

Hydraulic Calculations

Project Name: 775 Vaughan

DESIGN DATA:

Remote Area Location: Residential Suite of 38th Floor

System Type: Wet

Hazard: Light Hazard System

Design Density: 0.1 gpm/ sq. ft

Remote Area: Maximum 04 Nos. Sprinkler Head most demanding.

Sprinkler Classification: Residential Sprinklers

Maximum Sprinkler Coverage: 320 sq. ft

Sprinkler K-Factor: K5.8

CALCULATING END SPRINKLER FLOW IN REMOTE AREA

Design Density = 0.1 gpm/sq ft

Maximum area covered by one sprinkler = 320 sq. ft

Flow required at end sprinkler = 0.1 x 320 gpm

$$= 32 \text{ gpm}$$

CALCULATING END SPRINKLER PRESSURE

Using equation.

$$Q = K \times \sqrt{P}$$

Where, Q = Flow in gpm (gallons per minute)

K = Sprinkler constant given by manufacture data sheet

P = Pressure at sprinkler in psi (pound per square inch)

Once the flow (Q) is calculated, the required pressure (P) can be calculated by simply rearranging the above formula:

$$P = \left(\frac{Q}{K}\right)^2$$

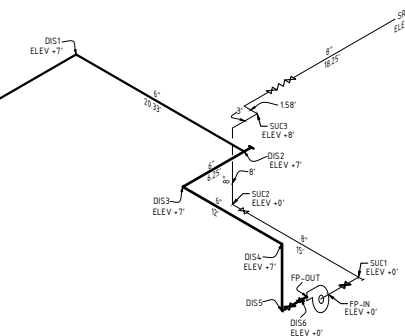
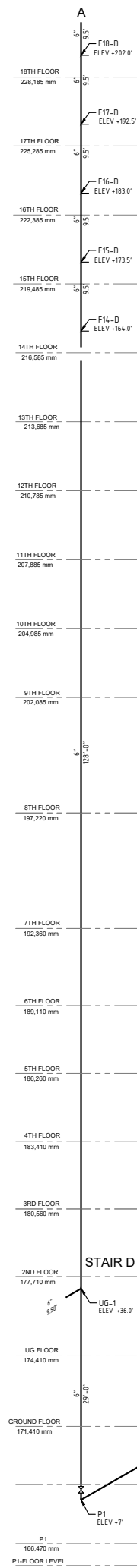
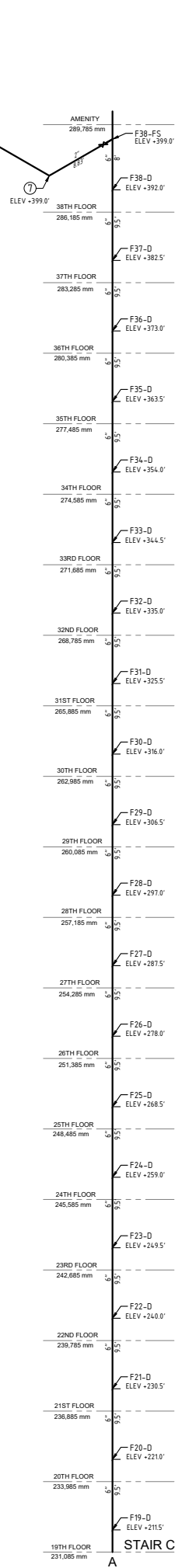
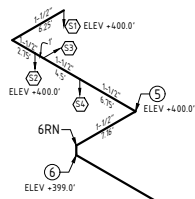
$$Q = 32 \text{ gpm}$$

$$K = 5.8$$

$$\text{Therefore, Pressure required at end sprinkler} = (32/5.8)^2 = 30.43 \text{ psi.}$$

Therefore, our calculation shall start at Pressure P = 30.43 psi.

This pressure shall be inserted into hydraulic calculation software of minimum end conditions.



HYDRAULIC CALCULATIONS FOR SPRINKLER SYSTEM RESIDENTIAL SUITE 38TH FLOOR

DESIGN DATA:

Remote Area Location : Elevator Machine Room on 41th Floor
System Type : Wet System
Hazard : Ordinary Hazard System - Group 1
Design Density : 0.15 gpm / sq. ft
Remote Area : 1500 sq. ft
Number of Sprinklers in Remote Area : 08 Nos
Sprinkler Classification : Quick Response (QR)
Maximum sprinkler Coverage : 130 sq. ft
Sprinkler K- Factor : K5.6

LIFELINE FIRE PROTECTION
www.lifelinefireprotection.com
50 Cosmair Court, Concord, ON
L4K 4J5
(416)850-9477

PROPOSED MIXED-USED DEVELOPMENT

ADDRESS:
775-783 Vaughan Rd & 670-680
Northcliffe Blvd, York, ON

HYDRAULIC CALCULATIONS ISOMETRIC DIAGRAM SPRINKLER SYSTEM RESIDENTIAL SUITE 38 FLOOR

Project No.: 2127
Scale: As indicated
Date: MAY 13, 2024
Drawn by: STUDIO JCI

Drawing No.:

CALC.04

DATE: 6/6/2024IC CALC\SPRINKLER SYSTEM - RESIDENTIAL SUITE 38TH FLOOR.SDF

JOB TITLE: 775 Vaughan

DEMAND CALCULATIONS

WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	FLOW @ (GPM)	AVAIL. PRESS. (PSI)	TOTAL @ DEMAND (GPM)	REQ'D PRESS. (PSI)
SRC	60.0	52.0	1082.0	59.8	130.8	20.0

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	130.8 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	130.8 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
S1	400.0	K= 5.80	30.4	32.0
S2	400.0	K= 5.80	30.9	32.3
S3	400.0	K= 5.80	32.2	32.9
S4	400.0	K= 5.80	33.5	33.6
5	400.0	- - - -	39.1	- - -
6RN	400.0	- - - -	45.0	- - -
6	399.0	- - - -	48.0	- - -
7	399.0	- - - -	55.7	- - -
SRC	8.0	SOURCE	20.0	130.8
F38-D	392.0	- - - -	59.4	- - -
F37-D	382.5	- - - -	63.5	- - -
F36-D	373.0	- - - -	67.6	- - -
F35-D	363.5	- - - -	71.8	- - -
F34-D	354.0	- - - -	75.9	- - -
F33-D	344.5	- - - -	80.0	- - -
F32-D	335.0	- - - -	84.1	- - -
F31-D	325.5	- - - -	88.2	- - -
F30-D	316.0	- - - -	92.4	- - -
F29-D	306.5	- - - -	96.5	- - -
F28-D	297.0	- - - -	100.6	- - -
F27-D	287.5	- - - -	104.7	- - -
F26-D	278.0	- - - -	108.9	- - -
F25-D	268.5	- - - -	113.0	- - -
F24-D	259.0	- - - -	117.1	- - -
F23-D	249.5	- - - -	121.2	- - -
F22-D	240.0	- - - -	125.4	- - -
F21-D	230.5	- - - -	129.5	- - -
F20-D	221.0	- - - -	133.6	- - -
F19-D	211.5	- - - -	137.7	- - -
F18-D	202.0	- - - -	141.9	- - -
F17-D	192.5	- - - -	146.0	- - -
F16-D	183.0	- - - -	150.1	- - -
F15-D	173.5	- - - -	154.2	- - -
F14-D	164.0	- - - -	158.4	- - -
UG-1	36.0	- - - -	213.9	- - -
F38-FS	399.0	- - - -	56.3	- - -
P1	7.0	- - - -	226.5	- - -
DIS1	7.0	- - - -	226.6	- - -
DIS2	7.0	- - - -	226.6	- - -
DIS3	7.0	- - - -	226.6	- - -
DIS4	7.0	- - - -	226.7	- - -

