

Hydraulic Design Information Sheet

Name - Brick North Mezzanine Date - 8-18-14  
Location - Above ceiling  
Building - Brick North West wing System No. - 1 of 1  
Contractor - Residential Fire Protection Contract No. - C14019  
Calculated By - JAL Drawing No. - 1 of 2  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - 12  
Occupancy - Unoccupied

S (X) NFPA 13 ( ) 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 - 1500 System Type Sprinkler/Nozzle  
Density - .1 (X) Wet Make Viking  
D Area Per Sprinkler - 190 ( ) Dry Model VK300  
E Elevation at Highest Outlet - 10.5 ( ) Deluge Size 1/2"  
S Hose Allowance - Inside - ( ) Preaction K-Factor 5.6  
I Rack Sprinkler Allowance - ( ) Other Temp.Rat.200  
G Hose Allowance - Outside - 250

N Note Safety Margin: 33.045

Calculation Flow Required - 275.489 Press Required - 64.700  
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 9-13-11 Cap. -  
T Time of Test - Rated Cap.- Elev.-  
E Static Press - 98 @ Press -  
R Residual Press - 92 Elev. - Well  
Flow - 1519 Proof Flow  
S Elevation - 20

U Location -

P Source of Information -

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

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

G Horizontal Barriers Provided:  
E

# Water Supply Curve (C)

Residential Fire Protection  
Brick North Mezzanine

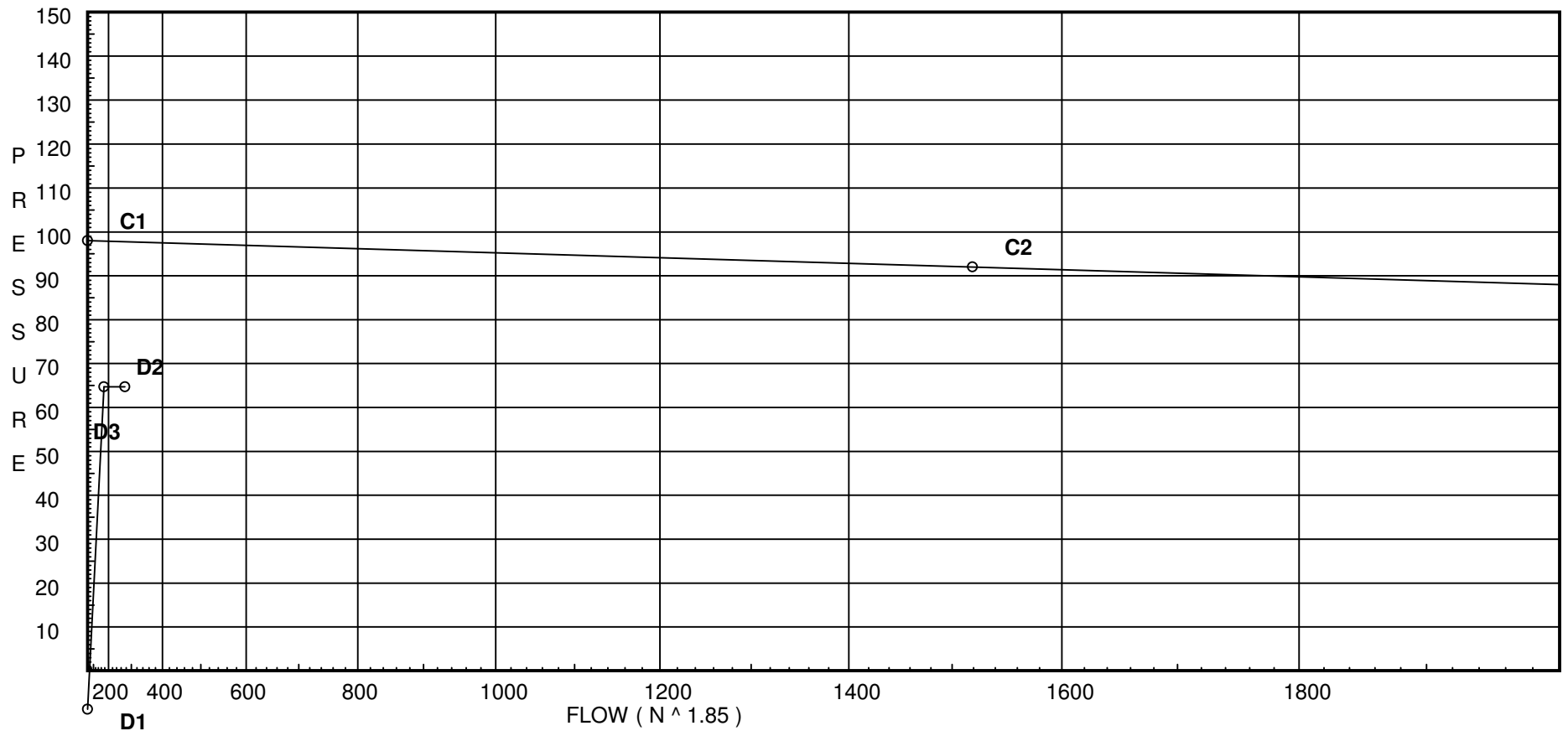
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### City Water Supply:

