

HYDRAULIC CALCULATIONS FOR STANDPIPE SYSTEM

DESIGN DATA:

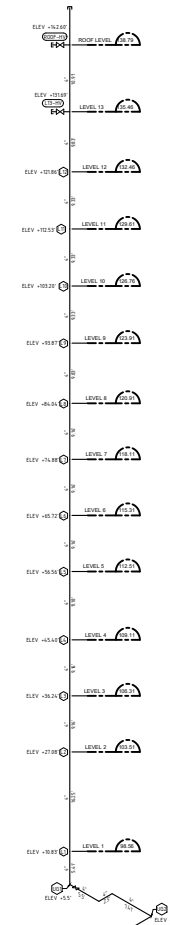
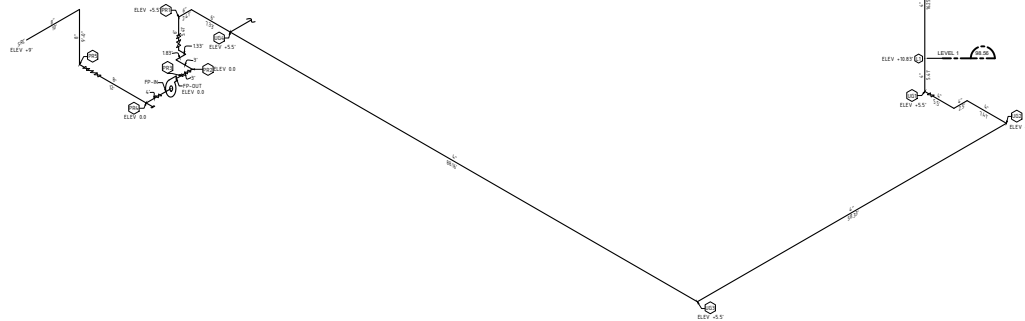
Minimum Pressure : 65 PSI

Standpipe Type : Wet System

Minimum Flow per FHV : 250 GPM

Number of FHV : 02 Nos.

Location of FHV : Roof Penthouse and 13th Floor



Y	XXX XX/XXXX	XXXXXXXXXXXX
NO	DATE	DESCRIPTION

ISSUED/REVISION RECORD

PROJECT

315 SPADINA MIXED-USE DEVELOPMENT

315-325 SPADINA AVENUE

DRAWING TITLE

HYDRAULIC CALCULATION
ISOMETRIC DIAGRAMS
AND DESIGN DATA
STANDPIPE SYSTEM



	22-0007
	PROJECT
	SK RJ
	BY REVIEWED
CALC-3	

DATE: 5/23/2024\REZA\315 SPADINA\HYDRAULIC CALC\STANDPIPE SYSTEM CALC.SDF

JOB TITLE: 315 Spadina

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	75.0	64.0	1200.0	72.8	500.0	69.5

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	500.0 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	500.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	0.0 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
ROOF-HV	142.6	HOSE STREAM	65.0	250.0
L13-HV	131.7	HOSE STREAM	69.9	250.0
L12	121.9	- - - -	74.9	- - -
L11	112.5	- - - -	79.6	- - -
L10	103.2	- - - -	84.3	- - -
L9	93.9	- - - -	89.0	- - -
L8	84.0	- - - -	94.0	- - -
L7	74.9	- - - -	98.6	- - -
L6	65.7	- - - -	103.3	- - -
L5	56.6	- - - -	107.9	- - -
L4	45.4	- - - -	113.5	- - -
L3	36.2	- - - -	118.2	- - -
L2	27.1	- - - -	122.8	- - -
L1	10.8	- - - -	131.0	- - -
UG1	5.5	- - - -	133.7	- - -
UG2	5.5	- - - -	137.1	- - -
UG3	5.5	- - - -	142.0	- - -
UG4	5.5	- - - -	149.0	- - -
PR1	5.5	- - - -	149.5	- - -
PR2	0.0	- - - -	152.5	- - -
FP-OUT	0.0	- - - -	153.0	- - -
FP-IN	0.0	- - - -	73.0	- - -
PR3	0.0	- - - -	153.0	- - -
PR4	0.0	- - - -	73.0	- - -
PR5	0.0	- - - -	73.3	- - -
SRC	9.0	SOURCE	69.5	500.0

