July 9, 2020

J·R ENGINEERING
A Westrian Company

Daniel Pershing
Aurora Water
15151 E. Alameda Parkway
Aurora, CO 80012

Re: Cross Creek Commercial – Utility Compliance Letter

Dear Mr. Pershing:

This letter has been prepared to demonstrate that the proposed sanitary sewer and water system infrastructure for the Cross Creek Commercial development is in compliance with the previously approved "Cross Creek Initial Phase Development Utility Report," by High Country Engineering, Inc, dated January 31, 2002, revised October 21, 2002. The Cross Creek Commercial site is bound by East Fifth Avenue on the north, Tract H Cross Creek Subdivision Filing Number 1 on the northeast, East Sixth Parkway on the southeast, and North Gun Club Road on the west. The site is currently vacant. An existing detention pond is located in the southwest corner of the site and a second existing detention pond is in the northwest corner of the site.

Proposed with this development are two commercial pad-ready lots in the southwest corner of the site. Also proposed is Street A, which is proposed to intersect East Sixth Parkway on the southeast and proposed Street B which is proposed to intersect North Gun Club Road to the west. In a future phase of development of the site, Street A will be extended to East Fifth Avenue. Utility infrastructure (water, sewer, and storm sewer) to serve the Cross Creek site is proposed within the Street A and Street B rights of way.

The unplatted land to the east of the Street A extension is anticipated to be developed as a Single-Family Duplex development at the future date and the land to the west of the Street A extension is anticipated to be developed as either multi-family or commercial at a future date.

A site map showing utilities has been included with this letter. No changes have been made to the previous site configuration that was presented within the original overall Cross Creek utility report. The subsections that follow outline the proposed conditions and compare them to the information provided within the "Cross Creek Initial Phase Development Utility Report."

Overall Site Data:

Based on lot acreage for each proposed use of the site and water and sanitary sewer demand per zoning classification set forth by the City of Aurora, Total Average Day Demand, Maximum Day Demand, and Maximum Day Demand plus Fire Flow were calculated for the water system and sewer system. The zoning for this site is R-2, Sub-Area C. A commercial use was assumed for the proposed pad-ready sites in the southwest corner of the site. Since the future uses for the northwest portion of the site and the northeast portion of the site are unknown at this time, Large Multi-Family (30 DU/Acre) was assumed for the northwest portion of the site and Single Family Attached or Detached use (15 DU/Acre) was assumed for the northeast portion of the site. A summary of the proposed Total Average Day Demand compared to the Average Day Demand per the previously-approved report is provided in Tables 1 and 3. The City's fire flow demand requirements are shown in Table 2. Detailed calculations are provided in the appendix.

7200 South Alton Way, Suite C400 Centennial, CO 80112
303-740-9393 • Fax: 303-721-9019 • www.jrengineering.com

Table 1 - Cross Creek Water System Demand

Land Use	Lot Acreage	Avg. Daily Flow (gal/acre/day)	# of Units Served	Total Avg. Day Demand (gpd)
Gas Station (Lot 1)	1.28	1,500	-	1,920.00
Retail (Lot 2)	1.05	1,500	-	1,575.00
Large Multi-Family	8.00	-	2.77	67,144.80
SFD or Townhome	16.00	-	2.77	67,144.80
Total Proposed	26.3	-	-	137,784.6
Per Previous Report	36.1	-	-	25,056.00

Table 2 - Fire Flow Demand Based on Use

Use Classification:	
Residential	1,500 gpm for 2 hrs
Commercial/Multifamily	2,500 gpm for 2 hrs

Table 3 - Cross Creek Sanitary Sewer System Demand

Land Use	Lot Acreage	Avg. Daily Flow (gal/acre/day)	Avg. Daily Flow (gal/capita/day)	# of Capita Served	Total Avg. Day Demand (gpd)
Gas Station (Lot 1)	1.28	1,500	-	28.16	1,920.00
Retail (Lot 2)	1.05	1,500	-	23.1	1575.00
Large Multi-Family	8.00	-	68	665	45,220.00
SFD or Townhome	16.00	-	68	665	45,220.00
Total Proposed	26.33	-	-	1,381.26	93.935.00
Per Previous Report	36.1	-	-	-	72,144.00

