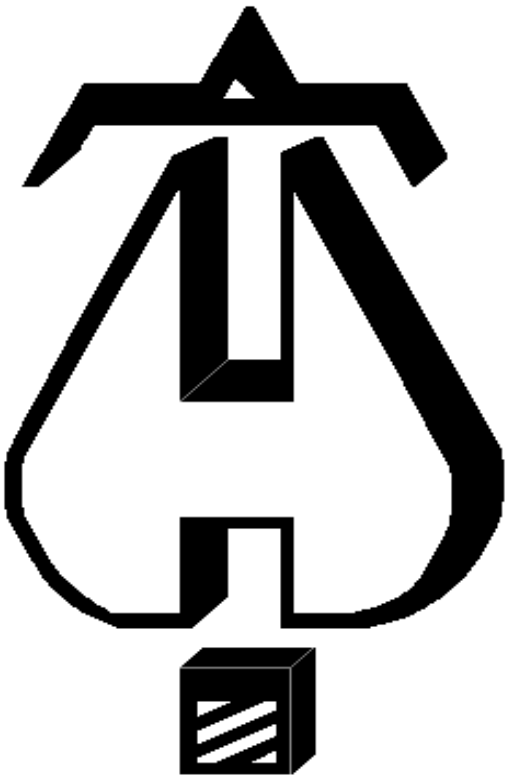


. . . Fire Protection by Computer Design

SPRINKLER SYSTEMS INC.
4 AVON STREET
P O BOX 1285
LEWISTON, ME. 04243
207-782-0104

Job Name	:	WEST END APTS. WET SYSTEM AREA 1
Building	:	NEW
Location	:	44 Pine Street Portland, Maine
System	:	1 Wet
Contract	:	13-058
Data File	:	West End Apts Wet System Area 1.WXF

Hydraulic Design Information Sheet

Name - West End Apartments Wet System Area 1 Date - 05/21/14
Location - 44 Pine Street Portland, Maine
Building - NEW System No. - 1 Wet
Contractor - SPRINKLER SYSTEMS INC. Contract No. - 13-058
Calculated By - CDS Drawing No. - 1-4 OF 4
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - Retail Space

SYSTEM DESIGN

(X) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 (x) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other
Specific Ruling Made By Date

Area of Sprinkler Operation - 900	System Type	Sprinkler/Nozzle
Density - .20	(x) Wet	Make RELIABLE
Area Per Sprinkler - 115	( ) Dry	Model F1FR56
Elevation at Highest Outlet - 153	( ) Deluge	Size 1/2" x 1/2"
Hose Allowance - Inside - 0	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance - 0	( ) Other	Temp.Rat.155 DEG.
Hose Allowance - Outside - 250		

Note

Calculation Summary: Flow Required - 258.36 Press Required - 38.406 AT BASE
C-Factor Used: 120 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - 04/25/14		Cap. -
Time of Test - AM	Rated Cap.-	Elev.-
Static Press - 54	@ Press -	
Residual Press - 40	Elev. -	Well
Flow - 838		Proof Flow
Elevation - 143.0'		

Location - BRACKETT STREET

Source of Information - OWNER AND WATER DISTRICT

COMMODITY STORAGE

Commodity Class Location
Storage Ht. Area Aisle W.
Storage Method: Solid Piled % Palletized % Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non
( ) Mult. Row		( ) Open Shelf	

RACK STORAGE

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP	0.0	5.6	16.87	na	23.0	0.2	115	7.0
14	153.0	K = K @ ARM	20.0	na	23.99			
12	153.0	K = K @ ARM	19.99	na	23.98			
13	153.0		20.25	na				
15	153.0		20.25	na				
10	153.0	K = K @ ARM	19.59	na	23.74			
7	153.0	K = K @ ARM	19.11	na	23.45			
8	153.0	K = K @ ARM	19.15	na	23.48			
9	153.0	K = K @ ARM	19.3	na	23.57			
5	153.0	K = K @ ARM	19.54	na	23.71			
1	153.0	K = K @ ARM	18.39	na	23.0			
2	153.0	K = K @ ARM	18.43	na	23.03			
3	153.0	K = K @ ARM	18.57	na	23.12			
4	153.0	K = K @ ARM	18.88	na	23.31			
6	153.0		19.82	na				
11	153.0		19.88	na				
16	153.0		20.27	na				
17	164.25		16.28	na				
18	164.25		19.5	na				
19	164.25		20.67	na				
20	152.75		26.07	na				
TWR	152.75		26.84	na				
TAV	149.0		31.53	na				
BWR	146.0		33.67	na				
BKFL	146.0		34.14	na				
BASE	143.0		38.41	na				
HOSE	143.0		38.69	na	250.0			
TEST	143.0		39.04	na				

The maximum velocity is 8.54 and it occurs in the pipe between nodes TYP and ARM

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
TYP	23.00	1.049	1E	2.0	2.000	16.869		K Factor = 5.60
to		120.0	1T	5.0	7.000	0.0		
ARM	23.0	0.1684		0.0	9.000	1.516		Vel = 8.54
	0.0							
	23.00					18.385		K Factor = 5.36
14	23.99	1.682	1T	9.9	3.750	19.997		K Factor @ node ARM
to		120.0		0.0	9.900	0.0		
15	23.99	0.0182		0.0	13.650	0.249		Vel = 3.46
	0.0							
	23.99					20.246		K Factor = 5.33
12	23.98	1.682	1T	9.9	4.250	19.988		K Factor @ node ARM
to		120.0		0.0	9.900	0.0		
13	23.98	0.0182		0.0	14.150	0.258		Vel = 3.46
13	0.0	4.26		0.0	1.000	20.246		
to		120.0		0.0	0.0	0.0		
15	23.98	0.0		0.0	1.000	0.0		Vel = 0.54
15	23.99	4.26	1T	26.334	2.250	20.246		
to		120.0		0.0	26.334	0.0		
16	47.97	0.0007		0.0	28.584	0.021		Vel = 1.08
	0.0							
	47.97					20.267		K Factor = 10.66
10	23.74	1.682	1T	9.9	6.250	19.586		K Factor @ node ARM
to		120.0		0.0	9.900	0.0		
11	23.74	0.0180		0.0	16.150	0.290		Vel = 3.43
	0.0							
	23.74					19.876		K Factor = 5.32
7	23.45	2.157		0.0	8.000	19.111		K Factor @ node ARM
to		120.0		0.0	0.0	0.0		
8	23.45	0.0052		0.0	8.000	0.042		Vel = 2.06
8	23.47	2.157		0.0	8.000	19.153		K Factor @ node ARM
to		120.0		0.0	0.0	0.0		
9	46.92	0.0189		0.0	8.000	0.151		Vel = 4.12
9	23.57	2.157	1T	12.307	2.000	19.304		K Factor @ node ARM
to		120.0		0.0	12.307	0.0		
11	70.49	0.0400		0.0	14.307	0.572		Vel = 6.19
	0.0							
	70.49					19.876		K Factor = 15.81
5	23.71	1.682	1T	9.9	6.250	19.535		K Factor @ node ARM
to		120.0		0.0	9.900	0.0		
6	23.71	0.0179		0.0	16.150	0.289		Vel = 3.42
	0.0							
	23.71					19.824		K Factor = 5.33
1	23.00	2.157		0.0	8.000	18.385		K Factor @ node ARM
to		120.0		0.0	0.0	0.0		
2	23.0	0.0051		0.0	8.000	0.041		Vel = 2.02

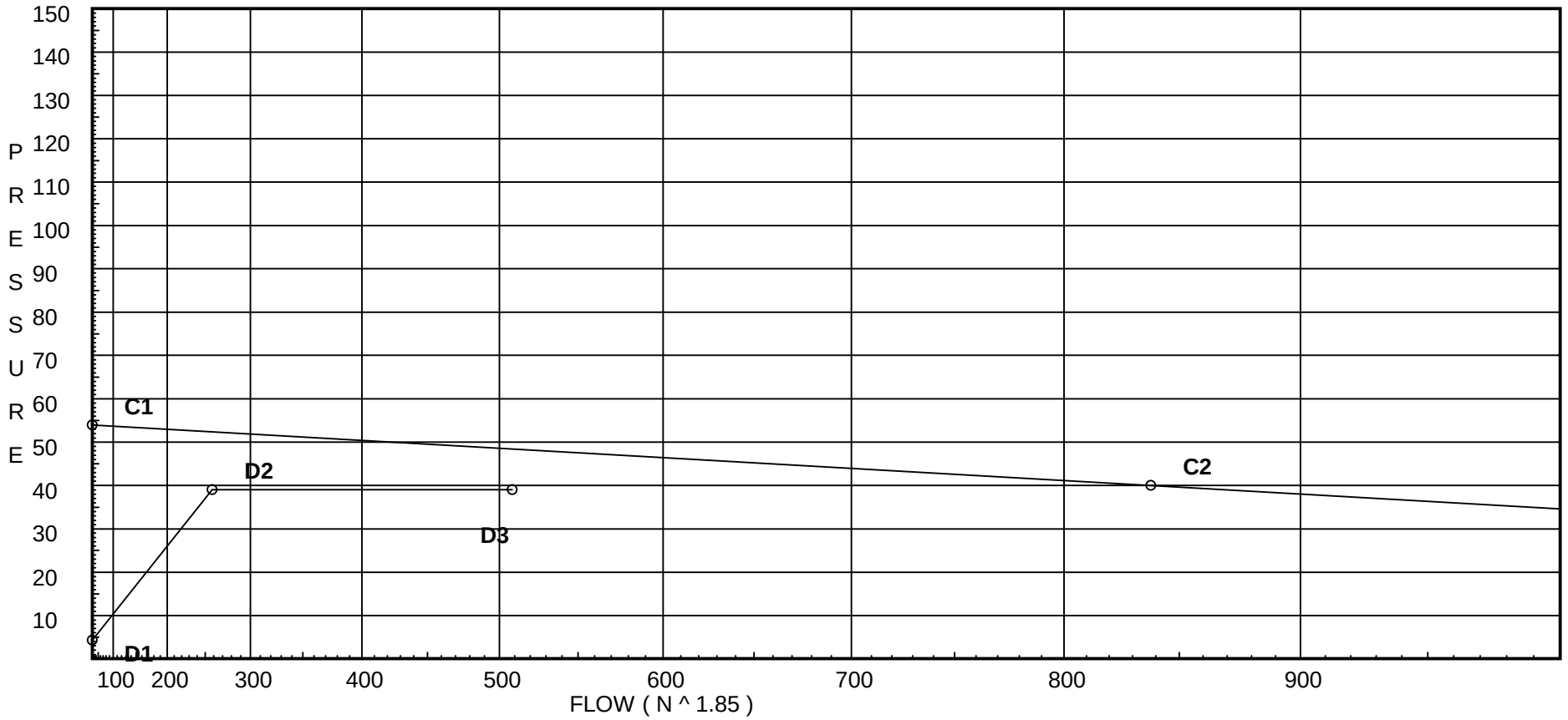
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
2	23.03	2.157		0.0	8.000	18.426		K Factor @ node ARM
to		120.0		0.0	0.0	0.0		
3	46.03	0.0181		0.0	8.000	0.145		Vel = 4.04
3	23.11	2.157		0.0	8.000	18.571		K Factor @ node ARM
to		120.0		0.0	0.0	0.0		
4	69.14	0.0386		0.0	8.000	0.309		Vel = 6.07
4	23.31	2.157	1T	12.307	2.000	18.880		K Factor @ node ARM
to		120.0		0.0	12.307	0.0		
6	92.45	0.0660		0.0	14.307	0.944		Vel = 8.12
6	23.71	4.26		0.0	14.000	19.824		
to		120.0		0.0	0.0	0.0		
11	116.16	0.0037		0.0	14.000	0.052		Vel = 2.61
11	94.23	4.26	1T	26.334	9.250	19.876		
to		120.0		0.0	26.334	0.0		
16	210.39	0.0110		0.0	35.584	0.391		Vel = 4.74
16	47.97	4.26	1E	13.167	15.500	20.267		
to		120.0	1T	26.334	39.501	-4.872		
17	258.36	0.0161		0.0	55.001	0.883		Vel = 5.82
17	0.0	4.26	2E	26.334	148.000	16.278		
to		120.0	1T	26.334	52.668	0.0		
18	258.36	0.0161		0.0	200.668	3.225		Vel = 5.82
18	0.0	4.26	3E	39.501	33.000	19.503		
to		120.0		0.0	39.501	0.0		
19	258.36	0.0161		0.0	72.501	1.165		Vel = 5.82
19	0.0	4.26	1E	13.167	12.750	20.668		
to		120.0		0.0	13.167	4.981		
20	258.36	0.0161		0.0	25.917	0.416		Vel = 5.82
20	0.0	4.26	1E	13.167	9.000	26.065		
to		120.0	1T	26.334	39.501	0.0		
TWR	258.36	0.0161		0.0	48.501	0.780		Vel = 5.82
TWR	0.0	4.26	1Fsp	0.0	3.500	26.845		
to		120.0		0.0	0.0	4.624		* Fixed loss = 3
TAV	258.36	0.0160		0.0	3.500	0.056		Vel = 5.82
TAV	0.0	4.26	1B	15.8	1.000	31.525		
to		120.0	1T	26.334	51.351	1.299		
BWR	258.36	0.0161	1Eql	9.217	52.351	0.842		Vel = 5.82
BWR	0.0	4.26	1T	26.334	3.000	33.666		
to		120.0		0.0	26.334	0.0		
BKFL	258.36	0.0161		0.0	29.334	0.471		Vel = 5.82
BKFL	0.0	4.026	1Zac	0.0	1.000	34.137		
to		120.0		0.0	0.0	4.247		* Fixed loss = 2.948
BASE	258.36	0.0220		0.0	1.000	0.022		Vel = 6.51
BASE	0.0	6.16	1E	20.084	75.000	38.406		
to		140.0	1T	43.037	67.425	0.0		
HOSE	258.36	0.0020	1G	4.304	142.425	0.285		Vel = 2.78

