

**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:	BRADLEY HEIGHTS	JOB NO. :	TC25207	OWNER :	
	BUILDING C	DATE:	9/30/2025	CRP/TP BRADLEY HEIGHTS LLC	
ADDRESS:	202 27TH AVE SE	BY:	A. RIDEOUT	AHJ :	
	PUYALLUP, WA 98374			PUYALLUP	

SYSTEM DESIGNATION: **SYSTEM #1 -L3 (4) HEAD COMPARTMENT**DESIGN PER: **NFPA 13R (2019 EDITION)**OCCUPANCY CLASSIFICATION: **RESIDENTIAL****DESIGN CRITERIA:**NFPA SECTION: **7.2.3**
AREA MODIFIER **N/A**SPRINKLER MANUFACTURER: **RELIABLE**
K-FACTOR: **4.9K**
MODEL: **F1RES49**
TEMPERATURE: **155°**
RESPONSE TYPE: **QR**SYSTEM TYPE: **WET**
MAX CEILING HEIGHT: **9'-1"**
CEILING HEIGHT: **9'-1"**
ROOF SLOPE: **4:12**
CEILING SLOPE: **2:12**TOTAL SPRINKLERS CALCULATED: **4**
MAX AREA OF COVERAGE PER SPRINKLER: **260 SQ. FT**
MAX DISTANCE BETWEEN SPRINKLERS: **16 FT**FIRE PUMP: **N**
RATED CAPACITY OF PUMP: **N/A****DESIGN AREA**

THE (4) HYDRAULICALLY MOST DEMANDING ADJACENT SPRINKLERS DELIVERING .05 GPM/SQ. FT. OR PER THE SPRINKLER LISTING, WHICHEVER IS MORE DEMANDING.

ALLOWANCES INCLUDED IN CALCULATIONS:ADDED AT:OUTSIDE HOSE **0 GPM**

CITY CONNECTION

WATER SUPPLY:	ELEVATION OF TEST: 0 FT.	ELEVATION OF LEVEL 1: 0 FT.	MAIN DRAIN TEST:
STATIC 95 PSI	DATE OF TEST: 4/19/2001		S: R:
RESIDUAL 90 PSI	DATA PROVIDED BY: FRUITLAND WATER		INSPECTORS TEST:
FLOW 1055 GPM	LOCATION OF TEST: FH @ 207 27TH AVE SE		TRIP TIME:

WET SYSTEM NUMBER 1

AREA	SQ. FT.	SPRINKLERS
FLOOR 1	11920	118
FLOOR 2	11390	112
FLOOR 3	11774	123

TOTAL: 35,084 354

NOTES:**MOST DEMANDING AREA: SYS. 1**

MOST DEMANDING (4) SPRINKLER(S) AT 7 PSI

BASE OF RISER: 63.8 GPM REQUIRED AT 63.2 PSI**SUMMARY:** 63.8 GPM REQUIRED AT 73.6 PSIAT CONNECTION TO **SOURCE**(INCLUDING **0 GPM** FOR HOSE STREAMS)



SMITH FIRE SYSTEMS, INC.

WATER SUPPLY DATA

STATIC 90 PSI
RESIDUAL 95 PSI
FLOWING 1055 GPM

JOB NAME BRADLEY HEIGHTS APARTMENTS

ADDRESS 202 27TH AVE SE

DATE PUYALLUP, WA 98374

JOB NO. TC25207

SYSTEM/AREA SYS 1: (4) 16x16 RES49

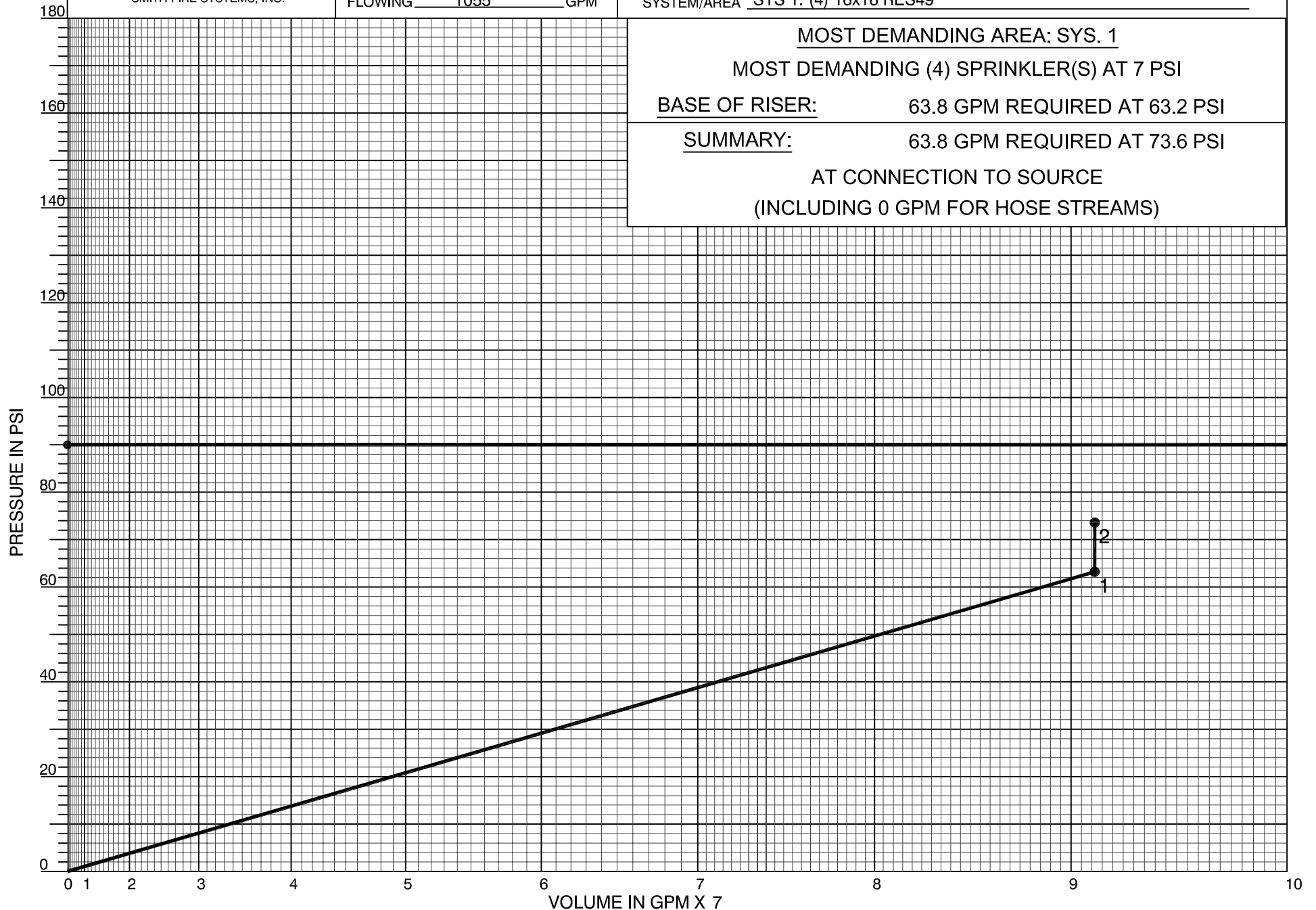
MOST DEMANDING AREA: SYS. 1

MOST DEMANDING (4) SPRINKLER(S) AT 7 PSI

BASE OF RISER: 63.8 GPM REQUIRED AT 63.2 PSI

SUMMARY: 63.8 GPM REQUIRED AT 73.6 PSI

AT CONNECTION TO SOURCE
(INCLUDING 0 GPM FOR HOSE STREAMS)



DATE: 10/1/2025RAULICS\HASS FILES\BUILDING C\C - (4) 16X16 RES49 7PSI.SDF

JOB TITLE: C - (4) 16x16 RES49 7PSI

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	95.0	90.0	1055.0	95.0	63.8	85.8

Available pressure is 9.1 psi (10%) greater than required pressure.

