



... Fire Protection by Computer Design

High Tech Fire Protection
84 Hackett Mills Road
P.O. Box 156
Minot, Maine 04258-0156
998-2551

Job Name : Second Floor Calc.
Drawing : Seaside Rehabilitation and Health Care
Location : 850 Baxter Boulevard
Remote Area : NFPA 13
Contract : 111612-2
Data File : Second Floor Calc.wxf

Hydraulic Design Information Sheet

Name - Second Floor Calc. Date - 05/08/2013
 Location - 850 Baxter Boulevard
 Building - Seaside Rehabilitation and Health Care System No. - NFPA 13
 Contractor - High Tech Fire Protection Contract No. - 111612-2
 Calculated By - Jeremy A Foss Drawing No. - FP-1.1
 Construction: () Combustible (X) Non-Combustible Ceiling Height - 9'-0"
 Occupancy - Medical - Healthcare

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

M	Area of Sprinkler Operation	- 900	System Type	Sprinkler/Nozzle
	Density	- .1	(X) Wet	Make Globe
D	Area Per Sprinkler	- 225	() Dry	Model GL5606
E	Elevation at Highest Outlet	- 23	() Deluge	Size 1/2"
S	Hose Allowance - Inside	-	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	-	() Other	Temp.Rat.155
G	Hose Allowance - Outside	- 100		

N Note

Calculation Flow Required - 517 Press Required - 92
 Summary C-Factor Used: 120 Overhead 120 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 05/02/2013		Cap. -
T	Time of Test - 12:45 PM	Rated Cap.-	Elev.-
E	Static Press - 102	@ Press -	
R	Residual Press - 90	Elev. -	Well
	Flow - 1453		Proof Flow
S	Elevation - -1		

P Location - Test Hydrant Located at Front and Presumpscot Street

L Source of Information - Hydrant Flow Test Conducted by the
 Y Portland Water District

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

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

G Horizontal Barriers Provided:

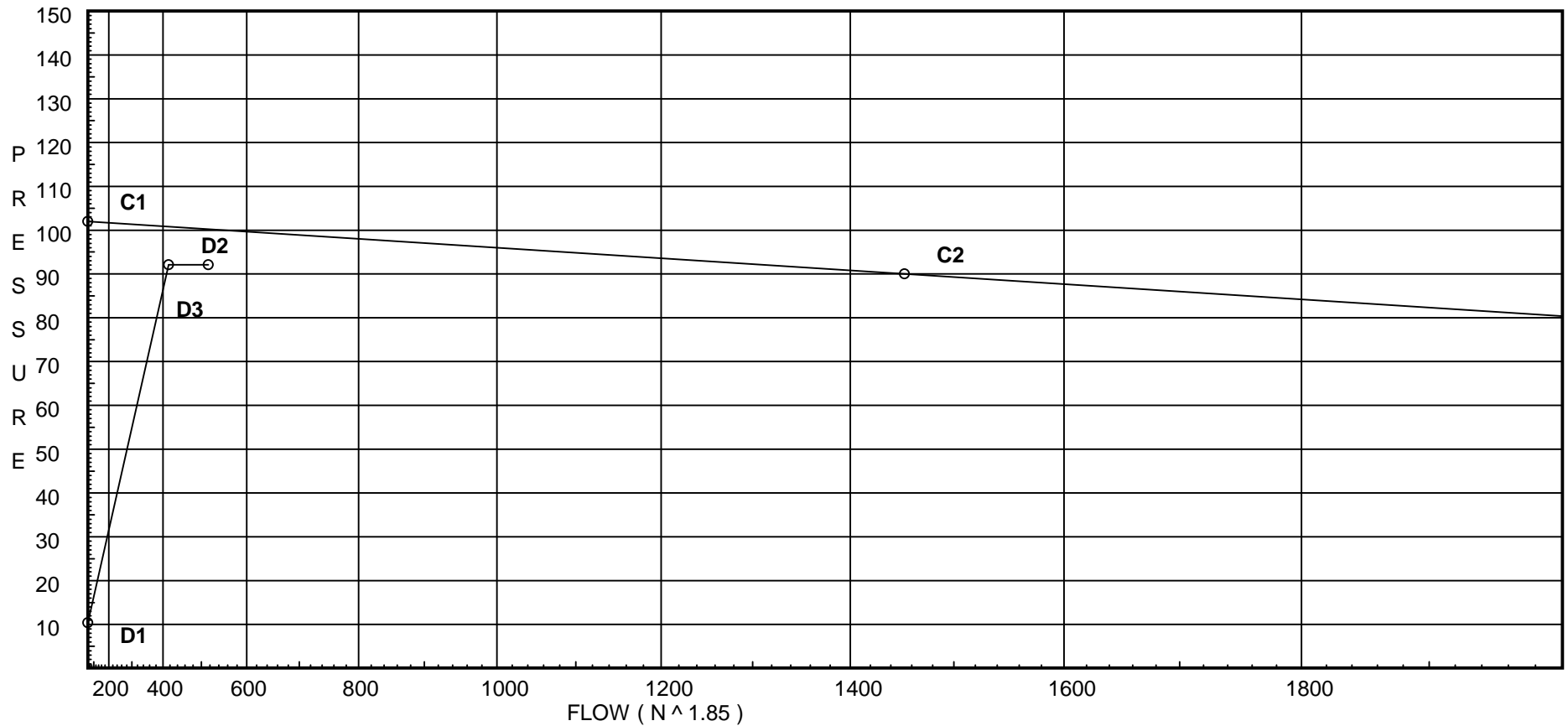
Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 102
C2 - Residual Pressure: 90
C2 - Residual Flow : 1453