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JOB TITLE: 315 Spadina

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						-250.0	4.026	PL	10.91	PF
ROOF-HV		142.6	H.S.	65.0	250.0	6.3	120	FTG	----	PE
L13-HV		131.7	H.S.	69.9	250.0		0.020	TL	10.91	PV
Pipe: 2						-500.0	4.026	PL	9.83	PF
L13-HV		131.7	H.S.	69.9	250.0	12.6	120	FTG	----	PE
L12		121.9	0.0	74.9	0.0		0.072	TL	9.83	PV
Pipe: 3						-500.0	4.026	PL	9.33	PF
L12		121.9	0.0	74.9	0.0	12.6	120	FTG	----	PE
L11		112.5	0.0	79.6	0.0		0.072	TL	9.33	PV
Pipe: 4						-500.0	4.026	PL	9.33	PF
L11		112.5	0.0	79.6	0.0	12.6	120	FTG	----	PE
L10		103.2	0.0	84.3	0.0		0.072	TL	9.33	PV
Pipe: 5						-500.0	4.026	PL	9.33	PF
L10		103.2	0.0	84.3	0.0	12.6	120	FTG	----	PE
L9		93.9	0.0	89.0	0.0		0.072	TL	9.33	PV
Pipe: 6						-500.0	4.026	PL	9.83	PF
L9		93.9	0.0	89.0	0.0	12.6	120	FTG	----	PE
L8		84.0	0.0	94.0	0.0		0.072	TL	9.83	PV
Pipe: 7						-500.0	4.026	PL	9.16	PF
L8		84.0	0.0	94.0	0.0	12.6	120	FTG	----	PE
L7		74.9	0.0	98.6	0.0		0.072	TL	9.16	PV
Pipe: 8						-500.0	4.026	PL	9.16	PF
L7		74.9	0.0	98.6	0.0	12.6	120	FTG	----	PE
L6		65.7	0.0	103.3	0.0		0.072	TL	9.16	PV
Pipe: 9						-500.0	4.026	PL	9.16	PF
L6		65.7	0.0	103.3	0.0	12.6	120	FTG	----	PE
L5		56.6	0.0	107.9	0.0		0.072	TL	9.16	PV
Pipe: 10						-500.0	4.026	PL	11.18	PF
L5		56.6	0.0	107.9	0.0	12.6	120	FTG	----	PE
L4		45.4	0.0	113.5	0.0		0.072	TL	11.18	PV
Pipe: 11						-500.0	4.026	PL	9.16	PF
L4		45.4	0.0	113.5	0.0	12.6	120	FTG	----	PE
L3		36.2	0.0	118.2	0.0		0.072	TL	9.16	PV
Pipe: 12						-500.0	4.026	PL	9.16	PF
L3		36.2	0.0	118.2	0.0	12.6	120	FTG	----	PE
L2		27.1	0.0	122.8	0.0		0.072	TL	9.16	PV
Pipe: 13						-500.0	4.026	PL	16.25	PF
L2		27.1	0.0	122.8	0.0	12.6	120	FTG	----	PE
L1		10.8	0.0	131.0	0.0		0.072	TL	16.25	PV
Pipe: 14						-500.0	4.026	PL	5.41	PF
L1		10.8	0.0	131.0	0.0	12.6	120	FTG	----	PE
UG1		5.5	0.0	133.7	0.0		0.072	TL	5.41	PV