Sanitary Sewer System:

The Cross Creek Commercial site will be serviced by an existing 8" sanitary sewer stub located at the intersection of East Sixth Parkway and East First Avenue, according to the Cross Creek Metropolitan District's Construction Drawings, dated August 6, 2003, by High Country Engineering, Inc. Loading and pipe loading calculations are provided in the Sanitary Sewer Demand Calculations and Channel Report attachments. These calculations are based on an 8" diameter sanitary main design and result in a 0%-59.7% full pipe depth of flow (d/D) under a minimum pipe slope design of 0.4%. The resulting pipe velocity of 2.72 feet per second (fps) is within the City of Aurora's required range of 2-10 fps. Refer to the calculations in the appendix.

Water System:

The Cross Creek Commercial site will be serviced by an existing 8" water stub located at the intersection of East Sixth Parkway and East First Avenue, according to the previously mentioned Cross Creek Metropolitan District's Construction Drawings.

During the review process, the City requested demonstration of system compliance for Average Day, Maximum Hour and Maximum Day plus Fire Flow. Since the development of Tract B is unknown, water demands for possible uses (SFD, multi-family, and commercial) were compared to determine highest water demand. This comparison determined that a Large Multi-Family development has the highest water usage. Therefore, Large Multi-Family water usage was assumed in the WaterCAD model as to not restrict future

development of Tract B. A static water pressure of 67 pounds per square inch (psi) at the East Sixth Parkway and Street A intersection was provided by the City and utilized in the WaterCAD model. The calculated hydraulic grade line is 5716.6 feet. Average Day, Maximum Day, Maximum Hour, and Maximum Day plus Fire-Flow model outputs for the system's pipes and junctions have been provided with this utility letter, along with the model layout. The calculations provided show the minimum system pressures on the junctions and maximum velocity and headloss in the pipes. During Maximum Day plus Fire-Flow, the lowest pressure exists on junction 9 with 57.7 psi. This value is greater than the 20 psi minimum City requirement. The highest velocity during all scenarios other than Maximum Day plus Fire-Flow exists during maximum hour on pipe 28 at 2.74 fps. The highest head loss during all scenarios other than Maximum Day plus Fire-Flow occurs during Maximum Hour on pipe 18 at 0.48 feet. These values are less than the City's requirements of 3 fps max velocity and 5 ft/1000 ft headloss on 8-inch pipes. All other pipes and junctions in the model are in compliance with the City's requirements.

