

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

FREEDOM FIRE PROTECTION INC.  
209 QUAKER RIDGE ROAD  
CASCO, MAINE 04015  
207-627-4109

Job Name : 191 PINE STREET PORTLAND TOWNHOUSE HC  
Building : 191 PINE STREET  
Location : PORTLAND, MAINE 04104  
System : #1 AREA#3  
Contract :  
Data File : 191 PINE STREET PORTLAND HC3.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - 191 PINE STREET PORTLAND Date - 9/14/12  
Location - PORTLAND, MAINE 04104  
Building - 191 PINE STREET System No. - #1 AREA#3  
Contractor - Contract No. -  
Calculated By - MIKE NOBLIT Drawing No. - FP-3  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height VARIES  
OCCUPANCY - TOWNHOUSE

S Type of Calculation: (X)NFPA 13 Residential (X)NFPA 13R ( )NFPA 13D  
Y Number of Sprinklers Flowing: ( )1 ( )2 ( )4 (X)3  
S ( )Other  
T ( )Specific Ruling Made by Date  
E  
M Listed Flow at Start Point - 16 Gpm System Type  
Listed Pres. at Start Point - 13.2 Psi (X) Wet ( ) Dry  
D MAXIMUM LISTED SPACING 16' x 16' ( ) Deluge ( ) PreAction  
E Domestic Flow Added - Gpm Sprinkler or Nozzle  
S Additional Flow Added - Gpm Make TYCO Model LFII  
I Elevation at Highest Outlet - 38'-0"Feet Size 1/2" K-Factor 4.4  
G Note: Temperature Rating 155  
N

Calculation Gpm Required 48.363 Psi Required 40.502 At Test  
Summary C-Factor Used: Overhead 120 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 8/31/12 Rated Cap. Cap.  
T Time of Test - @ Psi Elev.  
E Static (Psi) - 46 Elev.  
R Residual (Psi) - 24 Other Well  
Flow (Gpm) - 780 Proof Flow Gpm  
S Elevation -

P Location:  
P  
L Source of Information: PORTLAND WATER DISTRICT  
Y

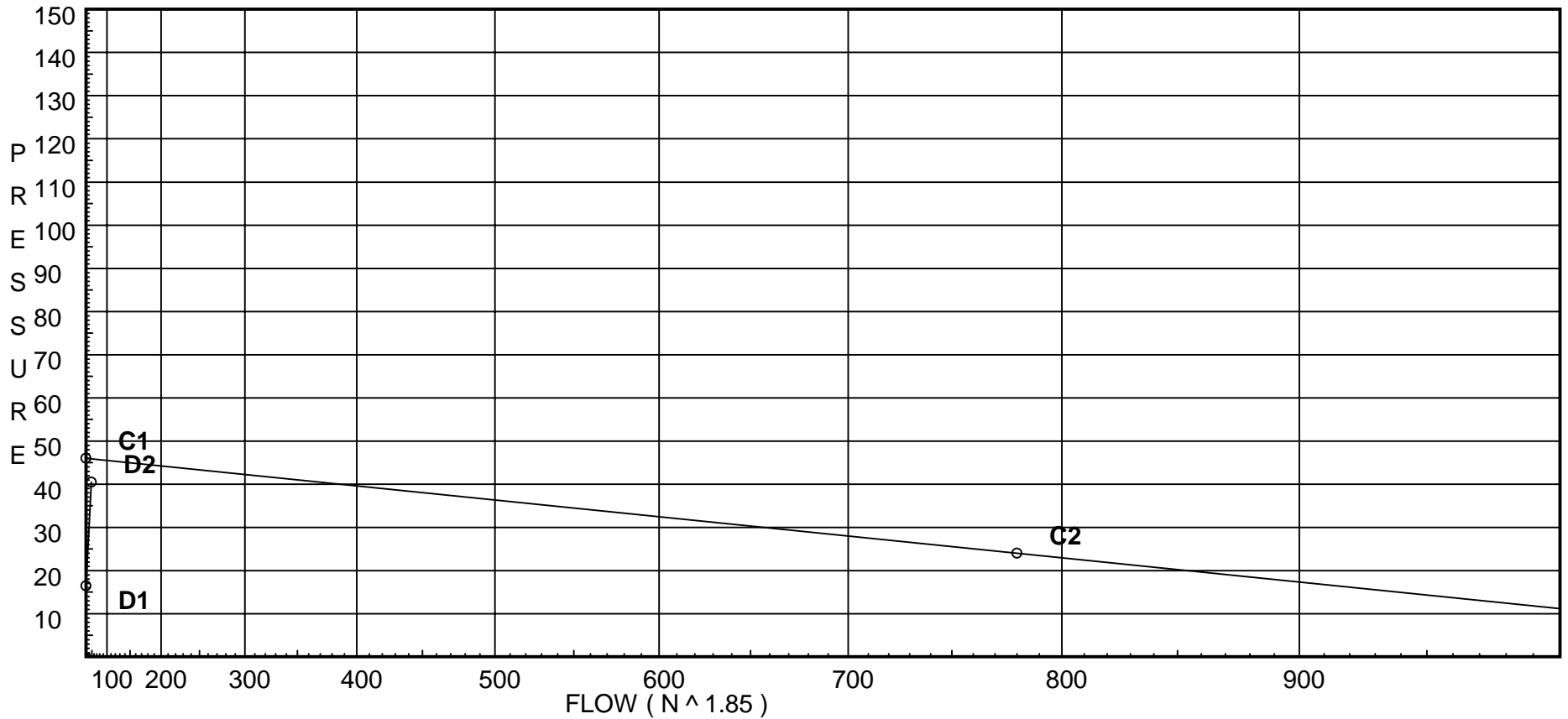
# Water Supply Curve (C)