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	63.8 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	63.8 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
S2	30.3	K= 4.90	7.8	13.7
S3	31.9	K= 4.90	7.0	13.0
S4	29.3	K= 4.90	14.6	18.7
S5	32.4	K= 4.90	14.2	18.5
B1	29.8	- - - -	8.5	- - -
B2	29.8	- - - -	15.7	- - -
M2	29.8	- - - -	16.1	- - -
M3	29.8	- - - -	16.8	- - -
31	29.7	- - - -	16.9	- - -
01	9.5	- - - -	31.0	- - -
TOR	14.5	- - - -	60.0	- - -
BFP1	7.6	- - - -	63.2	- - -
BFP2	7.6	- - - -	70.2	- - -
UG1	0.0	- - - -	38.6	- - -
UG2	0.0	- - - -	40.0	- - -
UG3	2.5	- - - -	45.6	- - -
UG4	2.5	- - - -	47.2	- - -
UG5	5.0	- - - -	52.8	- - -
UG6	5.0	- - - -	55.3	- - -
UG7	5.0	- - - -	73.6	- - -
UG8	5.0	- - - -	73.6	- - -
UG9	-23.2	- - - -	85.8	- - -
SOURCE	-23.2	SOURCE	85.8	63.8

DATE: 10/1/2025RAULICS\HASS FILES\BUILDING C\C - (4) 16X16 RES49 7PSI.SDF
JOB TITLE: C - (4) 16x16 RES49 7PSI

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											
S2		30.3	4.9	7.8	13.7	-13.7	4.6	1.101 PL	3.25	PF	0.4
B1		29.8	0.0	8.5	0.0			150 FTG	2T	PE	0.3
								0.034 TL	13.25	PV	
Pipe: 2											
S3		31.9	4.9	7.0	13.0	-13.0	4.4	1.101 PL	7.25	PF	0.5
B1		29.8	0.0	8.5	0.0			150 FTG	2T	PE	0.9
								0.030 TL	17.25	PV	
Pipe: 3											
S4		29.3	4.9	14.6	18.7	-18.7	6.3	1.101 PL	12.00	PF	1.3
B2		29.8	0.0	15.7	0.0			150 FTG	ET	PE	-0.2
								0.060 TL	22.00	PV	
Pipe: 4											
B1		29.8	0.0	8.5	0.0	-26.6	9.0	1.101 PL	31.17	PF	7.6
M2		29.8	0.0	16.1	0.0			150 FTG	6ET	PE	0.0
								0.115 TL	66.17	PV	
Pipe: 5											
B2		29.8	0.0	15.7	0.0	-18.7	6.3	1.101 PL	6.00	PF	0.4
M2		29.8	0.0	16.1	0.0			150 FTG	----	PE	0.0
								0.060 TL	6.00	PV	
Pipe: 6											
S5		32.4	4.9	14.2	18.5	-18.5	6.2	1.101 PL	14.42	PF	1.4
M3		29.8	0.0	16.8	0.0			150 FTG	2T	PE	1.2
								0.059 TL	24.42	PV	
Pipe: 7											
M3		29.8	0.0	16.8	0.0	-18.5	3.0	1.598 PL	5.25	PF	0.1
31		29.7	0.0	16.9	0.0			150 FTG	T	PE	0.0
								0.010 TL	13.25	PV	
Pipe: 8											
M2		29.8	0.0	16.1	0.0	-45.4	7.3	1.598 PL	7.75	PF	0.8
31		29.7	0.0	16.9	0.0			150 FTG	T	PE	0.0
								0.050 TL	15.75	PV	
Pipe: 9											
31		29.7	0.0	16.9	0.0	-63.8	10.2	1.598 PL	20.24	PF	5.3
01		9.5	0.0	31.0	0.0			150 FTG	4ET	PE	8.8
								0.095 TL	56.24	PV	
Pipe: 10											
01		9.5	0.0	31.0	0.0	-63.8	10.2	1.598 PL	15.00	PF	3.5
UG1		0.0	0.0	38.6	0.0			150 FTG	2ET	PE	4.1
								0.095 TL	37.00	PV	
Pipe: 11											
UG1		0.0	0.0	38.6	0.0	-63.8	6.5	2.003 PL	25.08	PF	1.4
UG2		0.0	0.0	40.0	0.0			150 FTG	2E	PE	0.0
								0.032 TL	43.08	PV	
Pipe: 12											
UG2		0.0	0.0	40.0	0.0	-63.8	10.2	1.598 PL	55.00	PF	6.7
UG3		2.5	0.0	45.6	0.0			150 FTG	2T	PE	-1.1
								0.095 TL	71.00	PV	
Pipe: 13											
UG3		2.5	0.0	45.6	0.0	-63.8	6.5	2.003 PL	30.33	PF	1.5
UG4		2.5	0.0	47.2	0.0			150 FTG	2E	PE	0.0
								0.032 TL	48.33	PV	

DATE: 10/1/2025RAULICS\HASS FILES\BUILDING C\C - (4) 16X16 RES49 7PSI.SDF
JOB TITLE: C - (4) 16x16 RES49 7PSI

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: 14					-63.8	1.598	PL	55.00	PF 6.7
UG4	2.5	0.0	47.2	0.0	10.2	150	FTG	2T	PE -1.1
UG5	5.0	0.0	52.8	0.0		0.095	TL	71.00	PV
Pipe: 15					-63.8	2.003	PL	25.08	PF 2.5
UG5	5.0	0.0	52.8	0.0	6.5	150	FTG	6E	PE 0.0
UG6	5.0	0.0	55.3	0.0		0.032	TL	79.08	PV
Pipe: 16					-63.8	1.598	PL	44.00	PF 8.8
UG6	5.0	0.0	55.3	0.0	10.2	150	FTG	7E	PE -4.1
TOR	14.5	0.0	60.0	0.0		0.095	TL	93.00	PV
Pipe: 17					-63.8	2.185	PL	6.92	PF 0.1
TOR	14.5	0.0	60.0	0.0	5.5	150	FTG	----	PE 3.0
BFP1	7.6	0.0	63.2	0.0		0.021	TL	6.92	PV
Pipe: 18					FIXED PRESSURE LOSS DEVICE				
BFP2	7.6	0.0	70.2	0.0	7.0 psi, 63.8 gpm				
BFP1	7.6	0.0	63.2	0.0					
Pipe: 19					-63.8	2.003	PL	50.50	PF 2.3
BFP2	7.6	0.0	70.2	0.0	6.5	150	FTG	ET2G	PE 1.1
UG7	5.0	0.0	73.6	0.0		0.032	TL	73.50	PV
Pipe: 20					-63.8	8.270	PL	95.00	PF 0.0
UG7	5.0	0.0	73.6	0.0	0.4	140	FTG	TG	PE 0.0
UG8	5.0	0.0	73.6	0.0		0.000	TL	148.00	PV
Pipe: 21					-63.8	12.340	PL	920.00	PF 0.0
UG8	5.0	0.0	73.6	0.0	0.2	140	FTG	TFG	PE 12.2
UG9	-23.2	0.0	85.8	0.0		0.000	TL	1027.00	PV
Pipe: 22					-63.8	6.160	PL	20.00	PF 0.0
UG9	-23.2	0.0	85.8	0.0	0.7	140	FTG	EG	PE -0.0
SOURCE	-23.2	SRCE	85.8	(N/A)		0.000	TL	36.00	PV

NOTES (HASS):

- 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
- 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 0.065 gpm.
- Total pressure at each node is used in balancing the system. Maximum water velocity is 10.2 ft/sec at pipe 16.

DATE: 10/1/2025RAULICS\HASS FILES\BUILDING C\C - (4) 16X16 RES49 7PSI.SDF
JOB TITLE: C - (4) 16x16 RES49 7PSI

(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
94.97 psi with a flow of 69.23 gpm.

(6) PIPE FITTINGS TABLE

User Pipe Table Name: SMITH

PAGE: D	MATERIAL: DI	HWC: 140				
Diameter	Equivalent Fitting Lengths in Feet					
(in)	E	T	F	C	B	G
	Ell	Tee	45	ChkVlv	BfyVlv	GatVlv
6.160	12.00	40.00	10.00	43.00	16.00	4.00
8.270	18.00	47.00	12.00	60.00	20.00	6.00
12.340	24.00	80.00	19.00	87.00	34.00	8.00

PAGE: P	MATERIAL: CPVC	HWC: 150					
Diameter	Equivalent Fitting Lengths in Feet						
(in)	E	T	F	R	C	G	B
	Ell	Tee	45	teeRun	Coup	Gva	Bfy
1.101	5.00	5.00	1.00	1.00	1.00	1.00	4.00
1.598	7.00	8.00	2.00	1.00	1.00	1.00	6.00
2.003	9.00	10.00	2.00	1.00	1.00	2.00	7.00