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
HOSE	250.00	6.16		0.0	50.000	38.691		Qa = 250		
to		140.0		0.0	0.0	0.0				
TEST	508.36	0.0070		0.0	50.000	0.351		Vel = 5.47		
	0.0									
	508.36					39.042		K Factor = 81.36		

City Water Supply:
- C1 - Static Pressure : 54
- C2 - Residual Pressure: 40
- C2 - Residual Flow : 838

Demand:

D1 - Elevation	:	4.331
D2 - System Flow	:	258.356
D2 - System Pressure	:	39.042
Hose (Demand)	:	250
D3 - System Demand	:	508.356
Safety Margin	:	9.405



Hydraulic Design Information Sheet

Name - West End Apartments Wet System Area 2 Date - 05/21/14
Location - 44 Pine Street Portland, Maine
Building - NEW System No. - 1 Wet
Contractor - SPRINKLER SYSTEMS INC. Contract No. - 13-058
Calculated By - CDS Drawing No. - 1-4 OF 4
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - Residential

SYSTEM DESIGN

( ) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other NFPA 13R
Specific Ruling Made By Date

Area of Sprinkler Operation	- 3 Heads	System Type	Sprinkler/Nozzle
Density	- .05	(x) Wet	Make RELIABLE
Area Per Sprinkler	- 288	( ) Dry	Model F1RES44
Elevation at Highest Outlet	- 184	( ) Deluge	Size 3/8"" x 1/2"
Hose Allowance - Inside	- 0	( ) Preaction	K-Factor 4.4
Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.155 DEG.
Hose Allowance - Outside	- 0		

Note

Calculation Summary: Flow Required - 54.09 Press Required - 48.878 AT BASE
C-Factor Used: 150 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:	
Date of Test	- 04/25/14			Cap. -	
Time of Test	- AM	Rated Cap.-		Elev.-	
Static Press	- 54	@ Press	-		
Residual Press	- 40	Elev.	-		Well
Flow	- 838				Proof Flow
Elevation	- 143.0'				

Location - BRACKETT STREET

Source of Information - OWNER AND WATER DISTRICT

COMMODITY STORAGE

Commodity		Class		Location	
Storage Ht.		Area		Aisle W.	
Storage Method:	Solid Piled	%	Palletized	%	Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.	
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non	
( ) Mult. Row		( ) Open Shelf		

RACK STORAGE

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
401	184.0	4.4	16.57	na	17.91	0.05	256	13.3
401A	174.5		23.0	na				
403	184.0	4.4	17.01	na	18.15	0.05	256	13.3
402	184.0	4.4	16.8	na	18.03	0.05	288	16.8
403T	184.0		17.61	na				
403A	174.5		23.32	na				
305	174.5		23.44	na				
306	174.5		24.07	na				
319	174.5		25.51	na				
320	174.5		26.72	na				
321	174.5		27.04	na				
424T	174.5		27.33	na				
3A	174.5		28.0	na				
19	164.25		32.69	na				
20	152.75		37.69	na				
TWR	152.75		37.74	na				
TAV	149.0		42.37	na				
BWR	146.0		43.71	na				
BKFL	146.0		43.74	na				
BASE	143.0		48.88	na				
HOSE	143.0		48.89	na				
TEST	143.0		48.9	na				

The maximum velocity is 7.61 and it occurs in the pipe between nodes 403T and 403A

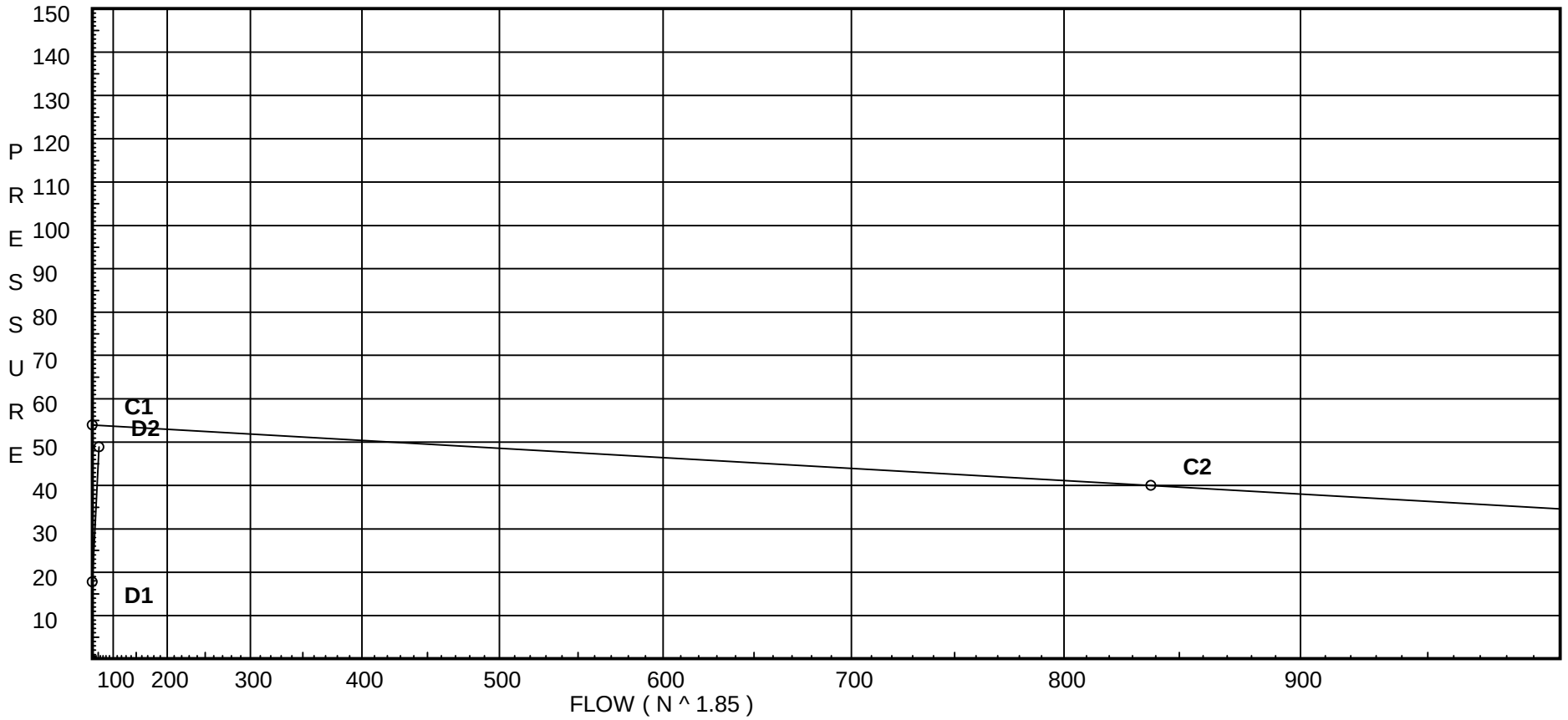
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
401	17.91	1.101	2T	19.125	15.000	16.565		K Factor = 4.40
to		150.0	2E	7.65	26.776	4.114		
401A	17.91	0.0555		0.0	41.776	2.317		Vel = 6.04
401A	0.0	1.394	1T	9.523	15.500	22.996		
to		150.0		0.0	9.523	0.0		
305	17.91	0.0176		0.0	25.023	0.440		Vel = 3.76
	0.0							
	17.91					23.436		K Factor = 3.70
403	18.15	1.101	1T	9.563	1.000	17.008		K Factor = 4.40
to		150.0		0.0	9.562	0.0		
403T	18.15	0.0568		0.0	10.562	0.600		Vel = 6.12
	0.0							
	18.15					17.608		K Factor = 4.33
402	18.03	1.101	1E	3.825	1.000	16.800		K Factor = 4.40
to		150.0	1T	9.563	13.387	0.0		
403T	18.03	0.0562		0.0	14.387	0.808		Vel = 6.08
403T	18.15	1.394	1E	4.762	10.500	17.608		
to		150.0	1T	9.523	14.284	4.114		
403A	36.18	0.0646		0.0	24.784	1.601		Vel = 7.61
403A	0.0	2.003		0.0	10.250	23.323		
to		150.0		0.0	0.0	0.0		
305	36.18	0.0110		0.0	10.250	0.113		Vel = 3.68
305	17.91	2.003	1T	12.965	14.250	23.436		
to		150.0		0.0	12.965	0.0		
306	54.09	0.0233		0.0	27.215	0.633		Vel = 5.51
306	0.0	2.157		0.0	59.000	24.069		
to		120.0		0.0	0.0	0.0		
319	54.09	0.0245		0.0	59.000	1.445		Vel = 4.75
319	0.0	2.157	1T	12.307	37.000	25.514		
to		120.0		0.0	12.307	0.0		
320	54.09	0.0245		0.0	49.307	1.208		Vel = 4.75
320	0.0	2.157	1E	6.153	6.750	26.722		
to		120.0		0.0	6.153	0.0		
321	54.09	0.0245		0.0	12.903	0.316		Vel = 4.75
321	0.0	2.157		0.0	12.000	27.038		
to		120.0		0.0	0.0	0.0		
424T	54.09	0.0245		0.0	12.000	0.294		Vel = 4.75
424T	0.0	2.157	2E	12.307	15.000	27.332		
to		120.0		0.0	12.307	0.0		
3A	54.09	0.0245		0.0	27.307	0.669		Vel = 4.75
3A	0.0	2.157		0.0	10.250	28.001		
to		120.0		0.0	0.0	4.439		
19	54.09	0.0245		0.0	10.250	0.251		Vel = 4.75
19	0.0	4.26	1E	13.167	12.750	32.691		
to		120.0		0.0	13.167	4.981		
20	54.09	0.0009		0.0	25.917	0.023		Vel = 1.22