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JOB TITLE: 315 Spadina

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: 15											
UG1		5.5	0.0	133.7	0.0	-500.0	12.6	4.026	PL 15.41	PF	3.4
UG2		5.5	0.0	137.1	0.0			120	FTG 3EG	PE	0.0
								0.072	TL 47.41	PV	
Pipe: 16											
UG2		5.5	0.0	137.1	0.0	-500.0	12.6	4.026	PL 58.33	PF	4.9
UG3		5.5	0.0	142.0	0.0			120	FTG E	PE	0.0
								0.072	TL 68.33	PV	
Pipe: 17											
UG3		5.5	0.0	142.0	0.0	-500.0	12.6	4.026	PL 88.16	PF	7.0
UG4		5.5	0.0	149.0	0.0			120	FTG E	PE	0.0
								0.072	TL 98.16	PV	
Pipe: 18											
UG4		5.5	0.0	149.0	0.0	-500.0	5.6	6.065	PL 7.33	PF	0.5
PR1		5.5	0.0	149.5	0.0			120	FTG ET	PE	0.0
								0.010	TL 51.33	PV	
Pipe: 19											
PR2		0.0	0.0	152.5	0.0	500.0	5.6	6.065	PL 11.57	PF	0.6
PR1		5.5	0.0	149.5	0.0			120	FTG EGA	PE	-2.4
								0.010	TL 56.57	PV	
Pipe: 20											
PR3		0.0	0.0	153.0	0.0	500.0	5.6	6.065	PL 2.00	PF	0.5
PR2		0.0	0.0	152.5	0.0			120	FTG ECG	PE	0.0
								0.010	TL 51.00	PV	
Pipe: 21											
FP-OUT		0.0	0.0	153.0	0.0	500.0	5.6	6.065	PL 1.00	PF	0.0
PR3		0.0	0.0	153.0	0.0			120	FTG ----	PE	0.0
								0.010	TL 1.00	PV	
Pipe: 22											
FP-IN		0.0	0.0	73.0	0.0	FIRE PUMP		Rating:	500.0 gpm @ 80.0 psi		
FP-OUT		0.0	0.0	153.0	0.0			Avail.:	500.0 gpm @ 80.0 psi		
								Req'd.:	500.0 gpm @ 80.0 psi		
Pipe: 23											
PR4		0.0	0.0	73.0	0.0	500.0	5.6	6.065	PL 4.00	PF	0.1
FP-IN		0.0	0.0	73.0	0.0			120	FTG G	PE	0.0
								0.010	TL 7.00	PV	
Pipe: 24											
PR4		0.0	0.0	73.0	0.0	-500.0	3.2	7.981	PL 12.00	PF	0.3
PR5		0.0	0.0	73.3	0.0			120	FTG 2C2G	PE	0.0
								0.003	TL 110.00	PV	
Pipe: 25											
PR5		0.0	0.0	73.3	0.0	-500.0	3.2	7.981	PL 19.00	PF	0.1
SRC		9.0	SRCE	69.5	(N/A)			120	FTG E	PE	-3.9
								0.003	TL 37.00	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 0.009 gpm.

JOB TITLE: 315 Spadina

- HASS Pipe Table Name: standard

Diameter	Equivalent Fitting Lengths in Feet
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(in)	E Ell	T Tee	L LngEll	C ChkVlv	B BfyVlv	G GatVlv	A AlmChk	D DPVlv	N NTee
	F F45Ell								
4.026	10.00 5.00	20.00	6.00	22.00	12.00	2.00	20.00	20.00	20.00
6.065	14.00 7.00	30.00	9.00	32.00	10.00	3.00	28.00	28.00	30.00
7.981	18.00 9.00	35.00	13.00	45.00	12.00	4.00	31.00	31.00	35.00