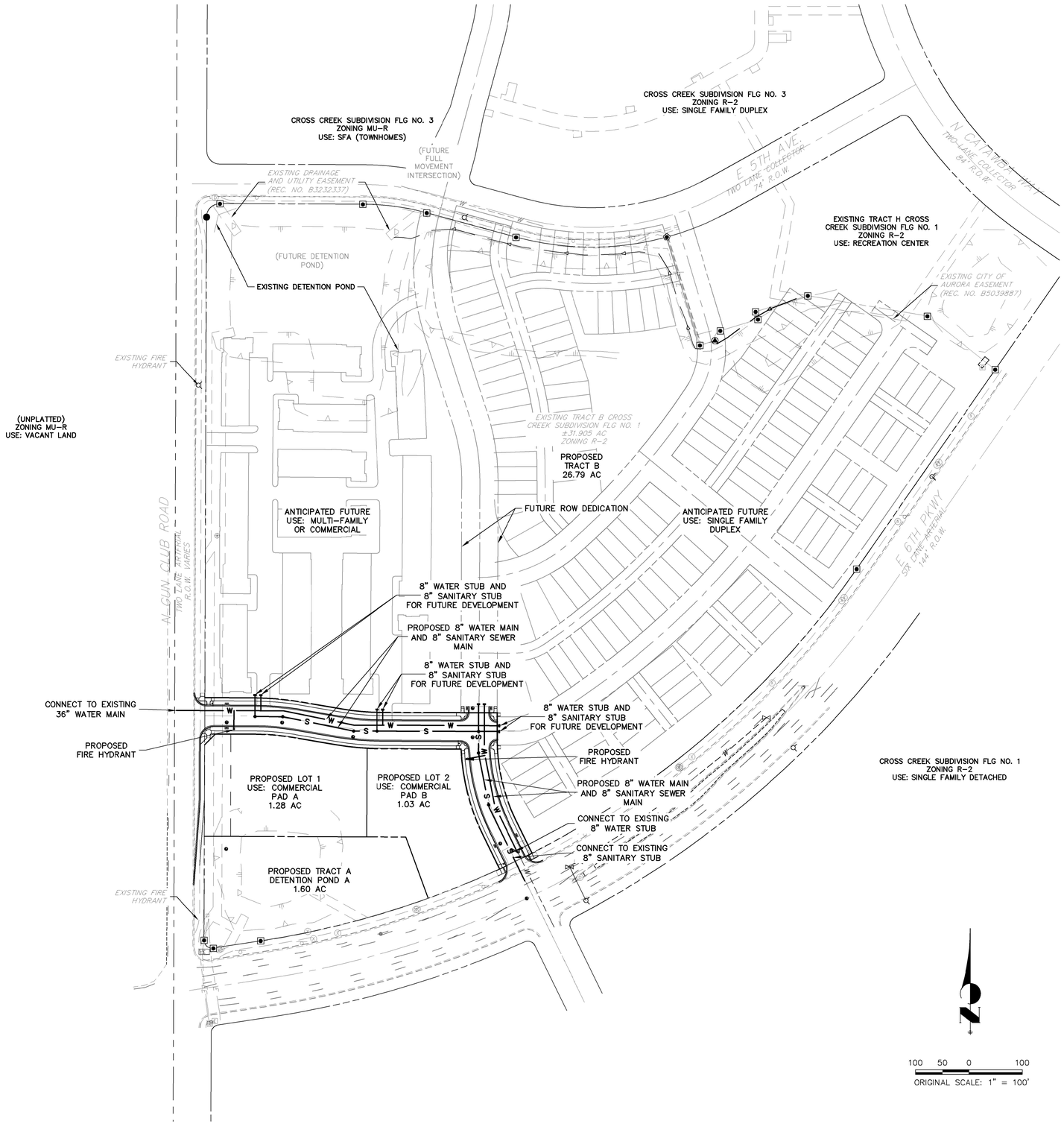
Conclusion:

The data presented in this letter demonstrates that the Cross Creek Commercial development conforms to the overall design set forth in the previously approved utility study. Although proposed development results in higher water and sewer demands than those assumed in the master study, the calculations show that the impact of the higher demands to the water and sewer systems is minimal and will not result in larger pipe sizes required to serve this development. The calculations show than an 8" diameter water main size and 8" diameter sewer main size will be sufficient to provide water and sewer service to this development. The existing and proposed sanitary sewer system and water system infrastructure are adequately sized to service the site and therefore are in compliance with City of Aurora criteria.

If you have any questions regarding the design or require any additional information, please do not hesitate to contact me at 303-358-7013 ext. 6190.

Sincerely,
JR Engineering, LLC

Kurtis W. Williams, PE
Vice President



LAYER LINETYPE LEGEND

	EXISTING	PROPOSED
SECTION LINE		
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
CENTERLINE		
TOP OF SLOPE		
TOE OF SLOPE		
CURB AND GUTTER		
SIDEWALK		
WATER LINE	W W	W W
SANITARY SEWER LINE	S S	S S
STORM SEWER		

CHECKED BY: JGS
DRAWN BY: JGS

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Fort Collins 970-491-9888 • www.jrengineering.com

CROSS CREEK PA-C1 - PRELIMINARY PLAT

NORTH GUN CLUB ROAD AND EAST 6TH PARKWAY

AURORA, CO

OWNER:
SUNRISE PARTNERS LP
David Meyerowitz
100 Sheppard Avenue E, Suite 20
North York, Ontario M2n 6n5