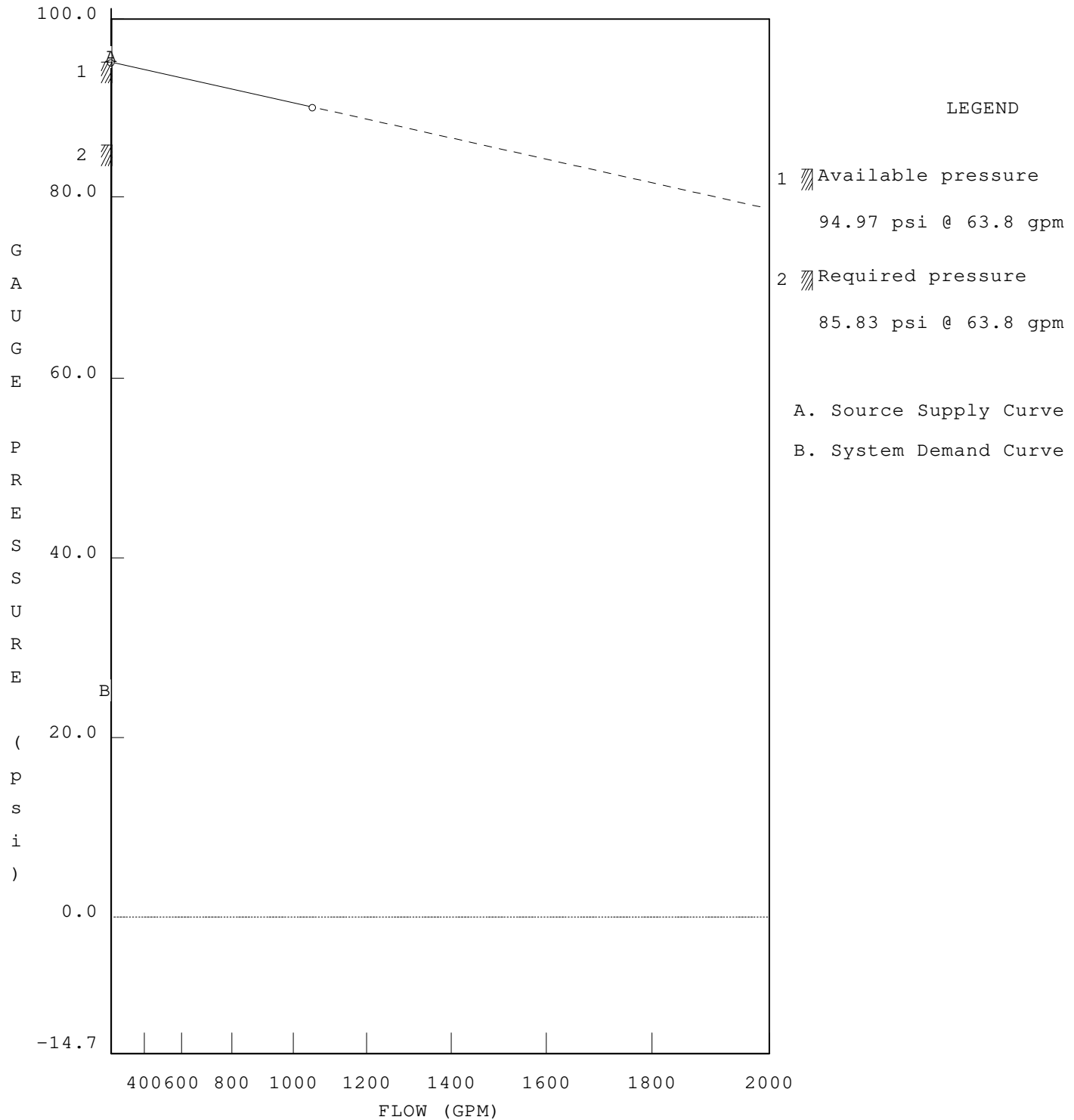
PAGE: Y	MATERIAL: SCH7	HWC: 120							
Diameter	Equivalent Fitting Lengths in Feet								
(in)	E	T	F	C	B	G	A	D	X
	Ell	Tee	45	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	flex
2.185	4.60	15.20	2.40	14.40	6.20	1.00	12.40	12.40	0.00

DATE: 10/1/2025RAULICS\HASS FILES\BUILDING C\C - (4) 16X16 RES49 7PSI.SDF

JOB TITLE: C - (4) 16x16 RES49 7PSI

WATER SUPPLY ANALYSIS

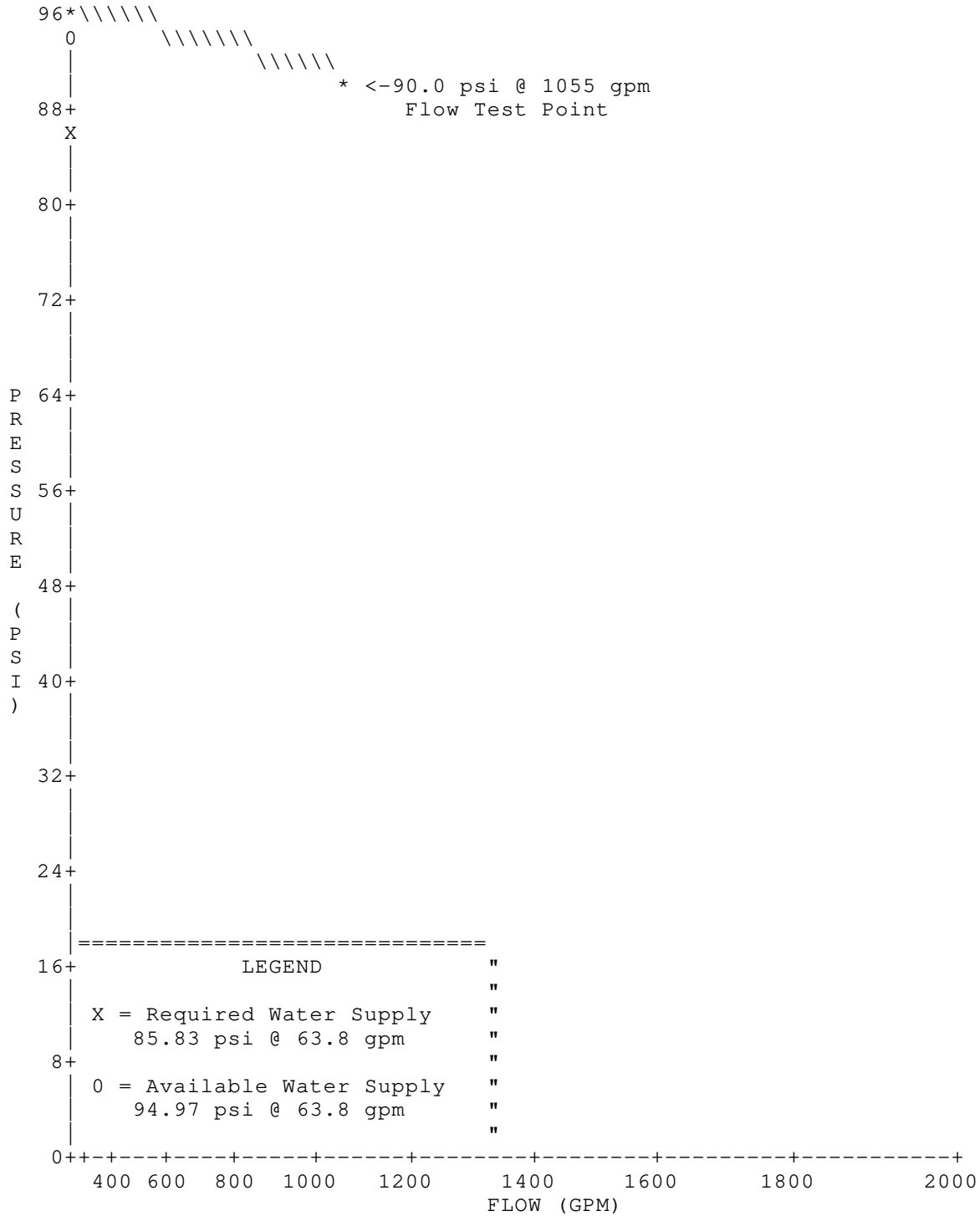
Static: 95.00 psi Resid: 90.00 psi Flow: 1055.0 gpm



DATE: 10/1/2025RAULICS\HASS FILES\BUILDING C\C - (4) 16X16 RES49 7PSI.SDF

JOB TITLE: C - (4) 16x16 RES49 7PSI

WATER SUPPLY CURVE



SMITH FIRE SYSTEMS, INC.
JOB NO. TC25207
BRADLEY HEIGHTS: BUILDING C

SYSTEM # 1

L3 (4) DRY HSW

AUXILIARY HYDRAULIC CALCULATION

DENSITY: 0.1 GPM OVER 4 HEADS

SYSTEM DEMAND AT BASE OF RISER

65.2 GPM AT 52.7 PSI

DATE: 10/1/2025 LICHS\HASS FILES\BUILDING C\AUX CALCS\C - (4) F3QR 7PSI.SDF

JOB TITLE: C - (4) F3QR 7PSI

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	95.0	90.0	1055.0	95.0	65.2	75.5

Available pressure is 19.5 psi (21%) greater than required pressure.