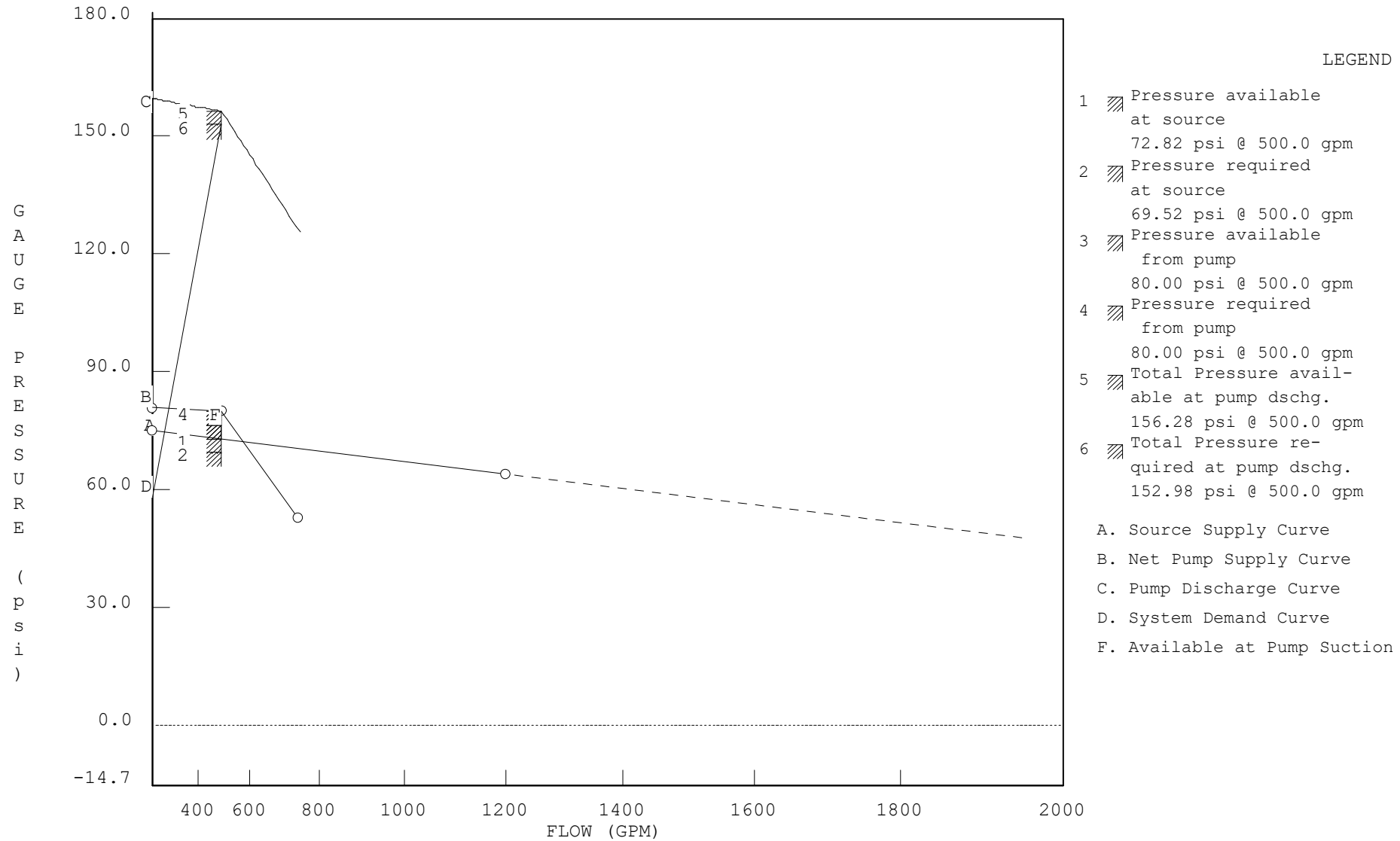
DATE: 5/26/2024\REZA\315 SPADINA\HYDRAULIC CALC\STANDPIPE SYSTEM CALC.SDF