DATE:
7/21/20 SUBMITTAL

SHEET TITLE:
OVERALL WATER AND SEWER EXHIBIT
PROJECT NO. 15879.20

Sanitary Sewer Demand Calculations
6/17/2020

Notes:
Zoning is R-2 Zone District, Subarea C
Since the use for the north portion of the site is unknown at this time, the highest water demand based on zoning has been conservatively used in these calculations:
- Maximum Density, Single Family attached or detached: 15 DU/Acre conservatively assumed for townhome/tiny home product
- Maximum Density, Large Multi-family buildings: 30 DU/Acre conservatively assumed
- Commercial: Average Day Water Demand: 1,500 gpd/acre (Avg. Day)

Cross Creek Sanitary Sewer Demand Calculations

Count	Land Use	Zoning	Lot Acreage	Avg. Daily Flow *(gal/acre/day)*	Avg. Daily Flow *(gal/capita/day)*	Capita/Unit	Population/Acre	# of Capita Served	Total Avg. Day Demand *(GPD)*	Total Avg. Day Demand *(GPM)*	I/I (10% of (GPM)	Peak Hour Demand Factor	Peak Hour *(GPM)*	Total Peak *(GPM)*	Total Peak *(CFS)*
1	Gas Station (Lot 1)	R-2, Subarea C	1.28	1500			22	28.16	1,920.00	1.33	0.13	4.0	5.33	5.47	0.01
2	Retail (Lot 2)	R-2, Subarea C	1.05	1500			22	23.1	1,575.00	1.09	0.11	4.0	4.38	4.48	0.01
3	Large Multi-Family	R-2, Subarea C	8.00		68	2.77		665	45,220.00	31.40	3.14	4.0	125.61	128.75	0.29
4	Single Family	R-2, Subarea C	16.00		68	2.77		665	45,220.00	31.40	3.14	4.0	125.61	128.75	0.29
	Total		26.3					1381.26	93,935.00	65.23	6.52		260.93	267.45	0.60
	From Previous Report		36.1						72,144.00	50.1				205.6	0.46

Zoning	Type of Development	Units/Acre	People/Unit	Gallons/person/day	. Daily Flow (gpd/acre)
R-2, Subarea C	Large Multi-Family	30	2.77	68	-
R-2, Subarea C	Single Family	15	2.77	68	-
R-2, Subarea C	Commercial	-	-	-	1500

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Jun 23 2020

<Name>

Depth of flow is less than 80% of pipe diameter, so OK.

