.40	12	-423.18	1.20	0.60
J5	38	22	334.84	128.62	P5	180.00	12	72.57	0.21	0.02
J6	43	22	334.67	126.38	P7	180.00	12	94.57	0.27	0.04
J7	20	75	342.34	139.67	PP8	211.10	8	22.00	0.14	0.02
J8	24	75	341.74	137.67	P9	460.60	16	-1376.57	2.20	1.31
J9	20	75	341.72	139.40	P10	512.75	12	-1236.01	3.51	4.35
J10	26.5	11	339.50	135.62	P11	512.75	12	-1225.01	3.48	4.28
J11	33	11	337.31	131.86	P12	743.70	12	739.02	2.10	1.68
J12	37	11	336.06	129.58	P13	743.70	12	728.02	2.07	1.63
J13	41	88	334.85	127.32	PP15	532.00	12	75.00	0.21	0.02
J14	46	22	334.68	125.09	P16	341.40	12	898.18	2.55	2.41
J15	43	11	334.67	126.38	P17	170.00	12	545.45	1.55	0.96
J16	38	44	329.86	126.46	PP18	263.60	8	33.00	0.21	0.04
J17	30	0	329.91	129.95	P21	170.00	12	490.45	1.39	0.79
J18	24	88	336.48	135.40	P22	357.10	12	88.00	0.25	0.03
J19	29	147	336.49	133.23	P23	797.20	12	663.18	1.88	1.37
J20	32.5	88	335.39	131.24	P24	797.20	12	575.18	1.63	1.06
J21	36	88	334.55	129.36	P25	800.00	12	-977.63	2.77	2.82
J22	30	88	332.30	130.98	P26	800.00	12	-889.63	2.52	2.37
J23	25	147	330.40	132.33	P27	1000.00	12	742.63	2.11	1.69
J24	23	1147	322.24	129.66	P28	360.00	12	-368.29	1.04	0.46
J25	25	1107	322.08	128.72	P29	480.00	12	-438.88	1.25	0.64
J26	27	1107	322.38	127.99	P30	10.00	12	-1545.88	4.39	6.59
J27	19	1107	323.39	131.89	P31	180.00	12	1515.29	4.30	6.35
J28	15	107	329.81	136.41	P32	300.00	12	2922.12	8.29	21.42
J29	20	0	322.53	131.09	PP33	375.00	8	299.84	1.91	2.28
J30	20	0	322.53	131.09	PP34	200.00	8	-299.84	1.91	2.28
J31	60	0	331.51	117.64	PP35	200.00	8	0.00	0.00	0.00
J32	25	0	328.71	131.60	P36	633.50	12	1315.30	3.73	4.88
J33	27	0	322.45	128.02	P37	982.60	12	1230.87	3.49	4.32
J34	24	0	334.96	134.74	P38	1377.00	12	796.68	2.26	1.93
RES1	355	-2227	355.00	0.00	P39	1538.10	12	847.25	2.40	2.16
RES2	355	-1790	355.00	0.00	P40A	741.33	12	847.25	2.40	2.16
RES3	355	-977	355.00	0.00	P40B	612.00	12	803.25	2.28	1.96
RES4	355	-877	355.00	0.00	PP40C	668.80	8	-44.00	0.28	0.07
					P41	950.00	12	1545.88	4.39	6.59
					P42	570.00	12	0.00	0.00	0.00
					P43	900.00	12	1432.74	4.06	5.72
					P44	500.00	12	Pipe Closed		
					P45	486.00	8	-1432.74	9.14	41.23
					P46	500.00	8	-1596.38	10.19	50.38





