

HYDRAULIC DESIGN INFORMATION SHEET

Name - GMS Westminister Date - 7-8-13
Location - Dining Area
Building - System No. - 1 of 1
Contractor - Residential Fire Protection Contract No. - C13017
Calculated By - JAL Drawing No. - 1 of 1
Construction: (X) Combustible () Non-Combustible Ceiling Height Varies
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 VK300
I Elevation at Highest Outlet - 8.5 Feet Size 1/2" K-Factor 4.0
G Note:Safety Margin: 14.365 Temperature Rating 155
N

Calculation Gpm Required 161.965 Psi Required 75.612 At Test
Summary C-Factor Used: Overhead 150 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 10-22-09 Rated Cap. Cap.
T Time of Test - @ Psi Elev.
E Static (Psi) - 90 Elev.
R Residual (Psi) - 88 Other Well
Flow (Gpm) - 1838 Proof Flow Gpm
S Elevation - -10

P Location:
P
L Source of Information:
Y

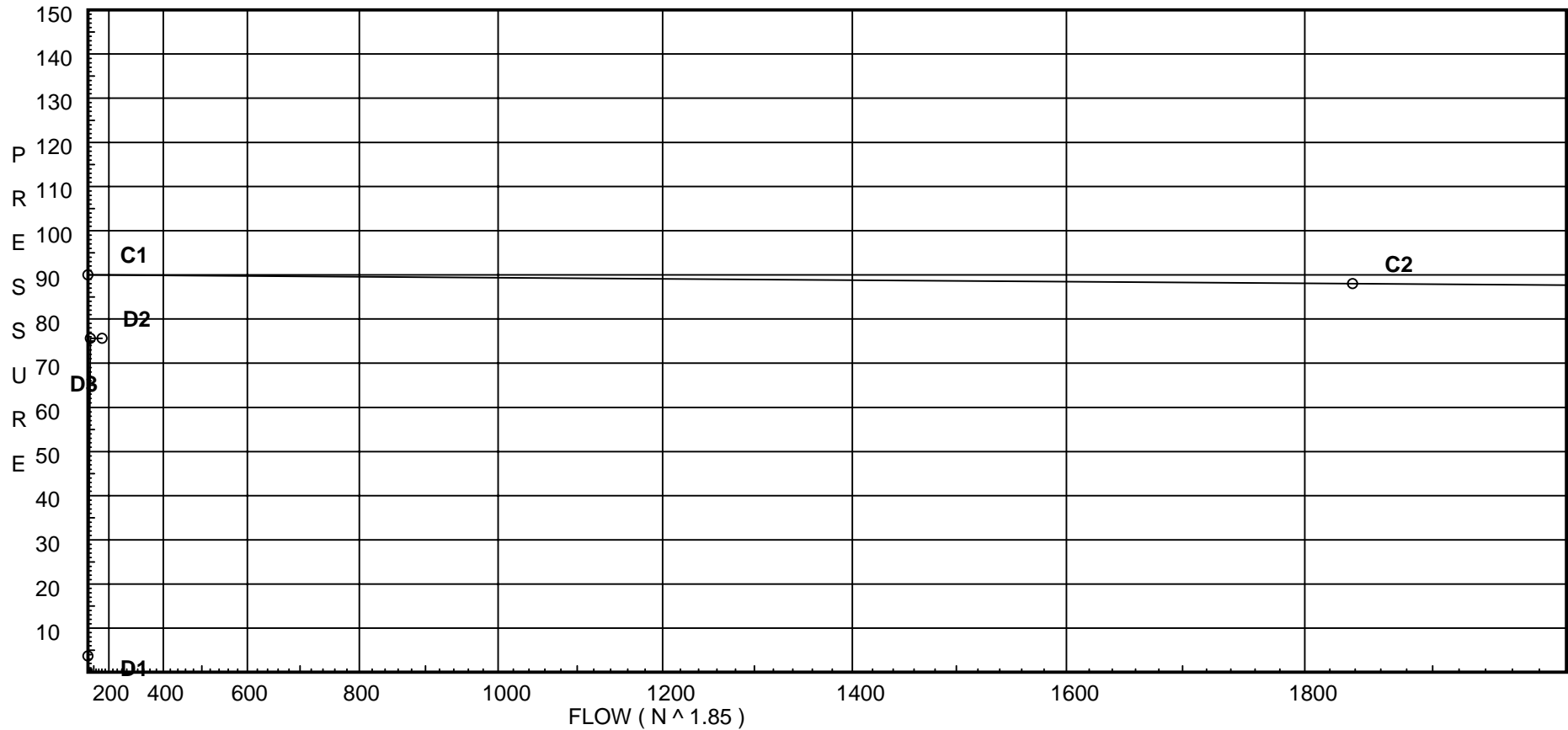
Water Supply Curve (C)