Circular

Diameter (ft)	= 0.67
Invert Elev (ft)	= 100.00
Slope (%)	= 0.40
N-Value	= 0.011

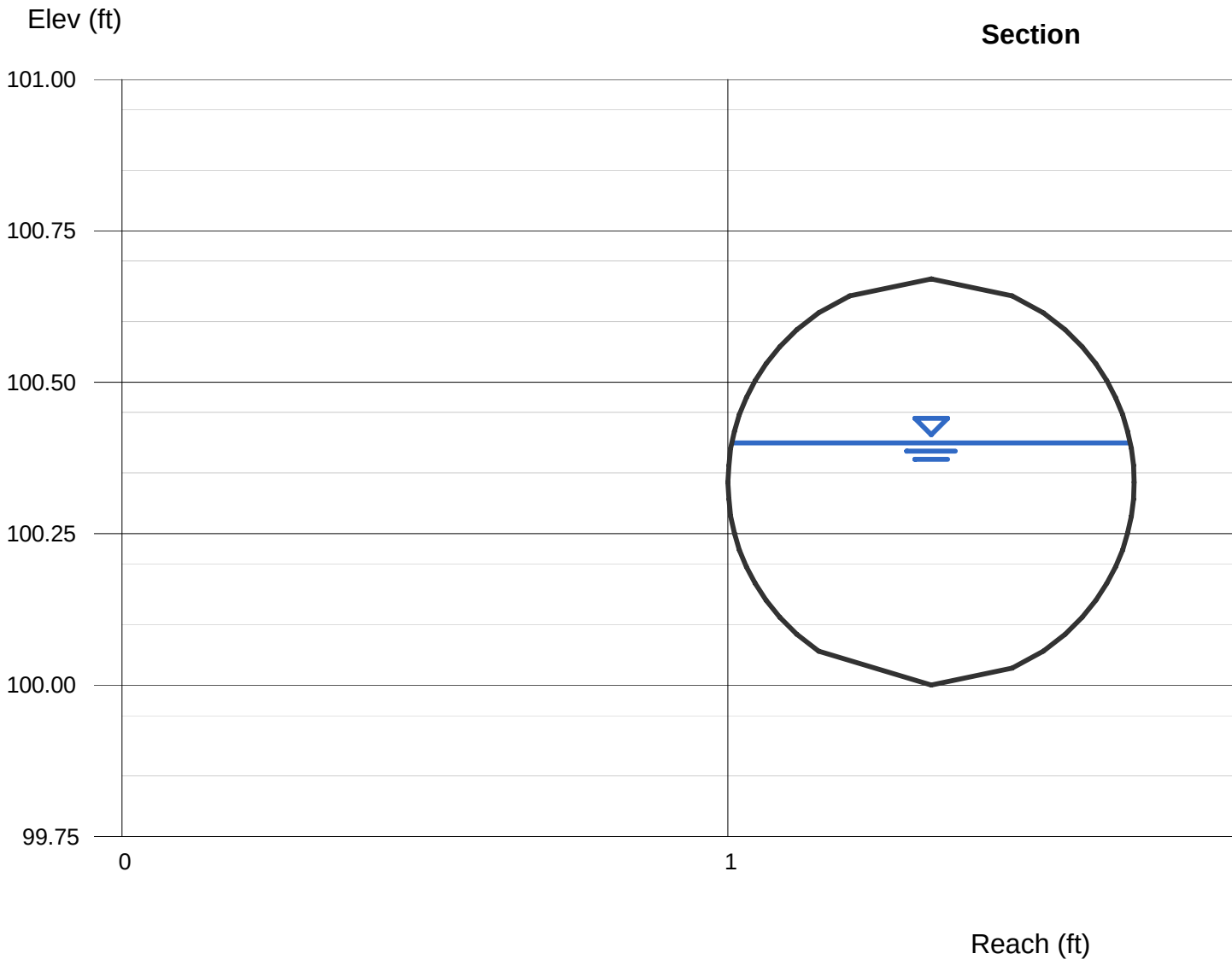
Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.60

Highlighted

Depth (ft)	= 0.40
Q (cfs)	= 0.600
Area (sqft)	= 0.22
Velocity (ft/s)	= 2.72
Wetted Perim (ft)	= 1.19
Crit Depth, Yc (ft)	= 0.37
Top Width (ft)	= 0.66
EGL (ft)	= 0.52

Velocity is greater than 2 ft/s and less than 10 ft/s, so OK.



HURON RESIDENTIAL
Water Demands Summary Table

Water Demand Calculations
6/17/2020

Notes:
Zoning is R-2 Zone District, Subarea C
Since the use for the north portion of the site is unknown at this time, the highest water demand based on zoning has been conservatively used in these calculations:
- Maximum Density, Single Family attached or detached: 15 DU/Acre conservatively assumed for townhome/tiny home product
- Maximum Density, Large Multi-family buildings: 30 DU/Acre conservatively assumed
- Commercial: Average Day Water Demand: 1,500 gpd/acre (Avg. Day)

Cross Creek Water System Demand Calculations															
Count	Land Use	Zoning	Junction	Pressure Zone	Lot Acreage	Avg. Daily Flow	Avg. Daily Flow	Capita/Unit	# of Units Served	Total Avg. Day Demand		Max Day Demand	Max Day	Peak Hour Demand	Peak Hour
						(gal/acre/day)	*(gal/capita/day)*			*(GPD)*	*(GPM)*		*(GPM)*		*(GPM)*
1	Gas Station (Lot 1)	R-2, Subarea C			1.28	1500				1,920.00	1.33	2.8	3.73	4.5	6.00
2	Retail (Lot 2)	R-2, Subarea C			1.05	1500				1,575.00	1.09	2.8	3.06	4.5	4.92
3	Large Multi-Family	R-2, Subarea C			8.00		101	2.77	240	67,144.80	46.63	2.8	130.56	4.5	209.83
4	Single Family	R-2, Subarea C			16.00		101	2.77	240	67,144.80	46.63	2.8	130.56	4.5	209.83
	Total				26.3					137,784.60	95.68		267.91		430.58
	From Previous Report:				36.1					25,056.00	17.40		34.90		69.30

