



**. . . Fire Protection by Computer Design**

SPRINKLER SYSTEMS INC.  
P. O. BOX 1285  
2-4 AVON STREET  
LEWISTON, ME 04243  
207-782-0104

Job Name : 191 MARGINAL WAY  
Building :  
Location : 191 MARGINAL WAY, PORTLAND, MAINE 04101  
System : 1 OF 1  
Contract : 17-082  
Data File : 17082191MARGINALWAYA1.WXF

Hydraulic Design Information Sheet

Name - 191 MARGINAL WAY Date - 7-31-2017  
 Location - 191 MARGINAL WAY, PORTLAND, MAINE 04101  
 Building - System No. - 1 OF 1  
 Contractor - LANDRY/FRENCH Contract No. - 17-082  
 Calculated By - SCOTT E. GARLAND Drawing No. - 1 OF 1  
 Construction: ( ) Combustible (X) Non-Combustible Ceiling Height - VARIES  
 Occupancy - OFFICE AREA - LIGHT HAZARD

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.  
 Y ( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve

S Other

T Specific Ruling Made By Date

E

M	Area of Sprinkler Operation - 900	System Type	Sprinkler/Nozzle
	Density - .10	(X) Wet	Make RELIABLE
D	Area Per Sprinkler - 152.418	( ) Dry	Model F1FR56
E	Elevation at Highest Outlet - 111	( ) Deluge	Size 1/2" X 1/2"
S	Hose Allowance - Inside -	( ) Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance -	( ) Other	Temp.Rat.155 DEG
G	Hose Allowance - Outside - 100		

N

Note DESIGN AREA #1 - OFFICE AREA FIT-UP

Calculation Flow Required - 185.224 Press Required - 41.662 AT BASE OF RISER  
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 5-31-2016		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 98	@ Press -	
R	Residual Press - 92	Elev. -	Well
	Flow - 1528		Proof Flow
S	Elevation - 98.0		

U

P Location - ON MARGINAL WAY, 150' FROM THE BUILDING

P

L Source of Information - PORTLAND WATER DISTRICT

Y

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method: Solid Piled	% Palletized	% Rack
M	( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage ( ) Encap.
S	( ) Double Row	( ) Slave Pallet	( ) Solid Shelf ( ) Non
T	( ) Mult. Row	( ) Open Shelf	

O

R K Flue Spacing Clearance:Storage to Ceiling  
 A Longitudinal Transverse

G

E Horizontal Barriers Provided:

# Fittings Used Summary

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## Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
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																			

## Unit 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.

**SUPPLY ANALYSIS**

<b>Node at Source</b>	<b>Static Pressure</b>	<b>Residual Pressure</b>	<b>Flow</b>	<b>Available Pressure</b>	<b>Total Demand</b>	<b>Required Pressure</b>
TEST	98.0	92	1528.0	97.731	285.22	43.388

**NODE ANALYSIS**

<b>Node Tag</b>	<b>Elevation</b>	<b>Node Type</b>	<b>Pressure at Node</b>	<b>Discharge at Node</b>	<b>Notes</b>
TYP	0.0	5.6	7.41	15.24	
TYP1	0.0	5.6	7.41	15.24	
TYP2	0.0	5.6	7.41	15.24	
TYP3	0.0	5.6	7.41	15.24	
TYP4	0.0	5.6	7.41	15.24	
TYP5	0.0	5.6	7.41	15.24	
1	111.0	5.28	8.33	15.24	K=K @ DROP
2	111.0	5.27	8.39	15.26	K=K @ DRP1
3	111.0	5.29	8.6	15.52	K=K @ DRP2
4	111.0	5.29	9.15	16.02	K=K @ DRP2
5	111.0	5.29	10.12	16.84	K=K @ DRP2
A	111.0		11.62		
6	111.0	5.27	12.86	18.9	K=K @ DRP3
7	111.0	5.27	13.02	19.02	K=K @ DRP3
D	111.0		13.62		
8	111.0	5.27	10.19	16.81	K=K @ DRP4
9	111.0	5.27	10.24	16.86	K=K @ DRP1
10	111.0	5.25	10.54	17.03	K=K @ DRP5
11	111.0	5.25	11.42	17.72	K=K @ DRP5
F	111.0		12.75		
B	111.0		14.37		
C	111.0		14.49		
E	111.0		14.77		
G	111.0		15.37		
H	111.0		17.35		
J	113.917		19.39		
K	113.917		20.66		
L	113.917		21.45		
R	117.0		28.17		
TOR	117.0		29.08		
BKFL	105.333		37.24		
BASE	101.0		41.66		
X1	101.0		41.9	100.0	
TEST	98.0		43.39		

