SMITH FIRE SYSTEMS, INC
1106 54TH AVENUE EAST TACOMA, WASHINGTON 98424
(253) 926-1880 Fax (253) 926-2350
CONTR. REG. NO. SMITHFS1360T

GENERAL / HYDRAULIC CALCULATION INFORMATION SHEET

PROJECT NAME:	WASHINGTON STATE FAIR	JOB NO. :	TI24073	OWNER :
	INTERNATIONAL VILLAGE	DATE:	11/25/2024	WA STATE FAIR
ADDRESS:	110 9TH AVE SW	BY:	A. RIDEOUT	AHJ :
	PUYALLUP, WA 98371			CITY OF PUYALLUP

SYSTEM DESIGNATION: **SYSTEM #1- GROUND FLOOR**

DESIGN PER: **NFPA #13 (2019 EDITION)**

OCCUPANCY CLASSIFICATION: **ORDINARY HAZARD - GROUP I**

DESIGN CRITERIA:

NFPA SECTION:	**19.3.3.2.3.1**
QUICK RESPONSE REDUCTION:	**NO**
NFPA SECTION:	**19.3.3.2.4**
SLOPED CEILING INCREASE:	**NO**
NFPA SECTION:	**20.13.3**
DRY SYSTEM INCREASE:	**YES 30% AREA INCREASE**
SYSTEM TYPE:	**DRY**
MAX CEILING HEIGHT:	**N/A**
CEILING HEIGHT:	**N/A**
ROOF SLOPE:	**N/A**

SPRINKLER MANUFACTURER:	**RELIABLE**
K-FACTOR:	**5.6**
MODEL:	**F1FR56**
TEMPERATURE:	**286°**
RESPONSE TYPE:	**QR**
TOTAL SPRINKLERS CALCULATED:	**24**
MAX AREA OF COVERAGE PER SPRINKLER:	**130 SQ. FT**
MAX DISTANCE BETWEEN SPRINKLERS:	**15**
FIRE PUMP:	NO
RATED CAPACITY OF PUMP:	N/A

DESIGN AREA

0.15 GPM OVER THE MOST HYDRAULICALLY DEMANDING **1950** SQ. FT.

ALLOWANCES INCLUDED IN CALCULATIONS:		ADDED AT:
OUTSIDE HOSE	**250** GPM	CONNECTION TO SOURCE

WATER SUPPLY: ELEVATION OF TEST: 0 FT. ELEVATION OF LEVEL 1: 0 FT.

STATIC	**59** PSI	DATE OF TEST:	11/19/2024
RESIDUAL	**20** PSI	DATA PROVIDED BY:	CITY OFPUYALLUP
FLOW	**1560** GPM	LOCATION OF TEST:	110 9TH AVE SW, PUYALLUP WA 98371

MAIN DRAIN TEST:
S: R:

INSPECTORS TEST:
TRIP TIME:

DRY SYSTEM NUMBER 1

AREA	SQ. FT.	SPRINKLERS
MAIN FLOOR	14,542	164
ROOF TOP	10,321	31
TOTAL:	24,863	195

NOTES:

MOST DEMANDING AREA: SYS. 1

DENSITY: .15 GPM OVER 1950 SQUARE FEET

BASE OF RISER: 472.2 GPM REQUIRED AT 40.6 PSI

SUMMARY: 722.2 GPM REQUIRED AT 47.1 PSI
AT CONNECTION TO **SOURCE**
(INCLUDING **250** GPM FOR HOSE STREAMS)
DRY SYSTEM VOLUME: 660 GALLONS

Expires 12 / 31 / 25
WASHINGTON STATE
CERTIFICATE OF COMPETENCY
FIRE SPRINKLER SYSTEMS
Nicholas James Scott
0627-1019-C Level 3
Smith Fire Systems, Inc.
SMITHFS136OT
Signature
01/07/2025
Date

SMITH FIRE SYSTEMS, INC.

WATER SUPPLY DATA		
STATIC	59	PSI
RESIDUAL	20	PSI
FLOWING	1560	GPM

JOB NAME: WASHINGTON STATE FAIR - INTERNATIONAL VILLAGE
ADDRESS: 110 9TH AVE SW
DATE: PUYALLUP, WA 98371
JOB NO.: TI24073
SYSTEM/AREA: #1 - ENTIRE