JOB TITLE: 315 Spadina

Calculation-3 Standpipe System

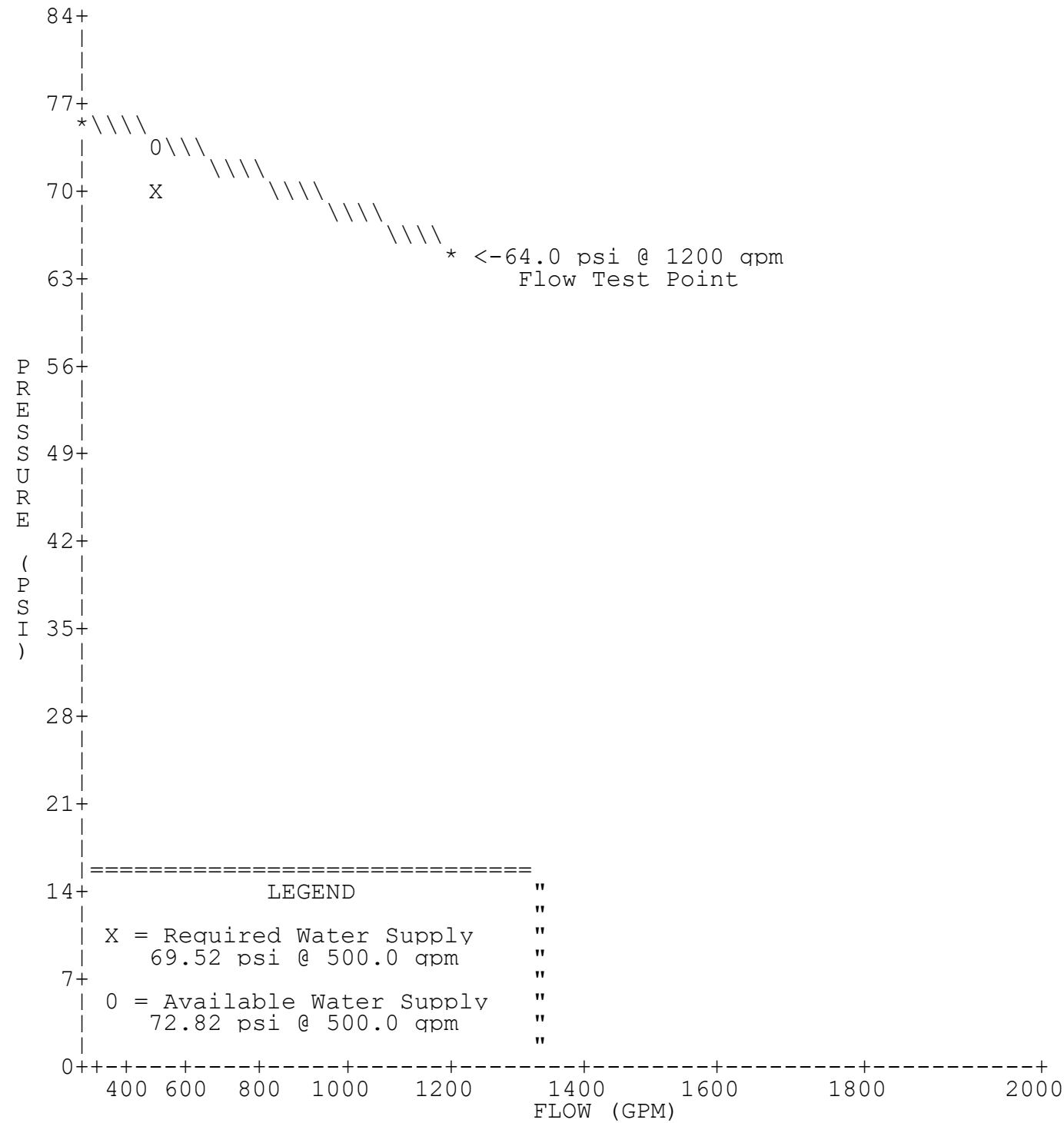
WATER SUPPLY ANALYSIS

Static: 75.00 psi Resid: 64.00 psi Flow: 1200.0 gpm



Note: (1) Dashed Lines indicate extrapolated values from Test Results

WATER SUPPLY CURVE



DATE: 5/23/2024\REZA\315 SPADINA\HYDRAULIC CALC\STANDPIPE SYSTEM CALC.SDF

JOB TITLE: 315 Spadina

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	75.0	64.0	1200.0	72.8	500.0	

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	500.0 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	500.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	0.0 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
ROOF-HV	142.6	HOSE STREAM	68.3	250.0
L13-HV	131.7	HOSE STREAM	73.2	250.0
L12	121.9	- - - -	78.2	- - -
L11	112.5	- - - -	82.9	- - -
L10	103.2	- - - -	87.6	- - -
L9	93.9	- - - -	92.3	- - -
L8	84.0	- - - -	97.3	- - -
L7	74.9	- - - -	101.9	- - -
L6	65.7	- - - -	106.6	- - -
L5	56.6	- - - -	111.2	- - -
L4	45.4	- - - -	116.8	- - -
L3	36.2	- - - -	121.5	- - -
L2	27.1	- - - -	126.1	- - -
L1	10.8	- - - -	134.3	- - -
UG1	5.5	- - - -	137.0	- - -
UG2	5.5	- - - -	140.4	- - -
UG3	5.5	- - - -	145.3	- - -
UG4	5.5	- - - -	152.3	- - -
PR1	5.5	- - - -	152.8	- - -
PR2	0.0	- - - -	155.8	- - -
FP-OUT	0.0	- - - -	156.3	- - -
FP-IN	0.0	- - - -	76.3	- - -
PR3	0.0	- - - -	156.3	- - -
PR4	0.0	- - - -	76.3	- - -
PR5	0.0	- - - -	76.6	- - -
SRC	9.0	SOURCE	72.8	500.0