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JOB TITLE: 775 Vaughan

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
DIS5	0.0	- - - -	229.7	- - -
DIS6	0.0	- - - -	229.7	- - -
FP-IN	0.0	- - - -	23.4	- - -
FP-OUT	0.0	- - - -	229.7	- - -
SUC1	0.0	- - - -	23.4	- - -
SUC2	0.0	- - - -	23.4	- - -
SUC3	8.0	- - - -	20.0	- - -

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JOB TITLE: 775 Vaughan

PIPE DATA

PIPE TAG	END	ELEV.	NOZ.	PT	DISC.	Q (GPM)	DIA (IN)	LENGTH	PRESS.	
	NODES	(FT)	(K)	(PSI)	(GPM)	VEL (FPS)	HW (C)	(FT)	SUM.	
							FL/FT		(PSI)	
Pipe: 1										
S1		400.0	5.8	30.4	32.0	-32.0 5.0	1.610 120	9.00 E	PF PE	0.5 0.0
S2		400.0	5.8	30.9	32.3		0.039 TL	13.00	PV	
Pipe: 2										
S2		400.0	5.8	30.9	32.3	-64.3 10.1	1.610 120	1.00 T	PF PE	1.3 0.0
S3		400.0	5.8	32.2	32.9		0.140 TL	9.00	PV	
Pipe: 3										
S3		400.0	5.8	32.2	32.9	-97.2 15.3	1.610 120	4.50	PF PE	1.4 0.0
S4		400.0	5.8	33.5	33.6		0.301 TL	4.50	PV	
Pipe: 4										
S4		400.0	5.8	33.5	33.6	-130.8 20.6	1.610 120	6.75 E	PF PE	5.6 0.0
5		400.0	0.0	39.1	0.0		0.521 TL	10.75	PV	
Pipe: 5										
5		400.0	0.0	39.1	0.0	-130.8 20.6	1.610 120	7.16 E	PF PE	5.8 0.0
6RN		400.0	0.0	45.0	0.0		0.521 TL	11.16	PV	
Pipe: 6										
6RN		400.0	0.0	45.0	0.0	-130.8 20.6	1.610 120	1.00 E	PF PE	2.6 0.4
6		399.0	0.0	48.0	0.0		0.521 TL	5.00	PV	
Pipe: 7										
6		399.0	0.0	48.0	0.0	-130.8 8.8	2.469 120	112.75 E	PF PE	7.7 0.0
7		399.0	0.0	55.7	0.0		0.065 TL	118.75	PV	
Pipe: 8										
7		399.0	0.0	55.7	0.0	-130.8 8.8	2.469 120	8.83 G	PF PE	0.6 0.0
F38-FS		399.0	0.0	56.3	0.0		0.065 TL	9.83	PV	
Pipe: 23										
F38-FS		399.0	0.0	56.3	0.0	-130.8 1.5	6.065 120	8.00	PF PE	0.0 3.0
F38-D		392.0	0.0	59.4	0.0		0.001 TL	8.00	PV	
Pipe: 24										
F38-D		392.0	0.0	59.4	0.0	-130.8 1.5	6.065 120	9.50	PF PE	0.0 4.1
F37-D		382.5	0.0	63.5	0.0		0.001 TL	9.50	PV	
Pipe: 25										
F37-D		382.5	0.0	63.5	0.0	-130.8 1.5	6.065 120	9.50	PF PE	0.0 4.1
F36-D		373.0	0.0	67.6	0.0		0.001 TL	9.50	PV	
Pipe: 26										
F36-D		373.0	0.0	67.6	0.0	-130.8 1.5	6.065 120	9.50	PF PE	0.0 4.1
F35-D		363.5	0.0	71.8	0.0		0.001 TL	9.50	PV	
Pipe: 27										
F35-D		363.5	0.0	71.8	0.0	-130.8 1.5	6.065 120	9.50	PF PE	0.0 4.1
F34-D		354.0	0.0	75.9	0.0		0.001 TL	9.50	PV	
Pipe: 28										
F34-D		354.0	0.0	75.9	0.0	-130.8 1.5	6.065 120	9.50	PF PE	0.0 4.1
F33-D		344.5	0.0	80.0	0.0		0.001 TL	9.50	PV	