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	65.2 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	65.2 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
S6	29.3	K= 5.60	9.8	17.5
S7	29.3	K= 5.60	9.2	17.0
S8	29.3	K= 5.60	7.0	14.8
S9	29.3	K= 5.60	8.0	15.9
B3	29.8	- - - -	8.5	- - -
M3	29.8	- - - -	11.2	- - -
M4	29.8	- - - -	11.9	- - -
31	29.8	- - - -	11.6	- - -
32	32.3	- - - -	11.7	- - -
01	9.5	- - - -	21.0	- - -
02	12.0	- - - -	21.0	- - -
TOR	14.5	- - - -	49.6	- - -
BFP1	7.6	- - - -	52.7	- - -
BFP2	7.6	- - - -	59.7	- - -
UG1	0.0	- - - -	26.5	- - -
UG2	0.0	- - - -	26.9	- - -
UG3	2.5	- - - -	32.8	- - -
UG4	2.5	- - - -	34.4	- - -
UG5	5.0	- - - -	40.3	- - -
UG6	5.0	- - - -	42.9	- - -
UG7	5.0	- - - -	63.2	- - -
UG8	5.0	- - - -	63.3	- - -
UG9	-23.2	- - - -	75.5	- - -
SOURCE	-23.2	SOURCE	75.5	65.2

DATE: 10/1/2025 LICHS\HASS FILES\BUILDING C\AUX CALCS\C - (4) F3QR 7PSI.SDF
 JOB TITLE: C - (4) F3QR 7PSI

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)	
S6 M3	Pipe: 1					-17.5	1.101 PL	15.00	PF	1.6
	29.3	5.6	9.8	17.5	5.9		150 FTG	E2T	PE	-0.2
	29.8	0.0	11.2	0.0			0.053 TL	30.00	PV	
S7 M3	Pipe: 2					-17.0	1.101 PL	8.50	PF	2.2
	29.3	5.6	9.2	17.0	5.7		150 FTG	5E2T	PE	-0.2
	29.8	0.0	11.2	0.0			0.050 TL	43.50	PV	
S8 B3	Pipe: 4					-14.8	1.101 PL	20.00	PF	1.8
	29.3	5.6	7.0	14.8	5.0		150 FTG	4ET	PE	-0.2
	29.8	0.0	8.5	0.0			0.039 TL	45.00	PV	
S9 B3	Pipe: 5					-15.9	1.101 PL	6.00	PF	0.7
	29.3	5.6	8.0	15.9	5.4		150 FTG	ET	PE	-0.2
	29.8	0.0	8.5	0.0			0.044 TL	16.00	PV	
B3 M4	Pipe: 6					-30.7	1.101 PL	17.50	PF	3.4
	29.8	0.0	8.5	0.0	10.3		150 FTG	T	PE	0.0
	29.8	0.0	11.9	0.0			0.150 TL	22.50	PV	
M4 32	Pipe: 7					-30.7	1.598 PL	28.42	PF	0.9
	29.8	0.0	11.9	0.0	4.9		150 FTG	T	PE	-1.1
	32.3	0.0	11.7	0.0			0.024 TL	36.42	PV	
M3 31	Pipe: 8					-34.5	1.598 PL	5.25	PF	0.4
	29.8	0.0	11.2	0.0	5.5		150 FTG	T	PE	0.0
	29.8	0.0	11.6	0.0			0.030 TL	13.25	PV	
31 01	Pipe: 9					-34.5	1.598 PL	20.25	PF	0.6
	29.8	0.0	11.6	0.0	5.5		150 FTG	----	PE	8.8
	9.5	0.0	21.0	0.0			0.030 TL	20.25	PV	
32 02	Pipe: 9A					-30.7	1.598 PL	20.25	PF	0.5
	32.3	0.0	11.7	0.0	4.9		150 FTG	----	PE	8.8
	12.0	0.0	21.0	0.0			0.024 TL	20.25	PV	
01 UG1	Pipe: 9B					-34.5	1.598 PL	15.00	PF	1.4
	9.5	0.0	21.0	0.0	5.5		150 FTG	2E2T	PE	4.1
	0.0	0.0	26.5	0.0			0.030 TL	45.00	PV	
02 UG2	Pipe: 9C					-30.7	1.598 PL	12.00	PF	0.7
	12.0	0.0	21.0	0.0	4.9		150 FTG	2T	PE	5.2
	0.0	0.0	26.9	0.0			0.024 TL	28.00	PV	
UG1 UG2	Pipe: 10					-34.5	2.003 PL	25.08	PF	0.4
	0.0	0.0	26.5	0.0	3.5		150 FTG	2E	PE	0.0
	0.0	0.0	26.9	0.0			0.010 TL	43.08	PV	
UG2 UG3	Pipe: 11					-65.2	1.598 PL	55.00	PF	7.0
	0.0	0.0	26.9	0.0	10.4		150 FTG	2T	PE	-1.1
	2.5	0.0	32.8	0.0			0.099 TL	71.00	PV	

DATE: 10/1/2025 LICHS\HASS FILES\BUILDING C\AUX CALCS\C - (4) F3QR 7PSI.SDF
 JOB TITLE: C - (4) F3QR 7PSI

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: 12										
UG3	2.5	0.0	32.8	0.0	6.6	150	FTG	2E	PF	1.6
UG4	2.5	0.0	34.4	0.0		0.033	TL	48.33	PE	0.0
Pipe: 13										
UG4	2.5	0.0	34.4	0.0	10.4	150	FTG	2T	PF	7.0
UG5	5.0	0.0	40.3	0.0		0.099	TL	71.00	PE	-1.1
Pipe: 14										
UG5	5.0	0.0	40.3	0.0	6.6	150	FTG	6E	PF	2.6
UG6	5.0	0.0	42.9	0.0		0.033	TL	79.08	PE	0.0
Pipe: 15										
UG6	5.0	0.0	42.9	0.0	10.4	150	FTG	7E2T	PF	10.8
TOR	14.5	0.0	49.6	0.0		0.099	TL	109.00	PE	-4.1
Pipe: 16										
TOR	14.5	0.0	49.6	0.0	5.6	150	FTG	----	PF	0.1
BFP1	7.6	0.0	52.7	0.0		0.022	TL	6.92	PE	3.0
Pipe: 18										
BFP2	7.6	0.0	59.7	0.0		7.0 psi,		65.2 gpm	PV	
BFP1	7.6	0.0	52.7	0.0						
Pipe: 19										
BFP2	7.6	0.0	59.7	0.0	6.6	150	FTG	ET2G	PF	2.4
UG7	5.0	0.0	63.2	0.0		0.033	TL	73.50	PE	1.1
Pipe: 20										
UG7	5.0	0.0	63.2	0.0	0.4	140	FTG	TG	PF	0.0
UG8	5.0	0.0	63.3	0.0		0.000	TL	148.00	PE	0.0
Pipe: 21										
UG8	5.0	0.0	63.3	0.0	0.2	140	FTG	TFG	PF	0.0
UG9	-23.2	0.0	75.5	0.0		0.000	TL	1027.00	PE	12.2
Pipe: 22										
UG9	-23.2	0.0	75.5	0.0	0.7	140	FTG	EG	PF	0.0
SOURCE	-23.2	SRCE	75.5	(N/A)		0.000	TL	36.00	PE	-0.0
									PV	

NOTES (HASS):

- 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
- 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 0.017 gpm.

DATE: 10/1/2025 LICs\HASS FILES\BUILDING C\AUX CALCS\C - (4) F3QR 7PSI.SDF
 JOB TITLE: C - (4) F3QR 7PSI

(3) Total pressure at each node is used in balancing the system.
 Maximum water velocity is 10.4 ft/sec at pipe 13.

(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
 94.96 psi with a flow of 78.78 gpm.

(6) PIPE FITTINGS TABLE

User Pipe Table Name: SMITH

PAGE: D	MATERIAL: DI	HWC: 140				
Diameter	Equivalent Fitting Lengths in Feet					
(in)	E	T	F	C	B	G
	Ell	Tee	45	ChkVlv	BfyVlv	GatVlv
6.160	12.00	40.00	10.00	43.00	16.00	4.00
8.270	18.00	47.00	12.00	60.00	20.00	6.00
12.340	24.00	80.00	19.00	87.00	34.00	8.00

PAGE: P	MATERIAL: CPVC	HWC: 150					
Diameter	Equivalent Fitting Lengths in Feet						
(in)	E	T	F	R	C	G	B
	Ell	Tee	45	teeRun	Coup	Gva	Bfy
1.101	5.00	5.00	1.00	1.00	1.00	1.00	4.00
1.598	7.00	8.00	2.00	1.00	1.00	1.00	6.00
2.003	9.00	10.00	2.00	1.00	1.00	2.00	7.00

