PATRIOT FIRE PROTECTION, INC.

Fire Sprinklers Save Lives!

2707 70TH Avenue East
Tacoma, WA 98424

TEL: (253) 926.2290
FAX: (253) 922.6150

BPLC NORTH YARD

Hydraulic Calculations

5511 INTER AVE
PUYALLUP, WA 98372

Patriot Project No. 11-2495

Submitted To:

OWNER

BPLC PROPERTIES, LLC

Expires DEC 31, 25

WASHINGTON STATE
CERTIFICATE OF COMPETENCY
FIRE SPRINKLER SYSTEMS

Clint Edward Carr
8765-1209-C Level 3
Patriot Fire Protection, Inc.
PATRIFP099CF

Signature

03/04/2025
Date

HANFORD, WA OFFICE
TEL (509) 373.8895
FAX (509) 373.8919

VANCOUVER, WA OFFICE
TEL (360) 699.4403
PORTLAND (503) 222.6001
FAX (360) 699.4485

SPOKANE, WA OFFICE
TEL (509) 926.3428
FAX (509) 926.3708

PATRIFP099CF

PATRIOT FIRE PROTECTION, INC
2707 70TH AVE E
TACOMA, WA 98424

HYDRAULIC CALCULATIONS

FOR

BPLC NORTH YARD BUILDING
WAREHOUSE

FILE NUMBER: 17-2495
DATE: MAR 4, 2025

-DESIGN DATA-

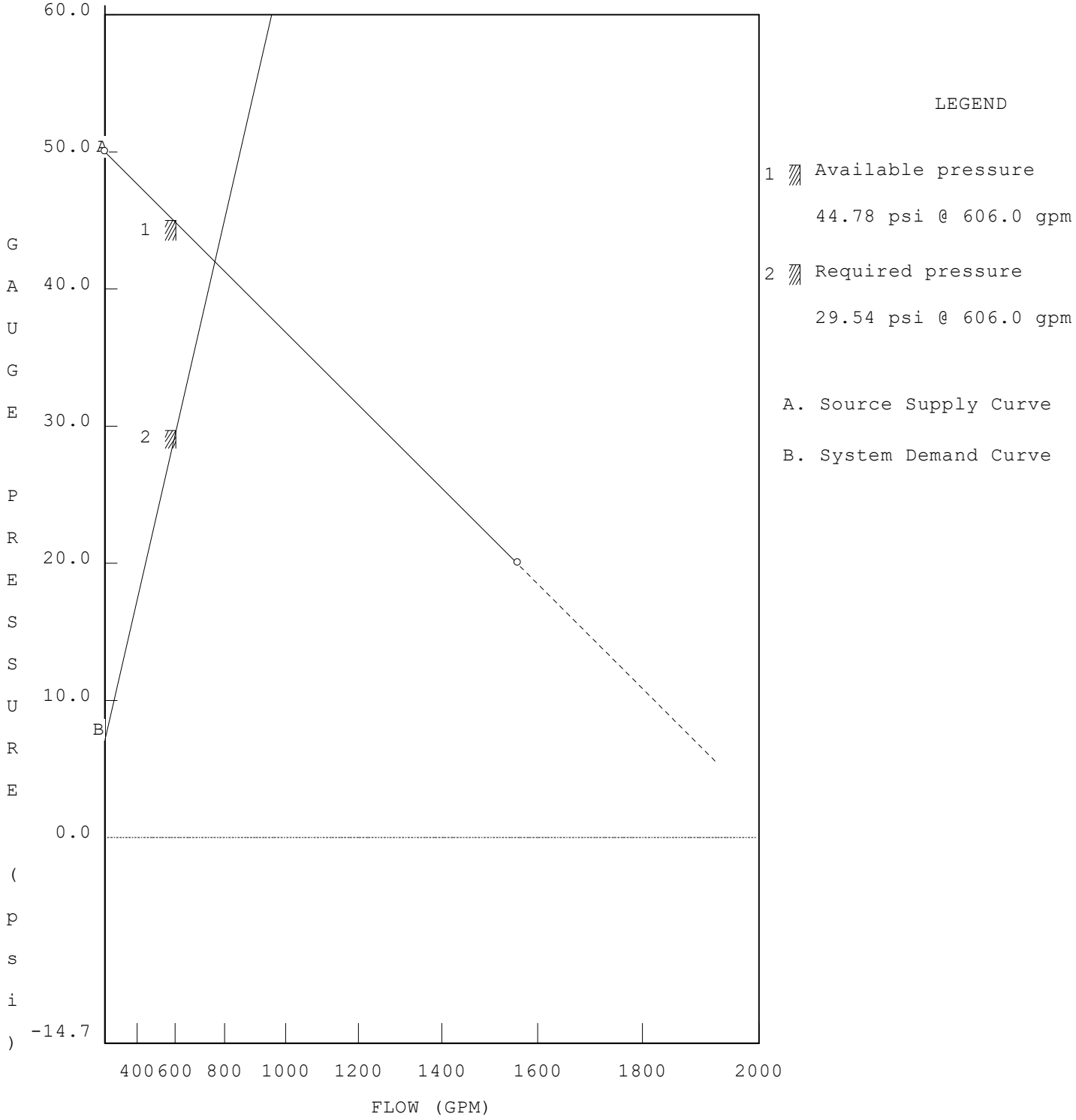
OCCUPANCY CLASSIFICATION:	ORDINARY HAZARD GROUP II
DENSITY:	.20 gpm/sq. ft.
AREA OF APPLICATION:	1500 sq. ft.
COVERAGE PER SPRINKLER:	130 sq. ft. MAX
NUMBER OF SPRINKLERS CALCULATED:	14 sprinklers
TOTAL SPRINKLER WATER FLOW REQUIRED:	356.0 gpm
TOTAL WATER REQUIRED (including hose):	606.0 gpm
FLOW AND PRESSURE (@ BOR):	356 gpm @ 23.2 psi
SPRINKLER K-FACTOR:	8.0K
NAME OF CONTRACTOR:	PATRIOT FIRE PROTECTION, INC.
DESIGN/LAYOUT BY:	CLINT CARR
AUTHORITY HAVING JURISDICTION:	CITY OF PUYALLUP
CONTRACTOR CERTIFICATION NUMBER:	PATRIFP099CF

CALCULATIONS BY HASS COMPUTER PROGRAM (LICENSE # 65839843)
HRS SYSTEMS, INC.

DATE: 3/4/2025495 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\WAREHOUSE.SDF
JOB TITLE:

WATER SUPPLY ANALYSIS

Static: 50.00 psi Resid: 20.00 psi Flow: 1560.0 gpm



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

DATE: 3/4/2025495 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\WAREHOUSE.SDF
JOB TITLE:

NFPA WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	@ FLOW (GPM)	AVAIL. PRESS. (PSI)	@ TOTAL DEMAND (GPM)	REQ'D PRESS. (PSI)
CITY	50.0	20.0	1560.0	44.8	606.0	29.5

Available pressure is 15.2 psi (34%) greater than required pressure.