Demand:
D1 - Elevation : 10.394
D2 - System Flow : 416.305
D2 - System Pressure : 92.092
Hose (Adj City) : _____
Hose (Demand) : 100
D3 - System Demand : 516.305
Safety Margin : 8.138



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	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
Fsw	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
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
V	90' Ell Firelock #001	0	0	0	0	0	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
X	90'Tee-BranchFirelock002	0	0	0	0	0	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DP1	-1.0	5.6	12.25	na	19.6	0.1	196	7.0
DP2	-1.0	5.6	12.25	na	19.6	0.1	196	7.0
DP3	-1.0	5.6	12.25	na	19.6	0.1	196	7.0
201	23.0	K = K @ EQ01	15.05	na	21.78			
202	23.0	K = K @ EQ01	12.19	na	19.6			
203	23.0	K = K @ EQ02	12.82	na	19.79			
A1	23.0		16.15	na				
204	23.0	K = K @ EQ02	18.83	na	23.99			
207	23.0	K = K @ EQ01	13.45	na	20.58			
206	23.0	K = K @ EQ02	14.13	na	20.78			
205	23.0	K = K @ EQ02	19.92	na	24.68			
208	23.0	K = K @ EQ01	16.23	na	22.62			
209	23.0	K = K @ EQ02	17.93	na	23.41			
210	23.0	K = K @ EQ02	22.13	na	26.01			
211	23.0	K = K @ EQ02	23.25	na	26.65			
212	23.0	K = K @ EQ01	15.03	na	21.76			
213	23.0	K = K @ EQ03	16.11	na	21.56			
214	23.0	K = K @ EQ01	18.11	na	23.89			
A4	23.0		19.32	na				
215	23.0	K = K @ EQ03	20.35	na	24.23			
218	23.0	K = K @ EQ03	18.9	na	23.35			
217	23.0	K = K @ EQ03	19.55	na	23.74			
216	23.0	K = K @ EQ02	25.45	na	27.89			
A2	23.0		23.82	na				
A3	23.0		25.79	na				
A5	23.0		28.33	na				
A6	23.0		49.38	na				
A7	23.0		59.85	na				
A8	23.0		61.66	na				
A9	11.0		69.53	na				
A10	11.0		70.58	na				
TOR	11.0		76.88	na				
BOR	1.0		89.6	na				
H1	0.0		90.49	na				
H2	-1.0		91.61	na				
H3	-1.0		91.69	na				
TEST	-1.0		92.09	na	100.0			