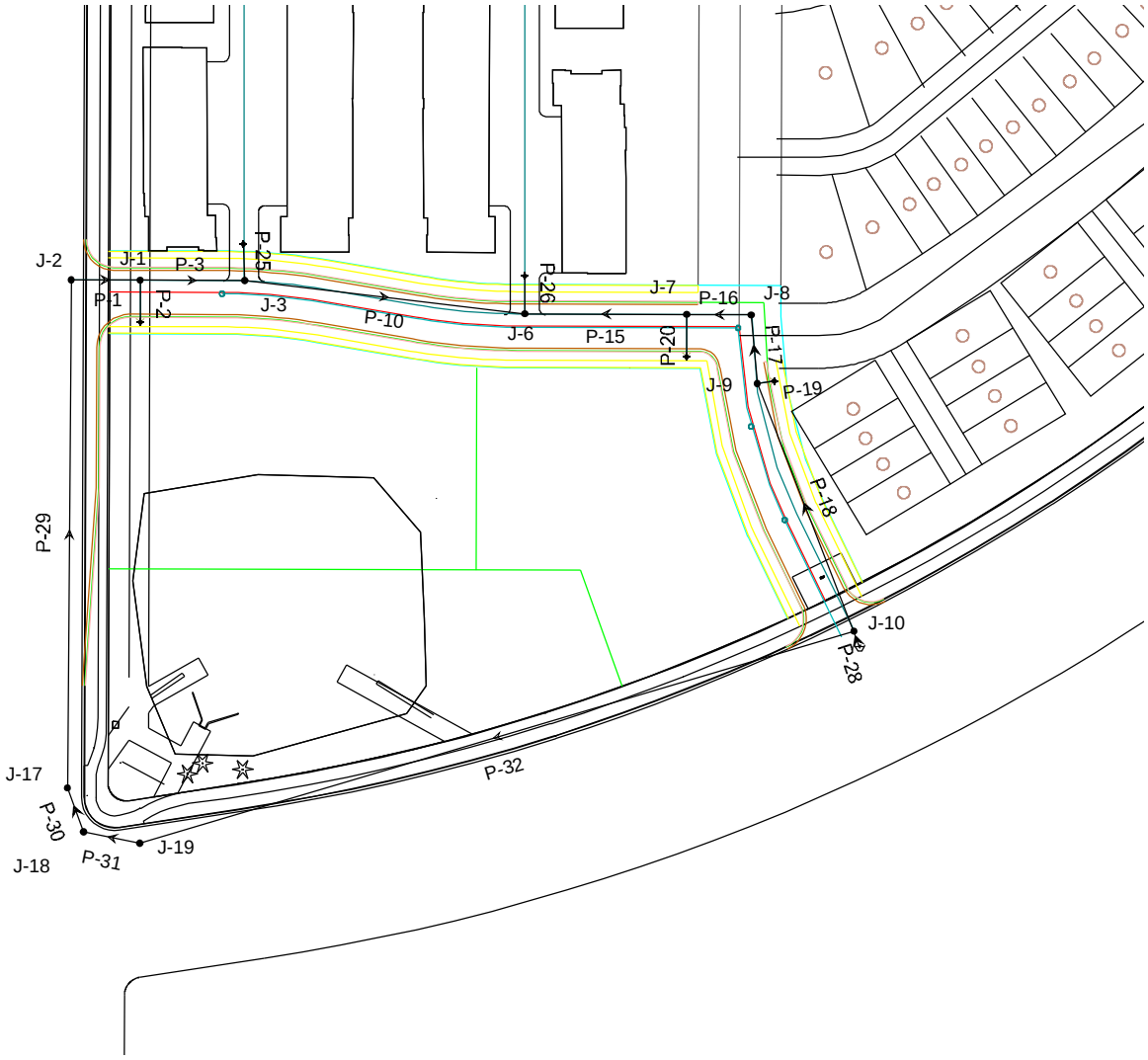
Water Demand Based on Use

Zoning	Type of Development	Units/Acre	People/Unit	Gallons/person/day	Avg. Daily Flow (gpd/acre)
R-2, Subarea C	Large Multi-Family	30	2.77	101	-
R-2, Subarea C	Single Family	15	2.77	101	-
R-2, Subarea C	Commercial	-	-	-	1500