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	606.0 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	250.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	356.0 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
101	78.4	K= 8.00	10.7	26.1
102	78.5	K= 8.00	10.7	26.2
103	78.8	K= 8.00	10.7	26.1
104	78.2	K= 8.00	10.9	26.4
105	78.4	K= 8.00	10.7	26.2
106	78.5	K= 8.00	10.7	26.2
107	78.8	K= 8.00	10.7	26.2
108	78.2	K= 8.00	10.9	26.4
109	78.5	K= 8.00	8.8	23.7
110	78.2	K= 8.00	9.0	24.0
111	78.5	K= 8.00	9.0	24.0
112	78.8	K= 8.00	9.1	24.2
113	78.8	K= 8.00	9.9	25.1
114	78.5	K= 8.00	10.0	25.3
20	78.8	- - - -	11.1	- - -
21	78.8	- - - -	11.1	- - -
22	78.8	- - - -	10.2	- - -
10	77.2	- - - -	12.9	- - -
11	77.2	- - - -	13.0	- - -
12	77.2	- - - -	13.1	- - -
58	77.2	- - - -	17.5	- - -
TOR	77.2	- - - -	18.1	- - -
BOR	66.3	- - - -	23.2	- - -
FLG	62.9	- - - -	26.2	- - -
HS	58.0	HOSE STREAM	29.2	250.0
CITY	63.0	SOURCE	29.5	606.0

NFPA PIPE DATA 5

Pipe Tag / Frm Node / To Node	El (ft)	K-fac / PT	Add Fl (q) / Tot.(Q)	Add Fl To Node/ Disch	Nom ID / Act ID	Fit: Eq.Ln. (ft.)	L / F / T	C / Pf/ft.	(Pt) (Pe) (Pf)
Pipe: 0		Source	250.0	Disch			236.83	140	0.4
CITY	63.0	29.5	356.0		FLG D6.000	T:47.0	52.00		-2.2
HS	58.0	29.2	606.0		6.280	G: 5.0	288.83	0.009	2.6
Pipe: 1		0.0	0.0				152.85	140	3.0
HS	58.0	29.2	356.0		BOR D6.000	4E:88.0	98.00		2.1
FLG	62.9	26.2	356.0		6.280	2G:10.0	250.85	0.003	0.8
Pipe: 2		0.0	0.0				40.00	120	3.0
FLG	62.9	26.2	356.0		TOR A4.000	----	0.00		1.4
BOR	66.3	23.2	356.0		4.026		40.00	0.038	1.5
Pipe: 3		0.0	0.0				11.42	120	5.1
BOR	66.3	23.2	356.0	58	B4.000	----	0.00		4.7
TOR	77.2	18.1	356.0		4.260		11.42	0.029	0.3
Pipe: 4		0.0	0.0				10.08	120	0.7
TOR	77.2	18.1	356.0	12	B4.000	2F:13.0	13.00		-0.0
58	77.2	17.5	356.0		4.260		23.08	0.029	0.7
Pipe: 5		0.0	146.2	22			125.50	120	4.4
58	77.2	17.5	209.8	11	B4.000	T:26.0	26.00		-0.0
12	77.2	13.1	356.0		4.260		151.50	0.029	4.4
Pipe: 6		0.0	104.9	21			10.79	120	0.1
12	77.2	13.1	104.8	10	B4.000	----	0.00		-0.0
11	77.2	13.0	209.8		4.260		10.79	0.011	0.1
Pipe: 7		0.0	0.0				7.33	120	0.0
11	77.2	13.0	104.8	20	B4.000	----	0.00		-0.0
10	77.2	12.9	104.8		4.260		7.33	0.003	0.0
Pipe: 8		0.0	95.8	112			1.67	120	2.8
12	77.2	13.1	50.4	113	B2.000	T:12.0	12.00		0.7
22	78.8	10.2	146.2		2.157		13.67	0.154	2.1
Pipe: 9		0.0	52.4	106			1.67	120	1.9
11	77.2	13.0	52.6	107	B2.000	T:12.0	12.00		0.7
21	78.8	11.1	104.9		2.157		13.67	0.083	1.1
Pipe: 10		0.0	52.3	102			1.67	120	1.9
10	77.2	12.9	52.5	103	B2.000	T:12.0	12.00		0.7
20	78.8	11.1	104.8		2.157		13.67	0.083	1.1
Pipe: 11		8.00	25.1	Disch			4.83	120	0.4
22	78.8	10.2	25.3	114	B2.000	T:12.0	12.00		-0.0
113	78.8	9.9	50.4		2.157		16.83	0.021	0.4
Pipe: 12		8.00	25.3	Disch			8.92	120	-0.1
113	78.8	9.9	0.0		B2.000	----	0.00		-0.1
114	78.5	10.0	25.3		2.157		8.92	0.006	0.1

Pipe Tag / Frm Node / To Node	El (ft)	K-fac / PT	Add Fl (q) / Tot.(Q)	Add Fl To Node/ Disch	Nom ID / Act ID	Fit: Eq.Ln. (ft.)	L / F / T	C / Pf/ft.	(Pt) (Pe) (Pf)
Pipe: 13		8.00	24.2	Disch			3.58	120	1.1
22	78.8	10.2	71.6	111	B2.000	T:12.0	12.00		-0.0
112	78.8	9.1	95.8		2.157		15.58	0.071	1.1
		8.00	24.0	Disch					
Pipe: 14			0.0				7.33	120	0.2
112	78.8	9.1	47.7	110	B2.000	----	0.00		-0.1
111	78.5	9.0	71.6		2.157		7.33	0.041	0.3
		8.00	24.0	Disch					
Pipe: 15			0.0				8.42	120	0.0
111	78.5	9.0	23.7	109	B2.000	----	0.00		-0.1
110	78.2	9.0	47.7		2.157		8.42	0.019	0.2
Pipe: 16		8.00	23.7	Disch			8.42	120	0.2
110	78.2	9.0	0.0		B2.000	----	0.00		0.1
109	78.5	8.8	23.7		2.157		8.42	0.005	0.0
		8.00	26.2	Disch					
Pipe: 17			0.0				4.92	120	0.4
21	78.8	11.1	26.4	108	B2.000	T:12.0	12.00		-0.0
107	78.8	10.7	52.6		2.157		16.92	0.023	0.4
Pipe: 18		8.00	26.4	Disch			14.75	120	-0.2
107	78.8	10.7	0.0		B2.000	----	0.00		-0.3
108	78.2	10.9	26.4		2.157		14.75	0.006	0.1
		8.00	26.2	Disch					
Pipe: 19			0.0				9.83	120	0.4
21	78.8	11.1	26.2	105	B2.000	T:12.0	12.00		-0.1
106	78.5	10.7	52.4		2.157		21.83	0.023	0.5
Pipe: 20		8.00	26.2	Disch			14.75	120	0.0
106	78.5	10.7	0.0		B2.000	----	0.00		-0.1
105	78.4	10.7	26.2		2.157		14.75	0.006	0.1
Pipe: 21		8.00	26.1	Disch			4.92	120	0.4
20	78.8	11.1	26.4	104	B2.000	T:12.0	12.00		-0.0
103	78.8	10.7	52.5		2.157		16.92	0.023	0.4
Pipe: 22		8.00	26.4	Disch			14.75	120	-0.2
103	78.8	10.7	0.0		B2.000	----	0.00		-0.3
104	78.2	10.9	26.4		2.157		14.75	0.006	0.1
Pipe: 23		8.00	26.2	Disch			9.83	120	0.4
20	78.8	11.1	26.1	101	B2.000	T:12.0	12.00		-0.1
102	78.5	10.7	52.3		2.157		21.83	0.023	0.5
Pipe: 24		8.00	26.1	Disch			14.75	120	0.0
102	78.5	10.7	0.0		B2.000	----	0.00		-0.1
101	78.4	10.7	26.1		2.157		14.75	0.006	0.1