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PIPE TAG					Q (GPM)	DIA (IN)	LENGTH	PRESS.	
END	ELEV.	NOZ.	PT	DISC.	VEL (FPS)	HW (C)	(FT)	SUM.	
NODES	(FT)	(K)	(PSI)	(GPM)		FL/FT		(PSI)	
Pipe: 29					-130.8	6.065	PL	9.50	PF 0.0
F33-D	344.5	0.0	80.0	0.0	1.5	120	FTG	----	PE 4.1
F32-D	335.0	0.0	84.1	0.0		0.001	TL	9.50	PV
Pipe: 30					-130.8	6.065	PL	9.50	PF 0.0
F32-D	335.0	0.0	84.1	0.0	1.5	120	FTG	----	PE 4.1
F31-D	325.5	0.0	88.2	0.0		0.001	TL	9.50	PV
Pipe: 31					-130.8	6.065	PL	9.50	PF 0.0
F31-D	325.5	0.0	88.2	0.0	1.5	120	FTG	----	PE 4.1
F30-D	316.0	0.0	92.4	0.0		0.001	TL	9.50	PV
Pipe: 32					-130.8	6.065	PL	9.50	PF 0.0
F30-D	316.0	0.0	92.4	0.0	1.5	120	FTG	----	PE 4.1
F29-D	306.5	0.0	96.5	0.0		0.001	TL	9.50	PV
Pipe: 33					-130.8	6.065	PL	9.50	PF 0.0
F29-D	306.5	0.0	96.5	0.0	1.5	120	FTG	----	PE 4.1
F28-D	297.0	0.0	100.6	0.0		0.001	TL	9.50	PV
Pipe: 34					-130.8	6.065	PL	9.50	PF 0.0
F28-D	297.0	0.0	100.6	0.0	1.5	120	FTG	----	PE 4.1
F27-D	287.5	0.0	104.7	0.0		0.001	TL	9.50	PV
Pipe: 35					-130.8	6.065	PL	9.50	PF 0.0
F27-D	287.5	0.0	104.7	0.0	1.5	120	FTG	----	PE 4.1
F26-D	278.0	0.0	108.9	0.0		0.001	TL	9.50	PV
Pipe: 36					-130.8	6.065	PL	9.50	PF 0.0
F26-D	278.0	0.0	108.9	0.0	1.5	120	FTG	----	PE 4.1
F25-D	268.5	0.0	113.0	0.0		0.001	TL	9.50	PV
Pipe: 37					-130.8	6.065	PL	9.50	PF 0.0
F25-D	268.5	0.0	113.0	0.0	1.5	120	FTG	----	PE 4.1
F24-D	259.0	0.0	117.1	0.0		0.001	TL	9.50	PV
Pipe: 38					-130.8	6.065	PL	9.50	PF 0.0
F24-D	259.0	0.0	117.1	0.0	1.5	120	FTG	----	PE 4.1
F23-D	249.5	0.0	121.2	0.0		0.001	TL	9.50	PV
Pipe: 39					-130.8	6.065	PL	9.50	PF 0.0
F23-D	249.5	0.0	121.2	0.0	1.5	120	FTG	----	PE 4.1
F22-D	240.0	0.0	125.4	0.0		0.001	TL	9.50	PV
Pipe: 40					-130.8	6.065	PL	9.50	PF 0.0
F22-D	240.0	0.0	125.4	0.0	1.5	120	FTG	----	PE 4.1
F21-D	230.5	0.0	129.5	0.0		0.001	TL	9.50	PV
Pipe: 41					-130.8	6.065	PL	9.50	PF 0.0
F21-D	230.5	0.0	129.5	0.0	1.5	120	FTG	----	PE 4.1
F20-D	221.0	0.0	133.6	0.0		0.001	TL	9.50	PV
Pipe: 42					-130.8	6.065	PL	9.50	PF 0.0
F20-D	221.0	0.0	133.6	0.0	1.5	120	FTG	----	PE 4.1
F19-D	211.5	0.0	137.7	0.0		0.001	TL	9.50	PV
Pipe: 43					-130.8	6.065	PL	9.50	PF 0.0
F19-D	211.5	0.0	137.7	0.0	1.5	120	FTG	----	PE 4.1
F18-D	202.0	0.0	141.9	0.0		0.001	TL	9.50	PV

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PIPE TAG	END	ELEV.	NOZ.	PT	DISC.	Q (GPM)	DIA (IN)	LENGTH	PRESS.	
NODES	(FT)	(K)	(PSI)	(GPM)	VEL (FPS)	HW (C)	FL/FT	(FT)	SUM.	(PSI)
Pipe: 44										
F18-D	202.0	0.0	141.9	0.0	1.5	120	FTG	----	PE	4.1
F17-D	192.5	0.0	146.0	0.0		0.001	TL	9.50	PV	
Pipe: 45										
F17-D	192.5	0.0	146.0	0.0	1.5	120	FTG	----	PE	4.1
F16-D	183.0	0.0	150.1	0.0		0.001	TL	9.50	PV	
Pipe: 46										
F16-D	183.0	0.0	150.1	0.0	1.5	120	FTG	----	PE	4.1
F15-D	173.5	0.0	154.2	0.0		0.001	TL	9.50	PV	
Pipe: 47										
F15-D	173.5	0.0	154.2	0.0	1.5	120	FTG	----	PE	4.1
F14-D	164.0	0.0	158.4	0.0		0.001	TL	9.50	PV	
Pipe: 48										
F14-D	164.0	0.0	158.4	0.0	1.5	120	FTG	T	PE	55.5
UG-1	36.0	0.0	213.9	0.0		0.001	TL	158.00	PV	
Pipe: 56										
UG-1	36.0	0.0	213.9	0.0	1.5	120	FTG	EG	PE	12.6
P1	7.0	0.0	226.5	0.0		0.001	TL	46.00	PV	
Pipe: 57										
P1	7.0	0.0	226.5	0.0	1.5	120	FTG	E	PE	0.0
DIS1	7.0	0.0	226.6	0.0		0.001	TL	39.41	PV	
Pipe: 58										
DIS1	7.0	0.0	226.6	0.0	1.5	120	FTG	T	PE	0.0
DIS2	7.0	0.0	226.6	0.0		0.001	TL	50.33	PV	
Pipe: 59										
DIS2	7.0	0.0	226.6	0.0	1.5	120	FTG	E	PE	0.0
DIS3	7.0	0.0	226.6	0.0		0.001	TL	20.25	PV	
Pipe: 60										
DIS3	7.0	0.0	226.6	0.0	1.5	120	FTG	E	PE	0.0
DIS4	7.0	0.0	226.7	0.0		0.001	TL	26.00	PV	
Pipe: 61										
DIS4	7.0	0.0	226.7	0.0	1.5	120	FTG	E	PE	3.0
DIS5	0.0	0.0	229.7	0.0		0.001	TL	21.00	PV	
Pipe: 62										
DIS6	0.0	0.0	229.7	0.0	1.5	120	FTG	CG	PE	0.0
DIS5	0.0	0.0	229.7	0.0		0.001	TL	38.00	PV	
Pipe: 63										
FP-OUT	0.0	0.0	229.7	0.0	1.5	120	FTG	----	PE	0.0
DIS6	0.0	0.0	229.7	0.0		0.001	TL	1.00	PV	
Pipe: 64										
FP-IN	0.0	0.0	23.4	0.0				750.0 gpm @ 225.0 psi		
FP-OUT	0.0	0.0	229.7	0.0				130.7 gpm @ 225.0 psi		
								130.7 gpm @ 206.3 psi		
Pipe: 65										
SUC1	0.0	0.0	23.4	0.0	0.8	120	FTG	G	PE	0.0
FP-IN	0.0	0.0	23.4	0.0		0.000	TL	8.00	PV	

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PIPE TAG	END	ELEV.	NOZ.	PT	DISC.	Q (GPM)	DIA (IN)	LENGTH	PRESS.	
	NODES	(FT)	(K)	(PSI)	(GPM)	VEL (FPS)	HW (C)	(FT)	SUM.	
							FL/FT		(PSI)	
Pipe: 66						-130.8	7.981 PL	15.00	PF	0.0
SUC1		0.0	0.0	23.4	0.0	0.8	120 FTG	EG	PE	0.0
SUC2		0.0	0.0	23.4	0.0		0.000 TL	37.00	PV	
Pipe: 67						-130.8	7.981 PL	11.00	PF	0.0
SUC2		0.0	0.0	23.4	0.0	0.8	120 FTG	2E	PE	-3.5
SUC3		8.0	0.0	20.0	0.0		0.000 TL	47.00	PV	
Pipe: 68						130.8	7.981 PL	19.83	PF	0.0
SRC		8.0	SRCE	20.0	(N/A)	0.8	120 FTG	E2C2G	PE	0.0
SUC3		8.0	0.0	20.0	0.0		0.000 TL	135.83	PV	