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JOB TITLE: 315 Spadina

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						-250.0	4.026	PL	10.91	PF 0.2
ROOF-HV		142.6	H.S.	68.3	250.0	6.3	120	FTG	----	PE 4.7
L13-HV		131.7	H.S.	73.2	250.0		0.020	TL	10.91	PV
Pipe: 2						-500.0	4.026	PL	9.83	PF 0.7
L13-HV		131.7	H.S.	73.2	250.0	12.6	120	FTG	----	PE 4.3
L12		121.9	0.0	78.2	0.0		0.072	TL	9.83	PV
Pipe: 3						-500.0	4.026	PL	9.33	PF 0.7
L12		121.9	0.0	78.2	0.0	12.6	120	FTG	----	PE 4.0
L11		112.5	0.0	82.9	0.0		0.072	TL	9.33	PV
Pipe: 4						-500.0	4.026	PL	9.33	PF 0.7
L11		112.5	0.0	82.9	0.0	12.6	120	FTG	----	PE 4.0
L10		103.2	0.0	87.6	0.0		0.072	TL	9.33	PV
Pipe: 5						-500.0	4.026	PL	9.33	PF 0.7
L10		103.2	0.0	87.6	0.0	12.6	120	FTG	----	PE 4.0
L9		93.9	0.0	92.3	0.0		0.072	TL	9.33	PV
Pipe: 6						-500.0	4.026	PL	9.83	PF 0.7
L9		93.9	0.0	92.3	0.0	12.6	120	FTG	----	PE 4.3
L8		84.0	0.0	97.3	0.0		0.072	TL	9.83	PV
Pipe: 7						-500.0	4.026	PL	9.16	PF 0.7
L8		84.0	0.0	97.3	0.0	12.6	120	FTG	----	PE 4.0
L7		74.9	0.0	101.9	0.0		0.072	TL	9.16	PV
Pipe: 8						-500.0	4.026	PL	9.16	PF 0.7
L7		74.9	0.0	101.9	0.0	12.6	120	FTG	----	PE 4.0
L6		65.7	0.0	106.6	0.0		0.072	TL	9.16	PV
Pipe: 9						-500.0	4.026	PL	9.16	PF 0.7
L6		65.7	0.0	106.6	0.0	12.6	120	FTG	----	PE 4.0
L5		56.6	0.0	111.2	0.0		0.072	TL	9.16	PV
Pipe: 10						-500.0	4.026	PL	11.18	PF 0.8
L5		56.6	0.0	111.2	0.0	12.6	120	FTG	----	PE 4.8
L4		45.4	0.0	116.8	0.0		0.072	TL	11.18	PV
Pipe: 11						-500.0	4.026	PL	9.16	PF 0.7
L4		45.4	0.0	116.8	0.0	12.6	120	FTG	----	PE 4.0
L3		36.2	0.0	121.5	0.0		0.072	TL	9.16	PV
Pipe: 12						-500.0	4.026	PL	9.16	PF 0.7
L3		36.2	0.0	121.5	0.0	12.6	120	FTG	----	PE 4.0
L2		27.1	0.0	126.1	0.0		0.072	TL	9.16	PV
Pipe: 13						-500.0	4.026	PL	16.25	PF 1.2
L2		27.1	0.0	126.1	0.0	12.6	120	FTG	----	PE 7.0
L1		10.8	0.0	134.3	0.0		0.072	TL	16.25	PV
Pipe: 14						-500.0	4.026	PL	5.41	PF 0.4
L1		10.8	0.0	134.3	0.0	12.6	120	FTG	----	PE 2.3
UG1		5.5	0.0	137.0	0.0		0.072	TL	5.41	PV