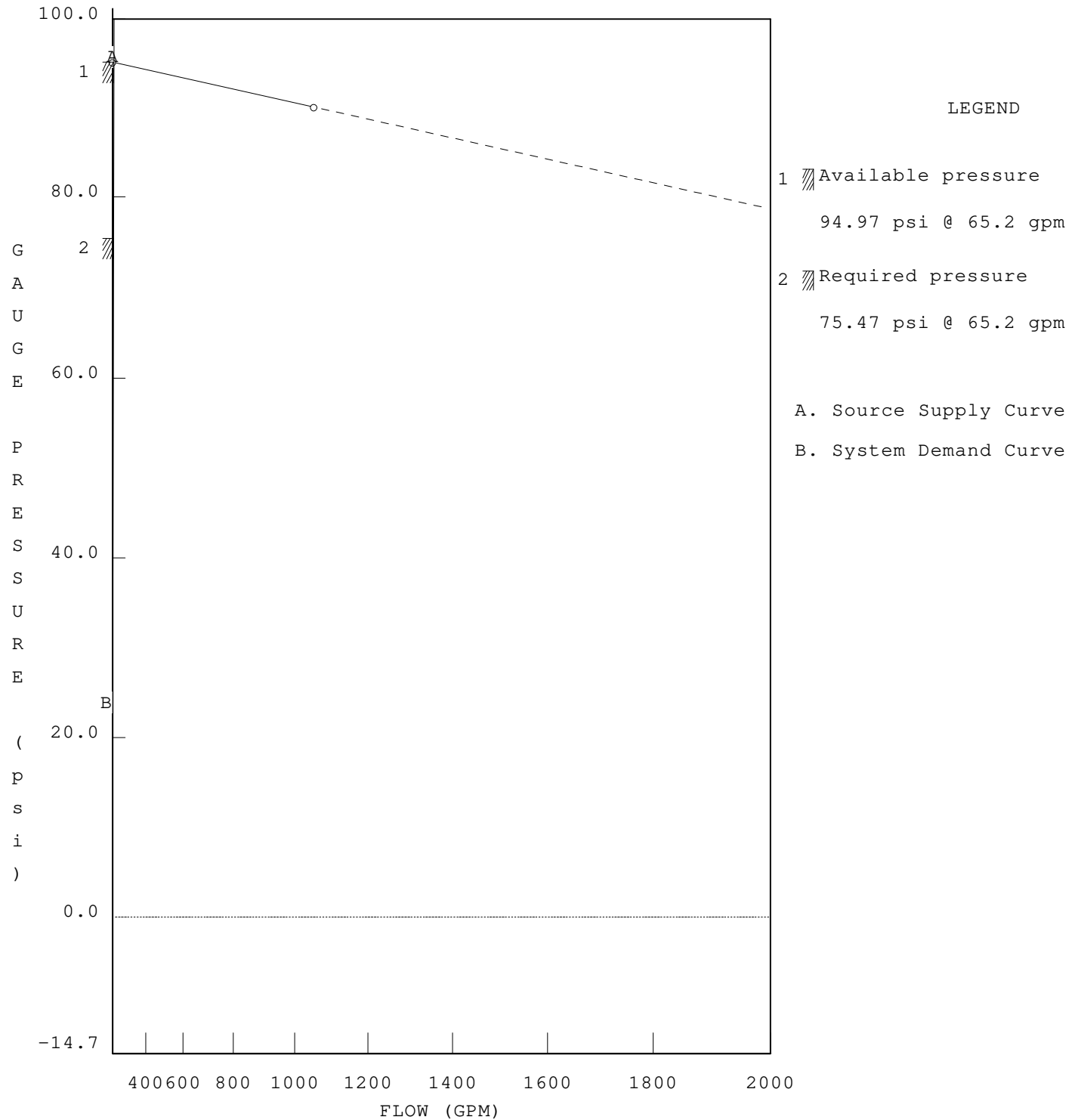
PAGE: Y	MATERIAL: SCH7	HWC: 120							
Diameter	Equivalent Fitting Lengths in Feet								
(in)	E	T	F	C	B	G	A	D	X
	Ell	Tee	45	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	flex
2.185	4.60	15.20	2.40	14.40	6.20	1.00	12.40	12.40	0.00

DATE: 10/1/2025 LICS\HASS FILES\BUILDING C\AUX CALCS\C - (4) F3QR 7PSI.SDF

JOB TITLE: C - (4) F3QR 7PSI

WATER SUPPLY ANALYSIS

Static: 95.00 psi Resid: 90.00 psi Flow: 1055.0 gpm

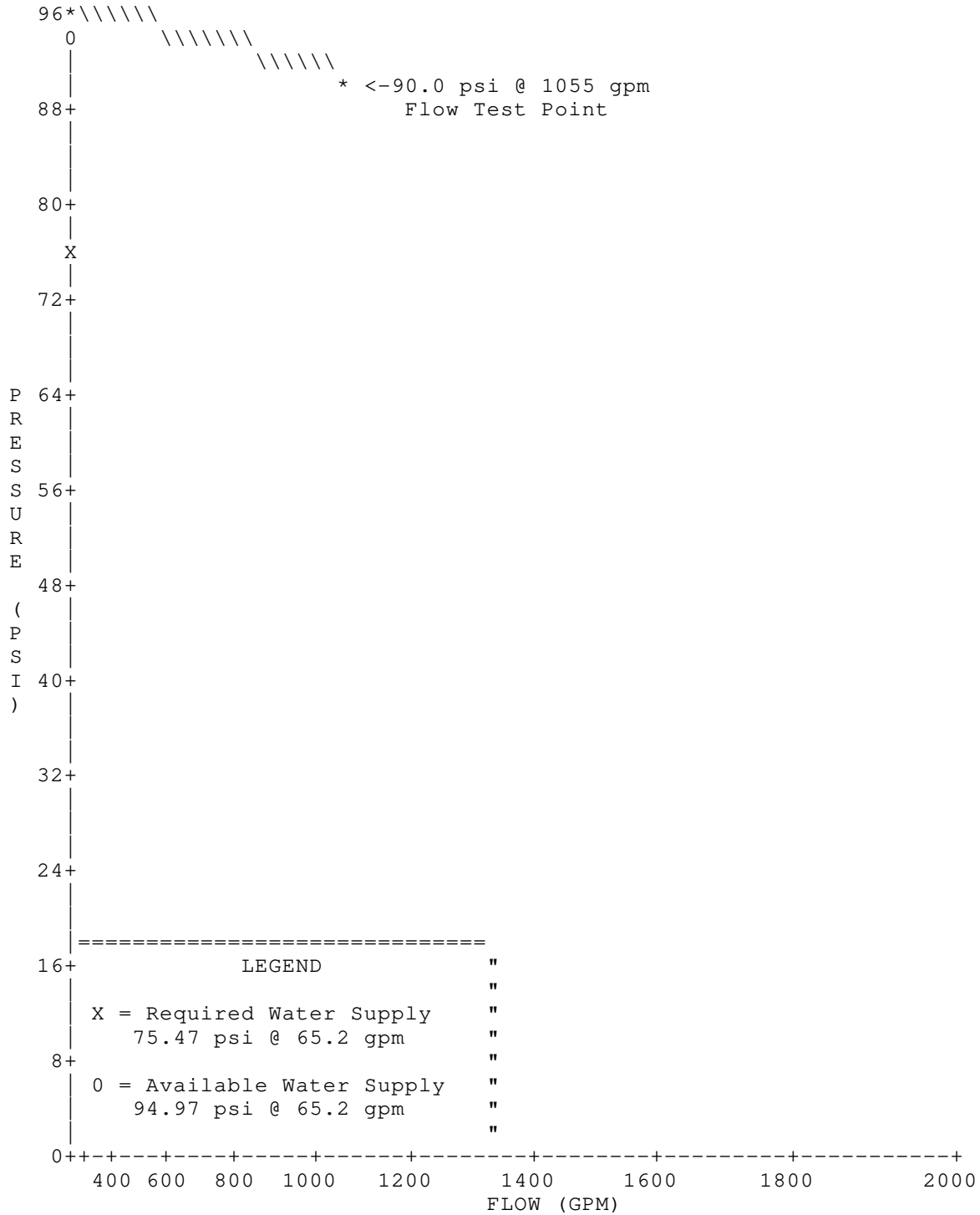


Note: (1) Dashed Lines indicate extrapolated values from Test Results

DATE: 10/1/2025 LICs\HASS FILES\BUILDING C\AUX CALCS\C - (4) F3QR 7PSI.SDF

JOB TITLE: C - (4) F3QR 7PSI

WATER SUPPLY CURVE



SMITH FIRE SYSTEMS, INC.
JOB NO. TC25207
BRADLEY HEIGHTS: BUILDING C

SYSTEM # 1

L3 (2) HEAD COMPARTMENT

AUXILIARY HYDRAULIC CALCULATION

DENSITY: 0.05 GPM OVER 2 HEADS

SYSTEM DEMAND AT BASE OF RISER

35.1 GPM AT 40.6 PSI

DATE: 10/1/2025S FILES\BUILDING C\AUX CALCS\C - (2) 18X18 RES49 12PSI.SDF

JOB TITLE: C - (2) 18x18 RES49 12PSI

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	95.0	90.0	1055.0	95.0	35.1	61.7

Available pressure is 33.3 psi (35%) greater than required pressure.