MOST DEMANDING AREA: SYS. 1

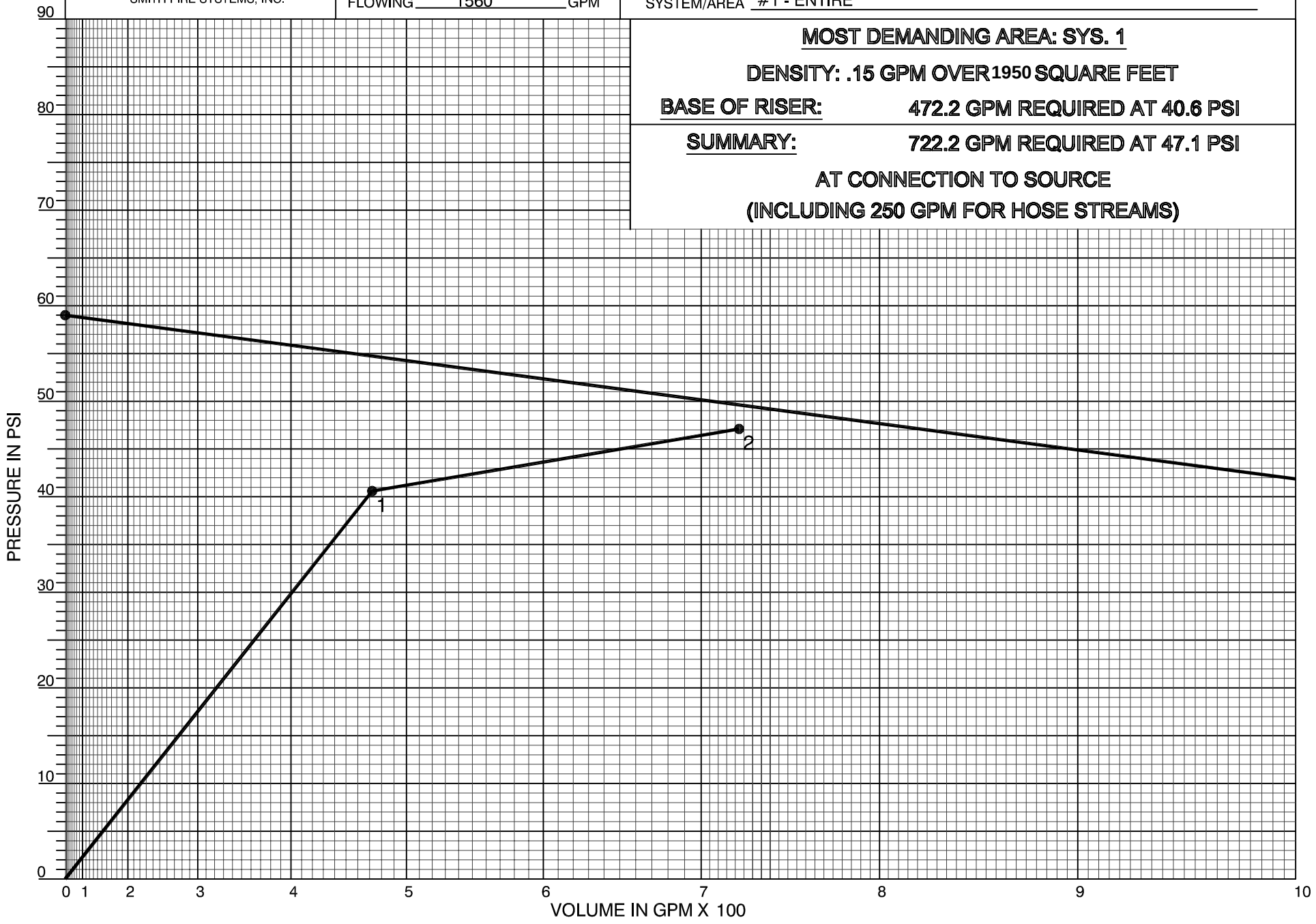
DENSITY: .15 GPM OVER 1950 SQUARE FEET

BASE OF RISER: 472.2 GPM REQUIRED AT 40.6 PSI

SUMMARY: 722.2 GPM REQUIRED AT 47.1 PSI

AT CONNECTION TO SOURCE

(INCLUDING 250 GPM FOR HOSE STREAMS)



DATE: 12/27/2024NAL VILLAGE\DESIGN\HYDRAULIC CALCS\R2 LAYOUT 12.02.24.SDF
JOB TITLE: SYS 1

WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. @ (PSI)	FLOW @ (GPM)	AVAIL. PRESS. @ (PSI)	TOTAL DEMAND (GPM)	REQ'D PRESS. (PSI)
SOURCE	59.0	20.0	1560.0	49.6	722.2	47.1

Available pressure is 2.5 psi (5%) greater than required pressure.

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	722.2 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	250.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	472.2 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)	AREA (FT^2)	DENSITY REQ. (GPM/FT^2)	DENSITY ACT. (GPM/FT^2)
S1	9.5	K= 5.60	9.3	17.1	100.0	0.150	0.171
S2	9.5	K= 5.60	9.3	17.1	100.0	0.150	0.171
S3	9.5	K= 5.60	9.4	17.1	80.0	0.150	0.214
S4	9.5	K= 5.60	9.0	16.8	80.0	0.150	0.210
S5	9.5	K= 5.60	9.3	17.1	50.0	0.150	0.341
S6	9.5	K= 5.60	9.4	17.1	50.0	0.150	0.343
S7	9.5	K= 5.60	8.9	16.7	80.0	0.150	0.209
S8	9.5	K= 5.60	9.4	17.2	64.0	0.150	0.269
S9	9.5	K= 5.60	9.5	17.3	72.0	0.150	0.240
S10	9.5	K= 5.60	9.3	17.0	104.0	0.150	0.164
S11	9.5	K= 5.60	9.6	17.3	104.0	0.150	0.167
S12	9.5	K= 5.60	9.7	17.4	116.0	0.150	0.150
S13	12.8	K= 5.60	16.7	22.9	116.0	0.100	0.197
S14	12.8	K= 5.60	16.8	22.9	116.0	0.100	0.198
S15	12.8	K= 5.60	17.0	23.1	116.0	0.100	0.199
S16	12.8	K= 5.60	16.7	22.9	84.0	0.100	0.273
S17	12.8	K= 5.60	16.8	22.9	84.0	0.100	0.273
S18	12.8	K= 5.60	17.0	23.1	84.0	0.100	0.275
S19	18.5	K= 5.60	14.6	21.4	116.0	0.100	0.184
S20	18.5	K= 5.60	14.6	21.4	116.0	0.100	0.185
S21	18.4	K= 5.60	14.9	21.6	116.0	0.100	0.186
S22	18.5	K= 5.60	14.7	21.5	84.0	0.100	0.255
S23	18.5	K= 5.60	14.7	21.5	84.0	0.100	0.256
S24	18.4	K= 5.60	15.0	21.7	84.0	0.100	0.258
1	13.6	- - - -	12.4	- - -	- - -	- - -	- - -
2	13.6	- - - -	12.5	- - -	- - -	- - -	- - -
3	13.5	- - - -	12.6	- - -	- - -	- - -	- - -
4	13.6	- - - -	12.4	- - -	- - -	- - -	- - -
5	13.6	- - - -	12.4	- - -	- - -	- - -	- - -
6	13.5	- - - -	12.6	- - -	- - -	- - -	- - -
7	13.6	- - - -	12.6	- - -	- - -	- - -	- - -
8	13.6	- - - -	12.7	- - -	- - -	- - -	- - -
9	13.5	- - - -	12.8	- - -	- - -	- - -	- - -