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JOB TITLE: 315 Spadina

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: 15										
UG1		5.5	0.0	137.0	0.0	-500.0 12.6	4.026 120	PL FTG	PF PE	3.4 0.0
UG2		5.5	0.0	140.4	0.0		0.072	TL	PV	
Pipe: 16										
UG2		5.5	0.0	140.4	0.0	-500.0 12.6	4.026 120	PL FTG	PF PE	4.9 0.0
UG3		5.5	0.0	145.3	0.0		0.072	TL	PV	
Pipe: 17										
UG3		5.5	0.0	145.3	0.0	-500.0 12.6	4.026 120	PL FTG	PF PE	7.0 0.0
UG4		5.5	0.0	152.3	0.0		0.072	TL	PV	
Pipe: 18										
UG4		5.5	0.0	152.3	0.0	-500.0 5.6	6.065 120	PL FTG	PF PE	0.5 0.0
PR1		5.5	0.0	152.8	0.0		0.010	TL	PV	
Pipe: 19										
PR2		0.0	0.0	155.8	0.0	500.0 5.6	6.065 120	PL FTG	PF PE	0.6 -2.4
PR1		5.5	0.0	152.8	0.0		0.010	TL	PV	
Pipe: 20										
PR3		0.0	0.0	156.3	0.0	500.0 5.6	6.065 120	PL FTG	PF PE	0.5 0.0
PR2		0.0	0.0	155.8	0.0		0.010	TL	PV	
Pipe: 21										
FP-OUT		0.0	0.0	156.3	0.0	500.0 5.6	6.065 120	PL FTG	PF PE	0.0 0.0
PR3		0.0	0.0	156.3	0.0		0.010	TL	PV	
Pipe: 22										
FP-IN		0.0	0.0	76.3	0.0	FIRE PUMP	Rating:	500.0 gpm @ 80.0 psi		
FP-OUT		0.0	0.0	156.3	0.0		Avail.:	500.0 gpm @ 80.0 psi		
							Req'd.:	500.0 gpm @ 80.0 psi		
Pipe: 23										
PR4		0.0	0.0	76.3	0.0	500.0 5.6	6.065 120	PL FTG	PF PE	0.1 0.0
FP-IN		0.0	0.0	76.3	0.0		0.010	TL	PV	
Pipe: 24										
PR4		0.0	0.0	76.3	0.0	-500.0 3.2	7.981 120	PL FTG	PF PE	0.3 0.0
PR5		0.0	0.0	76.6	0.0		0.003	TL	PV	
Pipe: 25										
PR5		0.0	0.0	76.6	0.0	-500.0 3.2	7.981 120	PL FTG	PF PE	0.1 -3.9
SRC		9.0	SRCE	72.8	(N/A)		0.003	TL	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 0.005 gpm.

DATE: 5/23/2024\REZA\315 SPADINA\HYDRAULIC CALC\STANDPIPE SYSTEM CALC.SDF

JOB TITLE: 315 Spadina

- (3) Total pressure at each node is used in balancing the system.
Maximum water velocity is 12.6 ft/sec at pipe 7.
- (4) The Minimum pump suction pressure under maximum calculated demand is 76.28 (psi)
- (5) Items listed in bold print on the cover sheet
are automatically transferred from the calculation report.
- (6) Available pressure at source node SRC under full flow conditions is
72.82 psi with a flow of 500.00 gpm.
- (7) PIPE FITTINGS TABLE

HASS Pipe Table Name: standard

PAGE: A MATERIAL: S40 HWC: 120

Diameter (in)	Equivalent Fitting Lengths in Feet								
	E Ell	T Tee	L LngEll	C ChkVlv	B BfyVlv	G GatVlv	A AlmChk	D DPVlv	N NTee
	F F45Ell								
4.026	10.00 5.00	20.00	6.00	22.00	12.00	2.00	20.00	20.00	20.00
6.065	14.00 7.00	30.00	9.00	32.00	10.00	3.00	28.00	28.00	30.00
7.981	18.00 9.00	35.00	13.00	45.00	12.00	4.00	31.00	31.00	35.00