Fire Flow Based on Use

Use Classification	
Residential	1500 gpm for 2 hrs
Commercial/Multifamily	2500 gpm for 2 hrs

Active Scenario: Average Daily



Active Scenario: Average Daily

Label	Length (ft)	Diameter (in)	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss (ft)
P-28	15	8.0	120.0	95.46	0.61	0.00
P-18	217	8.0	120.0	65.63	0.42	0.03
P-17	56	8.0	120.0	65.63	0.42	0.01
P-1	56	8.0	120.0	29.83	0.19	0.00
P-29	415	8.0	120.0	29.83	0.19	0.01
P-30	38	8.0	120.0	29.83	0.19	0.00
P-31	47	8.0	120.0	29.83	0.19	0.00
P-32	608	8.0	120.0	29.83	0.19	0.02
P-3	85	8.0	120.0	28.49	0.18	0.00
P-16	53	8.0	120.0	19.09	0.12	0.00
P-15	132	8.0	120.0	18.00	0.11	0.00
P-10	230	8.0	120.0	5.25	0.03	0.00
P-26	31	6.0	120.0	0.00	0.00	0.00
P-2	34	6.0	120.0	0.00	0.00	0.00
P-25	30	6.0	120.0	0.00	0.00	0.00
P-19	14	6.0	120.0	0.00	0.00	0.00
P-20	35	6.0	120.0	0.00	0.00	0.00

Active Scenario: Average Daily

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2	5,559.0	0.00	5,716.6	68.2
J-1	5,559.5	1.33	5,716.6	68.0
J-19	5,560.0	0.00	5,716.6	67.7
J-18	5,560.0	0.00	5,716.6	67.7
J-17	5,560.0	0.00	5,716.6	67.7
J-3	5,560.5	23.24	5,716.6	67.5
J-10	5,561.0	0.00	5,716.6	67.3
J-6	5,561.5	23.24	5,716.6	67.1
J-7	5,562.5	1.09	5,716.6	66.7
J-8	5,563.0	46.54	5,716.6	66.4
J-9	5,563.5	0.00	5,716.6	66.2

Active Scenario: Max Hour

Label	Length (ft)	Diameter (in)	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss (ft)
P-28	15	8.0	120.0	429.50	2.74	0.07
P-18	217	8.0	120.0	295.29	1.88	0.48
P-17	56	8.0	120.0	295.29	1.88	0.12
P-1	56	8.0	120.0	134.21	0.86	0.03
P-29	415	8.0	120.0	134.21	0.86	0.21
P-30	38	8.0	120.0	134.21	0.86	0.02
P-31	47	8.0	120.0	134.21	0.86	0.02
P-32	608	8.0	120.0	134.21	0.86	0.31
P-3	85	8.0	120.0	128.21	0.82	0.04
P-16	53	8.0	120.0	85.88	0.55	0.01
P-15	132	8.0	120.0	80.96	0.52	0.03
P-10	230	8.0	120.0	23.63	0.15	0.00
P-26	31	6.0	120.0	0.00	0.00	0.00
P-19	14	6.0	120.0	0.00	0.00	0.00
P-2	34	6.0	120.0	0.00	0.00	0.00
P-20	35	6.0	120.0	0.00	0.00	0.00
P-25	30	6.0	120.0	0.00	0.00	0.00

Active Scenario: Max Hour

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2	5,559.0	0.00	5,716.0	67.9
J-1	5,559.5	5.99	5,715.9	67.7
J-19	5,560.0	0.00	5,716.2	67.6
J-18	5,560.0	0.00	5,716.2	67.6
J-17	5,560.0	0.00	5,716.2	67.6
J-10	5,561.0	0.00	5,716.5	67.3
J-3	5,560.5	104.58	5,715.9	67.2
J-6	5,561.5	104.58	5,715.9	66.8
J-7	5,562.5	4.91	5,715.9	66.4
J-8	5,563.0	209.41	5,715.9	66.2
J-9	5,563.5	0.00	5,716.1	66.0