RESIDENTIAL FIRE PROTECTION
GMS Westminister

Page 2
Date 7-8-13

City Water Supply:
C1 - Static Pressure : 90
C2 - Residual Pressure: 88
C2 - Residual Flow : 1838

Demand:
D1 - Elevation : 3.681
D2 - System Flow : 61.965
D2 - System Pressure : 75.612
Hose (Adj City) : _____
Hose (Demand) : 100
D3 - System Demand : 161.965
Safety Margin : 14.365



Fittings Used Summary

RESIDENTIAL FIRE PROTECTION
GMS Westminister

Page 3
Date 7-8-13

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
G	Generic Gate Valve	0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N	CPVC 90'ElI 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
Zwa	Watts 007	Fitting generates a Fixed Loss Based on Flow																			

Pressure / Flow Summary - STANDARD

RESIDENTIAL FIRE PROTECTION
GMS Westminister

Page 4
Date 7-8-13

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	8.5	4	12.03	na	13.87	0.1	130	10.6
2	8.25	4.9	13.18	na	17.79	0.1	130	7.0
3	8.5	4	10.6	na	13.02	0.1	130	10.6
4	8.25	4.9	12.44	na	17.28	0.1	130	7.0
10	0.0		17.65	na				
11	0.0		18.23	na				
12	0.0		17.58	na				
13	0.0		18.86	na				
14	0.0		24.23	na				
TR	1.0		27.9	na	100.0			
BR	-4.0		38.92	na				
UG1	-10.0		79.32	na				
TEST	0.0		75.61	na				

The maximum velocity is 22.36 and it occurs in the pipe between nodes BR and UG1

Final Calculations - Hazen-Williams

RESIDENTIAL FIRE PROTECTION
GMS Westminister

Page 5
Date 7-8-13

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 to 10	13.87 13.87	0.874 150 0.1065	2N	14.0 0.0 0.0	4.250 14.000 18.250	12.029 3.681 1.944			K Factor = 4.00 Vel = 7.42	
	0.0 13.87						17.654		K Factor = 3.30	
2 to 11	17.79 17.79	0.874 150 0.1687	1O	3.0 0.0 0.0	5.750 3.000 8.750	13.179 3.573 1.476			K Factor = 4.90 Vel = 9.51	
	0.0 17.79						18.228		K Factor = 4.17	
3 to 4	13.02 13.02	0.874 150 0.0947	2N	14.0 0.0 0.0	4.250 14.000 18.250	10.600 0.108 1.729			K Factor = 4.00 Vel = 6.96	
4 to 12	17.28 30.3	1.101 150 0.1467	1O	5.0 0.0 0.0	5.700 5.000 10.700	12.437 3.573 1.570			K Factor = 4.90 Vel = 10.21	
	0.0 30.30						17.580		K Factor = 7.23	
10 to 11	13.87 13.87	1.101 150 0.0346	1N	7.0 0.0 0.0	9.600 7.000 16.600	17.654 0.0 0.574			Vel = 4.67	
11 to 13	17.79 31.66	1.101 150 0.1590		0.0 0.0 0.0	4.000 0.0 4.000	18.228 0.0 0.636			Vel = 10.67	
	0.0 31.66						18.864		K Factor = 7.29	
12 to 13	30.30 30.3	1.101 150 0.1467		0.0 0.0 0.0	8.750 0.0 8.750	17.580 0.0 1.284			Vel = 10.21	
13 to 14	31.67 61.97	1.394 150 0.1747	2O	12.0 0.0 0.0	18.700 12.000 30.700	18.864 0.0 5.364			Vel = 13.03	
14 to TR	0.0 61.97	1.394 150 0.1747	2N	16.0 0.0 0.0	7.500 16.000 23.500	24.228 -0.433 4.105			Vel = 13.03	
TR to BR	99.99 161.96	2.067 120 0.2292	1Zwa 1Z	0.0 5.0 0.0	7.000 5.000 12.000	27.900 8.266 2.751			Qa = 100 * Fixed loss = 6.1 Vel = 15.49	
BR to UG1	0.0 161.96	1.72 150 0.3713	1G 1T	0.617 6.174 0.0	95.000 6.792 101.792	38.917 2.599 37.799			Vel = 22.36	
UG1 to TEST	0.0 161.96	6.16 140 0.0008	1T	43.037 0.0 0.0	700.000 43.037 743.037	79.315 -4.331 0.628			Vel = 1.74	
	0.0 161.96						75.612		K Factor = 18.63	