DATE: 12/27/2024NAL VILLAGE\DESIGN\HYDRAULIC CALCS\R2 LAYOUT 12.02.24.SDF
JOB TITLE: SYS 1

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)	AREA (FT^2)	DENSITY REQ. (GPM/FT^2)	DENSITY ACT. (GPM/FT^2)
10	13.6	- - - -	12.8	- - -	- - -	- - -	- - -
11	13.6	- - - -	12.9	- - -	- - -	- - -	- - -
12	13.5	- - - -	13.0	- - -	- - -	- - -	- - -
M1	12.0	- - - -	13.8	- - -	- - -	- - -	- - -
M2	13.6	- - - -	12.7	- - -	- - -	- - -	- - -
M3	12.0	- - - -	13.8	- - -	- - -	- - -	- - -
M4	13.6	- - - -	12.8	- - -	- - -	- - -	- - -
M5	12.0	- - - -	14.0	- - -	- - -	- - -	- - -
M6	13.6	- - - -	13.0	- - -	- - -	- - -	- - -
M7	12.0	- - - -	14.3	- - -	- - -	- - -	- - -
M8	13.6	- - - -	13.2	- - -	- - -	- - -	- - -
M9	12.0	- - - -	14.4	- - -	- - -	- - -	- - -
M10	18.5	- - - -	13.6	- - -	- - -	- - -	- - -
M11	16.4	- - - -	17.2	- - -	- - -	- - -	- - -
M12	18.4	- - - -	15.0	- - -	- - -	- - -	- - -
M13	11.5	- - - -	18.6	- - -	- - -	- - -	- - -
M14	13.4	- - - -	17.1	- - -	- - -	- - -	- - -
M15	11.4	- - - -	18.6	- - -	- - -	- - -	- - -
M16	13.4	- - - -	17.1	- - -	- - -	- - -	- - -
M17	11.5	- - - -	18.6	- - -	- - -	- - -	- - -
M18	16.5	- - - -	16.6	- - -	- - -	- - -	- - -
M19	16.4	- - - -	16.6	- - -	- - -	- - -	- - -
M20	18.4	- - - -	15.2	- - -	- - -	- - -	- - -
M21	16.4	- - - -	16.7	- - -	- - -	- - -	- - -
M22	18.4	- - - -	15.3	- - -	- - -	- - -	- - -
M23	15.5	- - - -	22.2	- - -	- - -	- - -	- - -
M24	16.3	- - - -	20.9	- - -	- - -	- - -	- - -
TOR	15.3	- - - -	30.8	- - -	- - -	- - -	- - -
BOR	1.5	- - - -	40.6	- - -	- - -	- - -	- - -
FLG	0.5	- - - -	41.1	- - -	- - -	- - -	- - -
BFP1	0.0	- - - -	42.3	- - -	- - -	- - -	- - -
BFP2	0.0	- - - -	46.3	- - -	- - -	- - -	- - -
SOURCE	0.0	SOURCE	47.1	472.2	- - -	- - -	- - -

DATE: 12/27/2024NAL VILLAGE\DESIGN\HYDRAULIC CALCS\R2 LAYOUT 12.02.24.SDF
JOB TITLE: SYS 1

PIPE DATA

PIPE TAG / END NODES	ELEV. (FT)	NOZ. (K)	PT (PSI)	DISC. (GPM)	Q(GPM) VEL(FPS)	DIA(IN) HW(C) FL/FT	LENGTH (FT)		PRESS. SUM. (PSI)	
Pipe: 1					17.1	1.049	PL	27.00	PF	4.9
1	13.6	0.0	12.4	0.0	6.3	100	FTG	4ET	PE	1.8
S1	9.5	5.6	9.3	17.1		0.136	TL	36.20	PV	
Pipe: 2					17.1	1.049	PL	27.00	PF	4.9
2	13.6	0.0	12.5	0.0	6.3	100	FTG	4ET	PE	1.8
S2	9.5	5.6	9.3	17.1		0.136	TL	36.20	PV	
Pipe: 3					17.1	1.049	PL	27.00	PF	5.0
3	13.5	0.0	12.6	0.0	6.4	100	FTG	4ET	PE	1.7
S3	9.5	5.6	9.4	17.1		0.137	TL	36.20	PV	
Pipe: 4					16.8	1.049	PL	29.00	PF	5.2
4	13.6	0.0	12.4	0.0	6.2	100	FTG	5ET	PE	1.8
S4	9.5	5.6	9.0	16.8		0.132	TL	39.60	PV	
Pipe: 5					17.1	1.049	PL	27.00	PF	4.9
5	13.6	0.0	12.4	0.0	6.3	100	FTG	4ET	PE	1.8
S5	9.5	5.6	9.3	17.1		0.136	TL	36.20	PV	
Pipe: 6					17.1	1.049	PL	27.00	PF	5.0
6	13.5	0.0	12.6	0.0	6.4	100	FTG	4ET	PE	1.7
S6	9.5	5.6	9.4	17.1		0.137	TL	36.20	PV	
Pipe: 7					16.7	1.049	PL	31.00	PF	5.5
7	13.6	0.0	12.6	0.0	6.2	100	FTG	5ET	PE	1.8
S7	9.5	5.6	8.9	16.7		0.131	TL	41.60	PV	
Pipe: 8					17.2	1.049	PL	27.00	PF	5.0
8	13.6	0.0	12.7	0.0	6.4	100	FTG	4ET	PE	1.8
S8	9.5	5.6	9.4	17.2		0.138	TL	36.20	PV	
Pipe: 9					17.3	1.049	PL	27.00	PF	5.0
9	13.5	0.0	12.8	0.0	6.4	100	FTG	4ET	PE	1.7
S9	9.5	5.6	9.5	17.3		0.139	TL	36.20	PV	
Pipe: 10					17.0	1.049	PL	29.00	PF	5.4
10	13.6	0.0	12.8	0.0	6.3	100	FTG	5ET	PE	1.8
S10	9.5	5.6	9.3	17.0		0.135	TL	39.60	PV	
Pipe: 11					17.3	1.049	PL	27.00	PF	5.1
11	13.6	0.0	12.9	0.0	6.4	100	FTG	4ET	PE	1.8
S11	9.5	5.6	9.6	17.3		0.140	TL	36.20	PV	
Pipe: 12					17.4	1.049	PL	27.00	PF	5.1
12	13.5	0.0	13.0	0.0	6.5	100	FTG	4ET	PE	1.7
S12	9.5	5.6	9.7	17.4		0.141	TL	36.20	PV	
Pipe: B1					-17.1	2.185	PL	10.00	PF	0.0
1	13.6	0.0	12.4	0.0	1.5	100	FTG	----	PE	0.0
2	13.6	0.0	12.5	0.0		0.004	TL	10.00	PV	