NOTES (HASS):

- Calculations were performed by the HASS 2023 D computer program in accordance with (2020) under license no. 65699794 granted by
 HRS Systems, Inc.
 208 Southside Square
 Petersburg, TN 37144
 (931) 659-9760
- The system has been calculated to provide an average imbalance at each node of 0.001 gpm and a maximum imbalance at any node of 0.010 gpm.
- Total pressure at each node is used in balancing the system. Maximum water velocity is 20.6 ft/sec at pipe 4.
- The Minimum pump suction pressure under maximum calculated demand is 23.42 (psi)
- Items listed in bold print on the cover sheet
 are automatically transferred from the calculation report.
- Available pressure at source node SRC under full flow conditions is 59.68 psi with a flow of 190.08 gpm.
- PIPE FITTINGS TABLE

HASS Pipe Table Name: standard

PAGE: A	MATERIAL: S40		HWC: 120						
Diameter	Equivalent Fitting Lengths in Feet								
(in)	E	T	L	C	B	G	A	D	N
	Ell	Tee	LngEll	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	NTee

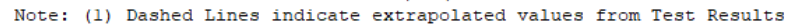
	F								
	F45Ell								
1.610	4.00	8.00	2.00	9.00	6.00	1.00	10.00	10.00	8.00
	2.00								
2.469	6.00	12.00	4.00	14.00	7.00	1.00	10.00	10.00	12.00
	3.00								
6.065	14.00	30.00	9.00	32.00	10.00	3.00	28.00	28.00	30.00
	7.00								
7.981	18.00	35.00	13.00	45.00	12.00	4.00	31.00	31.00	35.00

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9.00

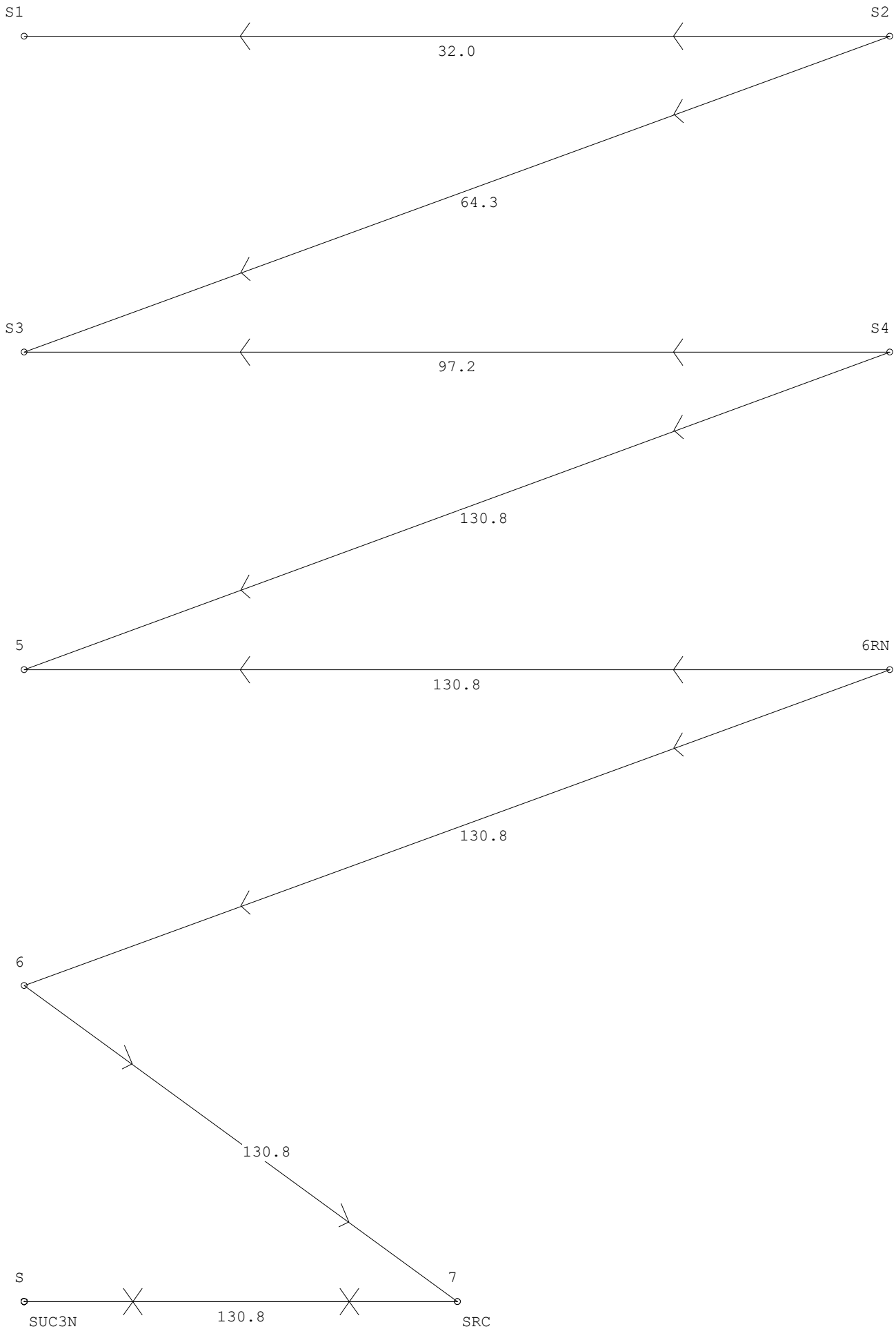
Static: 60.00 psi Resid: 52.00 psi Flow: 1082.0 gpm