Active Scenario: Max Day

Label	Length (ft)	Diameter (in)	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss (ft)
P-28	15	8.0	120.0	267.24	1.71	0.03
P-18	217	8.0	120.0	183.74	1.17	0.20
P-17	56	8.0	120.0	183.73	1.17	0.05
P-1	56	8.0	120.0	83.51	0.53	0.01
P-29	415	8.0	120.0	83.51	0.53	0.09
P-30	38	8.0	120.0	83.51	0.53	0.01
P-31	47	8.0	120.0	83.51	0.53	0.01
P-32	608	8.0	120.0	83.51	0.53	0.13
P-3	85	8.0	120.0	79.77	0.51	0.02
P-16	53	8.0	120.0	53.43	0.34	0.00
P-15	132	8.0	120.0	50.37	0.32	0.01
P-10	230	8.0	120.0	14.70	0.09	0.00
P-19	14	6.0	120.0	0.00	0.00	0.00
P-2	34	6.0	120.0	0.00	0.00	0.00
P-26	31	6.0	120.0	0.00	0.00	0.00
P-20	35	6.0	120.0	0.00	0.00	0.00
P-25	30	6.0	120.0	0.00	0.00	0.00

Active Scenario: Max Day

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2	5,559.0	0.00	5,716.3	68.1
J-1	5,559.5	3.73	5,716.3	67.9
J-19	5,560.0	0.00	5,716.4	67.7
J-18	5,560.0	0.00	5,716.4	67.7
J-17	5,560.0	0.00	5,716.4	67.7
J-3	5,560.5	65.07	5,716.3	67.4
J-10	5,561.0	0.00	5,716.6	67.3
J-6	5,561.5	65.07	5,716.3	67.0
J-7	5,562.5	3.06	5,716.3	66.5
J-8	5,563.0	130.30	5,716.3	66.3
J-9	5,563.5	0.00	5,716.4	66.1

Active Scenario: Max Day + Fire Flow High Point

Label	Length (ft)	Diameter (in)	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss (ft)
P-19	14	6.0	120.0	2,500.00	28.37	6.60
P-28	15	8.0	120.0	2,767.23	17.66	2.07
P-18	217	8.0	120.0	2,062.90	13.17	17.58
P-1	56	8.0	120.0	704.34	4.50	0.62
P-29	415	8.0	120.0	704.34	4.50	4.59
P-30	38	8.0	120.0	704.34	4.50	0.42
P-31	47	8.0	120.0	704.34	4.50	0.52
P-32	608	8.0	120.0	704.34	4.50	6.73
P-3	85	8.0	120.0	700.61	4.47	0.94
P-10	230	8.0	120.0	635.54	4.06	2.11
P-15	132	8.0	120.0	570.47	3.64	0.99
P-16	53	8.0	120.0	567.41	3.62	0.39
P-17	56	8.0	120.0	437.10	2.79	0.26
P-20	35	6.0	120.0	0.00	0.00	0.00
P-26	31	6.0	120.0	0.00	0.00	0.00
P-2	34	6.0	120.0	0.00	0.00	0.00
P-25	30	6.0	120.0	0.00	0.00	0.00

Active Scenario: Max Day + Fire Flow High Point

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-10	5,561.0	0.00	5,714.5	66.4
J-19	5,560.0	0.00	5,707.8	63.9
J-18	5,560.0	0.00	5,707.3	63.7
J-17	5,560.0	0.00	5,706.9	63.5
J-2	5,559.0	0.00	5,702.3	62.0
J-1	5,559.5	3.73	5,701.6	61.5
J-3	5,560.5	65.07	5,700.7	60.7
J-6	5,561.5	65.07	5,698.6	59.3
J-7	5,562.5	3.06	5,697.6	58.5
J-8	5,563.0	130.30	5,697.2	58.1
J-9	5,563.5	0.00	5,697.0	57.7