DATE: 3/4/2025495 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\WAREHOUSE.SDF
JOB TITLE:

NOTES (HASS):

(1) Calculations were performed by the HASS 2023 D computer program in accordance with NFPA (2019) under license no. 65839843 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 0.070 gpm.

(3) Total pressure at each node is used in balancing the system. Maximum water velocity is 12.8 ft/sec at pipe 8.

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

are automatically transferred from the calculation report.

(5) Available pressure at source node CITY under full flow conditions is 43.04 psi with a flow of 708.05 gpm.

(6) PIPE FITTINGS TABLE

User 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

PAGE: B MATERIAL: THNWL 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 NPTee
	F F45Ell								
2.157	6.00 3.00	12.00	3.00	14.00	8.00	1.00	12.00	12.00	12.00
4.260	13.00 6.50	26.00	8.00	29.00	16.00	3.00	26.00	26.00	26.00

DATE: 3/4/2025495 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\WAREHOUSE.SDF
JOB TITLE:

PAGE: D MATERIAL: DIRON HWC: 140

Diameter (in)	Equivalent Fitting Lengths in Feet							
	E Ell	T Tee Lng	L Ell Chk	C Vlv Bfy	B Vlv Gat	G Vlv NP	N Tee F	F 45 Ell
6.280	22.00	47.00	14.00	51.00	16.00	5.00	47.00	11.00

PATRIOT FIRE PROTECTION, INC
2707 70TH AVE E
TACOMA, WA 98424

HYDRAULIC CALCULATIONS

FOR

BPLC NORTH YARD BUILDING
LOWER OFFICE AREA

FILE NUMBER: 17-2495
DATE: MAR 4, 2025

-DESIGN DATA-

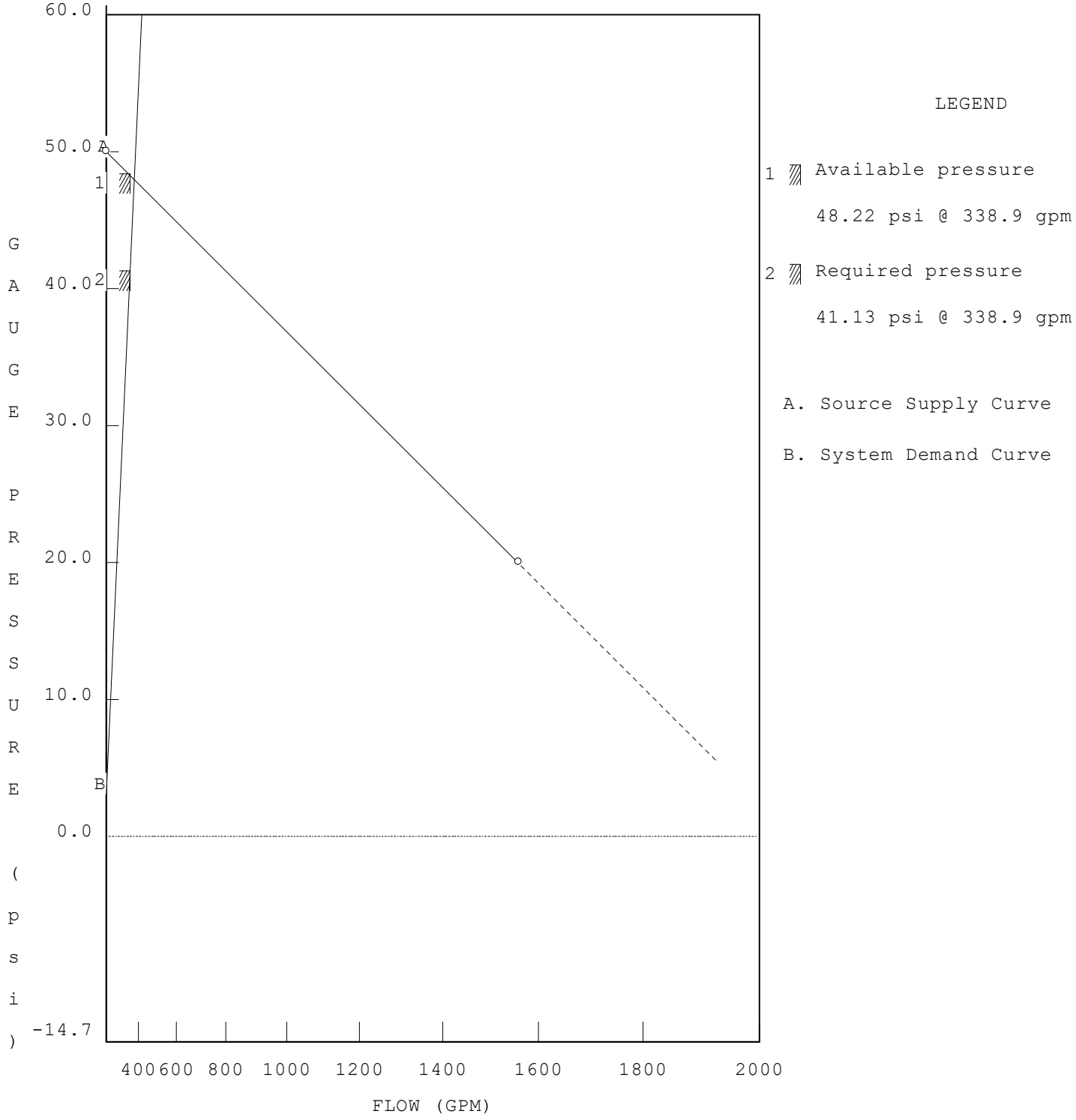
OCCUPANCY CLASSIFICATION:	LIGHT HAZARD
DENSITY:	.10 gpm/sq. ft.
AREA OF APPLICATION:	900 sq. ft.
COVERAGE PER SPRINKLER:	225 sq. ft. MAX
NUMBER OF SPRINKLERS CALCULATED:	11 sprinklers
TOTAL SPRINKLER WATER FLOW REQUIRED:	238.8 gpm
TOTAL WATER REQUIRED (including hose):	338.9 gpm
FLOW AND PRESSURE (@ BOR):	238.9 gpm @ 36.9 psi
SPRINKLER K-FACTOR:	5.6K
NAME OF CONTRACTOR:	PATRIOT FIRE PROTECTION, INC.
DESIGN/LAYOUT BY:	CLINT CARR
AUTHORITY HAVING JURISDICTION:	CITY OF PUYALLUP
CONTRACTOR CERTIFICATION NUMBER:	PATRIFP099CF