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	35.1 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	35.1 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
S10	29.3	K= 4.90	12.0	17.0
S11	29.3	K= 4.90	13.7	18.1
B5	29.8	- - - -	13.8	- - -
M4	29.8	- - - -	21.0	- - -
32	32.3	- - - -	21.6	- - -
02	12.0	- - - -	31.0	- - -
TOR	14.5	- - - -	37.6	- - -
BFP1	7.6	- - - -	40.6	- - -
BFP2	7.6	- - - -	47.6	- - -
UG3	2.5	- - - -	36.3	- - -
UG4	2.5	- - - -	36.8	- - -
UG5	5.0	- - - -	37.9	- - -
UG6	5.0	- - - -	38.8	- - -
UG7	5.0	- - - -	49.5	- - -
UG8	5.0	- - - -	49.5	- - -
UG9	-23.2	- - - -	61.7	- - -
SOURCE	-23.2	SOURCE	61.7	35.1

DATE: 10/1/2025S FILES\BUILDING C\AUX CALCS\C - (2) 18X18 RES49 12PSI.SDF
JOB TITLE: C - (2) 18x18 RES49 12PSI

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											
S10		29.3	4.9	12.0	17.0	-17.0	5.7	1.101 PL	15.25	PF	2.0
B5		29.8	0.0	13.8	0.0			150 FTG	4ET	PE	-0.2
								0.050 TL	40.25	PV	
Pipe: 2											
S11		29.3	4.9	13.7	18.1	-18.1	6.1	1.101 PL	0.50	PF	0.3
B5		29.8	0.0	13.8	0.0			150 FTG	T	PE	-0.2
								0.057 TL	5.50	PV	
Pipe: 3											
B5		29.8	0.0	13.8	0.0	-35.1	11.8	1.101 PL	12.42	PF	7.2
M4		29.8	0.0	21.0	0.0			150 FTG	4ET	PE	0.0
								0.193 TL	37.42	PV	
Pipe: 4											
M4		29.8	0.0	21.0	0.0	-35.1	5.6	1.598 PL	30.92	PF	1.7
32		32.3	0.0	21.6	0.0			150 FTG	2ET	PE	-1.1
								0.031 TL	52.92	PV	
Pipe: 5											
32		32.3	0.0	21.6	0.0	-35.1	5.6	1.598 PL	20.25	PF	0.6
02		12.0	0.0	31.0	0.0			150 FTG	----	PE	8.8
								0.031 TL	20.25	PV	
Pipe: 6											
02		12.0	0.0	31.0	0.0	-35.1	5.6	1.598 PL	15.25	PF	1.2
UG3		2.5	0.0	36.3	0.0			150 FTG	2ET	PE	4.1
								0.031 TL	37.25	PV	
Pipe: 7											
UG3		2.5	0.0	36.3	0.0	-35.1	3.6	2.003 PL	30.33	PF	0.5
UG4		2.5	0.0	36.8	0.0			150 FTG	2E	PE	0.0
								0.010 TL	48.33	PV	
Pipe: 8											
UG4		2.5	0.0	36.8	0.0	-35.1	5.6	1.598 PL	55.00	PF	2.2
UG5		5.0	0.0	37.9	0.0			150 FTG	2T	PE	-1.1
								0.031 TL	71.00	PV	
Pipe: 9											
UG5		5.0	0.0	37.9	0.0	-35.1	3.6	2.003 PL	25.08	PF	0.8
UG6		5.0	0.0	38.8	0.0			150 FTG	6E	PE	0.0
								0.010 TL	79.08	PV	
Pipe: 10											
UG6		5.0	0.0	38.8	0.0	-35.1	5.6	1.598 PL	44.00	PF	2.9
TOR		14.5	0.0	37.6	0.0			150 FTG	7E	PE	-4.1
								0.031 TL	93.00	PV	
Pipe: 11											
TOR		14.5	0.0	37.6	0.0	-35.1	3.0	2.185 PL	6.92	PF	0.0
BFP1		7.6	0.0	40.6	0.0			150 FTG	----	PE	3.0
								0.007 TL	6.92	PV	
Pipe: 12											
BFP2		7.6	0.0	47.6	0.0	FIXED PRESSURE LOSS DEVICE					
BFP1		7.6	0.0	40.6	0.0	7.0 psi, 35.1 gpm					
Pipe: 13											
BFP2		7.6	0.0	47.6	0.0	-35.1	3.6	2.003 PL	50.50	PF	0.8
UG7		5.0	0.0	49.5	0.0			150 FTG	ET2G	PE	1.1
								0.010 TL	73.50	PV	

DATE: 10/1/2025S FILES\BUILDING C\AUX CALCS\C - (2) 18X18 RES49 12PSI.SDF
 JOB TITLE: C - (2) 18x18 RES49 12PSI

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: 14					-35.1	8.270	PL	95.00	PF 0.0
UG7	5.0	0.0	49.5	0.0	0.2	140	FTG	TG	PE 0.0
UG8	5.0	0.0	49.5	0.0		0.000	TL	148.00	PV
Pipe: 15					-35.1	12.340	PL	920.00	PF 0.0
UG8	5.0	0.0	49.5	0.0	0.1	140	FTG	TFG	PE 12.2
UG9	-23.2	0.0	61.7	0.0		0.000	TL	1027.00	PV
Pipe: 16					-35.1	6.160	PL	20.00	PF 0.0
UG9	-23.2	0.0	61.7	0.0	0.4	140	FTG	EG	PE -0.0
SOURCE	-23.2	SRCE	61.7	(N/A)		0.000	TL	36.00	PV

NOTES (HASS):

- 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
- The system has been calculated to provide an average imbalance at each node of 0.004 gpm and a maximum imbalance at any node of 0.068 gpm.
- Total pressure at each node is used in balancing the system. Maximum water velocity is 11.8 ft/sec at pipe 3.
- Items listed in bold print on the cover sheet
 are automatically transferred from the calculation report.
- Available pressure at source node SOURCE under full flow conditions is 94.98 psi with a flow of 50.97 gpm.
- PIPE FITTINGS TABLE

User Pipe Table Name: SMITH

DATE: 10/1/2025S FILES\BUILDING C\AUX CALCS\C - (2) 18X18 RES49 12PSI.SDF

JOB TITLE: C - (2) 18x18 RES49 12PSI

PAGE: D MATERIAL: DI HWC: 140

Diameter (in)	Equivalent Fitting Lengths in Feet					
	E	T	F	C	B	G
	Ell	Tee	45	ChkVlv	BfyVlv	GatVlv
6.160	12.00	40.00	10.00	43.00	16.00	4.00
8.270	18.00	47.00	12.00	60.00	20.00	6.00
12.340	24.00	80.00	19.00	87.00	34.00	8.00

PAGE: P MATERIAL: CPVC HWC: 150

Diameter (in)	Equivalent Fitting Lengths in Feet						
	E	T	F	R	C	G	B
	Ell	Tee	45	teeRun	Coup	Gva	Bfy
1.101	5.00	5.00	1.00	1.00	1.00	1.00	4.00
1.598	7.00	8.00	2.00	1.00	1.00	1.00	6.00
2.003	9.00	10.00	2.00	1.00	1.00	2.00	7.00

PAGE: Y MATERIAL: SCH7 HWC: 120

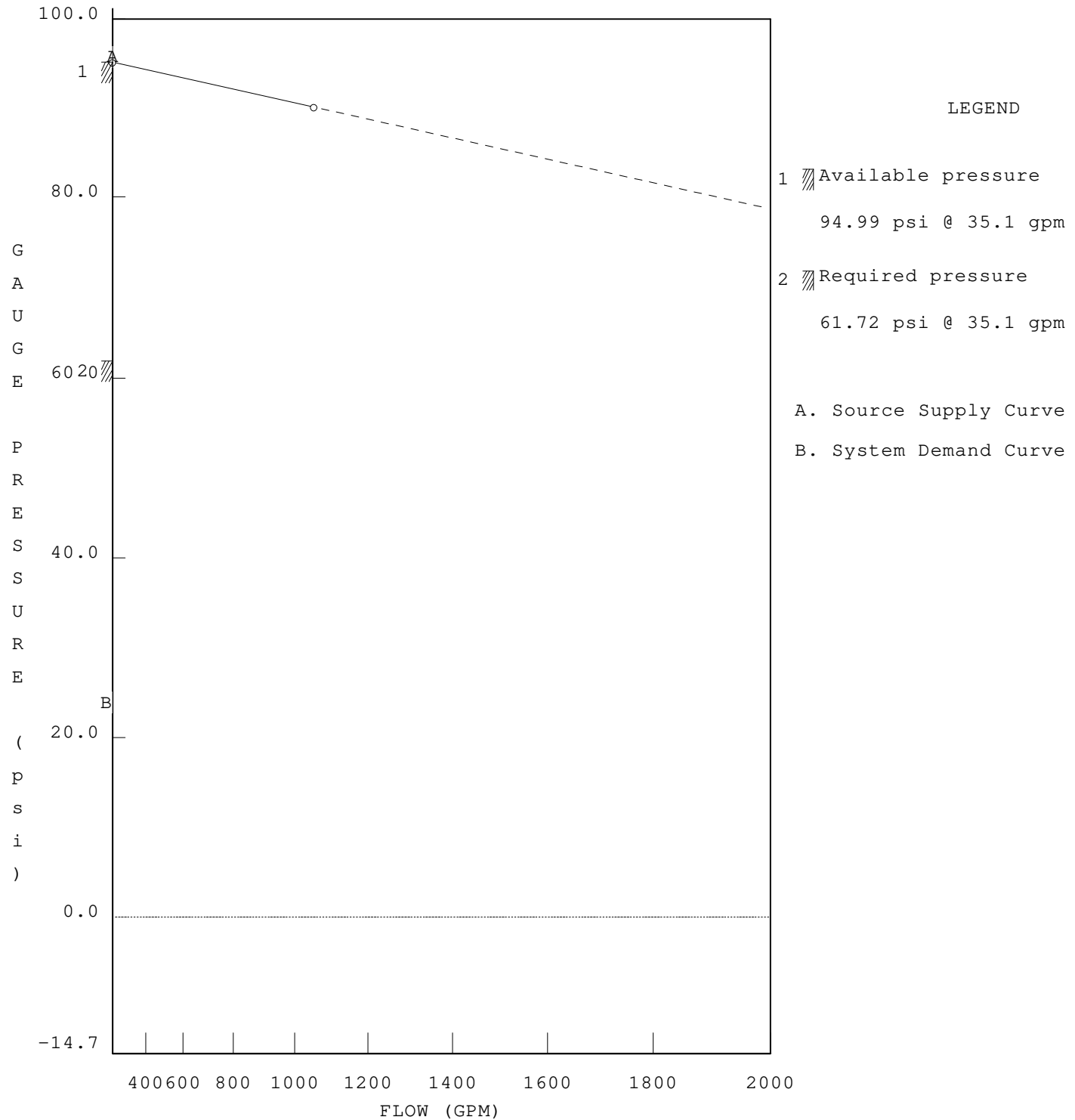
Diameter (in)	Equivalent Fitting Lengths in Feet								
	E	T	F	C	B	G	A	D	X
	Ell	Tee	45	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	flex
2.185	4.60	15.20	2.40	14.40	6.20	1.00	12.40	12.40	0.00