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
20	0.0	4.26	1E	13.167	9.000	37.695		
to		120.0	1T	26.334	39.501	0.0		
TWR	54.09	0.0009		0.0	48.501	0.043		Vel = 1.22
TWR	0.0	4.26	1Fsp	0.0	3.500	37.738		
to		120.0		0.0	0.0	4.624		* Fixed loss = 3
TAV	54.09	0.0009		0.0	3.500	0.003		Vel = 1.22
TAV	0.0	4.26	1B	15.8	1.000	42.365		
to		120.0	1T	26.334	51.351	1.299		
BWR	54.09	0.0009	1Eql	9.217	52.351	0.047		Vel = 1.22
BWR	0.0	4.26	1T	26.334	3.000	43.711		
to		120.0		0.0	26.334	0.0		
BKFL	54.09	0.0009		0.0	29.334	0.026		Vel = 1.22
BKFL	0.0	4.026	1Zac	0.0	1.000	43.737		
to		120.0		0.0	0.0	5.139		* Fixed loss = 3.84
BASE	54.09	0.0020		0.0	1.000	0.002		Vel = 1.36
BASE	0.0	6.16	1E	20.084	75.000	48.878		
to		140.0	1T	43.037	67.425	0.0		
HOSE	54.09	0.0001	1G	4.304	142.425	0.016		Vel = 0.58
HOSE	0.0	6.16		0.0	50.000	48.894		
to		140.0		0.0	0.0	0.0		
TEST	54.09	0.0001		0.0	50.000	0.005		Vel = 0.58
	0.0							
	54.09					48.899		K Factor = 7.74

City Water Supply:
- C1 - Static Pressure : 54
- C2 - Residual Pressure: 40
- C2 - Residual Flow : 838

Demand:

D1 - Elevation	:	17.757
D2 - System Flow	:	54.089
D2 - System Pressure	:	48.899
Hose (Demand)	:	
D3 - System Demand	:	54.089
Safety Margin	:	5.013



Hydraulic Design Information Sheet

Name - West End Apartments Wet System Area 3 Date - 05/21/14
Location - 44 Pine Street Portland, Maine
Building - NEW System No. - 1 Wet
Contractor - SPRINKLER SYSTEMS INC. Contract No. - 13-058
Calculated By - CDS Drawing No. - 1-4 OF 4
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - Residential

SYSTEM

( ) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other NFPA 13R
Specific Ruling Made By Date

DESIGN

Area of Sprinkler Operation	- 4 Heads	System Type	Sprinkler/Nozzle
Density	- .05	(x) Wet	Make RELIABLE
Area Per Sprinkler	- 256	( ) Dry	Model F1RES44
Elevation at Highest Outlet	- 184	( ) Deluge	Size 3/8" x 1/2"
Hose Allowance - Inside	- 0	( ) Preaction	K-Factor 4.4
Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.155 DEG.
Hose Allowance - Outside	- 0		

Note

Calculation Summary: Flow Required - 66.54 Press Required - 47.046 AT BASE
C-Factor Used: 150 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:	
Date of Test	- 04/25/14			Cap. -	
Time of Test	- AM	Rated Cap.-		Elev.-	
Static Press	- 54	@ Press	-		
Residual Press	- 40	Elev.	-		Well
Flow	- 838				Proof Flow
Elevation	- 143.0'				

Location - BRACKETT STREET

Source of Information - OWNER AND WATER DISTRICT

COMMODITY STORAGE

Commodity		Class		Location	
Storage Ht.		Area		Aisle W.	
Storage Method:	Solid Piled	%	Palletized	%	Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.	
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non	
( ) Mult. Row		( ) Open Shelf		

RACK STORAGE

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
407	184.0	4.4	13.9	na	16.4	0.05	256	13.3
408	174.5		19.37	na				
405	184.0	4.4	13.47	na	16.15	0.05	256	13.3
406	184.0	4.4	13.3	na	16.05	0.05	256	13.3
406T	184.0		13.95	na				
406A	174.5		19.26	na				
313	174.5		19.72	na				
314	174.5		20.07	na				
316	174.5		20.09	na				
411T	174.5		21.12	na				
317	174.5		22.14	na				
318	174.5		22.43	na				
409	184.0	4.4	16.63	na	17.95	0.05	256	13.3
410	174.5		22.16	na				
410T	174.5		22.6	na				
306	174.5		22.68	na				
319	174.5		22.86	na				
320	174.5		24.63	na				
321	174.5		25.09	na				
424T	174.5		25.52	na				
3A	174.5		26.51	na				
19	164.25		31.31	na				
20	152.75		36.33	na				
TWR	152.75		36.39	na				
TAV	149.0		41.02	na				
BWR	146.0		42.39	na				
BKFL	146.0		42.43	na				
BASE	143.0		47.05	na				
HOSE	143.0		47.07	na				
TEST	143.0		47.08	na				

The maximum velocity is 6.77 and it occurs in the pipe between nodes 406T and 406A

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
407	16.40	1.101	1E	3.825	15.500	13.895		K Factor = 4.40
to		150.0	1T	9.563	13.387	4.114		
408	16.4	0.0471		0.0	28.887	1.362		Vel = 5.53
408	0.0	1.101	1T	9.563	5.750	19.371		
to		150.0		0.0	9.562	0.0		
316	16.4	0.0472		0.0	15.312	0.722		Vel = 5.53
	0.0							
	16.40					20.093		K Factor = 3.66
405	16.15	1.101	1T	9.563	1.000	13.468		K Factor = 4.40
to		150.0		0.0	9.562	0.0		
406T	16.15	0.0457		0.0	10.562	0.483		Vel = 5.44
	0.0							
	16.15					13.951		K Factor = 4.32
406	16.05	1.101	1E	3.825	1.000	13.300		K Factor = 4.40
to		150.0	1T	9.563	13.387	0.0		
406T	16.05	0.0452		0.0	14.387	0.651		Vel = 5.41
406T	16.14	1.394	2E	9.523	13.500	13.951		
to		150.0		0.0	9.523	4.114		
406A	32.19	0.0521		0.0	23.023	1.199		Vel = 6.77
406A	0.0	1.394		0.0	8.750	19.264		
to		150.0		0.0	0.0	0.0		
313	32.19	0.0520		0.0	8.750	0.455		Vel = 6.77
313	0.0	1.598		0.0	13.000	19.719		
to		150.0		0.0	0.0	0.0		
314	32.19	0.0267		0.0	13.000	0.347		Vel = 5.15
314	0.0	1.598		0.0	1.000	20.066		
to		150.0		0.0	0.0	0.0		
316	32.19	0.0270		0.0	1.000	0.027		Vel = 5.15
316	16.41	2.003		0.0	54.000	20.093		
to		150.0		0.0	0.0	0.0		
411T	48.6	0.0191		0.0	54.000	1.030		Vel = 4.95
411T	0.0	2.003	1T	12.965	40.500	21.123		
to		150.0		0.0	12.965	0.0		
317	48.6	0.0191		0.0	53.465	1.020		Vel = 4.95
317	0.0	2.003		0.0	15.000	22.143		
to		150.0		0.0	0.0	0.0		
318	48.6	0.0191		0.0	15.000	0.286		Vel = 4.95
318	0.0	2.003	1T	12.965	9.500	22.429		
to		150.0		0.0	12.965	0.0		
319	48.6	0.0191		0.0	22.465	0.428		Vel = 4.95
	0.0							
	48.60					22.857		K Factor = 10.17
409	17.95	1.101	1E	3.825	12.000	16.634		K Factor = 4.40
to		150.0	1T	9.563	13.387	4.114		
410	17.95	0.0557		0.0	25.387	1.414		Vel = 6.05

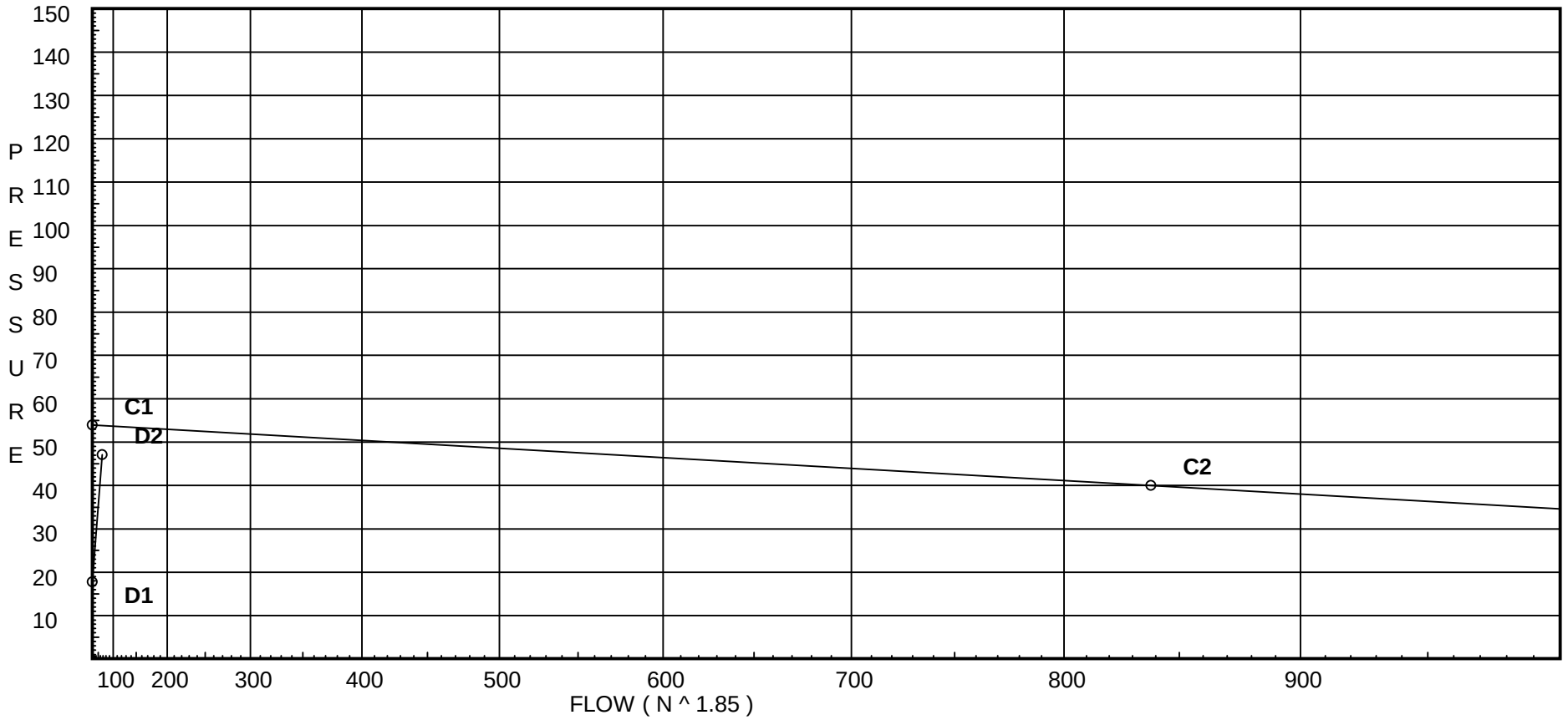
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
410	0.0	1.394	1E	4.762	10.500	22.162		
to		150.0	1T	9.523	14.284	0.0		
410T	17.95	0.0177		0.0	24.784	0.438		Vel = 3.77
410T	0.0	2.157		0.0	24.000	22.600		
to		120.0		0.0	0.0	0.0		
306	17.95	0.0032		0.0	24.000	0.076		Vel = 1.58
306	0.0	2.157		0.0	57.000	22.676		
to		120.0		0.0	0.0	0.0		
319	17.95	0.0032		0.0	57.000	0.181		Vel = 1.58
319	48.59	2.157	1T	12.307	37.000	22.857		
to		120.0		0.0	12.307	0.0		
320	66.54	0.0359		0.0	49.307	1.772		Vel = 5.84
320	0.0	2.157	1E	6.153	6.750	24.629		
to		120.0		0.0	6.153	0.0		
321	66.54	0.0360		0.0	12.903	0.464		Vel = 5.84
321	0.0	2.157		0.0	12.000	25.093		
to		120.0		0.0	0.0	0.0		
424T	66.54	0.0359		0.0	12.000	0.431		Vel = 5.84
424T	0.0	2.157	2E	12.307	15.000	25.524		
to		120.0		0.0	12.307	0.0		
3A	66.54	0.0359		0.0	27.307	0.981		Vel = 5.84
3A	0.0	2.157		0.0	10.250	26.505		
to		120.0		0.0	0.0	4.439		
19	66.54	0.0360		0.0	10.250	0.369		Vel = 5.84
19	0.0	4.26	1E	13.167	12.750	31.313		
to		120.0		0.0	13.167	4.981		
20	66.54	0.0013		0.0	25.917	0.033		Vel = 1.50
20	0.0	4.26	1E	13.167	9.000	36.327		
to		120.0	1T	26.334	39.501	0.0		
TWR	66.54	0.0013		0.0	48.501	0.064		Vel = 1.50
TWR	0.0	4.26	1Fsp	0.0	3.500	36.391		
to		120.0		0.0	0.0	4.624		* Fixed loss = 3
TAV	66.54	0.0011		0.0	3.500	0.004		Vel = 1.50
TAV	0.0	4.26	1B	15.8	1.000	41.019		
to		120.0	1T	26.334	51.351	1.299		
BWR	66.54	0.0013	1Eql	9.217	52.351	0.069		Vel = 1.50
BWR	0.0	4.26	1T	26.334	3.000	42.387		
to		120.0		0.0	26.334	0.0		
BKFL	66.54	0.0013		0.0	29.334	0.038		Vel = 1.50
BKFL	0.0	4.026	1Zac	0.0	1.000	42.425		
to		120.0		0.0	0.0	4.619		* Fixed loss = 3.32
BASE	66.54	0.0020		0.0	1.000	0.002		Vel = 1.68
BASE	0.0	6.16	1E	20.084	75.000	47.046		
to		140.0	1T	43.037	67.425	0.0		
HOSE	66.54	0.0002	1G	4.304	142.425	0.024		Vel = 0.72