PIPE TAG / END NODES	ELEV. (FT)	NOZ. (K)	PT (PSI)	DISC. (GPM)	Q(GPM) VEL(FPS)	DIA(IN) HW(C) FL/FT	LENGTH (FT)		PRESS. SUM. (PSI)	
Pipe: B2					-34.1	2.185 PL	8.00	PF		0.1
2	13.6	0.0	12.5	0.0	2.9	100 FTG	----	PE		0.0
3	13.5	0.0	12.6	0.0		0.014 TL	8.00	PV		
Pipe: B3					-51.3	2.185 PL	2.00	PF		0.2
3	13.5	0.0	12.6	0.0	4.4	100 FTG	E	PE		-0.0
M2	13.6	0.0	12.7	0.0		0.029 TL	5.30	PV		
Pipe: B4					-16.8	2.185 PL	8.00	PF		0.0
4	13.6	0.0	12.4	0.0	1.4	100 FTG	----	PE		0.0
5	13.6	0.0	12.4	0.0		0.004 TL	8.00	PV		
Pipe: B5					-33.8	2.185 PL	8.00	PF		0.1
5	13.6	0.0	12.4	0.0	2.9	100 FTG	----	PE		0.0
6	13.5	0.0	12.6	0.0		0.014 TL	8.00	PV		
Pipe: B6					-51.0	2.185 PL	4.00	PF		0.2
6	13.5	0.0	12.6	0.0	4.4	100 FTG	E	PE		-0.0
M4	13.6	0.0	12.8	0.0		0.029 TL	7.30	PV		
Pipe: B7					-16.7	2.185 PL	8.00	PF		0.0
7	13.6	0.0	12.6	0.0	1.4	100 FTG	----	PE		0.0
8	13.6	0.0	12.7	0.0		0.004 TL	8.00	PV		
Pipe: B8					-33.9	2.185 PL	8.00	PF		0.1
8	13.6	0.0	12.7	0.0	2.9	100 FTG	----	PE		0.0
9	13.5	0.0	12.8	0.0		0.014 TL	8.00	PV		
Pipe: B9					-51.2	2.185 PL	4.00	PF		0.2
9	13.5	0.0	12.8	0.0	4.4	100 FTG	E	PE		-0.0
M6	13.6	0.0	13.0	0.0		0.029 TL	7.30	PV		
Pipe: B10					-17.0	2.185 PL	8.00	PF		0.0
10	13.6	0.0	12.8	0.0	1.5	100 FTG	----	PE		0.0
11	13.6	0.0	12.9	0.0		0.004 TL	8.00	PV		
Pipe: B11					-34.4	2.185 PL	8.00	PF		0.1
11	13.6	0.0	12.9	0.0	2.9	100 FTG	----	PE		0.0
12	13.5	0.0	13.0	0.0		0.014 TL	8.00	PV		
Pipe: B12					-51.8	2.185 PL	4.00	PF		0.2
12	13.5	0.0	13.0	0.0	4.4	100 FTG	E	PE		-0.0
M8	13.6	0.0	13.2	0.0		0.030 TL	7.30	PV		
Pipe: B13					-22.9	2.185 PL	10.50	PF		0.1
S13	12.8	5.6	16.7	22.9	2.0	100 FTG	----	PE		0.0
S14	12.8	5.6	16.8	22.9		0.007 TL	10.50	PV		
Pipe: B14					-45.8	2.185 PL	10.50	PF		0.2
S14	12.8	5.6	16.8	22.9	3.9	100 FTG	----	PE		0.0
S15	12.8	5.6	17.0	23.1		0.024 TL	10.50	PV		

DATE: 12/27/2024NAL VILLAGE\DESIGN\HYDRAULIC CALCS\R2 LAYOUT 12.02.24.SDF
JOB TITLE: SYS 1

PIPE TAG / END NODES	ELEV. (FT)	NOZ. (K)	PT (PSI)	DISC. (GPM)	Q(GPM) VEL(FPS)	DIA(IN) HW(C) FL/FT	LENGTH (FT)		PRESS. SUM. (PSI)	
Pipe: B15					-68.9	2.185 PL	3.58	PF		0.3
S15	12.8	5.6	17.0	23.1	5.9	100 FTG	E	PE		-0.3
M14	13.4	0.0	17.1	0.0		0.050 TL	6.88	PV		
Pipe: B16					-22.9	2.185 PL	10.50	PF		0.1
S16	12.8	5.6	16.7	22.9	2.0	100 FTG	----	PE		0.0
S17	12.8	5.6	16.8	22.9		0.007 TL	10.50	PV		
Pipe: B17					-45.8	2.185 PL	10.50	PF		0.2
S17	12.8	5.6	16.8	22.9	3.9	100 FTG	----	PE		0.0
S18	12.8	5.6	17.0	23.1		0.024 TL	10.50	PV		
Pipe: B18					-68.9	2.185 PL	3.58	PF		0.3
S18	12.8	5.6	17.0	23.1	5.9	100 FTG	E	PE		-0.3
M16	13.4	0.0	17.1	0.0		0.050 TL	6.88	PV		
Pipe: B19					-21.4	2.185 PL	10.50	PF		0.1
S19	18.5	5.6	14.6	21.4	1.8	100 FTG	----	PE		0.0
S20	18.5	5.6	14.6	21.4		0.006 TL	10.50	PV		
Pipe: B20					-42.8	2.185 PL	10.50	PF		0.2
S20	18.5	5.6	14.6	21.4	3.7	100 FTG	----	PE		0.0
S21	18.4	5.6	14.9	21.6		0.021 TL	10.50	PV		
Pipe: B21					-64.4	2.185 PL	3.58	PF		0.3
S21	18.4	5.6	14.9	21.6	5.5	100 FTG	E	PE		-0.0
M20	18.4	0.0	15.2	0.0		0.045 TL	6.88	PV		
Pipe: B22					-21.5	2.185 PL	10.50	PF		0.1
S22	18.5	5.6	14.7	21.5	1.8	100 FTG	----	PE		0.0
S23	18.5	5.6	14.7	21.5		0.006 TL	10.50	PV		
Pipe: B23					-42.9	2.185 PL	10.50	PF		0.2
S23	18.5	5.6	14.7	21.5	3.7	100 FTG	----	PE		0.0
S24	18.4	5.6	15.0	21.7		0.021 TL	10.50	PV		
Pipe: B24					-64.6	2.185 PL	3.58	PF		0.3
S24	18.4	5.6	15.0	21.7	5.5	100 FTG	E	PE		-0.0
M22	18.4	0.0	15.3	0.0		0.045 TL	6.88	PV		
Pipe: R1					51.3	2.185 PL	1.58	PF		0.4
M1	12.0	0.0	13.8	0.0	4.4	100 FTG	T	PE		-0.7
M2	13.6	0.0	12.7	0.0		0.029 TL	12.38	PV		
Pipe: R2					51.0	2.185 PL	1.58	PF		0.4
M3	12.0	0.0	13.8	0.0	4.4	100 FTG	T	PE		-0.7
M4	13.6	0.0	12.8	0.0		0.029 TL	12.38	PV		
Pipe: R3					51.2	2.185 PL	1.58	PF		0.4
M5	12.0	0.0	14.0	0.0	4.4	100 FTG	T	PE		-0.7
M6	13.6	0.0	13.0	0.0		0.029 TL	12.38	PV		