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv. Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
TYP to DROP	0 0	5.60	15.24 15.24	1 1.049	2E T 4.0 5.0 0.0	2.667 9.000 11.667	120	7.408 0.0 0.918		Vel = 5.66	
DROP			0.0 15.24					8.326		K Factor = 5.28	
TYP1 to DRP1	0 0	5.60	15.24 15.24	1 1.049	2E T 4.0 5.0 0.0	3.209 9.000 12.209	120	7.408 0.0 0.961		Vel = 5.66	
DRP1			0.0 15.24					8.369		K Factor = 5.27	
TYP2 to DRP2	0 0	5.60	15.24 15.24	1 1.049	2E T 4.0 5.0 0.0	2.209 9.000 11.209	120	7.408 0.0 0.882		Vel = 5.66	
DRP2			0.0 15.24					8.290		K Factor = 5.29	
TYP3 to DRP3	0 0	5.60	15.24 15.24	1 1.049	2E T 4.0 5.0 0.0	3.167 9.000 12.167	120	7.408 0.0 0.958		Vel = 5.66	
DRP3			0.0 15.24					8.366		K Factor = 5.27	
TYP4 to DRP4	0 0	5.60	15.24 15.24	1 1.049	2E T 4.0 5.0 0.0	3.333 9.000 12.333	120	7.408 0.0 0.971		Vel = 5.66	
DRP4			0.0 15.24					8.379		K Factor = 5.26	
TYP5 to DRP5	0 0	5.60	15.24 15.24	1 1.049	2E T 4.0 5.0 0.0	4.167 9.000 13.167	120	7.408 0.0 1.037		Vel = 5.66	
DRP5			0.0 15.24					8.445		K Factor = 5.24	
1 to 2	111 111	5.28	15.24 15.24	1.5 1.682	0.0 0.0 0.0	8.375 0.0 8.375	120	8.326 0.0 0.067		K = K @ DROP Vel = 2.20	
2 to 3	111 111	5.27	15.27 30.51	1.5 1.682	0.0 0.0 0.0	7.292 0.0 7.292	120	8.393 0.0 0.207		K = K @ DRP1 Vel = 4.41	
3 to 4	111 111	5.29	15.52 46.03	1.5 1.682	0.0 0.0 0.0	9.083 0.0 9.083	120	8.600 0.0 0.555		K = K @ DRP2 Vel = 6.65	
4 to 5	111 111	5.29	16.02 62.05	1.5 1.682	0.0 0.0 0.0	9.083 0.0 9.083	120	9.155 0.0 0.963		K = K @ DRP2 Vel = 8.96	
5 to A	111 111	5.29	16.83 78.88	1.5 1.682	0.0 0.0 0.0	9.083 0.0 9.083	120	10.118 0.0 1.501		K = K @ DRP2 Vel = 11.39	
A to B	111 111		0.0 78.88	1.5 1.682	T 0.0 0.0	9.9 6.750 9.900 16.650	120	11.619 0.0 2.753		Vel = 11.39	