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
HOSE	0.0	6.16		0.0	50.000	47.070				
to		140.0		0.0	0.0	0.0				
TEST	66.54	0.0002		0.0	50.000	0.008		Vel = 0.72		
	0.0									
	66.54					47.078		K Factor = 9.70		

City Water Supply:
- C1 - Static Pressure : 54
- C2 - Residual Pressure: 40
- C2 - Residual Flow : 838

Demand:

D1 - Elevation	:	17.757
D2 - System Flow	:	66.541
D2 - System Pressure	:	47.078
Hose (Demand)	:	
D3 - System Demand	:	66.541
Safety Margin	:	6.793



Hydraulic Design Information Sheet

Name - West End Apartments Wet System Area 4 Date - 05/21/14
Location - 44 Pine Street Portland, Maine
Building - NEW System No. - 1 Wet
Contractor - SPRINKLER SYSTEMS INC. Contract No. - 13-058
Calculated By - CDS Drawing No. - 1-4 OF 4
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - Residential

SYSTEM

( ) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other NFPA 13R
Specific Ruling Made By Date

DESIGN

Area of Sprinkler Operation	- 3 Heads	System Type	Sprinkler/Nozzle
Density	- .05	(x) Wet	Make RELIABLE
Area Per Sprinkler	- 288	( ) Dry	Model F1RES44
Elevation at Highest Outlet	- 184	( ) Deluge	Size 3/8" x 1/2"
Hose Allowance - Inside	- 0	( ) Preaction	K-Factor 4.4
Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.155 DEG.
Hose Allowance - Outside	- 0		

Note

Calculation Summary: Flow Required - 54.32 Press Required - 45.238 AT BASE
C-Factor Used: 150 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:	
Date of Test	- 04/25/14			Cap. -	
Time of Test	- AM	Rated Cap.-		Elev.-	
Static Press	- 54	@ Press	-		
Residual Press	- 40	Elev.	-		Well
Flow	- 838				Proof Flow
Elevation	- 143.0'				

Location - BRACKETT STREET

Source of Information - OWNER AND WATER DISTRICT

COMMODITY STORAGE

Commodity		Class		Location	
Storage Ht.		Area		Aisle W.	
Storage Method:	Solid Piled	%	Palletized	%	Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.	
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non	
( ) Mult. Row		( ) Open Shelf		

RACK STORAGE

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
414	184.0	4.4	17.87	na	18.6	0.05	256	13.3
414T	184.0		18.84	na				
453T	184.0		18.85	na				
454T	184.0		18.9	na				
455	184.0		19.17	na				
412	184.0	4.4	16.16	na	17.69	0.05	256	13.3
412T	174.5		21.55	na				
411	184.0	4.4	16.8	na	18.03	0.05	288	16.8
411T	174.5		22.23	na				
317	174.5		22.39	na				
318	174.5		22.44	na				
319	174.5		22.68	na				
320	174.5		23.24	na				
321	174.5		23.39	na				
424T	174.5		23.68	na				
3A	174.5		24.36	na				
19	164.25		29.05	na				
20	152.75		34.05	na				
TWR	152.75		34.1	na				
TAV	149.0		38.72	na				
BWR	146.0		40.07	na				
BKFL	146.0		40.1	na				
BASE	143.0		45.24	na				
HOSE	143.0		45.25	na				
TEST	143.0		45.26	na				

The maximum velocity is 6.27 and it occurs in the pipe between nodes 414 and 414T

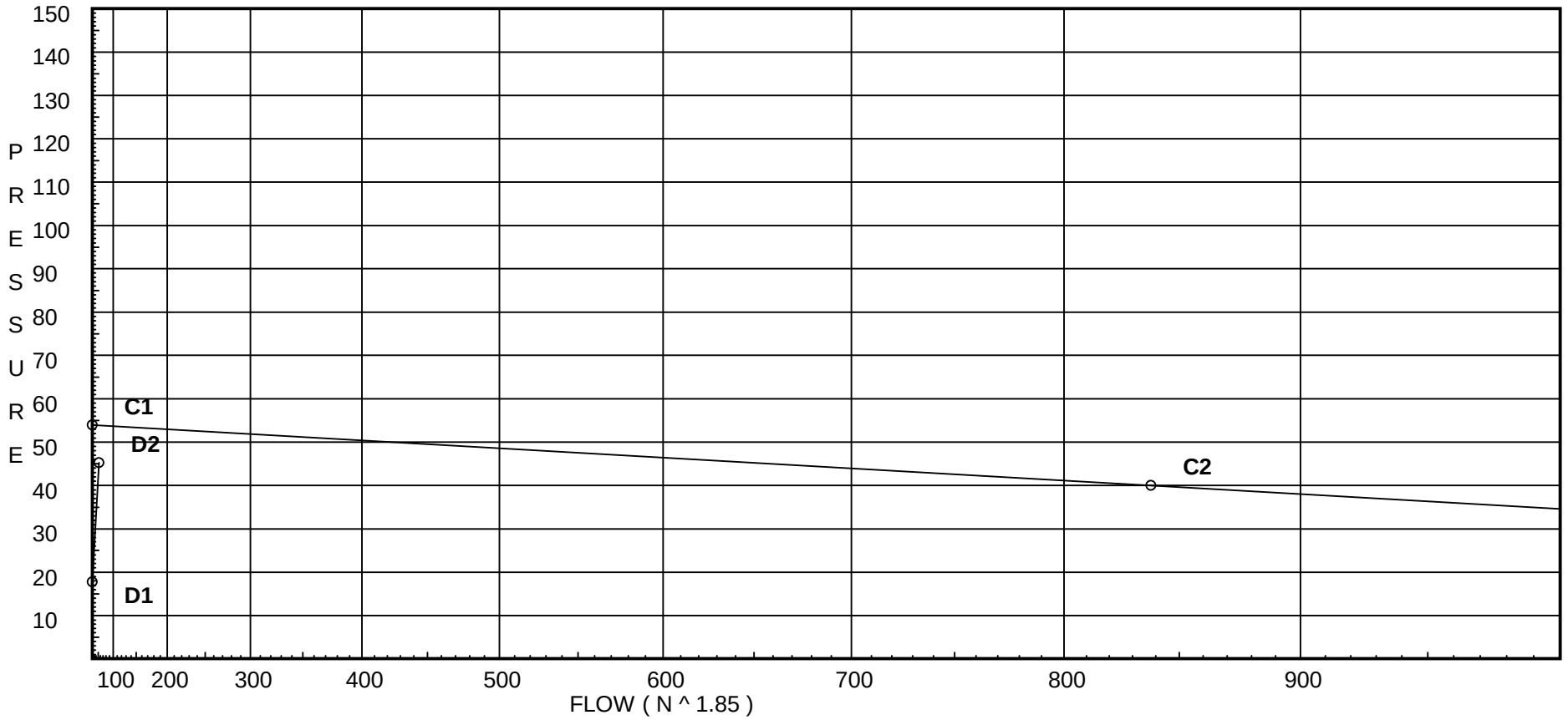
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
414	18.60	1.101	1E	3.825	3.000	17.866		K Factor = 4.40
to		150.0	1T	9.563	13.387	0.0		
414T	18.6	0.0595		0.0	16.387	0.975		Vel = 6.27
414T	0.0	2.157		0.0	3.250	18.841		
to		120.0		0.0	0.0	0.0		
453T	18.6	0.0034		0.0	3.250	0.011		Vel = 1.63
453T	0.0	2.157		0.0	14.000	18.852		
to		120.0		0.0	0.0	0.0		
454T	18.6	0.0034		0.0	14.000	0.047		Vel = 1.63
454T	0.0	2.157	1E	6.153	73.000	18.899		
to		120.0		0.0	6.153	0.0		
455	18.6	0.0034		0.0	79.153	0.269		Vel = 1.63
455	0.0	2.157	1E	6.153	12.250	19.168		
to		120.0	1T	12.307	18.460	4.114		
321	18.6	0.0034		0.0	30.710	0.105		Vel = 1.63
	0.0							
	18.60					23.387		K Factor = 3.85
412	17.69	1.101	1E	3.825	10.000	16.165		K Factor = 4.40
to		150.0	1T	9.563	13.387	4.114		
412T	17.69	0.0543		0.0	23.387	1.269		Vel = 5.96
412T	0.0	1.394	1T	9.523	42.250	21.548		
to		150.0		0.0	9.523	0.0		
318	17.69	0.0172		0.0	51.773	0.889		Vel = 3.72
	0.0							
	17.69					22.437		K Factor = 3.73
411	18.03	1.101	1E	3.825	10.000	16.800		K Factor = 4.40
to		150.0	1T	9.563	13.387	4.114		
411T	18.03	0.0562		0.0	23.387	1.315		Vel = 6.08
411T	0.0	2.003	1T	12.965	40.500	22.229		
to		150.0		0.0	12.965	0.0		
317	18.03	0.0030		0.0	53.465	0.163		Vel = 1.84
317	0.0	2.003		0.0	15.000	22.392		
to		150.0		0.0	0.0	0.0		
318	18.03	0.0030		0.0	15.000	0.045		Vel = 1.84
318	17.70	2.003	1T	12.965	9.500	22.437		
to		150.0		0.0	12.965	0.0		
319	35.73	0.0108		0.0	22.465	0.243		Vel = 3.64
319	0.0	2.157	1T	12.307	37.000	22.680		
to		120.0		0.0	12.307	0.0		
320	35.73	0.0114		0.0	49.307	0.560		Vel = 3.14
320	0.0	2.157	1E	6.153	6.750	23.240		
to		120.0		0.0	6.153	0.0		
321	35.73	0.0114		0.0	12.903	0.147		Vel = 3.14
321	18.59	2.157		0.0	12.000	23.387		
to		120.0		0.0	0.0	0.0		
424T	54.32	0.0247		0.0	12.000	0.296		Vel = 4.77