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JOB TITLE: 775 Vaughan

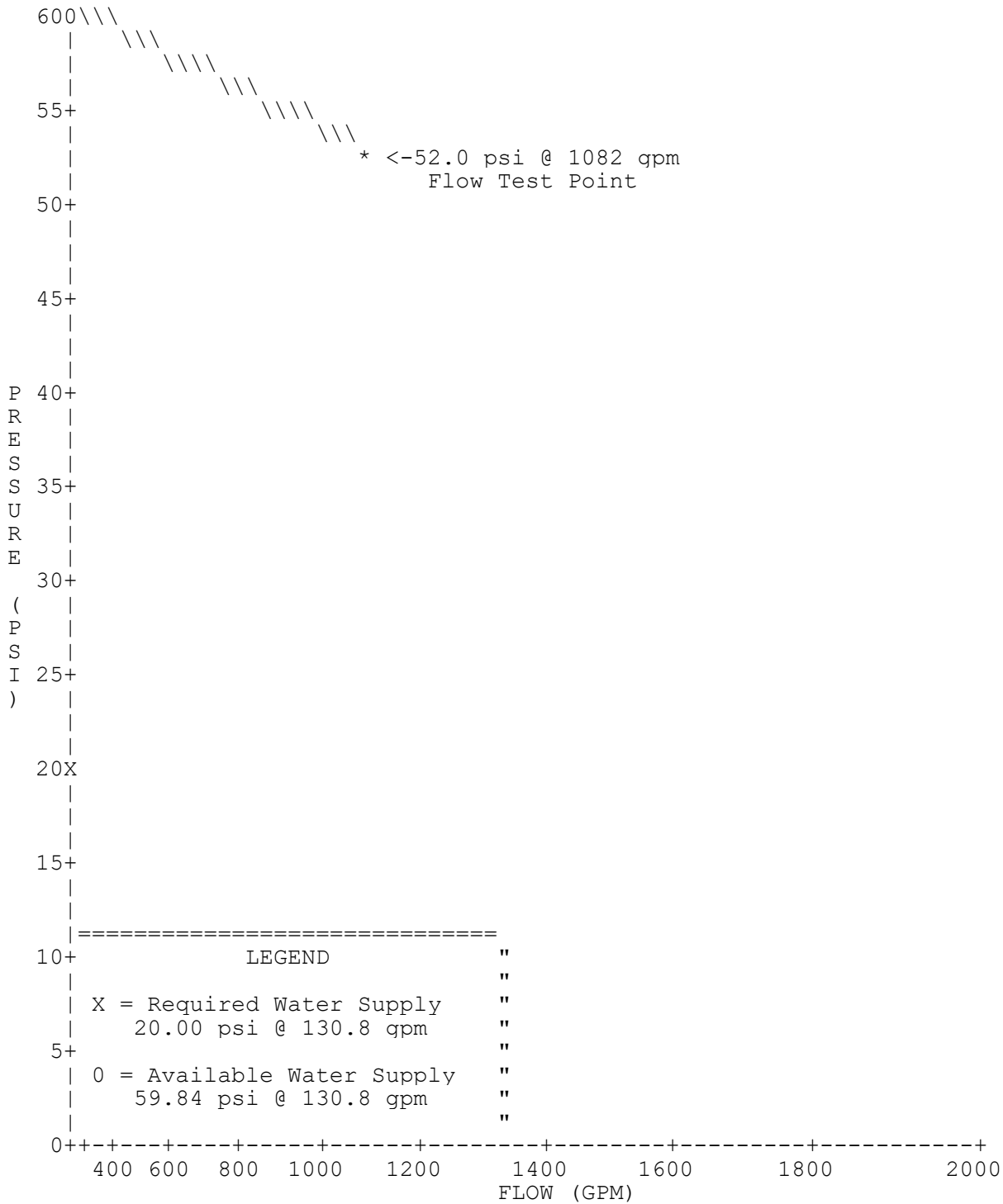
SPRINKLER SYSTEM DIAGRAM WITH FLOWPLOT



DATE: 6/6/2024 IC CALC\SPRINKLER SYSTEM - RESIDENTIAL SUITE 38TH FLOOR.SDF

JOB TITLE: 775 Vaughan

WATER SUPPLY CURVE



DATE: 6/6/2024IC CALC\SPRINKLER SYSTEM - RESIDENTIAL SUITE 38TH FLOOR.SDF

JOB TITLE: 775 Vaughan

SUPPLY CALCULATIONS

WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	FLOW @ (GPM)	AVAIL. PRESS. (PSI)	TOTAL @ DEMAND (GPM)	REQ'D PRESS. (PSI)
SRC	60.0	52.0	1082.0	59.7	190.1	

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	190.1 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	190.1 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
S1	400.0	K= 5.80	64.5	46.6
S2	400.0	K= 5.80	65.5	46.9
S3	400.0	K= 5.80	68.0	47.8
S4	400.0	K= 5.80	70.7	48.8
5	400.0	- - - -	81.9	- - -
6RN	400.0	- - - -	93.5	- - -
6	399.0	- - - -	99.1	- - -
7	399.0	- - - -	114.5	- - -
SRC	8.0	SOURCE	59.7	190.1
F38-D	392.0	- - - -	118.9	- - -
F37-D	382.5	- - - -	123.0	- - -
F36-D	373.0	- - - -	127.1	- - -
F35-D	363.5	- - - -	131.3	- - -
F34-D	354.0	- - - -	135.4	- - -
F33-D	344.5	- - - -	139.5	- - -
F32-D	335.0	- - - -	143.7	- - -
F31-D	325.5	- - - -	147.8	- - -
F30-D	316.0	- - - -	151.9	- - -
F29-D	306.5	- - - -	156.0	- - -
F28-D	297.0	- - - -	160.2	- - -
F27-D	287.5	- - - -	164.3	- - -
F26-D	278.0	- - - -	168.4	- - -
F25-D	268.5	- - - -	172.6	- - -
F24-D	259.0	- - - -	176.7	- - -
F23-D	249.5	- - - -	180.8	- - -
F22-D	240.0	- - - -	185.0	- - -
F21-D	230.5	- - - -	189.1	- - -
F20-D	221.0	- - - -	193.2	- - -
F19-D	211.5	- - - -	197.4	- - -
F18-D	202.0	- - - -	201.5	- - -
F17-D	192.5	- - - -	205.6	- - -
F16-D	183.0	- - - -	209.8	- - -
F15-D	173.5	- - - -	213.9	- - -
F14-D	164.0	- - - -	218.0	- - -
UG-1	36.0	- - - -	273.7	- - -
F38-FS	399.0	- - - -	115.8	- - -
P1	7.0	- - - -	286.4	- - -
DIS1	7.0	- - - -	286.4	- - -
DIS2	7.0	- - - -	286.5	- - -
DIS3	7.0	- - - -	286.6	- - -
DIS4	7.0	- - - -	286.6	- - -

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JOB TITLE: 775 Vaughan

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
DIS5	0.0	- - - -	289.7	- - -
DIS6	0.0	- - - -	289.7	- - -
FP-IN	0.0	- - - -	63.0	- - -
FP-OUT	0.0	- - - -	289.7	- - -
SUC1	0.0	- - - -	63.1	- - -
SUC2	0.0	- - - -	63.1	- - -
SUC3	8.0	- - - -	59.6	- - -

