

HYDRAULIC DESIGN INFORMATION SHEET

Name - Munjoy heights Date - 2-21-14  
Location - Third floor  
Building - B System No. - 1 of 1  
Contractor - Residential Fire Protection Contract No. - C14005  
Calculated By - JAL Drawing No. - 2 of 7  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9'-5"  
OCCUPANCY - Residential

S Type of Calculation: ( )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 - 10.6 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 - 100 Gpm Make Viking Model VK486  
I Elevation at Highest Outlet - Feet Size 1/2" K-Factor 4.0  
G Note:Safety Margin: 11.431 Temperature Rating  
N

Calculation Gpm Required 151.477 Psi Required 51.433 At Test  
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 11-7-13 Rated Cap. Cap.  
T Time of Test - 12:35 PM @ Psi Elev.  
E Static (Psi) - 63 Elev.  
R Residual (Psi) - 58 Other Well  
Flow (Gpm) - 1061 Proof Flow Gpm  
S Elevation - 0

P Location:  
P  
L Source of Information:  
Y

# Water Supply Curve (C)

Residential Fire Protection  
Munjoy Heights building B

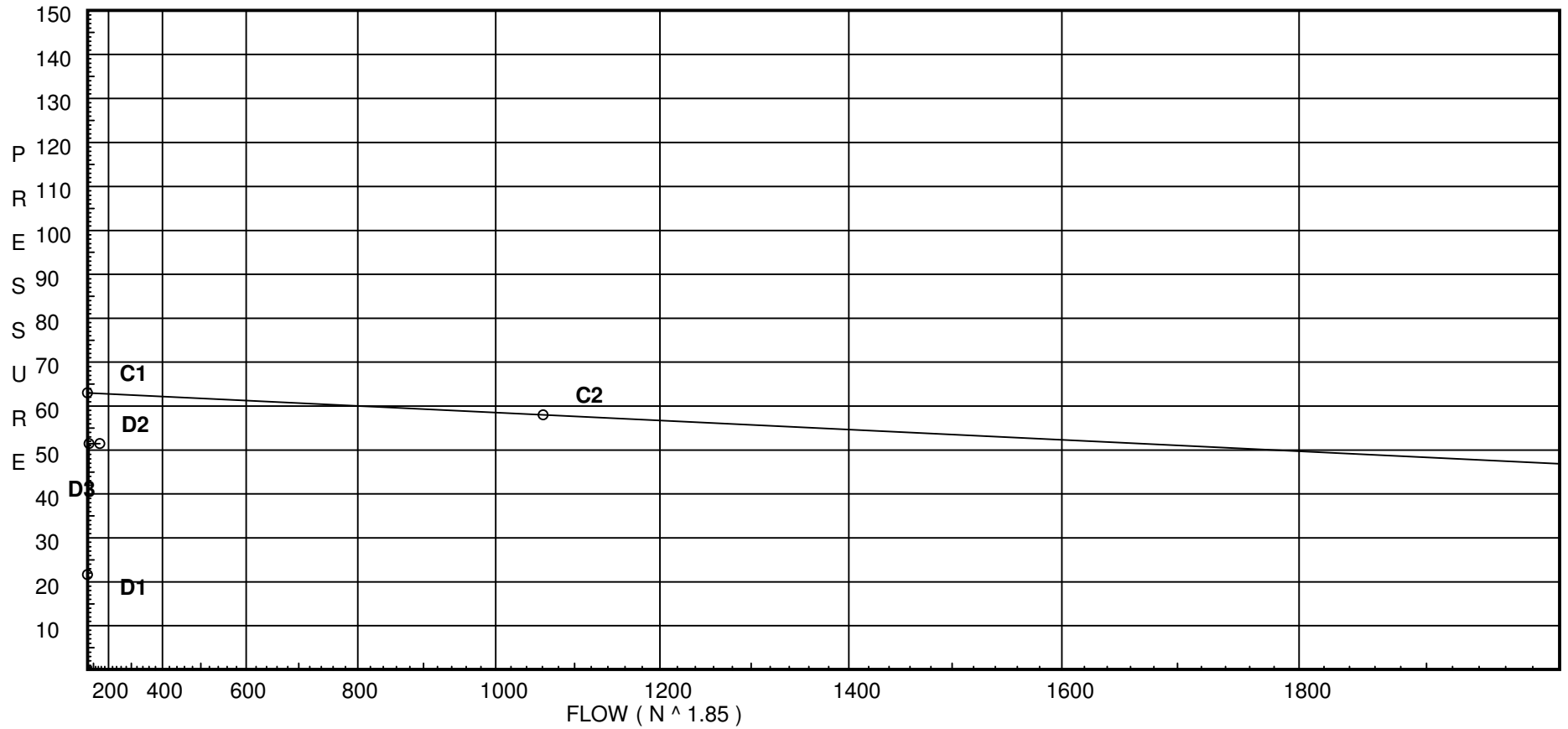
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### City Water Supply:

C1 - Static Pressure : 63  
C2 - Residual Pressure: 58  
C2 - Residual Flow : 1061

### Demand:

D1 - Elevation : 21.655  
D2 - System Flow : 51.477  
D2 - System Pressure : 51.433  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : 100  
D3 - System Demand : 151.477  
Safety Margin : 11.431



# Fittings Used Summary

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## Fitting Legend

Abbrev.	Name	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
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
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N	CPVC 90'El Harvel-Spears	7	7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
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
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61

# Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	50.0	4	7.6	na	11.03	0.1	110	7.6
1A	0.0		30.83	na				
2	50.0	4	8.67	na	11.78	0.1	110	7.6
2A	0.0		31.11	na				
3	40.0	4	12.59	na	14.19	0.1	130	10.6
4	40.0	4	13.1	na	14.48	0.1	130	10.6
10	0.0		32.13	na				
11	0.0		31.33	na				
11A	0.0		31.73	na				
12	0.0		32.97	na				
13	0.0		33.68	na				
14	0.0		34.5	na				
23	0.0		34.37	na				
24	0.0		34.77	na				
33	0.0		34.64	na				
34	0.0		35.46	na				
35	0.0		38.33	na				
TR	5.0		36.82	na				
BR	0.0		45.53	na				
UNG1	0.0		47.37	na	100.0			
TEST	0.0		51.43	na				

The maximum velocity is 10.82 and it occurs in the pipe between nodes 12 and 13

# 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	*****
1	11.03	0.824			11.250	7.600				
to		120		0.0	0.0	21.655			K Factor = 4.00	
1A	11.03	0.1402		0.0	11.250	1.577			Vel = 6.64	
1A	0.0	1.049	2N	14.0	16.000	30.832				
to		120		0.0	14.000	0.0				
10	11.03	0.0433		0.0	30.000	1.298			Vel = 4.09	
	0.0									
	11.03					32.130			K Factor = 1.95	
2	11.78	0.874		0.0	10.000	8.672			K Factor = 4.00	
to		150		0.0	0.0	21.655				
2A	11.78	0.0787		0.0	10.000	0.787			Vel = 6.30	
2A	0.0	1.101	1N	7.0	12.000	31.114				
to		150	1O	5.0	12.000	0.0				
11A	11.78	0.0255		0.0	24.000	0.613			Vel = 3.97	
	0.0									
	11.78					31.727			K Factor = 2.09	
3	14.19	0.874	1O	3.0	10.000	12.585			K Factor = 4.00	
to		150	1N	7.0	10.000	17.324				
10	14.19	0.1110		0.0	20.000	2.221			Vel = 7.59	
	0.0									
	14.19					32.130			K Factor = 2.50	
4	14.48	1.101	1O	5.0	12.000	13.104			K Factor = 4.00	
to		150	1N	7.0	12.000	17.324				
11	14.48	0.0375		0.0	24.000	0.899			Vel = 4.88	
	0.0									
	14.48					31.327			K Factor = 2.59	
10	25.22	1.101	1O	5.0	3.000	32.130				
to		150		0.0	5.000	0.0				
12	25.22	0.1044		0.0	8.000	0.835			Vel = 8.50	
	0.0									
	25.22					32.965			K Factor = 4.39	
11	14.48	1.101		0.0	10.680	31.327				
to		150		0.0	0.0	0.0				
11A	14.48	0.0375		0.0	10.680	0.400			Vel = 4.88	
11A	11.78	1.101	1O	5.0	6.000	31.727				
to		150		0.0	5.000	0.0				
12	26.26	0.1125		0.0	11.000	1.238			Vel = 8.85	
12	25.22	1.394		0.0	5.750	32.965				
to		150		0.0	0.0	0.0				
13	51.48	0.1240		0.0	5.750	0.713			Vel = 10.82	
13	-19.27	1.598	2O	16.0	10.000	33.678				
to		150		0.0	16.000	0.0				
23	32.21	0.0268		0.0	26.000	0.696			Vel = 5.15	
	0.0									
	32.21					34.374			K Factor = 5.49	
13	19.27	1.598		0.0	79.000	33.678				
to		150		0.0	0.0	0.0				
14	19.27	0.0104		0.0	79.000	0.818			Vel = 3.08	

# 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	*****
14 to 24	0.0 19.27	1.598 150 0.0103	2O	16.0 0.0 0.0	10.000 16.000 26.000	34.496 0.0 0.269				Vel = 3.08
	0.0 19.27						34.765			K Factor = 3.27
23 to 24	12.93 12.93	1.598 150 0.0049		0.0 0.0 0.0	79.000 0.0 79.000	34.374 0.0 0.391				Vel = 2.07
	0.0 12.93						34.765			K Factor = 2.19
23 to 33	19.27 19.27	1.598 150 0.0103	2O	16.0 0.0 0.0	10.000 16.000 26.000	34.374 0.0 0.269				Vel = 3.08
	0.0 19.27						34.643			K Factor = 3.27
24 to 34	32.21 32.21	1.598 150 0.0268	2O	16.0 0.0 0.0	10.000 16.000 26.000	34.765 0.0 0.696				Vel = 5.15
	0.0 32.21						35.461			K Factor = 5.41
33 to 34	19.27 19.27	1.598 150 0.0104		0.0 0.0 0.0	79.000 0.0 79.000	34.643 0.0 0.818				Vel = 3.08
34 to 35	32.21 51.48	1.598 150 0.0638	1N	9.0 0.0 0.0	36.000 9.000 45.000	35.461 0.0 2.869				Vel = 8.24
35 to TR	0.0 51.48	2.067 120 0.0275	2E 1T	10.0 10.0 0.0	3.750 20.000 23.750	38.330 -2.166 0.653				Vel = 4.92
TR to BR	0.0 51.48	2.067 120 0.0275	1E 1Z	5.0 5.0 0.0	10.000 10.000 20.000	36.817 8.166 0.550				* Fixed loss = 6 Vel = 4.92
BR to UNG1	0.0 51.48	1.92 150 0.0261	1T	10.55 0.0 0.0	60.000 10.550 70.550	45.533 0.0 1.839				Vel = 5.70
UNG1 to TEST	100.00 151.48	8.27 140 0.0002	1T 1G 4F	55.354 6.326 56.936	220.000 118.616 338.616	47.372 4.000 0.061				Qa = 100 * Fixed loss = 4 Vel = 0.90
	0.0 151.48						51.433			K Factor = 21.12