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
424T	0.0	2.157	2E	12.307	15.000	23.683		
to		120.0		0.0	12.307	0.0		
3A	54.32	0.0247		0.0	27.307	0.675		Vel = 4.77
3A	0.0	2.157		0.0	10.250	24.358		
to		120.0		0.0	0.0	4.439		
19	54.32	0.0247		0.0	10.250	0.253		Vel = 4.77
19	0.0	4.26	1E	13.167	12.750	29.050		
to		120.0		0.0	13.167	4.981		
20	54.32	0.0009		0.0	25.917	0.023		Vel = 1.22
20	0.0	4.26	1E	13.167	9.000	34.054		
to		120.0	1T	26.334	39.501	0.0		
TWR	54.32	0.0009		0.0	48.501	0.043		Vel = 1.22
TWR	0.0	4.26	1Fsp	0.0	3.500	34.097		
to		120.0		0.0	0.0	4.624		* Fixed loss = 3
TAV	54.32	0.0011		0.0	3.500	0.004		Vel = 1.22
TAV	0.0	4.26	1B	15.8	1.000	38.725		
to		120.0	1T	26.334	51.351	1.299		
BWR	54.32	0.0009	1Eql	9.217	52.351	0.047		Vel = 1.22
BWR	0.0	4.26	1T	26.334	3.000	40.071		
to		120.0		0.0	26.334	0.0		
BKFL	54.32	0.0009		0.0	29.334	0.026		Vel = 1.22
BKFL	0.0	4.026	1Zac	0.0	1.000	40.097		
to		120.0		0.0	0.0	5.139		* Fixed loss = 3.84
BASE	54.32	0.0020		0.0	1.000	0.002		Vel = 1.37
BASE	0.0	6.16	1E	20.084	75.000	45.238		
to		140.0	1T	43.037	67.425	0.0		
HOSE	54.32	0.0001	1G	4.304	142.425	0.016		Vel = 0.58
HOSE	0.0	6.16		0.0	50.000	45.254		
to		140.0		0.0	0.0	0.0		
TEST	54.32	0.0001		0.0	50.000	0.005		Vel = 0.58
	0.0							
	54.32					45.259		K Factor = 8.07

City Water Supply:
- C1 - Static Pressure : 54
- C2 - Residual Pressure: 40
- C2 - Residual Flow : 838

Demand:

D1 - Elevation	:	17.757
D2 - System Flow	:	54.323
D2 - System Pressure	:	45.259
Hose (Demand)	:	
D3 - System Demand	:	54.323
Safety Margin	:	8.652



Hydraulic Design Information Sheet

Name - West End Apartments Wet System Area 5 Date - 05/21/14
Location - 44 Pine Street Portland, Maine
Building - NEW System No. - 1 Wet
Contractor - SPRINKLER SYSTEMS INC. Contract No. - 13-058
Calculated By - CDS Drawing No. - 1-4 OF 4
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - Residential

SYSTEM

( ) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other NFPA 13R
Specific Ruling Made By Date

DESIGN

Area of Sprinkler Operation	- 4 Heads	System Type	Sprinkler/Nozzle
Density	- .05	(x) Wet	Make RELIABLE
Area Per Sprinkler	- 324	( ) Dry	Model F1RES49
Elevation at Highest Outlet	- 184	( ) Deluge	Size 7/16" x 1/2"
Hose Allowance - Inside	- 0	( ) Preaction	K-Factor 4.9
Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.155 DEG.
Hose Allowance - Outside	- 0		

Note

Calculation Summary: Flow Required - 70.00 Press Required - 44.819 AT BASE
C-Factor Used: 150 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:	
Date of Test	- 04/25/14			Cap. -	
Time of Test	- AM	Rated Cap.-		Elev.-	
Static Press	- 54	@ Press	-		
Residual Press	- 40	Elev.	-		Well
Flow	- 838				Proof Flow
Elevation	- 143.0'				

Location - BRACKETT STREET

Source of Information - OWNER AND WATER DISTRICT

COMMODITY STORAGE

Commodity		Class		Location	
Storage Ht.		Area		Aisle W.	
Storage Method:	Solid Piled	%	Palletized	%	Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.	
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non	
( ) Mult. Row		( ) Open Shelf		

RACK STORAGE

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
454	184.0	4.9	13.25	na	17.84	0.05	324	12.1
453	184.0	4.9	12.96	na	17.64	0.05	324	12.1
452	184.0	4.9	12.1	na	17.04	0.05	324	12.1
451	184.0	4.9	12.73	na	17.48	0.05	324	12.1
451T	184.0		13.77	na				
452T	184.0		13.83	na				
453T	184.0		14.02	na				
454T	184.0		14.34	na				
455	184.0		17.46	na				
321	174.5		22.79	na				
424T	174.5		23.26	na				
3A	174.5		24.34	na				
19	164.25		29.18	na				
20	152.75		34.2	na				
TWR	152.75		34.27	na				
TAV	149.0		38.9	na				
BWR	146.0		40.28	na				
BKFL	146.0		40.32	na				
BASE	143.0		44.82	na				
HOSE	143.0		44.84	na				
TEST	143.0		44.85	na				

The maximum velocity is 6.15 and it occurs in the pipe between nodes 454T and 455

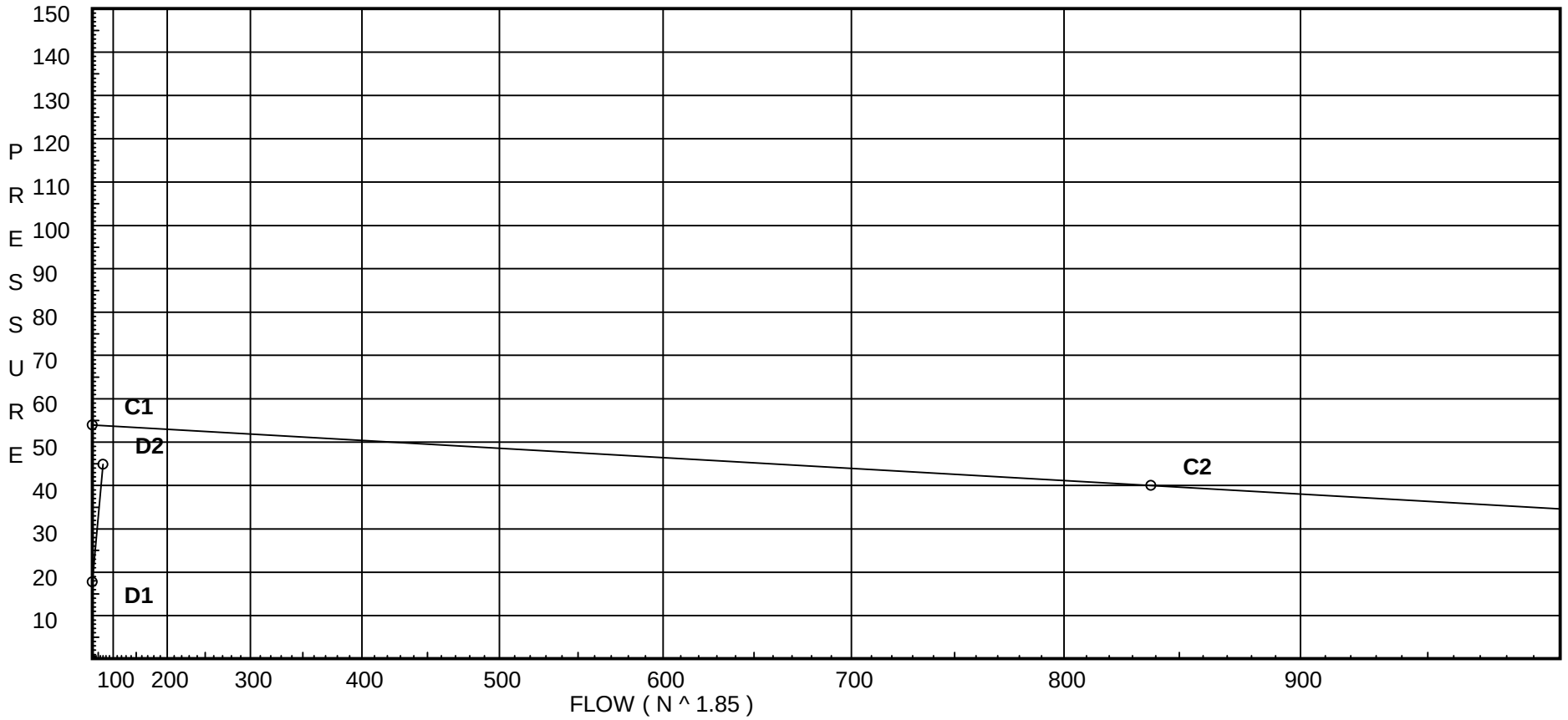
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
454	17.84	1.101	2E	7.65	2.500	13.254		K Factor = 4.90
to		150.0	1T	9.563	17.212	0.0		
454T	17.84	0.0550		0.0	19.712	1.085		Vel = 6.01
	0.0							
	17.84					14.339		K Factor = 4.71
453	17.64	1.101	2E	7.65	2.500	12.955		K Factor = 4.90
to		150.0	1T	9.563	17.212	0.0		
453T	17.64	0.0539		0.0	19.712	1.063		Vel = 5.94
	0.0							
	17.64					14.018		K Factor = 4.71
452	17.04	1.101	3E	11.475	3.500	12.100		K Factor = 4.90
to		150.0	2T	19.125	30.601	0.0		
452T	17.04	0.0506		0.0	34.101	1.726		Vel = 5.74
	0.0							
	17.04					13.826		K Factor = 4.58
451	17.48	1.101	2E	7.65	2.500	12.728		K Factor = 4.90
to		150.0	1T	9.563	17.212	0.0		
451T	17.48	0.0530		0.0	19.712	1.045		Vel = 5.89
451T	0.0	2.157		0.0	17.500	13.773		
to		120.0		0.0	0.0	0.0		
452T	17.48	0.0030		0.0	17.500	0.053		Vel = 1.53
452T	17.05	2.157		0.0	18.000	13.826		
to		120.0		0.0	0.0	0.0		
453T	34.53	0.0107		0.0	18.000	0.192		Vel = 3.03
453T	17.63	2.157		0.0	14.000	14.018		
to		120.0		0.0	0.0	0.0		
454T	52.16	0.0229		0.0	14.000	0.321		Vel = 4.58
454T	17.84	2.157	1E	6.153	73.000	14.339		
to		120.0		0.0	6.153	0.0		
455	70.0	0.0395		0.0	79.153	3.124		Vel = 6.15
455	0.0	2.157	1E	6.153	12.250	17.463		
to		120.0	1T	12.307	18.460	4.114		
321	70.0	0.0395		0.0	30.710	1.213		Vel = 6.15
321	0.0	2.157		0.0	12.000	22.790		
to		120.0		0.0	0.0	0.0		
424T	70.0	0.0394		0.0	12.000	0.473		Vel = 6.15
424T	0.0	2.157	2E	12.307	15.000	23.263		
to		120.0		0.0	12.307	0.0		
3A	70.0	0.0395		0.0	27.307	1.078		Vel = 6.15
3A	0.0	2.157		0.0	10.250	24.341		
to		120.0		0.0	0.0	4.439		
19	70.0	0.0395		0.0	10.250	0.405		Vel = 6.15
19	0.0	4.26	1E	13.167	12.750	29.185		
to		120.0		0.0	13.167	4.981		
20	70.0	0.0014		0.0	25.917	0.036		Vel = 1.58