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JOB TITLE: 775 Vaughan

PIPE DATA

PIPE TAG	END	ELEV.	NOZ.	PT	DISC.	Q (GPM)	VEL (FPS)	DIA (IN)	LENGTH	PRESS.	
	NODES	(FT)	(K)	(PSI)	(GPM)			HW (C)	(FT)	SUM.	
								FL/FT		(PSI)	
Pipe: 1											
S1		400.0	5.8	64.5	46.6	-46.6	7.3	1.610	9.00	PF	1.0
S2		400.0	5.8	65.5	46.9			120	FTG	E	0.0
								0.077	TL	PV	
Pipe: 2											
S2		400.0	5.8	65.5	46.9	-93.5	14.7	1.610	1.00	PF	2.5
S3		400.0	5.8	68.0	47.8			120	FTG	T	0.0
								0.280	TL	PV	
Pipe: 3											
S3		400.0	5.8	68.0	47.8	-141.3	22.3	1.610	4.50	PF	2.7
S4		400.0	5.8	70.7	48.8			120	FTG	----	0.0
								0.601	TL	PV	
Pipe: 4											
S4		400.0	5.8	70.7	48.8	-190.1	30.0	1.610	6.75	PF	11.2
5		400.0	0.0	81.9	0.0			120	FTG	E	0.0
								1.041	TL	PV	
Pipe: 5											
5		400.0	0.0	81.9	0.0	-190.1	30.0	1.610	7.16	PF	11.6
6RN		400.0	0.0	93.5	0.0			120	FTG	E	0.0
								1.041	TL	PV	
Pipe: 6											
6RN		400.0	0.0	93.5	0.0	-190.1	30.0	1.610	1.00	PF	5.2
6		399.0	0.0	99.1	0.0			120	FTG	E	0.4
								1.041	TL	PV	
Pipe: 7											
6		399.0	0.0	99.1	0.0	-190.1	12.7	2.469	112.75	PF	15.4
7		399.0	0.0	114.5	0.0			120	FTG	E	0.0
								0.130	TL	PV	
Pipe: 8											
7		399.0	0.0	114.5	0.0	-190.1	12.7	2.469	8.83	PF	1.3
F38-FS		399.0	0.0	115.8	0.0			120	FTG	G	0.0
								0.130	TL	PV	
Pipe: 23											
F38-FS		399.0	0.0	115.8	0.0	-190.1	2.1	6.065	8.00	PF	0.0
F38-D		392.0	0.0	118.9	0.0			120	FTG	----	3.0
								0.002	TL	PV	
Pipe: 24											
F38-D		392.0	0.0	118.9	0.0	-190.1	2.1	6.065	9.50	PF	0.0
F37-D		382.5	0.0	123.0	0.0			120	FTG	----	4.1
								0.002	TL	PV	
Pipe: 25											
F37-D		382.5	0.0	123.0	0.0	-190.1	2.1	6.065	9.50	PF	0.0
F36-D		373.0	0.0	127.1	0.0			120	FTG	----	4.1
								0.002	TL	PV	
Pipe: 26											
F36-D		373.0	0.0	127.1	0.0	-190.1	2.1	6.065	9.50	PF	0.0
F35-D		363.5	0.0	131.3	0.0			120	FTG	----	4.1
								0.002	TL	PV	
Pipe: 27											
F35-D		363.5	0.0	131.3	0.0	-190.1	2.1	6.065	9.50	PF	0.0
F34-D		354.0	0.0	135.4	0.0			120	FTG	----	4.1
								0.002	TL	PV	
Pipe: 28											
F34-D		354.0	0.0	135.4	0.0	-190.1	2.1	6.065	9.50	PF	0.0
F33-D		344.5	0.0	139.5	0.0			120	FTG	----	4.1
								0.002	TL	PV	

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JOB TITLE: 775 Vaughan

PIPE TAG					Q (GPM)	DIA (IN)	LENGTH	PRESS.	
END	ELEV.	NOZ.	PT	DISC.	VEL (FPS)	HW (C)	(FT)	SUM.	
NODES	(FT)	(K)	(PSI)	(GPM)		FL/FT		(PSI)	
Pipe: 29									
F33-D	344.5	0.0	139.5	0.0	2.1	120	FTG	----	PE 4.1
F32-D	335.0	0.0	143.7	0.0		0.002	TL	9.50	PV
Pipe: 30									
F32-D	335.0	0.0	143.7	0.0	2.1	120	FTG	----	PE 4.1
F31-D	325.5	0.0	147.8	0.0		0.002	TL	9.50	PV
Pipe: 31									
F31-D	325.5	0.0	147.8	0.0	2.1	120	FTG	----	PE 4.1
F30-D	316.0	0.0	151.9	0.0		0.002	TL	9.50	PV
Pipe: 32									
F30-D	316.0	0.0	151.9	0.0	2.1	120	FTG	----	PE 4.1
F29-D	306.5	0.0	156.0	0.0		0.002	TL	9.50	PV
Pipe: 33									
F29-D	306.5	0.0	156.0	0.0	2.1	120	FTG	----	PE 4.1
F28-D	297.0	0.0	160.2	0.0		0.002	TL	9.50	PV
Pipe: 34									
F28-D	297.0	0.0	160.2	0.0	2.1	120	FTG	----	PE 4.1
F27-D	287.5	0.0	164.3	0.0		0.002	TL	9.50	PV
Pipe: 35									
F27-D	287.5	0.0	164.3	0.0	2.1	120	FTG	----	PE 4.1
F26-D	278.0	0.0	168.4	0.0		0.002	TL	9.50	PV
Pipe: 36									
F26-D	278.0	0.0	168.4	0.0	2.1	120	FTG	----	PE 4.1
F25-D	268.5	0.0	172.6	0.0		0.002	TL	9.50	PV
Pipe: 37									
F25-D	268.5	0.0	172.6	0.0	2.1	120	FTG	----	PE 4.1
F24-D	259.0	0.0	176.7	0.0		0.002	TL	9.50	PV
Pipe: 38									
F24-D	259.0	0.0	176.7	0.0	2.1	120	FTG	----	PE 4.1
F23-D	249.5	0.0	180.8	0.0		0.002	TL	9.50	PV
Pipe: 39									
F23-D	249.5	0.0	180.8	0.0	2.1	120	FTG	----	PE 4.1
F22-D	240.0	0.0	185.0	0.0		0.002	TL	9.50	PV
Pipe: 40									
F22-D	240.0	0.0	185.0	0.0	2.1	120	FTG	----	PE 4.1
F21-D	230.5	0.0	189.1	0.0		0.002	TL	9.50	PV
Pipe: 41									
F21-D	230.5	0.0	189.1	0.0	2.1	120	FTG	----	PE 4.1
F20-D	221.0	0.0	193.2	0.0		0.002	TL	9.50	PV
Pipe: 42									
F20-D	221.0	0.0	193.2	0.0	2.1	120	FTG	----	PE 4.1
F19-D	211.5	0.0	197.4	0.0		0.002	TL	9.50	PV
Pipe: 43									
F19-D	211.5	0.0	197.4	0.0	2.1	120	FTG	----	PE 4.1
F18-D	202.0	0.0	201.5	0.0		0.002	TL	9.50	PV