The maximum velocity is 36.55 and it occurs in the pipe between nodes A5 and A6

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	*****
DP1 to EQ01	19.60 19.6 0.0 19.60	1.049 120 0.1253	1E 2.0 0.0 0.0	1.000 2.000 3.000	12.250 -0.433 0.376		K Factor = 5.60 Vel = 7.28		
					12.193		K Factor = 5.61		
DP2 to EQ02	19.60 19.6 0.0 19.60	1.049 120 0.1253	1T 5.0 0.0 0.0	1.000 5.000 6.000	12.250 -0.433 0.752		K Factor = 5.60 Vel = 7.28		
					12.569		K Factor = 5.53		
DP3 to EQ03	19.60 19.6 0.0 19.60	1.049 120 0.1253	2E 4.0 1T 5.0 0.0	3.000 9.000 12.000	12.250 -0.433 1.504		K Factor = 5.60 Vel = 7.28		
					13.321		K Factor = 5.37		
201 to A1	21.78 21.78 0.0 21.78	1.049 120 0.1524	0.0 0.0 0.0	7.200 0.0 7.200	15.052 0.0 1.097		K Factor @ node EQ01 Vel = 8.09		
					16.149		K Factor = 5.42		
202 to 203	19.60 19.6 0.0 19.60	1.049 120 0.1254	0.0 0.0 0.0	5.000 0.0 5.000	12.193 0.0 0.627		K Factor @ node EQ01 Vel = 7.28		
203 to A1	19.79 39.39 0.0 19.60	1.049 120 0.4560	1T 5.0 0.0 0.0	2.300 5.000 7.300	12.820 0.0 3.329		K Factor @ node EQ02 Vel = 14.62		
A1 to 204	21.78 61.17 0.0 21.78	1.38 120 0.2708	0.0 0.0 0.0	9.900 0.0 9.900	16.149 0.0 2.681		Vel = 13.12		
204 to A2	23.99 85.16 0.0 23.823	1.38 120 0.4993	1T 6.0 0.0 0.0	4.000 6.000 10.000	18.830 0.0 4.993		K Factor @ node EQ02 Vel = 18.27		
					23.823		K Factor = 17.45		
207 to 206	20.58 20.58 0.0 20.58	1.049 120 0.1372	0.0 0.0 0.0	5.000 0.0 5.000	13.446 0.0 0.686		K Factor @ node EQ01 Vel = 7.64		
206 to 205	20.79 41.37 0.0 20.58	1.049 120 0.4992	1E 2.0 0.0 0.0	9.600 2.000 11.600	14.132 0.0 5.791		K Factor @ node EQ02 Vel = 15.36		
205 to A2	24.67 66.04 0.0 23.823	1.38 120 0.3120	1T 6.0 0.0 0.0	6.500 6.000 12.500	19.923 0.0 3.900		K Factor @ node EQ02 Vel = 14.17		
					23.823		K Factor = 13.53		
*P									
208 to 209	22.62 22.62 0.0 22.62	1.049 120 0.1634	0.0 0.0 0.0	10.400 0.0 10.400	16.233 0.0 1.699		K Factor @ node EQ01 Vel = 8.40		