CALCULATIONS BY HASS COMPUTER PROGRAM (LICENSE # 65839843)
HRS SYSTEMS, INC.

DATE: 3/4/20251-2495 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\OFFICE.SDF
JOB TITLE:

WATER SUPPLY ANALYSIS

Static: 50.00 psi Resid: 20.00 psi Flow: 1560.0 gpm



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

DATE: 3/4/20251-2495 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\OFFICE.SDF
JOB TITLE:

NFPA WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	@ FLOW (GPM)	AVAIL. PRESS. (PSI)	@ TOTAL DEMAND (GPM)	REQ'D PRESS. (PSI)
CITY	50.0	20.0	1560.0	48.2	338.9	41.1

Available pressure is 7.1 psi (15%) greater than required pressure.

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	338.9 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	100.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	238.9 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
S1	69.8	K= 5.60	10.8	18.4
S2	69.8	K= 5.60	11.2	18.8
S3	69.8	K= 5.60	11.4	18.9
S4	69.8	K= 5.60	14.0	20.9
S5	69.8	K= 5.60	10.8	18.4
S6	69.8	K= 5.60	13.1	20.3
S7	69.8	K= 5.60	14.8	21.5
S8	69.8	K= 5.60	14.4	21.2
S9	69.8	K= 5.60	22.0	26.2
S10	69.8	K= 5.60	23.4	27.1
S11	69.8	K= 5.60	23.3	27.0
31	70.2	- - - -	11.3	- - -
32	70.2	- - - -	11.5	- - -
33	70.2	- - - -	12.1	- - -
34	70.2	- - - -	14.3	- - -
35	70.2	- - - -	11.1	- - -
36	70.2	- - - -	15.1	- - -
37	70.2	- - - -	15.1	- - -
38	70.2	- - - -	15.2	- - -
39	70.2	- - - -	24.5	- - -
40	70.2	- - - -	24.0	- - -
41	70.2	- - - -	24.0	- - -
49	70.2	- - - -	16.2	- - -
50	70.2	- - - -	17.5	- - -
51	70.2	- - - -	24.0	- - -
52	70.2	- - - -	29.2	- - -
53	69.3	- - - -	21.9	- - -
54	69.3	- - - -	24.4	- - -
55	69.3	- - - -	30.6	- - -
56	76.6	- - - -	29.1	- - -
57	77.2	- - - -	31.4	- - -
58	77.2	- - - -	31.7	- - -
TOR	77.2	- - - -	32.0	- - -
BOR	66.3	- - - -	36.9	- - -
FLG	62.9	- - - -	39.9	- - -

DATE: 3/4/20251-2495 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\OFFICE.SDF
JOB TITLE:

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
HS	58.0	HOSE STREAM	42.4	100.0
CITY	63.0	SOURCE	41.1	338.9

NFPA PIPE DATA 5

Pipe Tag / Frm Node / To Node	El (ft)	K-fac / PT	Add Fl (q) / Tot.(Q)	Add Fl To Node/ Disch	Nom ID / Act ID	Fit: Eq.Ln. (ft.)	L / F / T	C / Pf/ft.	(Pt) (Pe) (Pf)
Pipe: 0		Source	100.0	Disch			236.83	140	-1.3
CITY	63.0	41.1	238.8		FLG D6.000	T:47.0	52.00		-2.2
HS	58.0	42.4	338.9		6.280	G: 5.0	288.83	0.003	0.9
Pipe: 1		0.0	0.0				152.85	140	2.5
HS	58.0	42.4	238.8		BOR D6.000	4E:88.0	98.00		2.1
FLG	62.9	39.9	238.8		6.280	2G:10.0	250.85	0.002	0.4
Pipe: 2		0.0	0.0				85.00	120	3.0
FLG	62.9	39.9	238.8		TOR A4.000	----	0.00		1.4
BOR	66.3	36.9	238.8		4.026		85.00	0.018	1.6
Pipe: 3		0.0	0.0				11.42	120	4.9
BOR	66.3	36.9	238.8	58	B4.000	----	0.00		4.7
TOR	77.2	32.0	238.8		4.260		11.42	0.014	0.2
Pipe: 4		0.0	0.0				11.08	120	0.3
TOR	77.2	32.0	238.8	57	B4.000	2F:13.0	13.00		-0.0
58	77.2	31.7	238.8		4.260		24.08	0.014	0.3
Pipe: 5		0.0	0.0				21.00	120	0.3
58	77.2	31.7	238.8	56	B4.000	----	0.00		-0.0
57	77.2	31.4	238.8		4.260		21.00	0.014	0.3
Pipe: 6		0.0	0.0				19.67	120	2.3
57	77.2	31.4	238.8	55	B3.000	T:20.0	30.00		-0.3
56	76.6	29.1	238.8		3.260	2F:10.0	49.67	0.051	2.5
Pipe: 7		0.0	175.0	54			22.08	120	-1.5
56	76.6	29.1	63.8	52	B3.000	2F:10.0	10.00		-3.1
55	69.3	30.6	238.8		3.260		32.08	0.051	1.6
Pipe: 8		0.0	0.0				10.67	120	1.4
55	69.3	30.6	63.8	39	B2.000	T:12.0	21.00		0.4
52	70.2	29.2	63.8		2.157	3F: 9.0	31.67	0.033	1.1
Pipe: 9		0.0	16.5	51			16.83	120	6.2
55	69.3	30.6	158.5	53	B2.000	T:12.0	12.00		-0.0
54	69.3	24.4	175.0		2.157		28.83	0.215	6.2
Pipe: 10		0.0	0.0				13.92	120	2.5
54	69.3	24.4	158.5	50	B2.000	----	0.00		-0.0
53	69.3	21.9	158.5		2.157		13.92	0.179	2.5
Pipe: 11		0.0	0.0				4.83	120	0.4
54	69.3	24.4	16.5	41	B2.000	T:12.0	18.00		0.4
51	70.2	24.0	16.5		2.157	2F: 6.0	22.83	0.003	0.1
Pipe: 12		0.0	0.0				4.83	120	4.4
53	69.3	21.9	158.5	49	B2.000	T:12.0	18.00		0.4
50	70.2	17.5	158.5		2.157	2F: 6.0	22.83	0.179	4.1

