



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

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

Job Name : OAK STREET LOFTS HC2  
Building : 72 OAK STREET  
Location : PORTLAND, MAINE 04101  
System : #1 AREA#2  
Contract :  
Data File : OAK STREET LOFTS HC2.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - OAK STREET LOFTS Date - 6/14/11  
Location - PORTLAND, MAINE 04101  
Building - 72 OAK STREET System No. - #1 AREA#2  
Contractor - Contract No. -  
Calculated By - MIKE NOBLIT Drawing No. - FP-3  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9'-0"  
OCCUPANCY - LOFTS

S Type of Calculation: (X)NFPA 13 Residential (X)NFPA 13R ( )NFPA 13D  
Y Number of Sprinklers Flowing: ( )1 ( )2 (X)4 ( )  
S ( )Other  
T ( )Specific Ruling Made by Date  
E  
M Listed Flow at Start Point - 13 Gpm System Type  
Listed Pres. at Start Point - 7 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 - 45'-4"Feet Size 1/2" K-Factor 4.9  
G Note: Temperature Rating 155  
N

Calculation Gpm Required 58.558 Psi Required 59.372 At Test  
Summary C-Factor Used: Overhead 150 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 5/7/10 Rated Cap. Cap.  
T Time of Test - @ Psi Elev.  
E Static (Psi) - 66 Elev.  
R Residual (Psi) - 62 Other Well  
Flow (Gpm) - 1186 Proof Flow Gpm  
S Elevation - 0

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

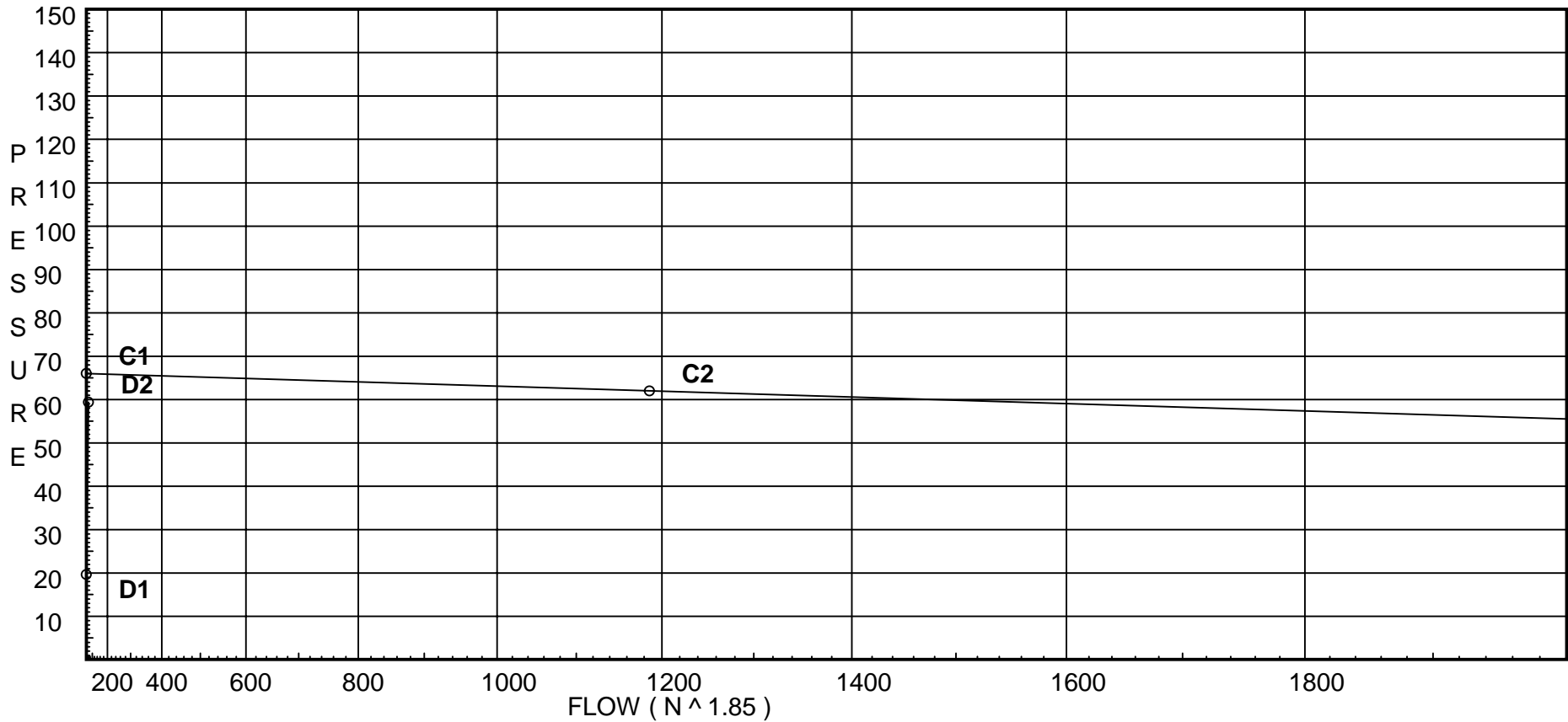
# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 66  
C2 - Residual Pressure: 62  
C2 - Residual Flow : 1186