Appendix B
Proposed Concept



DEVELOPMENT CONCEPT DIAGRAM



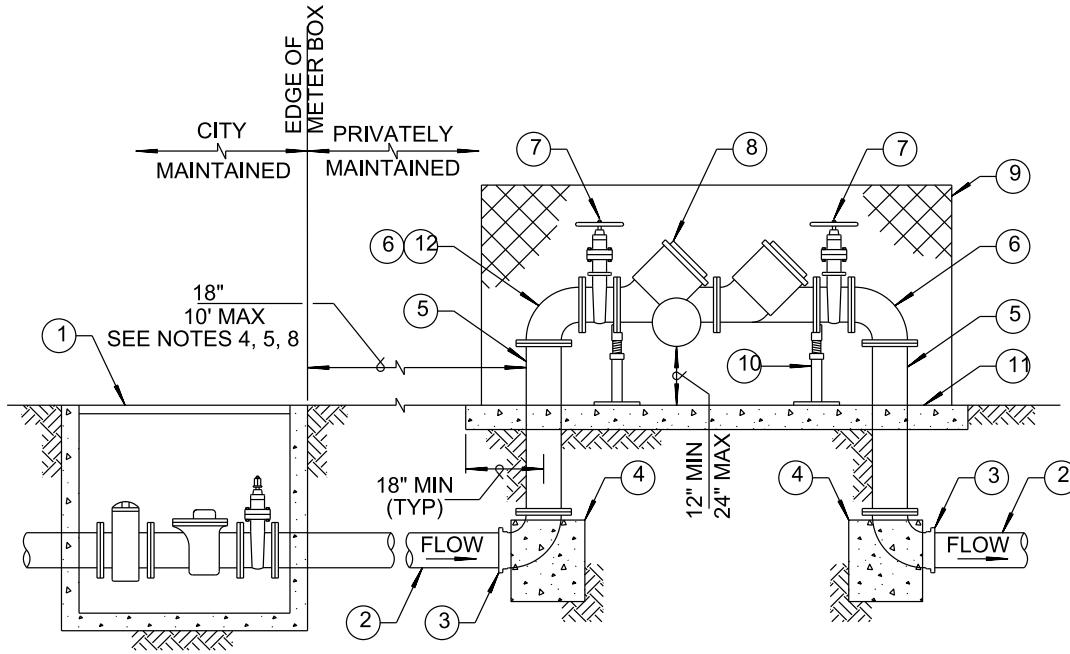
LEGEND

	CC-3-9 ZONE
	RM-4-11 ZONE
	OC 1-1 ZONE
	OP-1-1 ZONE

ZONING MAP

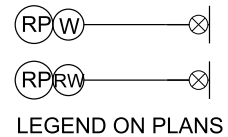
MARCH 28, 2019

Appendix C
SDW - 156



NOTES:

- 1) INSTALL WARNING/ IDENTIFICATION TAPE PER **SDM-105**.
- 2) LOCATE BACKFLOW PREVENTION ASSEMBLY IN SUCH A MANNER THAT WILL ALLOW THE ASSEMBLY TO BE READILY ACCESSIBLE FOR INSPECTION AND REPAIR
- 3) STRAINERS SHALL NOT BE INSTALLED PRIOR TO THE FIRST SHUT-OFF VALVE
- 4) INSTALL A CASING ENCASED IN CONCRETE WHEN THE DISTANCE BETWEEN THE METER BOX AND THE RISER TO THE ASSEMBLY EXCEEDS 18", REQUIRES APPROVAL.
- 5) INSTALL A PRESSURE REDUCING VALVE UPSTREAM OF THE BACKFLOW ASSEMBLY WHEN SYSTEM PRESSURE EXCEEDS 150 PSI.
- 6) TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SPECIFICATIONS PRIOR TO ACCEPTANCE
- 7) BACKFLOW PREVENTION ASSEMBLY & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS
- 8) PUBLIC UTILITIES DEPARTMENT CROSS CONNECTION CONTROL UNIT MUST APPROVE LOCATION AS SHOWN ON PLANS.



ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	METER VAULT & METER ASSEMBLY PER WS-04	⑧	APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY SIZED TO MATCH METER
②	MINIMAL SCHEDULE 80 PVC OR DUCTILE IRON PIPE	⑨	ENCLOSURE SHALL BE INSTALLED LEVEL AND PLUMB. ENCLOSURE IS REQUIRED.
③	FLG x FLG OR MJ/PO x FLG 90 DEGREE BEND	⑩	ADJUSTABLE VALVE SUPPORT
④	CONCRETE THRUST BLOCK PER SDW-151	⑪	CONCRETE SLAB, MINIMUM 4" THICK x 36" WIDE
⑤	FLANGED DUCTILE IRON PIPE	⑫	FLANGED ANGLE PRESSURE REDUCING VALVE SEE NOTE 5
⑥	FLANGED 90 DEGREE BEND, SEE NOTE 5		
⑦	FLANGED RESILIENT WEDGE VALVE		

REVISION	BY	APPROVED	DATE	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
ORIGINAL*	KA	J. NAGELVOORT	01/12		BACKFLOW PREVENTER FOR 3" AND LARGER METERED SERVICE
UPDATED	FG	J. NAGELVOORT	08/15		
UPDATED	FG	J. NAGELVOORT	02/16		
REDRAFTED	CD	J. NAGELVOORT	09/18		
				DRAWING NUMBER	SDW-156