PIPE TAG / END NODES	ELEV. (FT)	NOZ. (K)	PT (PSI)	DISC. (GPM)	Q(GPM) VEL(FPS)	DIA(IN) HW(C) FL/FT	LENGTH (FT)	PRESS. SUM. (PSI)
Pipe: R4					51.8	2.185 PL	1.58 PF	0.4
M7	12.0	0.0	14.3	0.0	4.4	100 FTG	T PE	-0.7
M8	13.6	0.0	13.2	0.0		0.030 TL	12.38 PV	
Pipe: R5					-205.2	3.314 PL	6.58 PF	2.0
M9	12.0	0.0	14.4	0.0	7.6	100 FTG	3ET PE	-2.8
M10	18.5	0.0	13.6	0.0		0.050 TL	40.28 PV	
Pipe: R6					205.2	3.314 PL	2.00 PF	1.3
M11	16.4	0.0	17.2	0.0	7.6	100 FTG	ET PE	-0.9
M12	18.4	0.0	15.0	0.0		0.050 TL	25.30 PV	
Pipe: R7					68.9	2.185 PL	1.92 PF	0.6
M13	11.5	0.0	18.6	0.0	5.9	100 FTG	T PE	-0.8
M14	13.4	0.0	17.1	0.0		0.050 TL	12.72 PV	
Pipe: R8					68.9	2.185 PL	2.00 PF	0.6
M15	11.4	0.0	18.6	0.0	5.9	100 FTG	T PE	-0.9
M16	13.4	0.0	17.1	0.0		0.050 TL	12.80 PV	
Pipe: R9					-137.9	4.298 PL	5.00 PF	0.1
M17	11.5	0.0	18.6	0.0	3.0	100 FTG	2E PE	-2.2
M18	16.5	0.0	16.6	0.0		0.007 TL	18.20 PV	
Pipe: R10					64.4	2.185 PL	2.00 PF	0.6
M19	16.4	0.0	16.6	0.0	5.5	100 FTG	T PE	-0.9
M20	18.4	0.0	15.2	0.0		0.045 TL	12.80 PV	
Pipe: R11					64.6	2.185 PL	2.00 PF	0.6
M21	16.4	0.0	16.7	0.0	5.5	100 FTG	T PE	-0.9
M22	18.4	0.0	15.3	0.0		0.045 TL	12.80 PV	
Pipe: R12					472.1	4.298 PL	0.83 PF	0.9
M23	15.5	0.0	22.2	0.0	10.4	100 FTG	2E PE	-0.4
M24	16.3	0.0	20.9	0.0		0.066 TL	14.03 PV	
Pipe: M1					-51.3	3.314 PL	8.00 PF	0.0
M1	12.0	0.0	13.8	0.0	1.9	100 FTG	---- PE	0.0
M3	12.0	0.0	13.8	0.0		0.004 TL	8.00 PV	
Pipe: M2					-102.3	3.314 PL	16.00 PF	0.2
M3	12.0	0.0	13.8	0.0	3.8	100 FTG	---- PE	0.0
M5	12.0	0.0	14.0	0.0		0.014 TL	16.00 PV	
Pipe: M3					-153.5	3.314 PL	8.00 PF	0.2
M5	12.0	0.0	14.0	0.0	5.7	100 FTG	---- PE	0.0
M7	12.0	0.0	14.3	0.0		0.029 TL	8.00 PV	
Pipe: M5					-205.2	3.314 PL	2.00 PF	0.1
M7	12.0	0.0	14.3	0.0	7.6	100 FTG	---- PE	0.0
M9	12.0	0.0	14.4	0.0		0.050 TL	2.00 PV	

PIPE TAG / END NODES	ELEV. (FT)	NOZ. (K)	PT (PSI)	DISC. (GPM)	Q(GPM) VEL(FPS)	DIA(IN) HW(C) FL/FT	LENGTH (FT)		PRESS. SUM. (PSI)
Pipe: M8					-205.2	3.314 PL	28.83	PF	1.4
M10	18.5	0.0	13.6	0.0	7.6	100 FTG	----	PE	0.0
M12	18.4	0.0	15.0	0.0		0.050 TL	28.83	PV	
Pipe: M9					-68.9	4.298 PL	8.00	PF	0.0
M13	11.5	0.0	18.6	0.0	1.5	100 FTG	----	PE	0.0
M15	11.4	0.0	18.6	0.0		0.002 TL	8.00	PV	
Pipe: M10					-137.9	4.298 PL	5.33	PF	0.0
M15	11.4	0.0	18.6	0.0	3.0	100 FTG	----	PE	-0.0
M17	11.5	0.0	18.6	0.0		0.007 TL	5.33	PV	
Pipe: M11					-137.9	4.298 PL	2.67	PF	0.0
M18	16.5	0.0	16.6	0.0	3.0	100 FTG	----	PE	0.0
M19	16.4	0.0	16.6	0.0		0.007 TL	2.67	PV	
Pipe: M12					-202.3	4.298 PL	8.00	PF	0.1
M19	16.4	0.0	16.6	0.0	4.5	100 FTG	----	PE	0.0
M21	16.4	0.0	16.7	0.0		0.014 TL	8.00	PV	
Pipe: M13					-266.9	4.298 PL	18.25	PF	0.4
M21	16.4	0.0	16.7	0.0	5.9	100 FTG	----	PE	0.0
M11	16.4	0.0	17.2	0.0		0.023 TL	18.25	PV	
Pipe: M14					-472.1	4.298 PL	49.83	PF	3.7
M11	16.4	0.0	17.2	0.0	10.4	100 FTG	E	PE	0.0
M24	16.3	0.0	20.9	0.0		0.066 TL	56.43	PV	
Pipe: M15					-472.1	4.298 PL	93.83	PF	8.5
M23	15.5	0.0	22.2	0.0	10.4	100 FTG	2ET	PE	0.1
TOR	15.3	0.0	30.8	0.0		0.066 TL	129.73	PV	
Pipe: M13A					-472.1	4.298 PL	14.75	PF	3.8
TOR	15.3	0.0	30.8	0.0	10.4	100 FTG	TD	PE	6.0
BOR	1.5	0.0	40.6	0.0		0.066 TL	58.05	PV	
Pipe: M14A					-472.1	4.298 PL	1.00	PF	0.0
BOR	1.5	0.0	40.6	0.0	10.4	120 FTG	----	PE	0.4
FLG	0.5	0.0	41.1	0.0		0.047 TL	1.00	PV	
Pipe: M15A					-472.1	6.160 PL	115.00	PF	1.0
FLG	0.5	0.0	41.1	0.0	5.1	140 FTG	2E2F	PE	0.2
BFP1	0.0	0.0	42.3	0.0		0.006 TL	159.00	PV	
Pipe: M16A					FIXED PRESSURE LOSS DEVICE				
BFP2	0.0	0.0	46.3	0.0	4.0 psi, 472.1 gpm				
BFP1	0.0	0.0	42.3	0.0					
Pipe: M17A					-472.2	6.160 PL	35.00	PF	0.8
BFP2	0.0	0.0	46.3	0.0	5.1	140 FTG	E2T2G	PE	0.0
SOURCE	0.0	SRCE	47.1	(N/A)		0.006 TL	135.00	PV	