# Final Calculations - Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv. Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
B			0.0 78.88					14.372		K Factor = 20.81	
6 to 7	111 111	5.27	18.90	1.5	0.0	14.000	120	12.860 0.0		K = K @ DRP3	
7 to D	111 111	5.27	18.9 19.02	1.682	0.0	14.000	0.0117 120	0.164 13.024		Vel = 2.73 K = K @ DRP3	
D to C	111 111		37.92 0.0	1.682	0.0	14.000	0.0426 120	0.597 13.621		Vel = 5.48	
D to C	111 111		0.0 37.92	1.5	T 9.9	10.583	120	9.900 0.0			
C			0.0 37.92					14.494		K Factor = 9.96	
8 to 9	111 111	5.27	16.81	1.5	0.0	5.375	120	10.193 0.0		K = K @ DRP4	
9 to 10	111 111	5.27	16.81 16.86	1.682	0.0	5.375	0.0095 120	0.051 10.244		Vel = 2.43 K = K @ DRP1	
10 to 11	111 111	5.25	16.86 33.67	1.5	0.0	8.667	120	0.0 0.297		Vel = 4.86 K = K @ DRP5	
10 to 11	111 111	5.25	17.03	1.5	0.0	12.000	120	0.0 0.0		Vel = 7.32	
11 to F	111 111	5.25	50.7 17.72	1.682	0.0	12.000	0.0729 120	0.875 11.416		K = K @ DRP5	
F to E	111 111		68.42 0.0	1.682	0.0	10.500	0.1270 120	1.334 12.750		Vel = 9.88	
F to E	111 111		0.0 68.42	1.5	T 9.9	6.000	120	9.900 0.0			
E			0.0 68.42					2.021		Vel = 9.88	
E			0.0 68.42					14.771		K Factor = 17.80	
B to C	111 111		78.88	2.5	0.0	6.583	120	14.372 0.0			
C to E	111 111		78.88	2.635	0.0	6.583	0.0185 120	0.122 14.494		Vel = 4.64	
C to E	111 111		37.92	2.5	0.0	7.209	120	0.0 0.0			
E to G	111 111		116.8	2.635	0.0	7.209	0.0384 120	0.277 14.771		Vel = 6.87	
E to G	111 111		68.42	2.5	0.0	6.625	120	0.0 0.0			
G to H	111 111		185.22	2.635	0.0	6.625	0.0901 120	0.597 15.368		Vel = 10.90	
G to H	111 111		0.0	2.5	0.0	22.042	120	0.0 0.0			
H to J	111 113.917		185.22	2.635	0.0	22.042	0.0901 120	1.986 17.354		Vel = 10.90	
H to J	111 113.917		0.0	2.5	E T 8.237 16.474	11.917	120	-1.263			
J to K	113.917 113.917		185.22	2.635	0.0	36.628	0.0901 120	3.299 19.390		Vel = 10.90	
J to K	113.917 113.917		0.0	2.5	0.0	14.042	120	0.0			
J to K	113.917 113.917		185.22	2.635	0.0	14.042	0.0901 120	1.265		Vel = 10.90	

# Final Calculations - Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv. Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
K to L	113.917 113.917		0.0 185.22	2.5 2.635		8.792 0.0 8.792	120	20.655 0.0			
L to R	113.917 117		0.0 185.22	2.5 2.635	2E 16.474 0.0	73.000 16.474 89.474	120	21.447 -1.335		Vel = 10.90	
R to TOR	117 117		0.0 185.22	4 4.26	2E 26.334 0.0	78.500 26.334 104.834	120	28.173 0.0		Vel = 4.17	
TOR to BKFL	117 105.333		0.0 185.22	4 4.26	Fsp 0.0 0.0	11.667 0.0 11.667	120	29.083 8.053		* Fixed Loss = 3 Vel = 4.17	
BKFL to BASE	105.333 101		0.0 185.22	4 4.26	Zac 0.0 0.0	4.333 0.0 4.333	120	37.238 4.387		* Fixed Loss = 2.51 Vel = 4.17	
BASE to X1	101 101		0.0 185.22	6 6.16	2E G 4.304 T 43.037	130.000 87.509 217.509	140	41.662 0.0		Vel = 1.99	
X1 to TEST	101 98	H100	100.00 285.22	8 7.98		150.000 0.0 150.000	100	41.898 1.299		Vel = 1.83	
TEST			0.0 285.22					43.388		K Factor = 43.30	

# Water Supply Curve C

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City Water Supply:  
C1 - Static Pressure : 98  
C2 - Residual Pressure: 92  
C2 - Residual Flow : 1528

Demand:  
D1 - Elevation : 5.630  
D2 - System Flow : 185.224  
D2 - System Pressure : 43.388  
Hose ( Demand ) : 100  
D3 - System Demand : 285.224  
Safety Margin : 54.344