Demand:  
D1 - Elevation : 19.632  
D2 - System Flow : 58.5578  
D2 - System Pressure : 59.372  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : \_\_\_\_\_  
D3 - System Demand : 58.5578  
Safety Margin : 6.613



# 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
B	Generic Butterfly Valve	0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	0	0	0	0	0
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
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
201	45.33	4.9	12.95	na	17.64	0.05	256	7.0
202	45.33	4.9	9.02	na	14.72	0.05	256	7.0
203	45.33	4.9	7.3	na	13.24	0.05	256	7.0
204	45.33	4.9	7.0	na	12.96	0.05	256	7.0
23	45.33		7.64	na				
22	45.33		9.43	na				
21	45.33		13.52	na				
20	45.33		20.5	na				
9	45.33		22.07	na				
8	45.33		29.14	na				
7	45.33		33.35	na				
6	12.76		48.55	na				
5	12.76		48.92	na				
4	12.76		50.07	na				
3	4.42		53.72	na				
2	4.42		53.75	na				
1	0.0		59.31	na				
TEST	0.0		59.37	na				

The maximum velocity is 13.79 and it occurs in the pipe between nodes 22 and 21

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
201 to 21	17.64	1.101 150 0.0540	1T 9.563 0.0 0.0	1.000 9.562 10.562	12.954 0.0 0.570		K Factor = 4.90 Vel = 5.94		
	0.0 17.64				13.524		K Factor = 4.80		
202 to 22	14.72	1.101 150 0.0386	1T 9.563 0.0 0.0	1.000 9.562 10.562	9.022 0.0 0.408		K Factor = 4.90 Vel = 4.96		
	0.0 14.72				9.430		K Factor = 4.79		
203 to 23	13.24	1.101 150 0.0317	1T 9.563 0.0 0.0	1.000 9.562 10.562	7.300 0.0 0.335		K Factor = 4.90 Vel = 4.46		
	0.0 13.24				7.635		K Factor = 4.79		
204 to 23	12.96	1.101 150 0.0305	1E 3.825 0.0 0.0	17.000 3.825 20.825	7.000 0.0 0.635		K Factor = 4.90 Vel = 4.37		
23 to 22	13.24	1.101 150 0.1122	 0.0 0.0 0.0	16.000 0.0 16.000	7.635 0.0 1.795		Vel = 8.83		
22 to 21	14.72	1.101 150 0.2559	 0.0 0.0 0.0	16.000 0.0 16.000	9.430 0.0 4.094		Vel = 13.79		
21 to 20	17.64	1.394 150 0.1573	1T 9.523 0.0 0.0	34.791 9.523 44.314	13.524 0.0 6.972		Vel = 12.31		
20 to 9	0.0	1.394 150 0.1573	1T 9.523 0.0 0.0	0.500 9.523 10.023	20.496 0.0 1.577		Vel = 12.31		
9 to 8	0.0	1.394 150 0.1573	1T 9.523 0.0 0.0	35.375 9.523 44.898	22.073 0.0 7.064		Vel = 12.31		
8 to 7	0.0	1.598 150 0.0809	1E 5.828 0.0 0.0	21.491 5.828 27.319	29.137 2.000 2.211		* Fixed loss = 2 Vel = 9.37		
7 to 6	0.0	2.157 120 0.0284	1E 6.153 0.0 0.0	32.660 6.153 38.813	33.348 14.106 1.101		Vel = 5.14		
6 to 5	0.0	2.157 120 0.0283	1T 12.307 0.0 0.0	0.750 12.307 13.057	48.555 0.0 0.370		Vel = 5.14		

Final Calculations - Standard

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	***** Notes *****
5 to 4	0.0 58.56	2.157 120 0.0284	3E 18.46 0.0	22.000 18.460 40.460	48.925 0.0 1.148		Vel = 5.14
4 to 3	0.0 58.56	4.26 120 0.0010	1E 13.167 1B 15.8 0.0	8.250 28.967 37.217	50.073 3.612 0.038		Vel = 1.32
3 to 2	0.0 58.56	4.26 120 0.0010	1T 26.334 0.0	2.000 26.334 28.334	53.723 0.0 0.029		Vel = 1.32
2 to 1	0.0 58.56	4.026 120 0.0015	1Zac 0.0 0.0	3.420 0.0 3.420	53.752 5.554 0.005		* Fixed loss = 3.64 Vel = 1.48
1 to TEST	0.0 58.56	4.1 140 0.0009	1E 14.534 0.0	50.000 14.534 64.534	59.311 0.0 0.061		Vel = 1.42
	0.0 58.56				59.372		K Factor = 7.60