DATE: 10/1/2025S FILES\BUILDING C\AUX CALCS\C - (2) 18X18 RES49 12PSI.SDF

JOB TITLE: C - (2) 18x18 RES49 12PSI

WATER SUPPLY ANALYSIS

Static: 95.00 psi Resid: 90.00 psi Flow: 1055.0 gpm

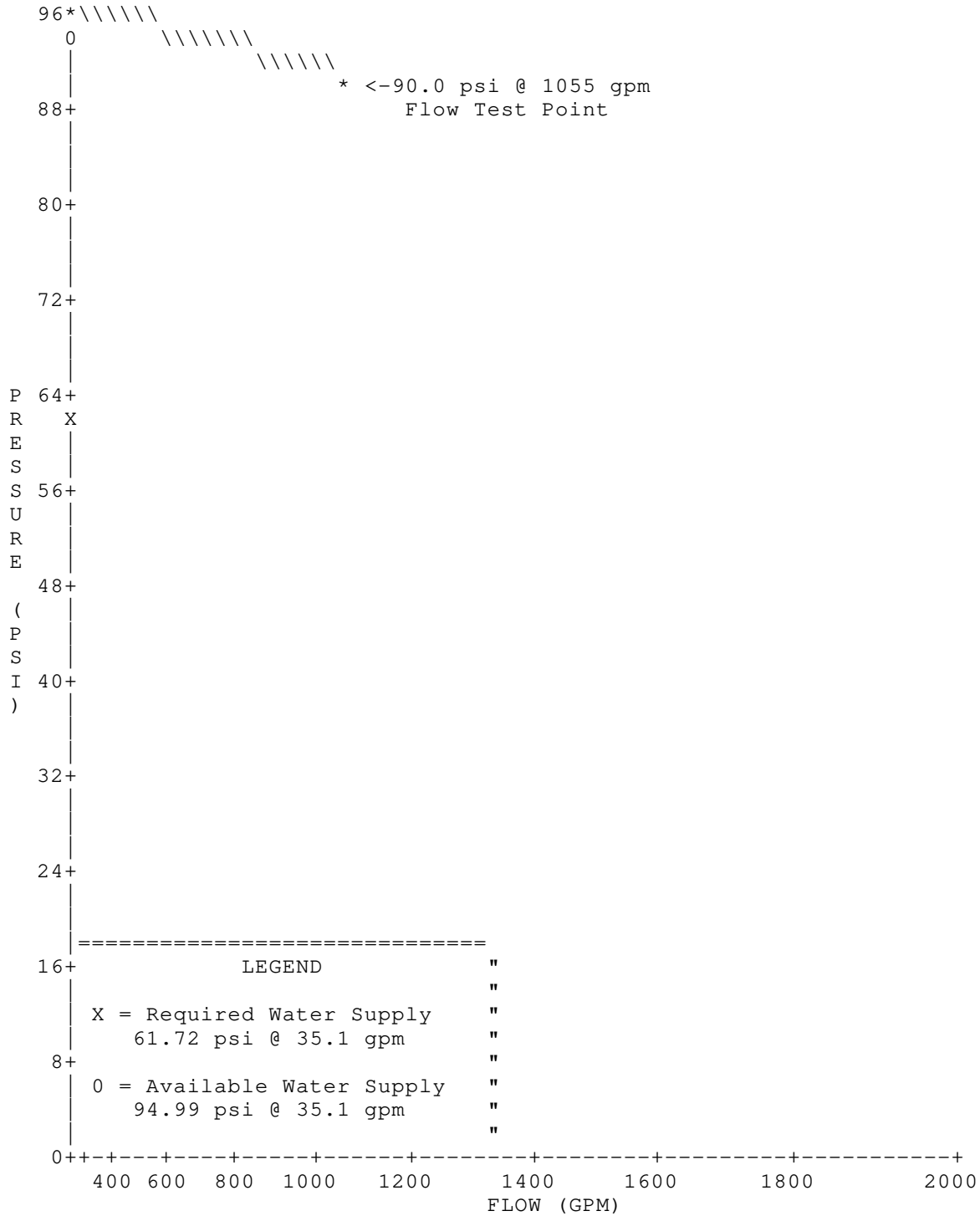


Note: (1) Dashed Lines indicate extrapolated values from Test Results

DATE: 10/1/2025S FILES\BUILDING C\AUX CALCS\C - (2) 18X18 RES49 12PSI.SDF

JOB TITLE: C - (2) 18x18 RES49 12PSI

WATER SUPPLY CURVE



SMITH FIRE SYSTEMS, INC.
JOB NO. TC25207
BRADLEY HEIGHTS: BUILDING C

SYSTEM # 1

L3 (1) HEAD COMPARTMENT

AUXILIARY HYDRAULIC CALCULATION

DENSITY: 0.05 GPM OVER 1 HEADS

SYSTEM DEMAND AT BASE OF RISER

20 GPM AT 34 PSI

DATE: 10/1/2025\FILES\BUILDING C\AUX CALCS\C - (1) 20X20 RES49 16.7PSI.SDF

JOB TITLE: C - (1) 20x20 RES49 16.7PSI

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	95.0	90.0	1055.0	95.0	20.0	54.6

Available pressure is 40.4 psi (43%) greater than required pressure.

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	20.0 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	20.0 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
S1	29.3	K= 4.90	16.7	20.0
M1	29.8	- - - -	19.8	- - -
31	29.8	- - - -	20.1	- - -
01	9.5	- - - -	29.5	- - -
TOR	14.5	- - - -	31.0	- - -
BFP1	7.6	- - - -	34.0	- - -
BFP2	7.6	- - - -	41.0	- - -
UG1	0.0	- - - -	33.9	- - -
UG2	0.0	- - - -	34.1	- - -
UG3	2.5	- - - -	33.8	- - -
UG4	2.5	- - - -	34.0	- - -
UG5	5.0	- - - -	33.7	- - -
UG6	5.0	- - - -	34.0	- - -
UG7	5.0	- - - -	42.4	- - -
UG8	5.0	- - - -	42.4	- - -
UG9	-23.2	- - - -	54.6	- - -
SOURCE	-23.2	SOURCE	54.6	20.0

DATE: 10/1/2025 FILES\BUILDING C\AUX CALCS\C - (1) 20X20 RES49 16.7PSI.SDF
 JOB TITLE: C - (1) 20x20 RES49 16.7PSI

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		29.3	4.9	16.7	20.0	-20.0	6.7	1.101 PL	18.58	PF	3.3
M1		29.8	0.0	19.8	0.0			150 FTG	5ET	PE	-0.2
								0.068 TL	48.58	PV	
Pipe: 2											
M1		29.8	0.0	19.8	0.0	-20.0	3.2	1.598 PL	20.50	PF	0.3
31		29.8	0.0	20.1	0.0			150 FTG	T	PE	0.0
								0.011 TL	28.50	PV	
Pipe: 3											
31		29.8	0.0	20.1	0.0	-20.0	3.2	1.598 PL	20.25	PF	0.6
01		9.5	0.0	29.5	0.0			150 FTG	4ET	PE	8.8
								0.011 TL	56.25	PV	
Pipe: 4											
01		9.5	0.0	29.5	0.0	-20.0	3.2	1.598 PL	15.00	PF	0.3
UG1		0.0	0.0	33.9	0.0			150 FTG	2E	PE	4.1
								0.011 TL	29.00	PV	
Pipe: 5											
UG1		0.0	0.0	33.9	0.0	-20.0	2.0	2.003 PL	25.08	PF	0.2
UG2		0.0	0.0	34.1	0.0			150 FTG	2E	PE	0.0
								0.004 TL	43.08	PV	
Pipe: 6											
UG2		0.0	0.0	34.1	0.0	-20.0	3.2	1.598 PL	55.00	PF	0.8
UG3		2.5	0.0	33.8	0.0			150 FTG	2T	PE	-1.1
								0.011 TL	71.00	PV	
Pipe: 7											
UG3		2.5	0.0	33.8	0.0	-20.0	2.0	2.003 PL	30.33	PF	0.2
UG4		2.5	0.0	34.0	0.0			150 FTG	2E	PE	0.0
								0.004 TL	48.33	PV	
Pipe: 8											
UG4		2.5	0.0	34.0	0.0	-20.0	3.2	1.598 PL	55.00	PF	0.8
UG5		5.0	0.0	33.7	0.0			150 FTG	2T	PE	-1.1
								0.011 TL	71.00	PV	
Pipe: 9											
UG5		5.0	0.0	33.7	0.0	-20.0	2.0	2.003 PL	25.08	PF	0.3
UG6		5.0	0.0	34.0	0.0			150 FTG	6E	PE	0.0
								0.004 TL	79.08	PV	
Pipe: 10											
UG6		5.0	0.0	34.0	0.0	-20.0	3.2	1.598 PL	50.00	PF	1.1
TOR		14.5	0.0	31.0	0.0			150 FTG	7E	PE	-4.1
								0.011 TL	99.00	PV	
Pipe: 11											
TOR		14.5	0.0	31.0	0.0	-20.0	1.7	2.185 PL	6.92	PF	0.0
BFP1		7.6	0.0	34.0	0.0			150 FTG	----	PE	3.0
								0.002 TL	6.92	PV	
Pipe: 12											
BFP2		7.6	0.0	41.0	0.0	FIXED PRESSURE LOSS DEVICE					
BFP1		7.6	0.0	34.0	0.0	7.0 psi, 20.0 gpm					
Pipe: 13											
BFP2		7.6	0.0	41.0	0.0	-20.0	2.0	2.003 PL	50.50	PF	0.3
UG7		5.0	0.0	42.4	0.0			150 FTG	ET2G	PE	1.1
								0.004 TL	73.50	PV	