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
20	0.0	4.26	1E	13.167	9.000	34.202		
to		120.0	1T	26.334	39.501	0.0		
TWR	70.0	0.0014		0.0	48.501	0.070		Vel = 1.58
TWR	0.0	4.26	1Fsp	0.0	3.500	34.272		
to		120.0		0.0	0.0	4.624		* Fixed loss = 3
TAV	70.0	0.0014		0.0	3.500	0.005		Vel = 1.58
TAV	0.0	4.26	1B	15.8	1.000	38.901		
to		120.0	1T	26.334	51.351	1.299		
BWR	70.0	0.0015	1Eql	9.217	52.351	0.076		Vel = 1.58
BWR	0.0	4.26	1T	26.334	3.000	40.276		
to		120.0		0.0	26.334	0.0		
BKFL	70.0	0.0014		0.0	29.334	0.042		Vel = 1.58
BKFL	0.0	4.026	1Zac	0.0	1.000	40.318		
to		120.0		0.0	0.0	4.499		* Fixed loss = 3.2
BASE	70.0	0.0020		0.0	1.000	0.002		Vel = 1.76
BASE	0.0	6.16	1E	20.084	75.000	44.819		
to		140.0	1T	43.037	67.425	0.0		
HOSE	70.0	0.0002	1G	4.304	142.425	0.025		Vel = 0.75
HOSE	0.0	6.16		0.0	50.000	44.844		
to		140.0		0.0	0.0	0.0		
TEST	70.0	0.0002		0.0	50.000	0.010		Vel = 0.75
	0.0							
	70.00					44.854		K Factor = 10.45

City Water Supply:
- C1 - Static Pressure : 54
- C2 - Residual Pressure: 40
- C2 - Residual Flow : 838

Demand:

D1 - Elevation	:	17.757
D2 - System Flow	:	70.001
D2 - System Pressure	:	44.854
Hose (Demand)	:	
D3 - System Demand	:	70.001
Safety Margin	:	9.005



Hydraulic Design Information Sheet

Name - West End Apartments Wet System Area 6 Date - 05/21/14
Location - 44 Pine Street Portland, Maine
Building - NEW System No. - 1 Wet
Contractor - SPRINKLER SYSTEMS INC. Contract No. - 13-058
Calculated By - CDS Drawing No. - 1-4 OF 4
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - Residential

SYSTEM

( ) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other NFPA 13R
Specific Ruling Made By Date

DESIGN

Area of Sprinkler Operation	- 4 Heads	System Type	Sprinkler/Nozzle
Density	- .05	(x) Wet	Make RELIABLE
Area Per Sprinkler	- 256	( ) Dry	Model F1RES44
Elevation at Highest Outlet	- 184	( ) Deluge	Size 3/8" x 1/2"
Hose Allowance - Inside	- 0	( ) Preaction	K-Factor 4.4
Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.155 DEG.
Hose Allowance - Outside	- 0		

Note

Calculation Summary: Flow Required - 70.51 Press Required - 48.272 AT BASE
C-Factor Used: 150 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:	
Date of Test	- 04/25/14			Cap. -	
Time of Test	- AM	Rated Cap.-		Elev.-	
Static Press	- 54	@ Press	-		
Residual Press	- 40	Elev.	-		Well
Flow	- 838				Proof Flow
Elevation	- 143				

Location - BRACKETT STREET

Source of Information - OWNER AND WATER DISTRICT

COMMODITY STORAGE

Commodity		Class		Location	
Storage Ht.		Area		Aisle W.	
Storage Method:	Solid Piled	%	Palletized	%	Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.	
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non	
( ) Mult. Row		( ) Open Shelf		

RACK STORAGE

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
424	184.0	4.4	20.91	na	20.12	0.05	256	13.3
423	184.0	4.4	15.85	na	17.52	0.05	256	13.3
421	184.0	4.4	13.3	na	16.05	0.05	256	13.3
422	184.0	4.4	14.64	na	16.83	0.05	256	13.3
422A	174.5		19.8	na				
422B	174.5		20.77	na				
423T	174.5		21.74	na				
317	174.5		24.37	na				
318	174.5		24.68	na				
319	174.5		25.14	na				
320	174.5		26.2	na				
321	174.5		26.47	na				
424T	174.5		26.73	na				
3A	174.5		27.83	na				
19	164.25		32.67	na				
20	152.75		37.69	na				
TWR	152.75		37.76	na				
TAV	149.0		42.39	na				
BWR	146.0		43.77	na				
BKFL	146.0		43.81	na				
BASE	143.0		48.27	na				
HOSE	143.0		48.3	na				
TEST	143.0		48.31	na				

The maximum velocity is 8.06 and it occurs in the pipe between nodes 423T and 317

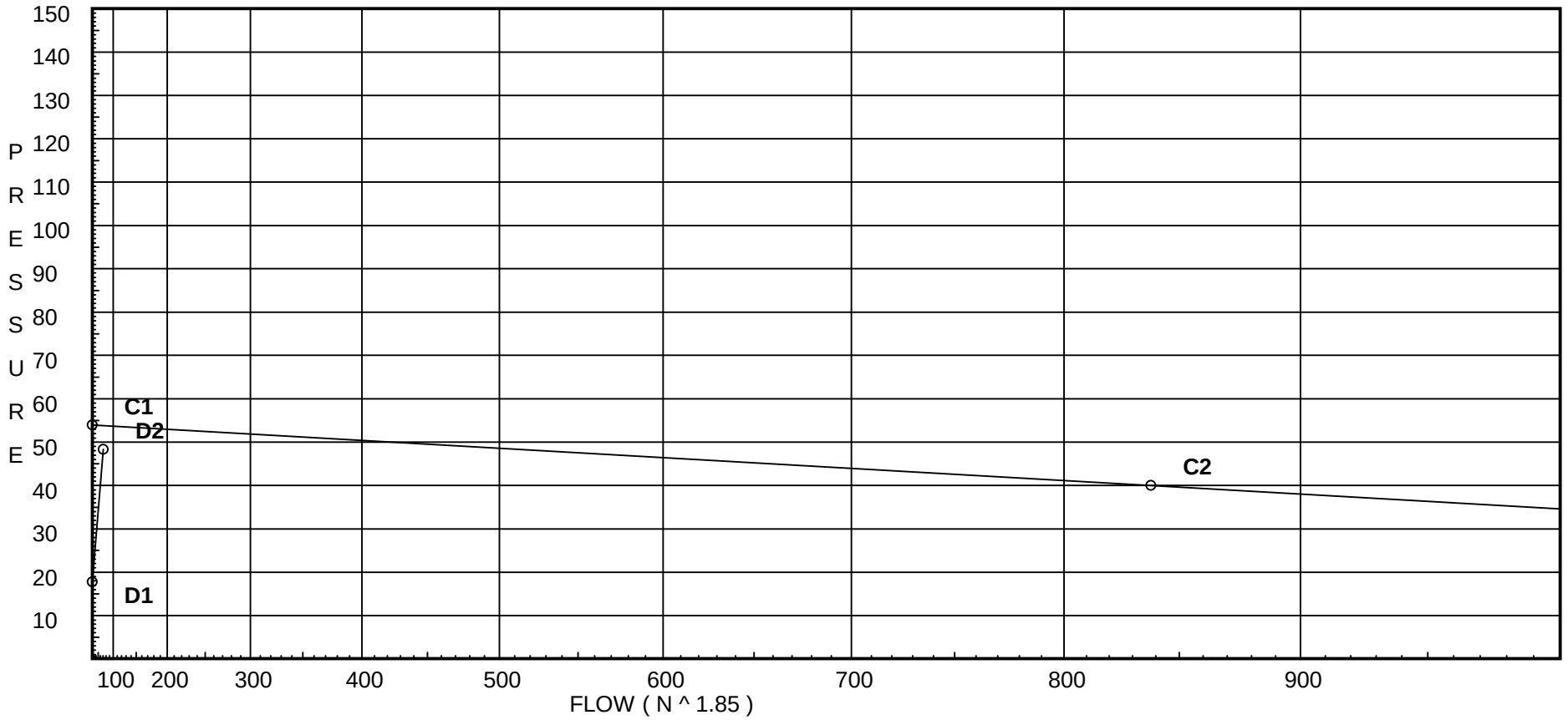
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
424	20.12	1.101	1E	3.825	11.500	20.906		K Factor = 4.40
to		150.0	1T	9.563	13.387	4.114		
424T	20.12	0.0688		0.0	24.887	1.713		Vel = 6.78
	0.0							
	20.12					26.733		K Factor = 3.89
423	17.52	1.101	2E	7.65	16.250	15.848		K Factor = 4.40
to		150.0	1T	9.563	17.212	4.114		
423T	17.52	0.0533		0.0	33.462	1.782		Vel = 5.90
	0.0							
	17.52					21.744		K Factor = 3.76
421	16.05	1.101	3E	11.475	22.000	13.300		K Factor = 4.40
to		150.0	2T	19.125	30.601	4.114		
422A	16.05	0.0453		0.0	52.601	2.382		Vel = 5.41
	0.0							
	16.05					19.796		K Factor = 3.61
422	16.83	1.101	2E	7.65	13.500	14.635		K Factor = 4.40
to		150.0		0.0	7.650	4.114		
422A	16.83	0.0495		0.0	21.150	1.047		Vel = 5.67
422A	16.05	1.394	1T	9.523	8.500	19.796		
to		150.0		0.0	9.523	0.0		
422B	32.88	0.0541		0.0	18.023	0.975		Vel = 6.91
422B	0.0	1.394		0.0	18.000	20.771		
to		150.0		0.0	0.0	0.0		
423T	32.88	0.0541		0.0	18.000	0.973		Vel = 6.91
423T	17.52	1.598	1T	11.656	31.250	21.744		
to		150.0		0.0	11.656	0.0		
317	50.4	0.0613		0.0	42.906	2.630		Vel = 8.06
317	0.0	2.003		0.0	15.000	24.374		
to		150.0		0.0	0.0	0.0		
318	50.4	0.0204		0.0	15.000	0.306		Vel = 5.13
318	0.0	2.003	1T	12.965	9.500	24.680		
to		150.0		0.0	12.965	0.0		
319	50.4	0.0204		0.0	22.465	0.458		Vel = 5.13
319	0.0	2.157	1T	12.307	37.000	25.138		
to		120.0		0.0	12.307	0.0		
320	50.4	0.0215		0.0	49.307	1.060		Vel = 4.43
320	0.0	2.157	1E	6.153	6.750	26.198		
to		120.0		0.0	6.153	0.0		
321	50.4	0.0215		0.0	12.903	0.277		Vel = 4.43
321	0.0	2.157		0.0	12.000	26.475		
to		120.0		0.0	0.0	0.0		
424T	50.4	0.0215		0.0	12.000	0.258		Vel = 4.43
424T	20.11	2.157	2E	12.307	15.000	26.733		
to		120.0		0.0	12.307	0.0		
3A	70.51	0.0400		0.0	27.307	1.092		Vel = 6.19