C1 - Static Pressure : 98  
C2 - Residual Pressure: 92  
C2 - Residual Flow : 1519

### Demand:

D1 - Elevation : -8.662  
D2 - System Flow : 175.489  
D2 - System Pressure : 64.700  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : 100  
D3 - System Demand : 275.489  
Safety Margin : 33.045



# 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
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
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
S	Generic Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
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
Zia	Wilkins 350	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.
AB	10.5	5.6	11.51	na	19.0	0.1	190	7.0
40	0.0	K = K @ AB1	17.28	na	19.0			
41	0.0	K = K @ AB1	18.38	na	19.59			
42	0.0	K = K @ AB1	19.42	na	20.14			
43	0.0	K = K @ AB1	21.76	na	21.32			
44	0.0	K = K @ AB1	27.99	na	24.18			
45	0.0	K = K @ AB1	23.29	na	22.06			
46	0.0	K = K @ AB1	25.22	na	22.95			
47	0.0	K = K @ AB1	32.98	na	26.25			
50	0.0		38.24	na				
51	0.0		40.15	na				
52	0.0		54.91	na				
TR	0.0		63.61	na				
HDR	0.0		68.97	na				
BR	0.0		72.65	na				
UG1	0.0		72.76	na	100.0			
TEST	20.0		64.7	na				

The maximum velocity is 22.36 and it occurs in the pipe between nodes 44 and 51

# Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
AB to AB1	19.00 19.0	1.049 120 0.1183	2T	10.0 0.0 0.0	0.330 10.000 10.330	11.512 4.548 1.222			K Factor = 5.60 Vel = 7.05	
	0.0 19.00						17.282		K Factor = 4.57	
40 to 41	19.00 19.0	1.049 120 0.1183		0.0 0.0 0.0	9.250 0.0 9.250	17.282 0.0 1.094			K Factor @ node AB1 Vel = 7.05	
41 to 42	19.59 38.59	1.38 120 0.1156		0.0 0.0 0.0	9.000 0.0 9.000	18.376 0.0 1.040			K Factor @ node AB1 Vel = 8.28	
42 to 43	20.14 58.73	1.38 120 0.2510		0.0 0.0 0.0	9.330 0.0 9.330	19.416 0.0 2.342			K Factor @ node AB1 Vel = 12.60	
43 to 44	21.32 80.05	1.38 120 0.4454		0.0 0.0 0.0	14.000 0.0 14.000	21.758 0.0 6.235			K Factor @ node AB1 Vel = 17.17	
44 to 51	24.18 104.23	1.38 120 0.7257	1T	6.0 0.0 0.0	10.750 6.000 16.750	27.993 0.0 12.155			K Factor @ node AB1 Vel = 22.36	
	0.0 104.23						40.148		K Factor = 16.45	
45 to 46	22.06 22.06	1.049 120 0.1560		0.0 0.0 0.0	12.400 0.0 12.400	23.286 0.0 1.934			K Factor @ node AB1 Vel = 8.19	
46 to 47	22.95 45.01	1.049 120 0.5835		0.0 0.0 0.0	13.300 0.0 13.300	25.220 0.0 7.761			K Factor @ node AB1 Vel = 16.71	
47 to 50	26.25 71.26	1.38 120 0.3590	1T	6.0 0.0 0.0	8.650 6.000 14.650	32.981 0.0 5.260			K Factor @ node AB1 Vel = 15.29	
50 to 51	0.0 71.26	1.61 120 0.1695		0.0 0.0 0.0	11.250 0.0 11.250	38.241 0.0 1.907			Vel = 11.23	
51 to 52	104.23 175.49	2.067 120 0.2659	1E 1T	5.0 10.0 0.0	40.500 15.000 55.500	40.148 0.0 14.760			Vel = 16.78	
52 to TR	0.0 175.49	2.067 120 0.2660	2T	20.0 0.0 0.0	12.700 20.000 32.700	54.908 0.0 8.697			Vel = 16.78	
TR to HDR	0.0 175.49	2.635 120 0.0815	1E 1T 1Z 1S 1B	8.237 16.474 8.237 19.22 9.61	4.000 61.778 65.778	63.605 0.0 5.363			Vel = 10.32	
HDR to BR	0.0 175.49	4.26 120 0.0079	2E 2T 1Zia	26.334 52.668 0.0	8.000 79.002 87.002	68.968 3.000 0.684			* Fixed loss = 3 Vel = 3.95	

# 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	*****
BR	0.0	6.16	1E 20.084	40.000	72.652				
to		140	1G 4.304	67.425	0.0				
UG1	175.49	0.0010	1T 43.037	107.425	0.105		Vel = 1.89		
UG1	100.00	8.27	2G 12.652	1000.000	72.757		Qa = 100		
to		140	2E 56.936	124.942	-8.662				
TEST	275.49	0.0005	1T 55.354	1124.942	0.605		Vel = 1.65		
	0.0								
	275.49				64.700		K Factor = 34.25		