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JOB TITLE: 775 Vaughan

PIPE TAG	END	ELEV.	NOZ.	PT	DISC.	Q (GPM)	DIA (IN)	LENGTH	PRESS.	
	NODES	(FT)	(K)	(PSI)	(GPM)	VEL (FPS)	HW (C)	(FT)	SUM.	
							FL/FT		(PSI)	
Pipe: 44										
F18-D		202.0	0.0	201.5	0.0	-190.1 2.1	6.065 120	PL FTG	PF PE	0.0 4.1
F17-D		192.5	0.0	205.6	0.0		0.002	TL	PV	
Pipe: 45										
F17-D		192.5	0.0	205.6	0.0	-190.1 2.1	6.065 120	PL FTG	PF PE	0.0 4.1
F16-D		183.0	0.0	209.8	0.0		0.002	TL	PV	
Pipe: 46										
F16-D		183.0	0.0	209.8	0.0	-190.1 2.1	6.065 120	PL FTG	PF PE	0.0 4.1
F15-D		173.5	0.0	213.9	0.0		0.002	TL	PV	
Pipe: 47										
F15-D		173.5	0.0	213.9	0.0	-190.1 2.1	6.065 120	PL FTG	PF PE	0.0 4.1
F14-D		164.0	0.0	218.0	0.0		0.002	TL	PV	
Pipe: 48										
F14-D		164.0	0.0	218.0	0.0	-190.1 2.1	6.065 120	PL FTG	PF PE	0.3 55.5
UG-1		36.0	0.0	273.7	0.0		0.002	TL	PV	
Pipe: 56										
UG-1		36.0	0.0	273.7	0.0	-190.1 2.1	6.065 120	PL FTG	PF EG	0.1 12.6
P1		7.0	0.0	286.4	0.0		0.002	TL	PV	
Pipe: 57										
P1		7.0	0.0	286.4	0.0	-190.1 2.1	6.065 120	PL FTG	PF E	0.1 0.0
DIS1		7.0	0.0	286.4	0.0		0.002	TL	PV	
Pipe: 58										
DIS1		7.0	0.0	286.4	0.0	-190.1 2.1	6.065 120	PL FTG	PF T	0.1 0.0
DIS2		7.0	0.0	286.5	0.0		0.002	TL	PV	
Pipe: 59										
DIS2		7.0	0.0	286.5	0.0	-190.1 2.1	6.065 120	PL FTG	PF E	0.0 0.0
DIS3		7.0	0.0	286.6	0.0		0.002	TL	PV	
Pipe: 60										
DIS3		7.0	0.0	286.6	0.0	-190.1 2.1	6.065 120	PL FTG	PF E	0.0 0.0
DIS4		7.0	0.0	286.6	0.0		0.002	TL	PV	
Pipe: 61										
DIS4		7.0	0.0	286.6	0.0	-190.1 2.1	6.065 120	PL FTG	PF E	0.0 3.0
DIS5		0.0	0.0	289.7	0.0		0.002	TL	PV	
Pipe: 62										
DIS6		0.0	0.0	289.7	0.0	190.1 2.1	6.065 120	PL FTG	PF CG	0.1 0.0
DIS5		0.0	0.0	289.7	0.0		0.002	TL	PV	
Pipe: 63										
FP-OUT		0.0	0.0	289.7	0.0	190.1 2.1	6.065 120	PL FTG	PF	0.0 0.0
DIS6		0.0	0.0	289.7	0.0		0.002	TL	PV	
Pipe: 64										
FP-IN		0.0	0.0	63.0	0.0	FIRE PUMP	Rating:	750.0 gpm @ 225.0 psi		
FP-OUT		0.0	0.0	289.7	0.0		Avail.:	190.1 gpm @ 225.0 psi		
							Req'd.:	190.1 gpm @ 225.0 psi		
Pipe: 65										
SUC1		0.0	0.0	63.1	0.0	190.1 1.2	7.981 120	PL FTG	PF G	0.0 0.0
FP-IN		0.0	0.0	63.0	0.0		0.000	TL	PV	

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PIPE TAG	END	ELEV.	NOZ.	PT	DISC.	Q (GPM)	DIA (IN)	LENGTH	PRESS.	
NODES	(FT)	(K)	(PSI)	(GPM)	VEL (FPS)	HW (C)	FL/FT	(FT)	SUM.	
									(PSI)	
Pipe: 66					-190.1	7.981	PL	15.00	PF	0.0
SUC1	0.0	0.0	63.1	0.0	1.2	120	FTG	EG	PE	0.0
SUC2	0.0	0.0	63.1	0.0		0.000	TL	37.00	PV	
Pipe: 67					-190.1	7.981	PL	11.00	PF	0.0
SUC2	0.0	0.0	63.1	0.0	1.2	120	FTG	2E	PE	-3.5
SUC3	8.0	0.0	59.6	0.0		0.000	TL	47.00	PV	
Pipe: 68					190.1	7.981	PL	19.83	PF	0.1
SRC	8.0	SRCE	59.7	(N/A)	1.2	120	FTG	E2C2G	PE	0.0
SUC3	8.0	0.0	59.6	0.0		0.000	TL	135.83	PV	

NOTES (HASS):

- Calculations were performed by the HASS 2023 D computer program in accordance with (2020) under license no. 65699794 granted by HRS Systems, Inc.
 208 Southside Square
 Petersburg, TN 37144
 (931) 659-9760
- The system has been calculated to provide an average imbalance at each node of 0.001 gpm and a maximum imbalance at any node of 0.006 gpm.
- Total pressure at each node is used in balancing the system. Maximum water velocity is 30.0 ft/sec at pipe 6.
- The Minimum pump suction pressure under maximum calculated demand is 63.05 (psi)
- Items listed in bold print on the cover sheet
 are automatically transferred from the calculation report.
- Available pressure at source node SRC under full flow conditions is 59.68 psi with a flow of 190.08 gpm.
- PIPE FITTINGS TABLE

HASS Pipe Table Name: standard

PAGE: A	MATERIAL: S40	HWC: 120	Equivalent Fitting Lengths in Feet						
Diameter (in)	E	T	L	C	B	G	A	D	N
	Ell	Tee	LngEll	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	NTee

	F								
	F45Ell								
1.610	4.00	8.00	2.00	9.00	6.00	1.00	10.00	10.00	8.00
	2.00								
2.469	6.00	12.00	4.00	14.00	7.00	1.00	10.00	10.00	12.00
	3.00								
6.065	14.00	30.00	9.00	32.00	10.00	3.00	28.00	28.00	30.00
	7.00								
7.981	18.00	35.00	13.00	45.00	12.00	4.00	31.00	31.00	35.00