NOTES (HASS):

(1) Calculations were performed by the HASS 2023 D computer program in accordance with NFPA (2020) under license no. 64621553 granted by

HRS Systems, Inc.
208 Southside Square
Petersburg, TN 37144
(931) 659-9760

(2) The system has been calculated to provide an average imbalance at each node of 0.003 gpm and a maximum imbalance at any node of 0.189 gpm.

(3) Total pressure at each node is used in balancing the system. Maximum water velocity is 10.4 ft/sec at pipe M14.

(4) Items listed in bold print on the cover sheet

are automatically transferred from the calculation report.

(5) Available pressure at source node SOURCE under full flow conditions is 49.27 psi with a flow of 736.37 gpm.

(6) PIPE FITTINGS TABLE

User Pipe Table Name: SMITH

PAGE: D MATERIAL: DI HWC: 140

Diameter	Equivalent Fitting Lengths in Feet					
(in)	E Ell	T Tee	F 45	C ChkVlv	B BfyVlv	G GatVlv
6.160	12.00	40.00	10.00	43.00	16.00	4.00

PAGE: Y MATERIAL: SCH7 HWC: 120

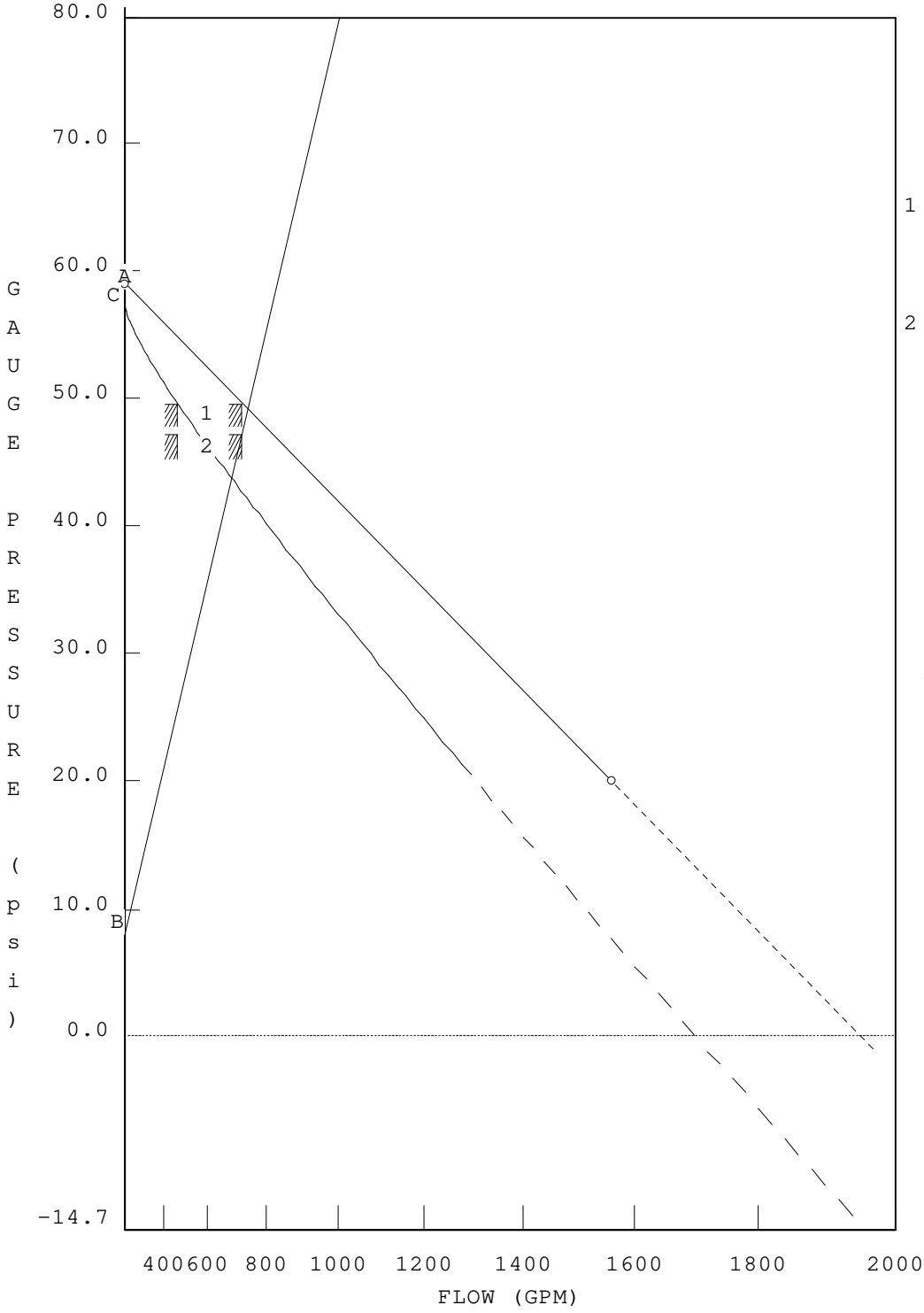
Diameter	Equivalent Fitting Lengths in Feet								
(in)	E Ell	T Tee	F 45	C ChkVlv	B BfyVlv	G GatVlv	A AlmChk	D DPVlv	X fleX
4.298	9.30	31.90	4.70	24.70	7.80	3.00	28.90	28.90	0.00

PAGE: Z MATERIAL: SCH7 HWC: 100

Diameter	Equivalent Fitting Lengths in Feet								
(in)	E Ell	T Tee	F 45	C ChkVlv	B BfyVlv	G GatVlv	A AlmChk	D DPVlv	X fleX
1.049	1.40	3.60	1.00	3.60	4.30	1.00	0.00	0.00	0.00
2.185	3.30	10.80	1.70	10.30	4.40	1.00	8.80	8.80	0.00
3.314	5.20	18.10	2.70	17.80	7.50	1.40	16.70	16.70	0.00
4.298	6.60	22.70	3.40	17.60	5.60	2.10	20.60	20.60	0.00