FREEDOM FIRE PROTECTION INC.  
 191 PINE STREET PORTLAND TOWNHOUSE HC

Page 2  
 Date 9/14/12

City Water Supply:  
 C1 - Static Pressure : 46  
 C2 - Residual Pressure: 24  
 C2 - Residual Flow : 780

Demand:  
 D1 - Elevation : 16.458  
 D2 - System Flow : 48.3631  
 D2 - System Pressure : 40.502  
 Hose ( Adj City ) : \_\_\_\_\_  
 Hose ( Demand ) : \_\_\_\_\_  
 D3 - System Demand : 48.3631  
 Safety Margin : 5.370



# Fittings Used Summary

FREEDOM FIRE PROTECTION INC.  
191 PINE STREET PORTLAND TOWNHOUSE HC

Page 3  
Date 9/14/12

Fitting Legend		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24	
Abbrev.	Name																					
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61	
T	90' Flow Thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121	

Pressure / Flow Summary - STANDARD

FREEDOM FIRE PROTECTION INC.  
 191 PINE STREET PORTLAND TOWNHOUSE HC

Page 4  
 Date 9/14/12

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
301	38.0	4.4	13.59	na	16.22	0.05	0.001	13.2
302	38.0	4.4	13.2	na	15.99	0.05	0.001	13.2
303	38.0	4.4	13.49	na	16.16	0.05	0.001	13.2
36	38.0		14.22	na				
35	38.0		14.69	na				
34	38.0		15.71	na				
33	28.0		20.48	na				
32	28.0		20.78	na				
31	17.0		25.76	na				
30	4.5		31.55	na				
5	4.5		31.94	na				
4	4.5		32.95	na				
3	4.5		33.04	na				
2	4.5		33.28	na				
1	0.0		39.38	na				
0	0.0		40.49	na				
TEST	0.0		40.5	na				

The maximum velocity is 7.62 and it occurs in the pipe between nodes 35 and 34

Final Calculations - Hazen-Williams

FREEDOM FIRE PROTECTION INC.  
191 PINE STREET PORTLAND TOWNHOUSE HC

Page 5  
Date 9/14/12

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
301 to 35	16.22	1.049 120	1E 2.0 1T 5.0	5.500 7.000	13.587 0.0			K Factor = 4.40	
	16.22	0.0883	0.0	12.500	1.104			Vel = 6.02	
	0.0								
	16.22				14.691			K Factor = 4.23	
302 to 36	15.99	1.049 120	1E 2.0 1T 5.0	4.830 7.000	13.200 0.0			K Factor = 4.40	
	15.99	0.0860	0.0	11.830	1.017			Vel = 5.94	
	0.0								
	15.99				14.217			K Factor = 4.24	
303 to 36	16.16	1.049 120	2E 4.0	4.330 4.000	13.487 0.0			K Factor = 4.40	
	16.16	0.0876	0.0	8.330	0.730			Vel = 6.00	
36 to 35	15.98	1.38 120	0.0	5.750 0.0	14.217 0.0				
	32.14	0.0824	0.0	5.750	0.474			Vel = 6.89	
35 to 34	16.22	1.61 120	2E 8.0	4.330 8.000	14.691 0.0				
	48.36	0.0827	0.0	12.330	1.020			Vel = 7.62	
34 to 33	0.0	2.157 120	1T 12.307	9.500 12.307	15.711 4.331				
	48.36	0.0199	0.0	21.807	0.434			Vel = 4.25	
33 to 32	0.0	2.157 120	1E 6.153	9.083 6.153	20.476 0.0				
	48.36	0.0200	0.0	15.236	0.304			Vel = 4.25	
32 to 31	0.0	2.157 120	0.0	11.000 0.0	20.780 4.764				
	48.36	0.0199	0.0	11.000	0.219			Vel = 4.25	
31 to 30	0.0	2.157 120	1E 6.153	12.500 6.153	25.763 5.414				
	48.36	0.0199	0.0	18.653	0.371			Vel = 4.25	
30 to 5	0.0	2.157 120	0.0	19.500 0.0	31.548 0.0				
	48.36	0.0199	0.0	19.500	0.388			Vel = 4.25	
5 to 4	0.0	2.157 120	1E 6.153 1T 12.307	32.458 18.460	31.936 0.0				
	48.36	0.0199	0.0	50.918	1.014			Vel = 4.25	
4 to 3	0.0	2.157 120	0.0	4.330 0.0	32.950 0.0				
	48.36	0.0199	0.0	4.330	0.086			Vel = 4.25	
3 to 2	0.0	2.157 120	1E 6.153	6.330 6.153	33.036 0.0				
	48.36	0.0199	0.0	12.483	0.249			Vel = 4.25	

Final Calculations - Standard

FREEDOM FIRE PROTECTION INC.  
191 PINE STREET PORTLAND TOWNHOUSE HC

Page 6  
Date 9/14/12

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 to 1	0.0 48.36	2.157 120 0.0199	0.0 0.0 0.0	7.500 0.0 7.500	33.285 5.949 0.149		* Fixed loss = 4 Vel = 4.25
1 to 0	0.0 48.36	2.009 140 0.0212	3E 17.368 0.0 0.0	35.000 17.368 52.368	39.383 0.0 1.109		Vel = 4.89
0 to TEST	0.0 48.36	8.27 140 0.0	1T 55.354 0.0 0.0	400.000 55.354 455.354	40.492 0.0 0.010		Vel = 0.29
	0.0 48.36				40.502		K Factor = 7.60