Pipe Tag / Frm Node / To Node	El (ft)	K-fac / PT	Add Fl (q) / Tot.(Q)	Add Fl To Node/ Disch	Nom ID / Act ID	Fit: Eq.Ln. (ft.)	L / F / T	C / Pf/ft.	(Pt) (Pe) (Pf)
Pipe: 13		0.0	26.2	S9			40.75	150	4.7
52	70.2	29.2	37.6	40	F1.500	T: 8.4	8.40		-0.0
39	70.2	24.5	63.8		1.598		49.15	0.095	4.7
Pipe: 14		0.0	27.1	S10			4.67	150	0.5
39	70.2	24.5	10.5	41	F1.500	T: 8.4	8.40		-0.0
40	70.2	24.0	37.6		1.598		13.07	0.036	0.5
Pipe: 15		0.0	27.0	S11			10.83	150	0.1
40	70.2	24.0	-16.5		F1.500	2E:18.0	18.00		-0.0
41	70.2	24.0	10.5		1.598		28.83	0.003	0.1
Pipe: 16		0.0	27.0	S11			2.50	150	0.0
51	70.2	24.0	-10.5		F1.500	----	0.00		-0.0
41	70.2	24.0	16.5		1.598		2.50	0.008	0.0
Pipe: 17		0.0	95.4	34			7.33	150	1.2
50	70.2	17.5	63.1	38	F2.000	----	0.00		-0.0
49	70.2	16.2	158.5		2.003		7.33	0.170	1.2
Pipe: 18		0.0	21.2	S8			2.08	150	1.0
49	70.2	16.2	16.5	37	F1.500	T: 8.4	8.40		-0.0
38	70.2	15.2	63.1		1.598		10.48	0.093	1.0
Pipe: 19		0.0	21.5	S7			7.42	150	0.1
38	70.2	15.2	-5.1		F1.500	T: 8.4	8.40		-0.0
37	70.2	15.1	16.5		1.598		15.82	0.008	0.1
Pipe: 20		0.0	21.5	S7			0.50	150	0.0
36	70.2	15.1	-16.5		F1.500	----	0.00		-0.0
37	70.2	15.1	5.1		1.598		0.50	0.001	0.0
Pipe: 21		0.0	20.3	S6			7.08	150	0.1
38	70.2	15.2	5.1	37	F1.500	----	0.00		-0.0
36	70.2	15.1	25.4		1.598		7.08	0.017	0.1
Pipe: 22		0.0	0.0				11.08	150	0.2
31	70.2	11.3	18.4	S5	F1.500	T: 8.4	8.40		-0.0
35	70.2	11.1	18.4		1.598		19.48	0.009	0.2
Pipe: 23		0.0	20.9	S4			1.12	150	1.9
49	70.2	16.2	74.4	33	F1.500	T: 8.4	8.40		-0.0
34	70.2	14.3	95.4		1.598		9.52	0.200	1.9
Pipe: 24		0.0	18.9	S3			8.67	150	2.2
34	70.2	14.3	55.5	32	F1.500	E: 9.0	9.00		-0.0
33	70.2	12.1	74.4		1.598		17.67	0.126	2.2
Pipe: 25		0.0	18.8	S2			8.25	150	0.6
33	70.2	12.1	36.8	31	F1.500	----	0.00		-0.0
32	70.2	11.5	55.5		1.598		8.25	0.073	0.6

Pipe Tag / Frm Node / To Node	El (ft)	K-fac / PT	Add Fl (q) / Tot.(Q)	Add Fl To Node/ Disch	Nom ID / Act ID	Fit: Eq.Ln. (ft.)	L / F / T	C / Pf/ft.	(Pt) (Pe) (Pf)
Pipe: 26		0.0	18.4	S1			6.00	150	0.2
32	70.2	11.5	18.4	35	F1.500	----	0.00		-0.0
31	70.2	11.3	36.8		1.598		6.00	0.034	0.2
Pipe: 27		5.60	27.0	Disch			0.83	150	0.6
41	70.2	24.0	0.0		F1.000	T: 6.0	6.00		-0.2
S11	69.8	23.3	27.0		1.101		6.83	0.119	0.8
Pipe: 28		5.60	27.1	Disch			0.83	150	0.6
40	70.2	24.0	0.0		F1.000	T: 6.0	6.00		-0.2
S10	69.8	23.4	27.1		1.101		6.83	0.119	0.8
Pipe: 29		5.60	26.2	Disch			4.41	150	2.6
39	70.2	24.5	0.0		F1.000	2E:14.0	20.00		-0.2
S9	69.8	22.0	26.2		1.101	T: 6.0	24.41	0.112	2.7
Pipe: 30		5.60	21.2	Disch			6.58	150	0.9
38	70.2	15.2	0.0		F1.000	E: 7.0	7.00		-0.2
S8	69.8	14.4	21.2		1.101		13.58	0.076	1.0
Pipe: 31		5.60	21.5	Disch			0.83	150	0.4
37	70.2	15.1	0.0		F1.000	T: 6.0	6.00		-0.2
S7	69.8	14.8	21.5		1.101		6.83	0.078	0.5
Pipe: 32		5.60	20.3	Disch			10.92	150	2.0
36	70.2	15.1	0.0		F1.000	2E:14.0	20.00		-0.2
S6	69.8	13.1	20.3		1.101	T: 6.0	30.92	0.070	2.2
Pipe: 33		5.60	18.4	Disch			1.83	150	0.3
35	70.2	11.1	0.0		F1.000	E: 7.0	7.00		-0.2
S5	69.8	10.8	18.4		1.101		8.83	0.058	0.5
Pipe: 34		5.60	20.9	Disch			0.83	150	0.3
34	70.2	14.3	0.0		F1.000	T: 6.0	6.00		-0.2
S4	69.8	14.0	20.9		1.101		6.83	0.074	0.5
Pipe: 35		5.60	18.9	Disch			1.33	150	0.7
33	70.2	12.1	0.0		F1.000	E: 7.0	13.00		-0.2
S3	69.8	11.4	18.9		1.101	T: 6.0	14.33	0.061	0.9
Pipe: 36		5.60	18.8	Disch			0.83	150	0.2
32	70.2	11.5	0.0		F1.000	T: 6.0	6.00		-0.2
S2	69.8	11.2	18.8		1.101		6.83	0.061	0.4
Pipe: 37		5.60	18.4	Disch			4.50	150	0.5
31	70.2	11.3	0.0		F1.000	E: 7.0	7.00		-0.2
S1	69.8	10.8	18.4		1.101		11.50	0.058	0.7

NOTES (HASS):

(1) Calculations were performed by the HASS 2023 D computer program in accordance with NFPA (2019) under license no. 65839843 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 0.002 gpm and a maximum imbalance at any node of 0.083 gpm.