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
3A	0.0	2.157		0.0	10.250	27.825		
to		120.0		0.0	0.0	4.439		
19	70.51	0.0401		0.0	10.250	0.411		Vel = 6.19
19	0.0	4.26	1E	13.167	12.750	32.675		
to		120.0		0.0	13.167	4.981		
20	70.51	0.0014		0.0	25.917	0.037		Vel = 1.59
20	0.0	4.26	1E	13.167	9.000	37.693		
to		120.0	1T	26.334	39.501	0.0		
TWR	70.51	0.0014		0.0	48.501	0.070		Vel = 1.59
TWR	0.0	4.26	1Fsp	0.0	3.500	37.763		
to		120.0		0.0	0.0	4.624		* Fixed loss = 3
TAV	70.51	0.0017		0.0	3.500	0.006		Vel = 1.59
TAV	0.0	4.26	1B	15.8	1.000	42.393		
to		120.0	1T	26.334	51.351	1.299		
BWR	70.51	0.0015	1Eql	9.217	52.351	0.076		Vel = 1.59
BWR	0.0	4.26	1T	26.334	3.000	43.768		
to		120.0		0.0	26.334	0.0		
BKFL	70.51	0.0015		0.0	29.334	0.043		Vel = 1.59
BKFL	0.0	4.026	1Zac	0.0	1.000	43.811		
to		120.0		0.0	0.0	4.459		* Fixed loss = 3.16
BASE	70.51	0.0020		0.0	1.000	0.002		Vel = 1.78
BASE	0.0	6.16	1E	20.084	75.000	48.272		
to		140.0	1T	43.037	67.425	0.0		
HOSE	70.51	0.0002	1G	4.304	142.425	0.026		Vel = 0.76
HOSE	0.0	6.16		0.0	50.000	48.298		
to		140.0		0.0	0.0	0.0		
TEST	70.51	0.0002		0.0	50.000	0.009		Vel = 0.76
	0.0							
	70.51					48.307		K Factor = 10.14

City Water Supply:
- C1 - Static Pressure : 54
- C2 - Residual Pressure: 40
- C2 - Residual Flow : 838

Demand:

D1 - Elevation	:	17.757
D2 - System Flow	:	70.514
D2 - System Pressure	:	48.307
Hose (Demand)	:	
D3 - System Demand	:	70.514
Safety Margin	:	5.549



Hydraulic Design Information Sheet

Name - West End Apartments Wet System Area 7 Date - 05/21/14
Location - 44 Pine Street Portland, Maine
Building - NEW System No. - 1 Wet
Contractor - SPRINKLER SYSTEMS INC. Contract No. - 13-058
Calculated By - CDS Drawing No. - 1-4 OF 4
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - Residential

SYSTEM

( ) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other NFPA 13R
Specific Ruling Made By Date

DESIGN

Area of Sprinkler Operation	- 4 Heads	System Type	Sprinkler/Nozzle
Density	- .05	(x) Wet	Make RELIABLE
Area Per Sprinkler	- 256	( ) Dry	Model F1RES49
Elevation at Highest Outlet	- 174.500	( ) Deluge	Size 7/16" x 1/2"
Hose Allowance - Inside	- 0	( ) Preaction	K-Factor 4.9
Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.155 DEG.
Hose Allowance - Outside	- 0		

Note

Calculation Summary: Flow Required - 54.31 Press Required - 39.226 AT BASE
C-Factor Used: 150 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:	
Date of Test	- 04/25/14			Cap. -	
Time of Test	- AM	Rated Cap.-		Elev.-	
Static Press	- 54	@ Press	-		
Residual Press	- 40	Elev.	-		Well
Flow	- 838				Proof Flow
Elevation	- 143.0'				

Location - BRACKETT STREET

Source of Information - OWNER AND WATER DISTRICT

COMMODITY STORAGE

Commodity		Class		Location	
Storage Ht.		Area		Aisle W.	
Storage Method:	Solid Piled	%	Palletized	%	Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.	
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non	
( ) Mult. Row		( ) Open Shelf		

RACK STORAGE

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
ARM1	174.5	4.9	8.39	na	14.19	0.05	256	7.0
303	174.5	4.9	8.19	na	14.02	0.05	256	7.0
304	174.5		9.02	na				
401A	174.5		12.75	na				
ARM2	174.5	4.9	7.18	na	13.13	0.05	256	7.0
301	174.5	4.9	7.0	na	12.96	0.05	256	7.0
302	174.5		7.69	na				
302T	174.5		13.68	na				
403A	174.5		13.69	na				
305	174.5		13.75	na				
306	174.5		14.38	na				
319	174.5		15.84	na				
320	174.5		17.06	na				
321	174.5		17.38	na				
424T	174.5		17.67	na				
3A	174.5		18.35	na				
19	164.25		23.04	na				
20	152.75		28.04	na				
TWR	152.75		28.09	na				
TAV	149.0		32.71	na				
BWR	146.0		34.06	na				
BKFL	146.0		34.09	na				
BASE	143.0		39.23	na				
HOSE	143.0		39.24	na				
TEST	143.0		39.25	na				

The maximum velocity is 9.51 and it occurs in the pipe between nodes 304 and 401A

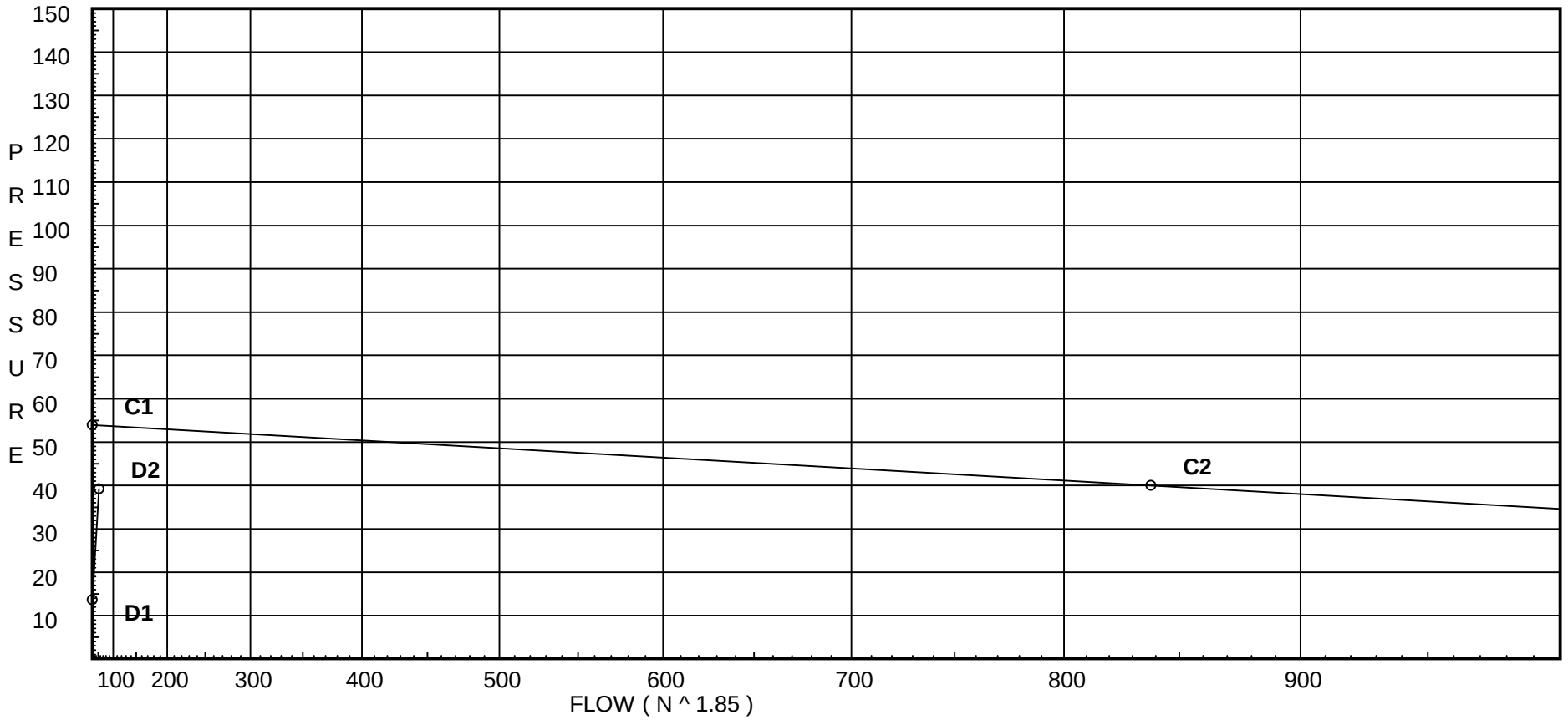
Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
ARM1	14.19	1.101	1E	3.825	4.000	8.392		K Factor = 4.90
to		150.0	1T	9.563	13.387	0.0		
304	14.19	0.0361		0.0	17.387	0.627		Vel = 4.78
	0.0							
	14.19					9.019		K Factor = 4.73
303	14.02	1.101	2E	7.65	16.000	8.185		K Factor = 4.90
to		150.0		0.0	7.650	0.0		
304	14.02	0.0353		0.0	23.650	0.834		Vel = 4.72
304	14.19	1.101		0.0	29.000	9.019		
to		150.0		0.0	0.0	0.0		
401A	28.21	0.1286		0.0	29.000	3.729		Vel = 9.51
401A	0.0	1.394	1T	9.523	15.000	12.748		
to		150.0		0.0	9.523	0.0		
305	28.21	0.0408		0.0	24.523	1.000		Vel = 5.93
	0.0							
	28.21					13.748		K Factor = 7.61
ARM2	13.13	1.101	1E	3.825	3.000	7.179		K Factor = 4.90
to		150.0	1T	9.563	13.387	0.0		
302	13.13	0.0312		0.0	16.387	0.512		Vel = 4.42
	0.0							
	13.13					7.691		K Factor = 4.73
301	12.96	1.101	2E	7.65	15.000	7.000		K Factor = 4.90
to		150.0		0.0	7.650	0.0		
302	12.96	0.0305		0.0	22.650	0.691		Vel = 4.37
302	13.13	1.101	1T	9.563	44.250	7.691		
to		150.0		0.0	9.562	0.0		
302T	26.09	0.1113		0.0	53.812	5.989		Vel = 8.79
302T	0.0	2.003		0.0	1.000	13.680		
to		150.0		0.0	0.0	0.0		
403A	26.09	0.0060		0.0	1.000	0.006		Vel = 2.66
403A	0.0	2.003		0.0	10.250	13.686		
to		150.0		0.0	0.0	0.0		
305	26.09	0.0060		0.0	10.250	0.062		Vel = 2.66
305	28.22	2.003	1T	12.965	14.250	13.748		
to		150.0		0.0	12.965	0.0		
306	54.31	0.0234		0.0	27.215	0.637		Vel = 5.53
306	0.0	2.157		0.0	59.000	14.385		
to		120.0		0.0	0.0	0.0		
319	54.31	0.0247		0.0	59.000	1.456		Vel = 4.77
319	0.0	2.157	1T	12.307	37.000	15.841		
to		120.0		0.0	12.307	0.0		
320	54.31	0.0247		0.0	49.307	1.217		Vel = 4.77
320	0.0	2.157	1E	6.153	6.750	17.058		
to		120.0		0.0	6.153	0.0		
321	54.31	0.0246		0.0	12.903	0.318		Vel = 4.77