DATE: 10/1/2025 FILES\BUILDING C\AUX CALCS\C - (1) 20X20 RES49 16.7PSI.SDF
 JOB TITLE: C - (1) 20x20 RES49 16.7PSI

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: 14					-20.0	8.270	PL	95.00	PF 0.0
UG7	5.0	0.0	42.4	0.0	0.1	140	FTG	TG	PE 0.0
UG8	5.0	0.0	42.4	0.0		0.000	TL	148.00	PV
Pipe: 15					-20.0	12.340	PL	920.00	PF 0.0
UG8	5.0	0.0	42.4	0.0	0.1	140	FTG	TFG	PE 12.2
UG9	-23.2	0.0	54.6	0.0		0.000	TL	1027.00	PV
Pipe: 16					-20.0	6.160	PL	20.00	PF 0.0
UG9	-23.2	0.0	54.6	0.0	0.2	140	FTG	EG	PE -0.0
SOURCE	-23.2	SRCE	54.6	(N/A)		0.000	TL	36.00	PV

NOTES (HASS):

- 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
- The system has been calculated to provide an average imbalance at each node of 0.005 gpm and a maximum imbalance at any node of 0.072 gpm.
- Total pressure at each node is used in balancing the system. Maximum water velocity is 6.7 ft/sec at pipe 1.
- Items listed in bold print on the cover sheet
 are automatically transferred from the calculation report.
- Available pressure at source node SOURCE under full flow conditions is 94.99 psi with a flow of 32.86 gpm.
- PIPE FITTINGS TABLE

User Pipe Table Name: SMITH

DATE: 10/1/2025\FILES\BUILDING C\AUX CALCS\C - (1) 20X20 RES49 16.7PSI.SDF

JOB TITLE: C - (1) 20x20 RES49 16.7PSI

PAGE: D MATERIAL: DI HWC: 140

Diameter (in)	Equivalent Fitting Lengths in Feet					
	E	T	F	C	B	G
	Ell	Tee	45	ChkVlv	BfyVlv	GatVlv
6.160	12.00	40.00	10.00	43.00	16.00	4.00
8.270	18.00	47.00	12.00	60.00	20.00	6.00
12.340	24.00	80.00	19.00	87.00	34.00	8.00

PAGE: P MATERIAL: CPVC HWC: 150

Diameter (in)	Equivalent Fitting Lengths in Feet						
	E	T	F	R	C	G	B
	Ell	Tee	45	teeRun	Coup	Gva	Bfy
1.101	5.00	5.00	1.00	1.00	1.00	1.00	4.00
1.598	7.00	8.00	2.00	1.00	1.00	1.00	6.00
2.003	9.00	10.00	2.00	1.00	1.00	2.00	7.00

PAGE: Y MATERIAL: SCH7 HWC: 120

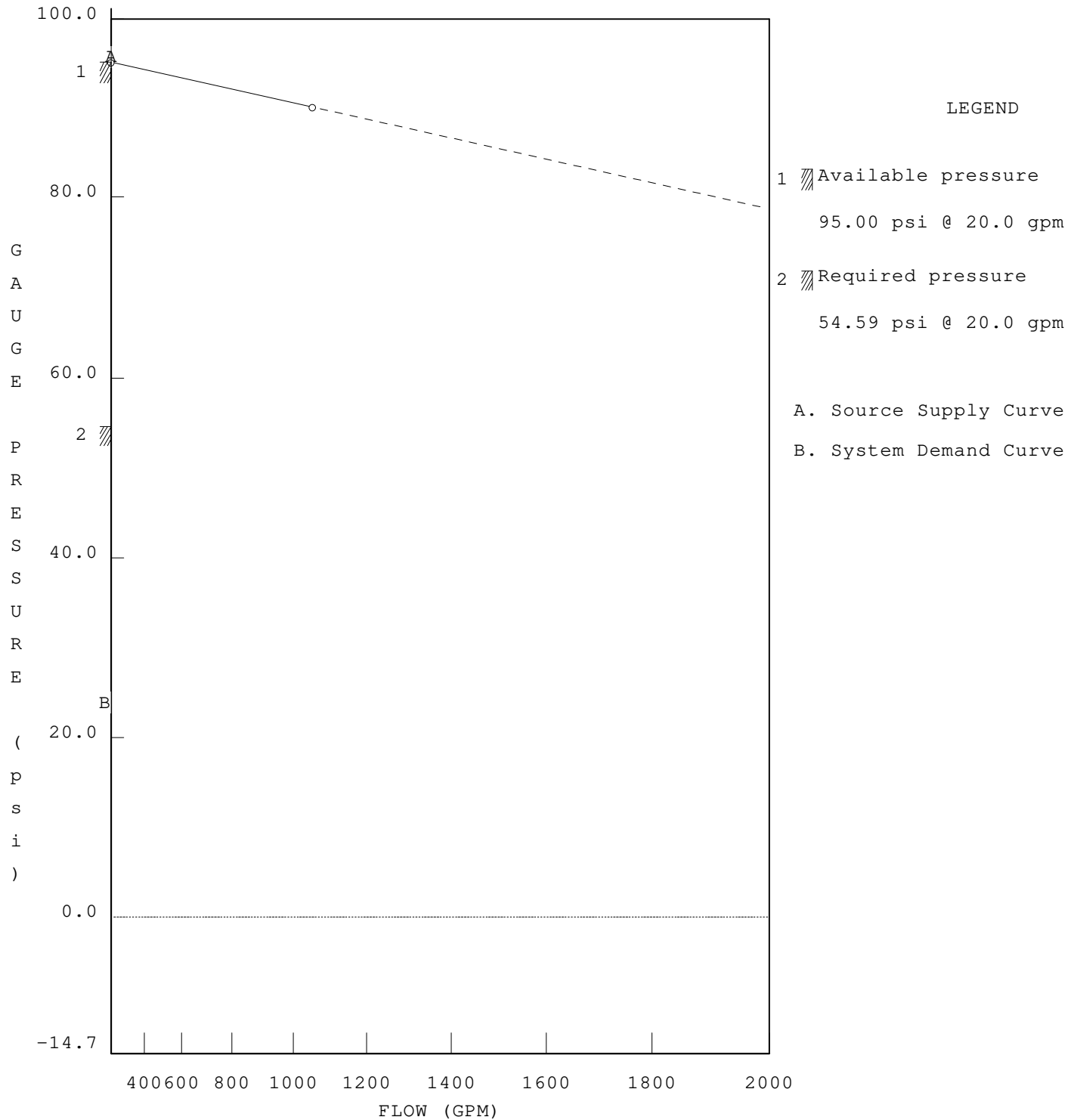
Diameter (in)	Equivalent Fitting Lengths in Feet								
	E	T	F	C	B	G	A	D	X
	Ell	Tee	45	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	flex
2.185	4.60	15.20	2.40	14.40	6.20	1.00	12.40	12.40	0.00

DATE: 10/1/2025FILES\BUILDING C\AUX CALCS\C - (1) 20X20 RES49 16.7PSI.SDF

JOB TITLE: C - (1) 20x20 RES49 16.7PSI

WATER SUPPLY ANALYSIS

Static: 95.00 psi Resid: 90.00 psi Flow: 1055.0 gpm



DATE: 10/1/2025FILES\BUILDING C\AUX CALCS\C - (1) 20X20 RES49 16.7PSI.SDF

JOB TITLE: C - (1) 20x20 RES49 16.7PSI

WATER SUPPLY CURVE