(3) Total pressure at each node is used in balancing the system. Maximum water velocity is 16.1 ft/sec at pipe 17.

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

are automatically transferred from the calculation report.

(5) Available pressure at source node CITY under full flow conditions is 48.00 psi with a flow of 360.57 gpm.

(6) PIPE FITTINGS TABLE

User 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	20.00	6.00	22.00	12.00	2.00	20.00	20.00	20.00
	5.00								

PAGE: B MATERIAL: THNWL 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 NPTee
	F F45Ell								
2.157	6.00	12.00	3.00	14.00	8.00	1.00	12.00	12.00	12.00
	3.00								
3.260	10.00	20.00	7.00	22.00	14.00	1.00	18.00	18.00	20.00
	5.00								
4.260	13.00	26.00	8.00	29.00	16.00	3.00	26.00	26.00	26.00
	6.50								

DATE: 3/4/20251-2495 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\OFFICE.SDF
JOB TITLE:

PAGE: D MATERIAL: DIRON HWC: 140

Diameter (in)	Equivalent Fitting Lengths in Feet							
	E Ell	T Tee	L Lng	C Ell	B Chk	F Vly	G Gat	N Vlv
6.280	22.00	47.00	14.00	51.00	16.00	NPTee	5.00	47.00

Diameter (in)	Equivalent Fitting Lengths in Feet						
	F F45 Ell	E Ell	T Tee	R RunT	K Kplg	C Chk	G Vlv Gate
1.101	1.40	7.00	6.00	1.70	1.00	8.00	0.40
1.598	2.10	9.00	8.40	2.70	1.00	14.00	1.00
2.003	2.60	11.00	12.00	4.00	1.00	17.00	1.50

PATRIOT FIRE PROTECTION, INC
2707 70TH AVE E
TACOMA, WA 98424

HYDRAULIC CALCULATIONS

FOR

BPLC NORTH YARD BUILDING
UPPER OFFICE AREA

FILE NUMBER: 17-2495
DATE: MAR 4, 2025

-DESIGN DATA-

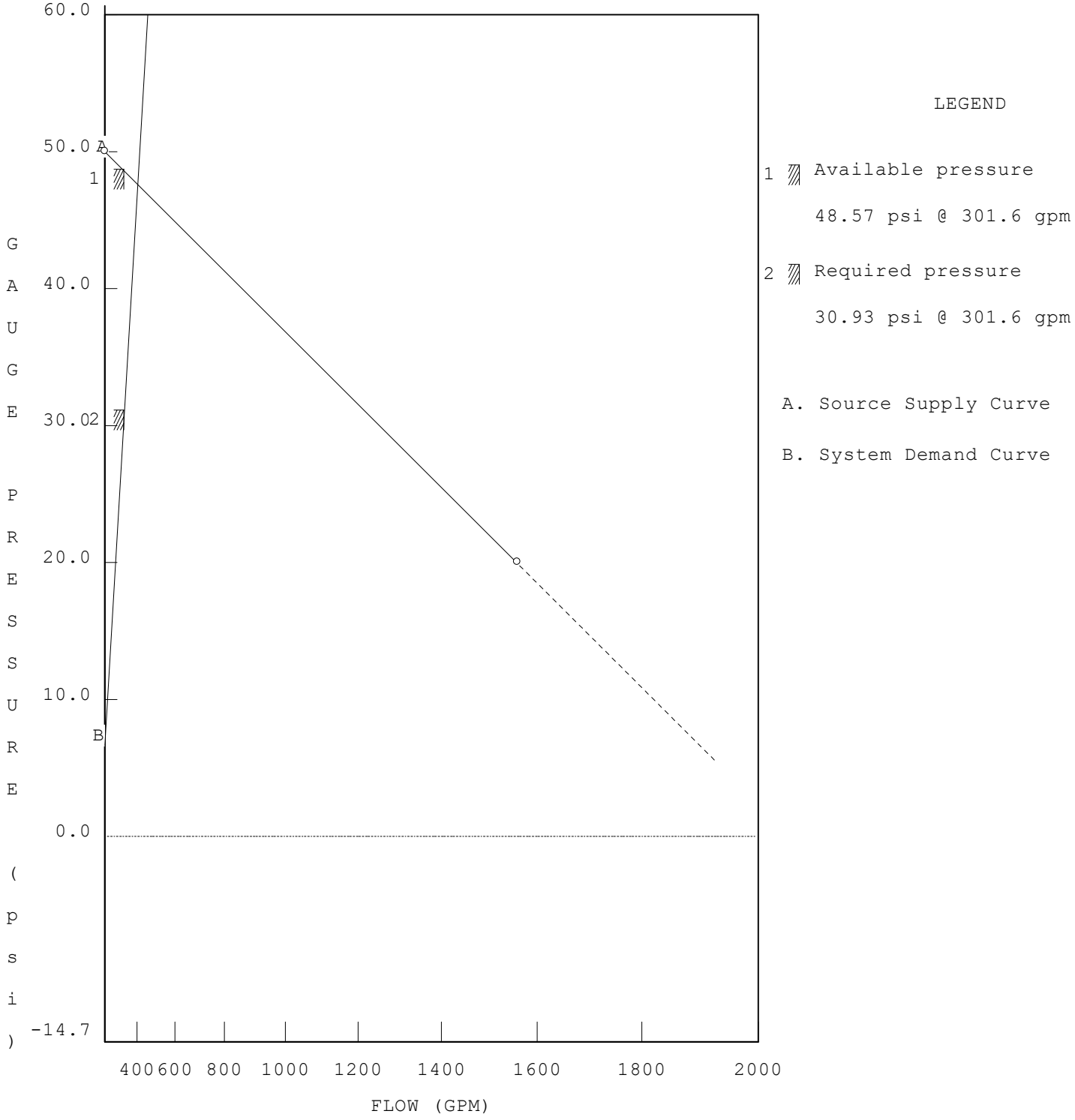
OCCUPANCY CLASSIFICATION:	LIGHT HAZARD
DENSITY:	.10 gpm/sq. ft.
AREA OF APPLICATION:	900 sq. ft.
COVERAGE PER SPRINKLER:	225 sq. ft. MAX
NUMBER OF SPRINKLERS CALCULATED:	12 sprinklers
TOTAL SPRINKLER WATER FLOW REQUIRED:	201.6 gpm
TOTAL WATER REQUIRED (including hose):	301.6 gpm
FLOW AND PRESSURE (@ BOR):	201.6 gpm @ 26.9 psi
SPRINKLER K-FACTOR:	5.6K
NAME OF CONTRACTOR:	PATRIOT FIRE PROTECTION, INC.
DESIGN/LAYOUT BY:	CLINT CARR
AUTHORITY HAVING JURISDICTION:	CITY OF PUYALLUP
CONTRACTOR CERTIFICATION NUMBER:	PATRIFP099CF

CALCULATIONS BY HASS COMPUTER PROGRAM (LICENSE # 65839843)
HRS SYSTEMS, INC.