WATER SUPPLY ANALYSIS

Static: 59.00 psi Resid: 20.00 psi Flow: 1560.0 gpm



LEGEND

1 Available pressure
49.62 psi @ 722.2 gpm

2 Required pressure
47.10 psi @ 722.2 gpm

Avail. OnSite Demand Press.
49.62 psi @ 472.2 gpm

Req. OnSite Demand Press.
47.10 psi @ 472.2 gpm

A. Source Supply Curve

B. System Demand Curve

C. Available at Source

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

(2) On Site pressures are based on hose stream deduction at the source

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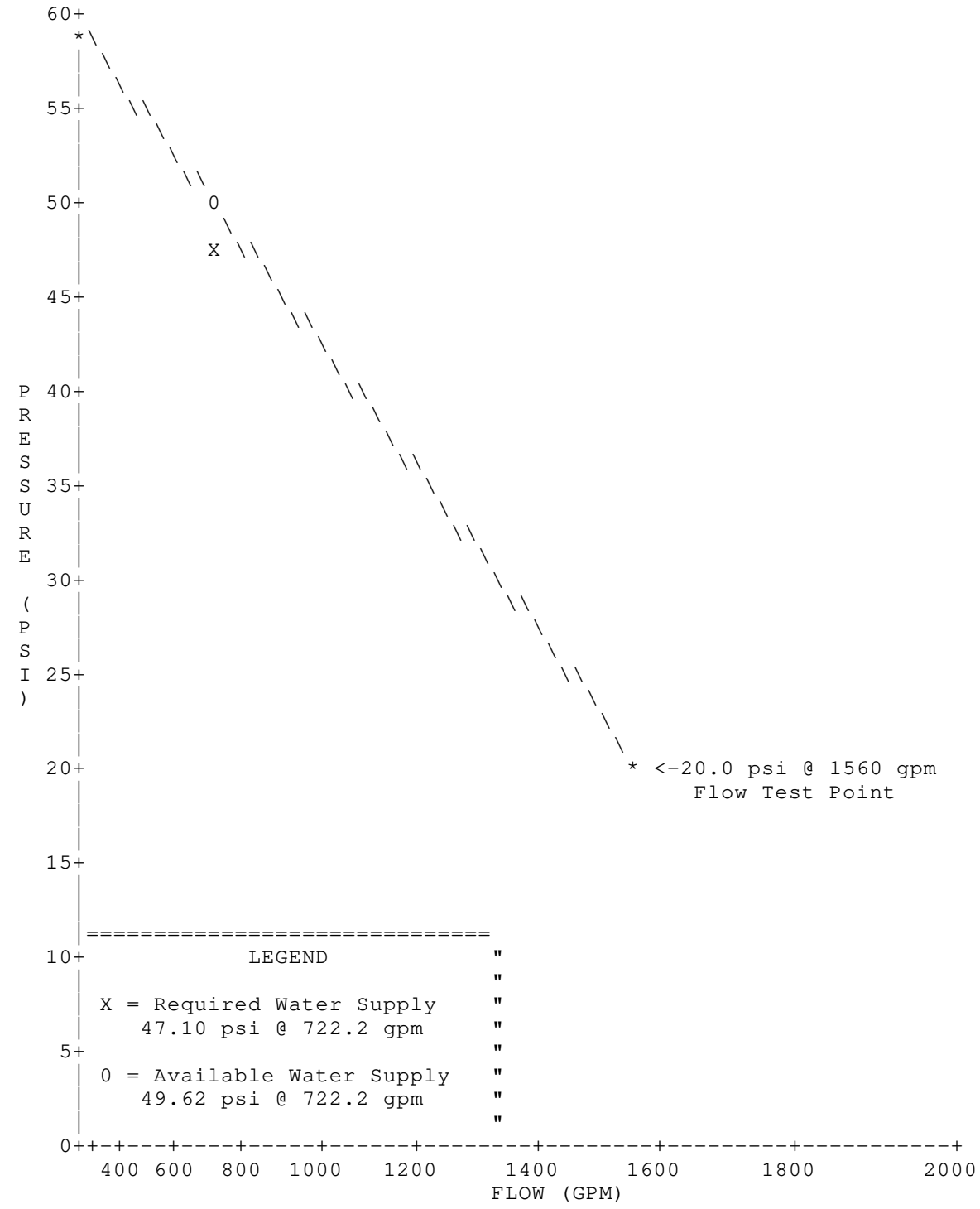
WATER SUPPLY CURVE



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Source Nodes

Node Tag	Elevation (ft)	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)	Hose Stream Allowance (gpm)
SOURCE	0.00	59.0	20.0	1560	250

Node Data

Node Tag	Elevation (ft)	K	Req.Den. (gpm/ft^2)	Area (ft^2)
S1	9.50	5.60	0.150	100.0
S2	9.50	5.60	0.150	100.0
S3	9.50	5.60	0.150	80.0
S4	9.50	5.60	0.150	80.0
S5	9.50	5.60	0.150	50.0
S6	9.50	5.60	0.150	50.0
S7	9.50	5.60	0.150	80.0
S8	9.50	5.60	0.150	64.0
S9	9.50	5.60	0.150	72.0
S10	9.50	5.60	0.150	104.0
S11	9.50	5.60	0.150	104.0
S12	9.50	5.60	0.150	116.0
S13	12.80	5.60	0.100	116.0
S14	12.80	5.60	0.100	116.0
S15	12.80	5.60	0.100	116.0
S16	12.80	5.60	0.100	84.0
S17	12.80	5.60	0.100	84.0
S18	12.80	5.60	0.100	84.0
S19	18.50	5.60	0.100	116.0
S20	18.50	5.60	0.100	116.0
S21	18.40	5.60	0.100	116.0
S22	18.50	5.60	0.100	84.0
S23	18.50	5.60	0.100	84.0
S24	18.40	5.60	0.100	84.0
1	13.58	0.00	0.000	0.0
2	13.58	0.00	0.000	0.0
3	13.50	0.00	0.000	0.0
4	13.58	0.00	0.000	0.0
5	13.58	0.00	0.000	0.0
6	13.50	0.00	0.000	0.0
7	13.58	0.00	0.000	0.0
8	13.58	0.00	0.000	0.0
9	13.50	0.00	0.000	0.0
10	13.58	0.00	0.000	0.0
11	13.58	0.00	0.000	0.0
12	13.50	0.00	0.000	0.0
M1	12.00	0.00	0.000	0.0
M2	13.58	0.00	0.000	0.0
M3	12.00	0.00	0.000	0.0
M4	13.58	0.00	0.000	0.0
M5	12.00	0.00	0.000	0.0
M6	13.58	0.00	0.000	0.0
M7	12.00	0.00	0.000	0.0
M8	13.58	0.00	0.000	0.0
M9	12.00	0.00	0.000	0.0
M10	18.50	0.00	0.000	0.0
M11	16.42	0.00	0.000	0.0
M12	18.42	0.00	0.000	0.0
M13	11.50	0.00	0.000	0.0