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
321	0.0	2.157		0.0	12.000	17.376		
to		120.0		0.0	0.0	0.0		
424T	54.31	0.0247		0.0	12.000	0.296		Vel = 4.77
424T	0.0	2.157	2E	12.307	15.000	17.672		
to		120.0		0.0	12.307	0.0		
3A	54.31	0.0247		0.0	27.307	0.674		Vel = 4.77
3A	0.0	2.157		0.0	10.250	18.346		
to		120.0		0.0	0.0	4.439		
19	54.31	0.0247		0.0	10.250	0.253		Vel = 4.77
19	0.0	4.26	1E	13.167	12.750	23.038		
to		120.0		0.0	13.167	4.981		
20	54.31	0.0009		0.0	25.917	0.023		Vel = 1.22
20	0.0	4.26	1E	13.167	9.000	28.042		
to		120.0	1T	26.334	39.501	0.0		
TWR	54.31	0.0009		0.0	48.501	0.044		Vel = 1.22
TWR	0.0	4.26	1Fsp	0.0	3.500	28.086		
to		120.0		0.0	0.0	4.624		* Fixed loss = 3
TAV	54.31	0.0009		0.0	3.500	0.003		Vel = 1.22
TAV	0.0	4.26	1B	15.8	1.000	32.713		
to		120.0	1T	26.334	51.351	1.299		
BWR	54.31	0.0009	1Eql	9.217	52.351	0.047		Vel = 1.22
BWR	0.0	4.26	1T	26.334	3.000	34.059		
to		120.0		0.0	26.334	0.0		
BKFL	54.31	0.0009		0.0	29.334	0.027		Vel = 1.22
BKFL	0.0	4.026	1Zac	0.0	1.000	34.086		
to		120.0		0.0	0.0	5.139		* Fixed loss = 3.84
BASE	54.31	0.0010		0.0	1.000	0.001		Vel = 1.37
BASE	0.0	6.16	1E	20.084	75.000	39.226		
to		140.0	1T	43.037	67.425	0.0		
HOSE	54.31	0.0001	1G	4.304	142.425	0.016		Vel = 0.58
HOSE	0.0	6.16		0.0	50.000	39.242		
to		140.0		0.0	0.0	0.0		
TEST	54.31	0.0001		0.0	50.000	0.006		Vel = 0.58
	0.0							
	54.31					39.248		K Factor = 8.67

City Water Supply:
- C1 - Static Pressure : 54
- C2 - Residual Pressure: 40
- C2 - Residual Flow : 838

Demand:

D1 - Elevation	:	13.643
D2 - System Flow	:	54.307
D2 - System Pressure	:	39.248
Hose (Demand)	:	
D3 - System Demand	:	54.307
Safety Margin	:	14.664



Hydraulic Design Information Sheet

Name - West End Apartments Wet System Area 8 Date - 05/21/14
Location - 44 Pine Street Portland, Maine
Building - NEW System No. - 1 Wet
Contractor - SPRINKLER SYSTEMS INC. Contract No. - 13-058
Calculated By - CDS Drawing No. - 1-4 OF 4
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - VARIES
Occupancy - Residential

SYSTEM DESIGN

( ) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other NFPA 13R
Specific Ruling Made By Date

Area of Sprinkler Operation	- 4 Heads	System Type	Sprinkler/Nozzle
Density	- .05	(x) Wet	Make RELIABLE
Area Per Sprinkler	- 324	( ) Dry	Model F1RES49
Elevation at Highest Outlet	- 174.500	( ) Deluge	Size 7/16" x 1/2"
Hose Allowance - Inside	- 0	( ) Preaction	K-Factor 4.9
Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.155 DEG.
Hose Allowance - Outside	- 0		

Note

Calculation Summary: Flow Required - 69.18 Press Required - 43.212 AT BASE
C-Factor Used: 150 Overhead 150 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:	
Date of Test	- 04/25/14			Cap. -	
Time of Test	- AM	Rated Cap.-		Elev.-	
Static Press	- 54	@ Press	-		
Residual Press	- 40	Elev.	-		Well
Flow	- 838				Proof Flow
Elevation	- 143.0'				

Location - BRACKETT STREET

Source of Information - OWNER AND WATER DISTRICT

COMMODITY STORAGE

Commodity		Class		Location	
Storage Ht.		Area		Aisle W.	
Storage Method:	Solid Piled	%	Palletized	%	Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.	
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non	
( ) Mult. Row		( ) Open Shelf		

RACK STORAGE

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
ARM1	174.5	4.9	12.6	na	17.39	0.05	324	12.1
315	174.5	4.9	12.66	na	17.44	0.05	324	12.1
408	174.5		13.33	na				
311	174.5	4.9	12.1	na	17.04	0.05	324	12.1
406A	174.5		12.88	na				
312	174.5	4.9	12.47	na	17.3	0.05	324	12.1
313	174.5		13.02	na				
314	174.5		13.41	na				
316	174.5		13.48	na				
411T	174.5		15.45	na				
317	174.5		17.41	na				
318	174.5		17.96	na				
319	174.5		18.79	na				
320	174.5		20.69	na				
321	174.5		21.19	na				
424T	174.5		21.65	na				
3A	174.5		22.71	na				
19	164.25		27.54	na				
20	152.75		32.56	na				
TWR	152.75		32.63	na				
TAV	149.0		37.26	na				
BWR	146.0		38.63	na				
BKFL	146.0		38.67	na				
BASE	143.0		43.21	na				
HOSE	143.0		43.24	na				
TEST	143.0		43.25	na				

The maximum velocity is 8.28 and it occurs in the pipe between nodes 314 and 316

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
ARM1	17.40	1.101	1E	3.825	2.000	12.602		K Factor = 4.90
to		150.0	1T	9.563	13.387	0.0		
314	17.4	0.0526		0.0	15.387	0.809		Vel = 5.86
	0.0							
	17.40					13.411		K Factor = 4.75
315	17.44	1.101	2E	7.65	5.000	12.662		K Factor = 4.90
to		150.0		0.0	7.650	0.0		
408	17.44	0.0528		0.0	12.650	0.668		Vel = 5.88
408	0.0	1.101		0.0	2.750	13.330		
to		150.0		0.0	0.0	0.0		
316	17.44	0.0531		0.0	2.750	0.146		Vel = 5.88
	0.0							
	17.44					13.476		K Factor = 4.75
311	17.04	1.101	1E	3.825	2.000	12.100		K Factor = 4.90
to		150.0	1T	9.563	13.387	0.0		
406A	17.04	0.0506		0.0	15.387	0.779		Vel = 5.74
406A	0.0	1.394		0.0	8.750	12.879		
to		150.0		0.0	0.0	0.0		
313	17.04	0.0160		0.0	8.750	0.140		Vel = 3.58
	0.0							
	17.04					13.019		K Factor = 4.72
312	17.30	1.101	2E	7.65	3.000	12.465		K Factor = 4.90
to		150.0		0.0	7.650	0.0		
313	17.3	0.0520		0.0	10.650	0.554		Vel = 5.83
313	17.04	1.598		0.0	13.000	13.019		
to		150.0		0.0	0.0	0.0		
314	34.34	0.0302		0.0	13.000	0.392		Vel = 5.49
314	17.40	1.598		0.0	1.000	13.411		
to		150.0		0.0	0.0	0.0		
316	51.74	0.0650		0.0	1.000	0.065		Vel = 8.28
316	17.44	2.003		0.0	54.000	13.476		
to		150.0		0.0	0.0	0.0		
411T	69.18	0.0366		0.0	54.000	1.979		Vel = 7.04
411T	0.0	2.003	1T	12.965	40.500	15.455		
to		150.0		0.0	12.965	0.0		
317	69.18	0.0366		0.0	53.465	1.959		Vel = 7.04
317	0.0	2.003		0.0	15.000	17.414		
to		150.0		0.0	0.0	0.0		
318	69.18	0.0367		0.0	15.000	0.550		Vel = 7.04
318	0.0	2.003	1T	12.965	9.500	17.964		
to		150.0		0.0	12.965	0.0		
319	69.18	0.0367		0.0	22.465	0.824		Vel = 7.04
319	0.0	2.157	1T	12.307	37.000	18.788		
to		120.0		0.0	12.307	0.0		
320	69.18	0.0386		0.0	49.307	1.903		Vel = 6.07

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
320	0.0	2.157	1E	6.153	6.750	20.691		
to		120.0		0.0	6.153	0.0		
321	69.18	0.0387		0.0	12.903	0.499		Vel = 6.07
321	0.0	2.157		0.0	12.000	21.190		
to		120.0		0.0	0.0	0.0		
424T	69.18	0.0386		0.0	12.000	0.463		Vel = 6.07
424T	0.0	2.157	2E	12.307	15.000	21.653		
to		120.0		0.0	12.307	0.0		
3A	69.18	0.0386		0.0	27.307	1.054		Vel = 6.07
3A	0.0	2.157		0.0	10.250	22.707		
to		120.0		0.0	0.0	4.439		
19	69.18	0.0386		0.0	10.250	0.396		Vel = 6.07
19	0.0	4.26	1E	13.167	12.750	27.542		
to		120.0		0.0	13.167	4.981		
20	69.18	0.0014		0.0	25.917	0.036		Vel = 1.56
20	0.0	4.26	1E	13.167	9.000	32.559		
to		120.0	1T	26.334	39.501	0.0		
TWR	69.18	0.0014		0.0	48.501	0.068		Vel = 1.56
TWR	0.0	4.26	1Fsp	0.0	3.500	32.627		
to		120.0		0.0	0.0	4.624		* Fixed loss = 3
TAV	69.18	0.0014		0.0	3.500	0.005		Vel = 1.56
TAV	0.0	4.26	1B	15.8	1.000	37.256		
to		120.0	1T	26.334	51.351	1.299		
BWR	69.18	0.0014	1Eql	9.217	52.351	0.074		Vel = 1.56
BWR	0.0	4.26	1T	26.334	3.000	38.629		
to		120.0		0.0	26.334	0.0		
BKFL	69.18	0.0014		0.0	29.334	0.041		Vel = 1.56
BKFL	0.0	4.026	1Zac	0.0	1.000	38.670		
to		120.0		0.0	0.0	4.539		* Fixed loss = 3.24
BASE	69.18	0.0030		0.0	1.000	0.003		Vel = 1.74
BASE	0.0	6.16	1E	20.084	75.000	43.212		
to		140.0	1T	43.037	67.425	0.0		
HOSE	69.18	0.0002	1G	4.304	142.425	0.025		Vel = 0.74
HOSE	0.0	6.16		0.0	50.000	43.237		
to		140.0		0.0	0.0	0.0		
TEST	69.18	0.0002		0.0	50.000	0.008		Vel = 0.74
	0.0							
	69.18					43.245		K Factor = 10.52

City Water Supply:
- C1 - Static Pressure : 54
- C2 - Residual Pressure: 40
- C2 - Residual Flow : 838

Demand:

D1 - Elevation	:	13.643
D2 - System Flow	:	69.176
D2 - System Pressure	:	43.245
Hose (Demand)	:	
D3 - System Demand	:	69.176
Safety Margin	:	10.616