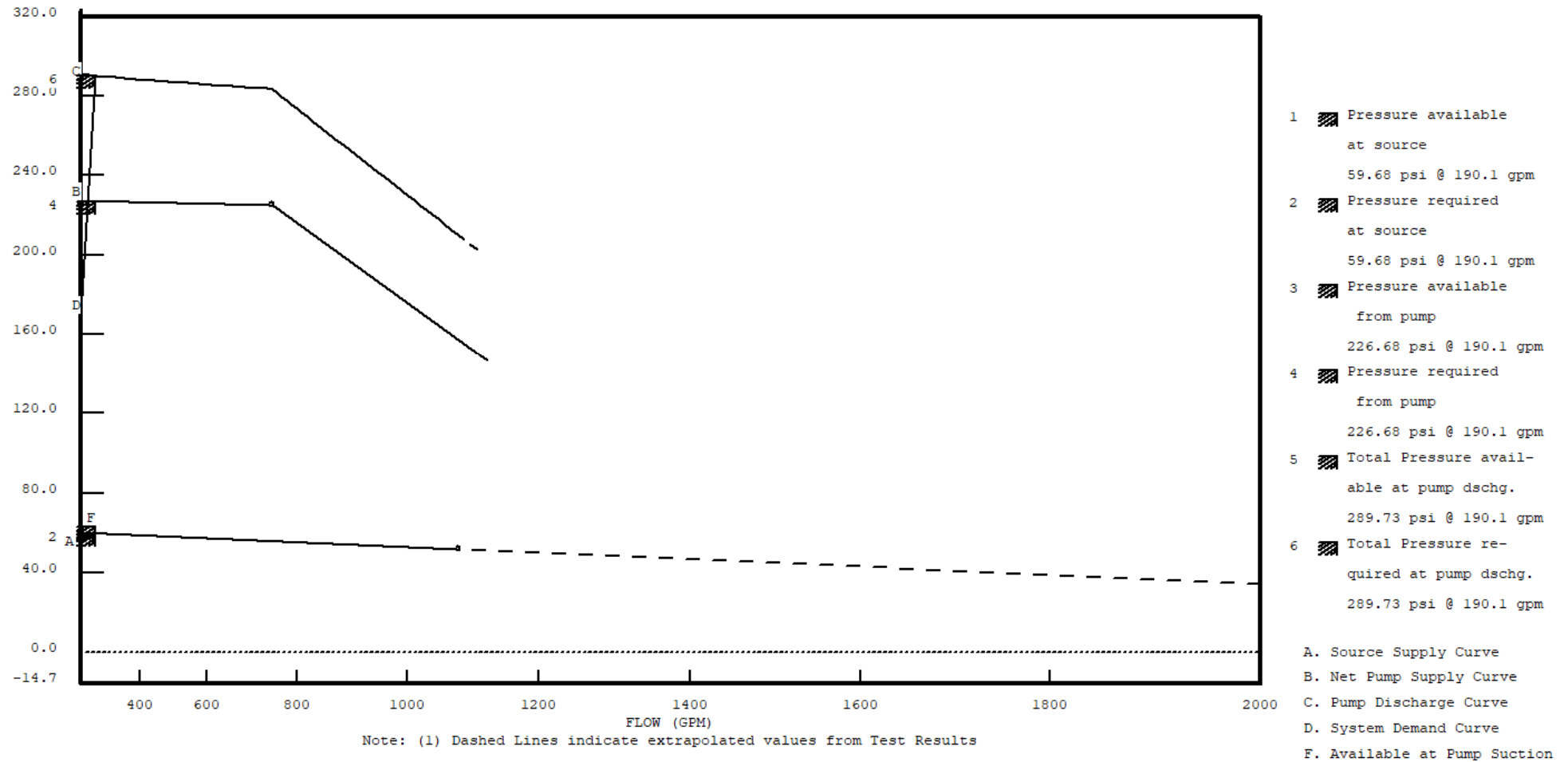
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9.00

WATER SUPPLY ANALYSIS

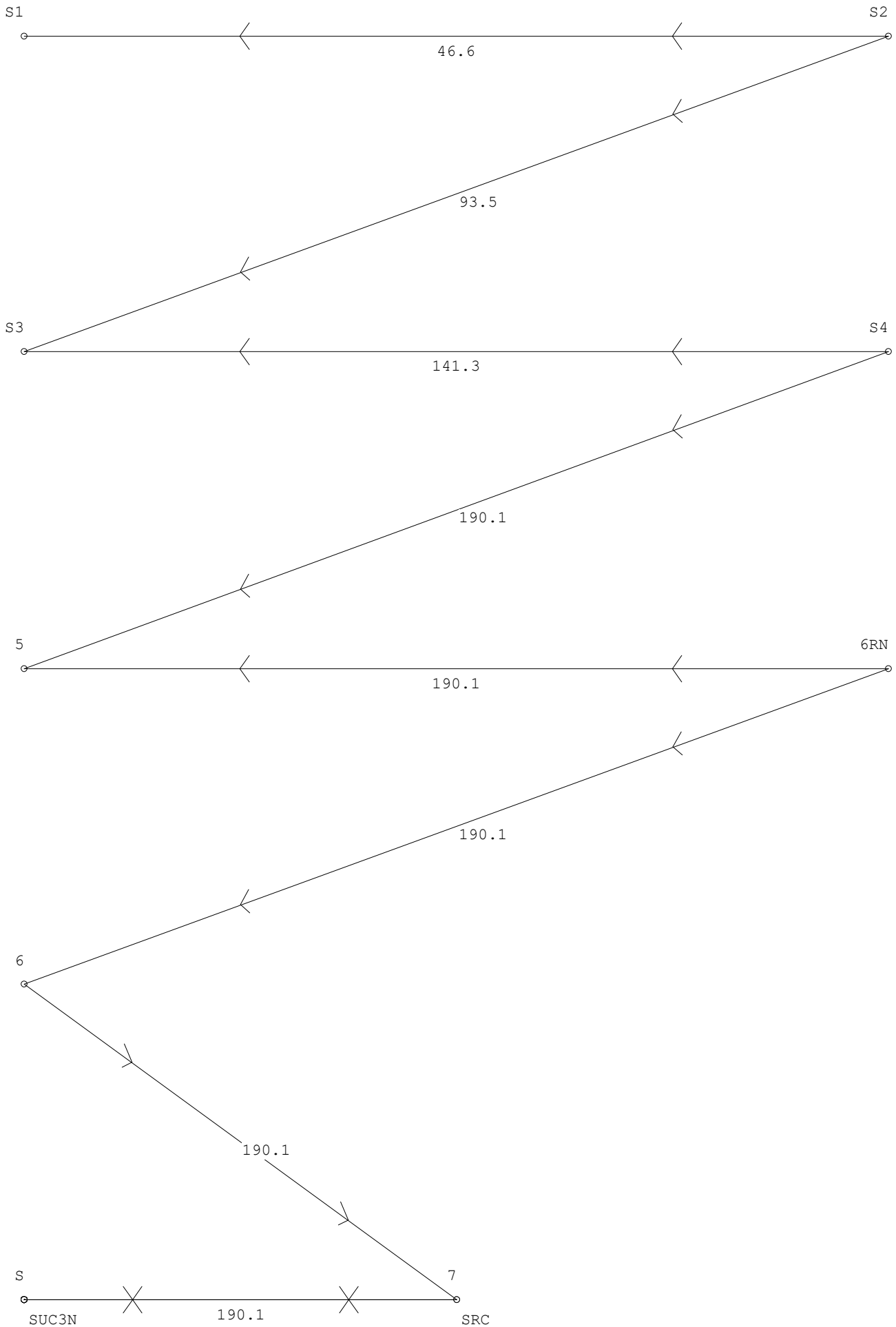
Static: 60.00 psi Resid: 52.00 psi Flow: 1082.0 gpm



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