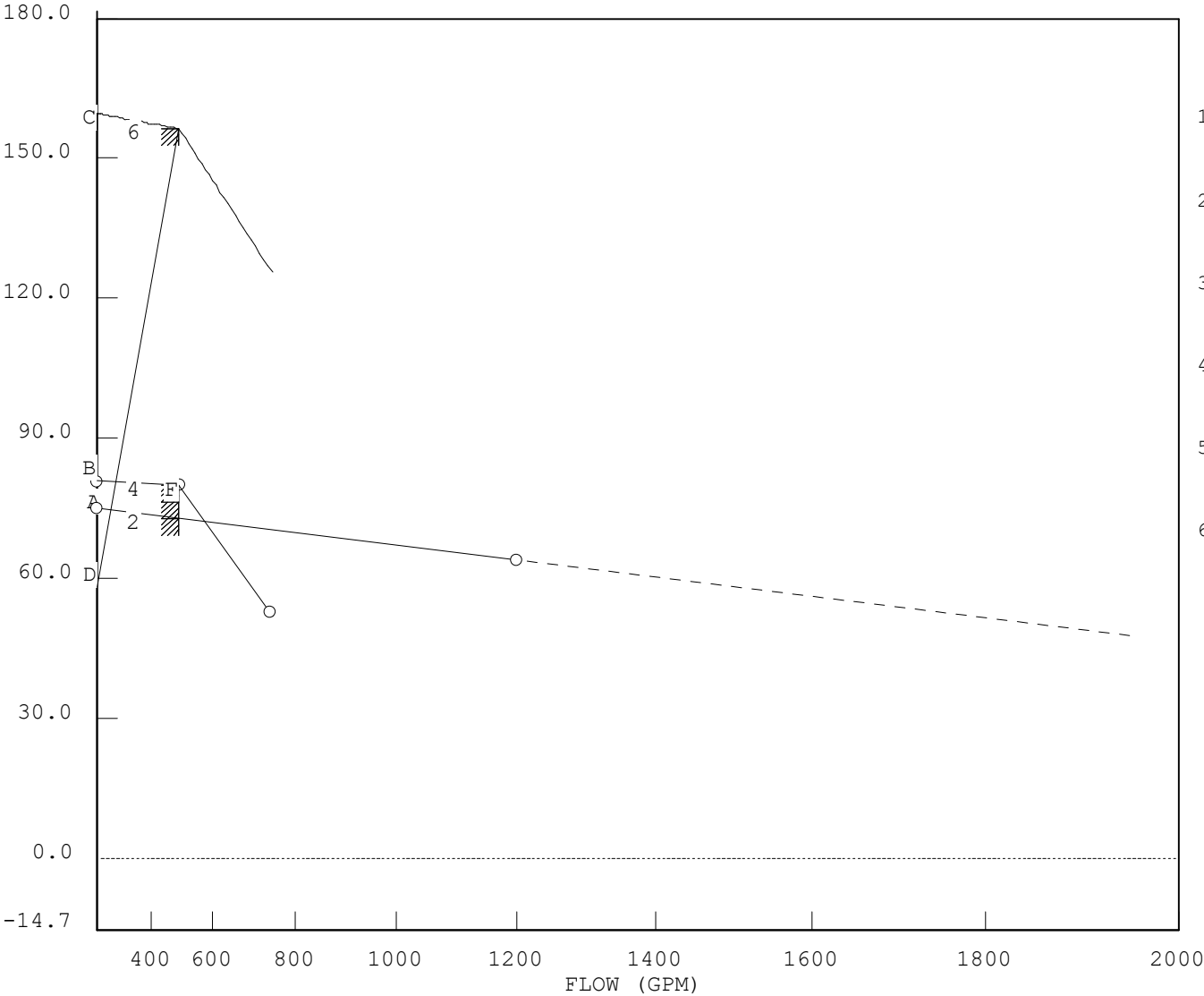
WATER SUPPLY ANALYSIS

Static: 75.00 psi Resid: 64.00 psi Flow: 1200.0 gpm

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LEGEND

- 1. Pressure available at source
72.82 psi @ 500.0 gpm
- 2. Pressure required at source
72.82 psi @ 500.0 gpm
- 3. Pressure available from pump
80.00 psi @ 500.0 gpm
- 4. Pressure required from pump
80.00 psi @ 500.0 gpm
- 5. Total Pressure available at pump dschg.
156.28 psi @ 500.0 gpm
- 6. Total Pressure required at pump dschg.
156.28 psi @ 500.0 gpm
- A. Source Supply Curve
- B. Net Pump Supply Curve
- C. Pump Discharge Curve
- D. System Demand Curve
- F. Available at Pump Suction

WATER SUPPLY CURVE