DATE: 3/4/2025 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\OFFICE UPPER.SDF
JOB TITLE:

WATER SUPPLY ANALYSIS

Static: 50.00 psi Resid: 20.00 psi Flow: 1560.0 gpm



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

DATE: 3/4/2025 BPLC NORTH YARD\DOCUMENTS\HYDRAULIC CALCS\OFFICE UPPER.SDF
JOB TITLE:

NFPA WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	@ FLOW (GPM)	AVAIL. PRESS. (PSI)	@ TOTAL DEMAND (GPM)	REQ'D PRESS. (PSI)
CITY	50.0	20.0	1560.0	48.6	301.6	30.9

Available pressure is 17.6 psi (36%) greater than required pressure.

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	301.6 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	100.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	201.6 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
S20	78.0	K= 5.60	7.0	14.8
S21	78.0	K= 5.60	7.1	14.9
S22	78.0	K= 5.60	7.6	15.5
S23	78.0	K= 5.60	8.0	15.8
S24	78.0	K= 5.60	9.5	17.3
S25	78.0	K= 5.60	10.3	18.0
S26	78.0	K= 5.60	10.5	18.1
S27	78.0	K= 5.60	11.1	18.7
S28	78.0	K= 5.60	8.5	16.3
S29	78.0	K= 5.60	8.9	16.7
S30	78.0	K= 5.60	9.6	17.3
S31	78.0	K= 5.60	10.5	18.1
82	78.5	- - - -	10.6	- - -
81	78.5	- - - -	9.7	- - -
80	78.5	- - - -	9.0	- - -
79	78.5	- - - -	8.9	- - -
77	78.5	- - - -	11.7	- - -
76	78.5	- - - -	11.2	- - -
75	78.5	- - - -	11.1	- - -
74	78.5	- - - -	9.9	- - -
73	78.5	- - - -	8.8	- - -
71	78.5	- - - -	7.2	- - -
70	78.5	- - - -	7.0	- - -
92	76.9	- - - -	13.4	- - -
90	76.9	- - - -	13.7	- - -
63	76.9	- - - -	21.6	- - -
62	76.9	- - - -	16.0	- - -
61	78.5	- - - -	13.7	- - -
60	76.9	- - - -	13.7	- - -
58	77.2	- - - -	21.8	- - -
TOR	77.2	- - - -	22.1	- - -
BOR	66.3	- - - -	26.9	- - -
FLG	62.9	- - - -	30.0	- - -
HS	58.0	HOSE STREAM	32.4	100.0
CITY	63.0	SOURCE	30.9	301.6

NFPA PIPE DATA 5

Pipe Tag / Frm Node / To Node	El (ft)	K-fac / PT	Add Fl (q) / Tot.(Q)	Add Fl To Node/ Disch	Nom ID / Act ID	Fit: Eq.Ln. (ft.)	L / F / T	C / Pf/ft.	(Pt) / (Pe) / (Pf)
Pipe: 1	Source	100.0	Disch				236.83	140	-1.5
CITY	63.0	30.9	201.6		FLG D6.000	T:47.0	52.00		-2.2
HS	58.0	32.4	301.6		6.280	G: 5.0	288.83	0.002	0.7
Pipe: 2		0.0	0.0				152.85	140	2.4
HS	58.0	32.4	201.6		BOR D6.000	4E:88.0	98.00		2.1
FLG	62.9	30.0	201.6		6.280	2G:10.0	250.85	0.001	0.3
Pipe: 3		0.0	0.0				120.00	120	3.0
FLG	62.9	30.0	201.6		TOR A4.000	----	0.00		1.4
BOR	66.3	26.9	201.6		4.026		120.00	0.013	1.6
Pipe: 4		0.0	0.0				11.42	120	4.8
BOR	66.3	26.9	201.6	58	B4.000	----	0.00		4.7
TOR	77.2	22.1	201.6		4.260		11.42	0.010	0.1
Pipe: 6		0.0	0.0				11.08	120	0.2
TOR	77.2	22.1	201.6	63	B4.000	2F:13.0	13.00		-0.0
58	77.2	21.8	201.6		4.260		24.08	0.010	0.2
Pipe: 7		0.0	0.0				23.08	120	0.3
58	77.2	21.8	201.6	62	B4.000	2F:13.0	13.00		-0.1
63	76.9	21.6	201.6		4.260		36.08	0.010	0.4
Pipe: 8		0.0	68.5	92			14.08	120	5.6
63	76.9	21.6	133.1	61	B2.000	2F: 6.0	6.00		-0.0
62	76.9	16.0	201.6		2.157		20.08	0.279	5.6
Pipe: 9		0.0	54.8	77			6.38	120	2.3
62	76.9	16.0	78.3	60	B2.000	2F: 6.0	6.00		0.7
61	78.5	13.7	133.1		2.157		12.38	0.130	1.6
Pipe: 10		0.0	0.0				7.75	120	-0.0
61	78.5	13.7	78.3	74	B2.000	2F: 6.0	6.00		-0.7
60	76.9	13.7	78.3		2.157		13.75	0.049	0.7
Pipe: 11		0.0	0.0				1.58	120	2.5
62	76.9	16.0	68.5	82	A1.250	T: 6.0	6.00		-0.0
92	76.9	13.4	68.5		1.380		7.58	0.334	2.5
Pipe: 12		0.0	0.0				1.58	120	0.0
90	76.9	13.7	0.0		A1.250	T: 6.0	6.00		-0.0
60	76.9	13.7	0.0		1.380		7.58	0.000	0.0
Pipe: 13		0.0	50.4	81			2.83	150	2.8
92	76.9	13.4	18.1		F1.250	T: 7.3	7.30		0.7
82	78.5	10.6	68.5		1.394		10.13	0.210	2.1
Pipe: 14		0.0	33.1	80			8.00	150	1.0
82	78.5	10.6	17.3		F1.250	----	0.00		-0.0
81	78.5	9.7	50.4		1.394		8.00	0.119	1.0