M14	13.42	0.00	0.000	0.0
M15	11.42	0.00	0.000	0.0
M16	13.42	0.00	0.000	0.0
M17	11.50	0.00	0.000	0.0
M18	16.50	0.00	0.000	0.0
M19	16.42	0.00	0.000	0.0
M20	18.42	0.00	0.000	0.0
M21	16.42	0.00	0.000	0.0
M22	18.42	0.00	0.000	0.0
M23	15.50	0.00	0.000	0.0
M24	16.33	0.00	0.000	0.0
TOR	15.25	0.00	0.000	0.0
BOR	1.50	0.00	0.000	0.0
FLG	0.50	0.00	0.000	0.0
BFP1	0.00	0.00	0.000	0.0
BFP2	0.00	0.00	0.000	0.0
SOURCE	0.0	SOURCE	0.000	0.0

Pipe Data

Pipe Tag	End Node Tags		Length (ft)	Fittings (ft)	Diameter (in)	HWC
1	1	S1	27.00	4ET	1.049 (Z1.000)	100
2	2	S2	27.00	4ET	1.049 (Z1.000)	100
3	3	S3	27.00	4ET	1.049 (Z1.000)	100
4	4	S4	29.00	5ET	1.049 (Z1.000)	100
5	5	S5	27.00	4ET	1.049 (Z1.000)	100
6	6	S6	27.00	4ET	1.049 (Z1.000)	100
7	7	S7	31.00	5ET	1.049 (Z1.000)	100
8	8	S8	27.00	4ET	1.049 (Z1.000)	100
9	9	S9	27.00	4ET	1.049 (Z1.000)	100
10	10	S10	29.00	5ET	1.049 (Z1.000)	100
11	11	S11	27.00	4ET	1.049 (Z1.000)	100
12	12	S12	27.00	4ET	1.049 (Z1.000)	100
B1	1	2	10.00	0.0	2.185 (Z2.000)	100
B2	2	3	8.00	0.0	2.185 (Z2.000)	100
B3	3	M2	2.00	E	2.185 (Z2.000)	100
B4	4	5	8.00	0.0	2.185 (Z2.000)	100
B5	5	6	8.00	0.0	2.185 (Z2.000)	100
B6	6	M4	4.00	E	2.185 (Z2.000)	100
B7	7	8	8.00	0.0	2.185 (Z2.000)	100
B8	8	9	8.00	0.0	2.185 (Z2.000)	100
B9	9	M6	4.00	E	2.185 (Z2.000)	100
B10	10	11	8.00	0.0	2.185 (Z2.000)	100
B11	11	12	8.00	0.0	2.185 (Z2.000)	100
B12	12	M8	4.00	E	2.185 (Z2.000)	100
B13	S13	S14	10.50	0.0	2.185 (Z2.000)	100
B14	S14	S15	10.50	0.0	2.185 (Z2.000)	100
B15	S15	M14	3.58	E	2.185 (Z2.000)	100
B16	S16	S17	10.50	0.0	2.185 (Z2.000)	100
B17	S17	S18	10.50	0.0	2.185 (Z2.000)	100
B18	S18	M16	3.58	E	2.185 (Z2.000)	100
B19	S19	S20	10.50	0.0	2.185 (Z2.000)	100
B20	S20	S21	10.50	0.0	2.185 (Z2.000)	100
B21	S21	M20	3.58	E	2.185 (Z2.000)	100
B22	S22	S23	10.50	0.0	2.185 (Z2.000)	100
B23	S23	S24	10.50	0.0	2.185 (Z2.000)	100
B24	S24	M22	3.58	E	2.185 (Z2.000)	100
R1	M1	M2	1.58	T	2.185 (Z2.000)	100

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R2	M3	M4	1.58	T	2.185	(Z2.000)	100	
R3	M5	M6	1.58	T	2.185	(Z2.000)	100	
R4	M7	M8	1.58	T	2.185	(Z2.000)	100	
R5	M9	M10	6.58	3ET	3.314	(Z3.000)	100	
R6	M11	M12	2.00	ET	3.314	(Z3.000)	100	
R7	M13	M14	1.92	T	2.185	(Z2.000)	100	
R8	M15	M16	2.00	T	2.185	(Z2.000)	100	
R9	M17	M18	5.00	2E	4.298	(Z4.000)	100	
R10	M19	M20	2.00	T	2.185	(Z2.000)	100	
R11	M21	M22	2.00	T	2.185	(Z2.000)	100	
R12	M23	M24	0.83	2E	4.298	(Z4.000)	100	
M1	M1	M3	8.00	0.0	3.314	(Z3.000)	100	
M2	M3	M5	16.00	0.0	3.314	(Z3.000)	100	
M3	M5	M7	8.00	0.0	3.314	(Z3.000)	100	
M5	M7	M9	2.00	0.0	3.314	(Z3.000)	100	
M8	M10	M12	28.83	0.0	3.314	(Z3.000)	100	
M9	M13	M15	8.00	0.0	4.298	(Z4.000)	100	
M10	M15	M17	5.33	0.0	4.298	(Z4.000)	100	
M11	M18	M19	2.67	0.0	4.298	(Z4.000)	100	
M12	M19	M21	8.00	0.0	4.298	(Z4.000)	100	
M13	M21	M11	18.25	0.0	4.298	(Z4.000)	100	
M14	M11	M24	49.83	E	4.298	(Z4.000)	100	
M15	M23	TOR	93.83	2ET	4.298	(Z4.000)	100	
M13A	TOR	BOR	14.75	TD	4.298	(Z4.000)	100	
M14A	BOR	FLG	1.00	0.0	4.298	(4.000)	120	
M15A	FLG	BFP1	115.00	2E2F	6.160	(D6.000)	140	
M16A	BFP2	BFP1	Fixed Loss Device		-4.000		psi	
M17A	BFP2	SOURCE	35.00	E2T2G	6.160	(D6.000)	140	

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