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	*****
209 to 210	23.41 46.03	1.049 120 0.6081		6.900 0.0 6.900	17.932 0.0 4.196		K Factor @ node EQ02		
							Vel = 17.09		
210 to A3	26.00 72.03	1.38 120 0.3664	1T	6.0 0.0 10.000	4.000 6.000 3.664	22.128 0.0	K Factor @ node EQ02		
	0.0 72.03					25.792	Vel = 15.45		
							K Factor = 14.18		
211 to A3	26.65 26.65	1.049 120 0.2214	1T	5.0 0.0 11.500	6.500 5.000 2.546	23.246 0.0	K Factor @ node EQ02		
	0.0 26.65					25.792	Vel = 9.89		
							K Factor = 5.25		
*P									
212 to 213	21.76 21.76	1.049 120 0.1521		7.100 0.0 7.100	15.034 0.0 1.080		K Factor @ node EQ01		
							Vel = 8.08		
213 to A4	21.56 43.32	1.049 120 0.5437		5.900 0.0 5.900	16.114 0.0 3.208		K Factor @ node EQ03		
	0.0 43.32					19.322	Vel = 16.08		
							K Factor = 9.86		
214 to A4	23.89 23.89	1.049 120 0.1807	1T	5.0 0.0 6.700	1.700 5.000 1.211	18.111 0.0	K Factor @ node EQ01		
							Vel = 8.87		
A4 to 215	43.32 67.21	1.38 120 0.3222		0.0 0.0 3.200	3.200 0.0 1.031	19.322 0.0	Vel = 14.42		
215 to A5	24.23 91.44	1.38 120 0.5695	1T	6.0 0.0 14.000	8.000 6.000 7.973	20.353 0.0	K Factor @ node EQ03		
	0.0 91.44					28.326	Vel = 19.61		
							K Factor = 17.18		
218 to 217	23.35 23.35	1.049 120 0.1732		3.700 0.0 3.700	18.905 0.0 0.641		K Factor @ node EQ03		
							Vel = 8.67		
217 to 216	23.74 47.09	1.049 120 0.6344		0.0 0.0 9.300	9.300 0.0 5.900	19.546 0.0	K Factor @ node EQ03		
							Vel = 17.48		
216 to A5	27.89 74.98	1.38 120 0.3945	1T	6.0 0.0 7.300	1.300 6.000 2.880	25.446 0.0	K Factor @ node EQ02		
	0.0 74.98					28.326	Vel = 16.08		
							K Factor = 14.09		
*P									
A2 to A3	151.20 151.2	2.157 120 0.1641		12.000 0.0 12.000	23.823 0.0 1.969		Vel = 13.28		

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	*****
A3 to A5	98.69 249.89	2.157 120 0.4154		0.0 0.0 0.0	6.100 0.0 6.100	25.792 0.0 2.534		Vel = 21.94	
A5 to A6	166.41 416.3	2.157 120 1.0684	1T	12.307 0.0 0.0	7.400 12.307 19.707	28.326 0.0 21.054		Vel = 36.55	
A6 to A7	0.0 416.3	3.26 120 0.1430	1X	17.471 0.0 0.0	55.800 17.471 73.271	49.380 0.0 10.475		Vel = 16.00	
A7 to A8	0.0 416.3	3.26 120 0.1429	1V	6.72 0.0 0.0	5.900 6.720 12.620	59.855 0.0 1.804		Vel = 16.00	
A8 to A9	0.0 416.3	3.26 120 0.1429	1V	6.72 0.0 0.0	12.000 6.720 18.720	61.659 5.197 2.676		Vel = 16.00	
A9 to A10	0.0 416.3	4.26 120 0.0389	1X	21.067 0.0 0.0	5.900 21.067 26.967	69.532 0.0 1.048		Vel = 9.37	
A10 to TOR	0.0 416.3	4.26 120 0.0388	6V	53.722 0.0 0.0	108.500 53.722 162.222	70.580 0.0 6.301		Vel = 9.37	
TOR to BOR	0.0 416.3	4.26 120 0.0389	1Fsw	0.0 0.0 0.0	10.000 0.0 10.000	76.881 12.331 0.389		* Fixed loss = 5 Vel = 9.37	
BOR to H1	0.0 416.3	6.16 140 0.0048	2F 1G 1E	20.084 4.304 20.084	50.000 44.472 94.472	89.601 0.433 0.458		Vel = 4.48	
H1 to H2	0.0 416.3	8.27 140 0.0012	1E 1G 1T	28.468 6.326 55.354	500.000 90.148 590.148	90.492 0.433 0.681		Vel = 2.49	
H2 to H3	0.0 416.3	8.27 140 0.0012		0.0 0.0 0.0	75.000 0.0 75.000	91.606 0.0 0.087		Vel = 2.49	
H3 to TEST	0.0 416.3	6.16 140 0.0048	1E 1G 1T	20.084 4.304 43.037	15.000 67.425 82.425	91.693 0.0 0.399		Vel = 4.48	
	100.00 516.30					92.092		Qa = 100.00 K Factor = 53.80	