Pipe Tag / Frm Node / To Node	El (ft)	K-fac / PT	Add Fl (q) / Tot.(Q)	Add Fl To Node/ Disch	Nom ID / Act ID	Fit: Eq.Ln. (ft.)	L / F / T	C / Pf/ft.	(Pt) (Pe) (Pf)
Pipe: 15		0.0	16.3	79			11.83	150	0.6
81	78.5	9.7	16.7		F1.250	----	0.00		-0.0
80	78.5	9.0	33.1		1.394		11.83	0.055	0.6
Pipe: 16		0.0	0.0				6.67	150	0.1
80	78.5	9.0	16.3		F1.250	----	0.00		-0.0
79	78.5	8.9	16.3		1.394		6.67	0.015	0.1
Pipe: 17		0.0	36.1	76			6.59	150	1.9
61	78.5	13.7	18.7		F1.250	T: 7.3	7.30		-0.0
77	78.5	11.7	54.8		1.394		13.89	0.139	1.9
Pipe: 19		0.0	18.0	75			8.83	150	0.6
77	78.5	11.7	18.1		F1.250	----	0.00		-0.0
76	78.5	11.2	36.1		1.394		8.83	0.064	0.6
Pipe: 20		0.0	0.0				6.75	150	0.1
76	78.5	11.2	18.0		F1.250	----	0.00		-0.0
75	78.5	11.1	18.0		1.394		6.75	0.018	0.1
Pipe: 21		0.0	61.0	73			4.42	150	3.8
60	76.9	13.7	17.3		F1.250	T: 7.3	7.30		0.7
74	78.5	9.9	78.3		1.394		11.72	0.269	3.2
Pipe: 22		0.0	31.2	S23			6.08	150	1.0
74	78.5	9.9	29.7	71	F1.250	----	0.00		-0.0
73	78.5	8.8	61.0		1.394		6.08	0.170	1.0
Pipe: 23		0.0	14.8	70			21.33	150	1.7
73	78.5	8.8	14.9		F1.250	2E:16.0	16.00		-0.0
71	78.5	7.2	29.7		1.394		37.33	0.045	1.7
Pipe: 24		0.0	0.0				9.33	150	0.1
71	78.5	7.2	14.8		F1.250	----	0.00		-0.0
70	78.5	7.0	14.8		1.394		9.33	0.012	0.1
Pipe: 25		5.60	18.1	Disch			0.50	150	0.2
82	78.5	10.6	0.0		F1.000	T: 6.0	6.00		-0.2
S31	78.0	10.5	18.1		1.101		6.50	0.057	0.4
Pipe: 26		5.60	17.3	Disch			0.50	150	0.1
81	78.5	9.7	0.0		F1.000	T: 6.0	6.00		-0.2
S30	78.0	9.6	17.3		1.101		6.50	0.052	0.3
Pipe: 27		5.60	16.7	Disch			0.50	150	0.1
80	78.5	9.0	0.0		F1.000	T: 6.0	6.00		-0.2
S29	78.0	8.9	16.7		1.101		6.50	0.049	0.3
Pipe: 28		5.60	16.3	Disch			1.00	150	0.4
79	78.5	8.9	0.0		F1.000	E: 7.0	13.00		-0.2
S28	78.0	8.5	16.3		1.101	T: 6.0	14.00	0.047	0.7

Pipe Tag / Frm Node / To Node	El (ft)	K-fac / PT	Add Fl (q) / Tot.(Q)	Add Fl To Node/ Disch	Nom ID / Act ID	Fit: Eq.Ln. (ft.)	L / F / T	C / Pf/ft.	(Pt) (Pe) (Pf)
Pipe: 30		5.60	18.7	Disch			1.00	150	0.6
77	78.5	11.7	0.0		F1.000	E: 7.0	13.00		-0.2
S27	78.0	11.1	18.7		1.101	T: 6.0	14.00	0.060	0.8
Pipe: 31		5.60	18.1	Disch			3.00	150	0.7
76	78.5	11.2	0.0		F1.000	E: 7.0	13.00		-0.2
S26	78.0	10.5	18.1		1.101	T: 6.0	16.00	0.057	0.9
Pipe: 32		5.60	18.0	Disch			3.00	150	0.7
75	78.5	11.1	0.0		F1.000	2E:14.0	14.00		-0.2
S25	78.0	10.3	18.0		1.101		17.00	0.056	1.0
Pipe: 33		5.60	17.3	Disch			5.00	150	0.4
74	78.5	9.9	0.0		F1.000	T: 6.0	6.00		-0.2
S24	78.0	9.5	17.3		1.101		11.00	0.052	0.6
Pipe: 34		5.60	15.8	Disch			5.00	120	0.9
73	78.5	8.8	15.5		A1.250	E: 3.0	9.00		-0.2
S23	78.0	8.0	31.2		1.380	T: 6.0	14.00	0.078	1.1
Pipe: 35		5.60	15.5	Disch			9.75	120	0.3
S23	78.0	8.0	0.0		A1.250	2E: 6.0	6.00		-0.0
S22	78.0	7.6	15.5		1.380		15.75	0.021	0.3
Pipe: 36		5.60	14.9	Disch			0.50	150	0.0
71	78.5	7.2	0.0		F1.000	T: 6.0	6.00		-0.2
S21	78.0	7.1	14.9		1.101		6.50	0.040	0.3
Pipe: 37		5.60	14.8	Disch			0.50	150	0.0
70	78.5	7.0	0.0		F1.000	T: 6.0	6.00		-0.2
S20	78.0	7.0	14.8		1.101		6.50	0.039	0.3

NOTES (HASS):

(1) Calculations were performed by the HASS 2023 D computer program in accordance with NFPA (2019) under license no. 65839843 granted by

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(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 0.114 gpm.

(3) Total pressure at each node is used in balancing the system. Maximum water velocity is 17.7 ft/sec at pipe 8.

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

are automatically transferred from the calculation report.

(5) Available pressure at source node CITY under full flow conditions is 47.94 psi with a flow of 366.51 gpm.

(6) PIPE FITTINGS TABLE

User 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								
1.380	3.00 1.50	6.00	2.00	7.00	6.00	1.00	10.00	10.00	6.00
4.026	10.00 5.00	20.00	6.00	22.00	12.00	2.00	20.00	20.00	20.00

PAGE: B MATERIAL: THNWL 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 NPTee
	F F45Ell								
2.157	6.00 3.00	12.00	3.00	14.00	8.00	1.00	12.00	12.00	12.00
4.260	13.00 6.50	26.00	8.00	29.00	16.00	3.00	26.00	26.00	26.00

PAGE: D MATERIAL: DIRON HWC: 140

Diameter (in)	Equivalent Fitting Lengths in Feet							
	E Ell	T Tee	L LngEll	C ChkVlv	B BfyVlv	G GatVlv	N NPTee	F F45Ell
6.280	22.00	47.00	14.00	51.00	16.00	5.00	47.00	11.00

PAGE: F MATERIAL: CPVC HWC: 150

Diameter (in)	Equivalent Fitting Lengths in Feet						
	F F45	E Ell	T Tee	R RunT	K Kplg	C ChkVlv	G Gate
1.101	1.40	7.00	6.00	1.70	1.00	8.00	0.40
1.394	1.80	8.00	7.30	2.30	1.00	11.00	0.80