

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

RICHARD MARTIN  
24 NORTH TERRACE  
FALMOUTH, ME  
04105  
207-518-1622

Job Name : 25 HILLCREST AVE  
Building : 2 STORY HOME  
Location : 25 HILLCREST AVE  
System : WET  
Contract :  
Data File : HILLCREST CALC 10-16-13.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - TIM HIGGINS Date - 10-16-13  
Location - 25 HILLCREST AVE  
Building - 2 STORY HOME System No. - WET  
Contractor - RICHARD MARTIN Contract No. -  
Calculated By - FPSS Drawing No. - SP-1  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 8'-0"  
OCCUPANCY - LIGHT HAZARD

S Type of Calculation: ( )NFPA 13 Residential ( )NFPA 13R ( X)NFPA 13D  
Y Number of Sprinklers Flowing: ( )1 ( )2 ( )4 ( )  
S ( )Other  
T ( )Specific Ruling Made by Date

E  
M Listed Flow at Start Point - 28 Gpm System Type  
Listed Pres. at Start Point - 70 Psi (X) Wet ( ) Dry  
D MAXIMUM LISTED SPACING 14 x 14 ( ) Deluge ( ) PreAction  
E Domestic Flow Added - 5 Gpm Sprinkler or Nozzle  
S Additional Flow Added - 5 Gpm Make RELIABLE Model RES 44  
I Elevation at Highest Outlet - 24 Feet Size 1/2" K-Factor 4.4  
G Note: Temperature Rating 155  
N

Calculation Gpm Required 28 Psi Required 70 At Test  
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 7-21-99 Rated Cap. Cap.  
T Time of Test - @ Psi Elev.  
E Static (Psi) - 88 Elev.  
R Residual (Psi) - 0 Other Well  
Flow (Gpm) - 1321 Proof Flow Gpm  
S Elevation - 0

P Location: TEST HYDRANT LOCATED ON BRIGHTON AVE  
P  
L Source of Information: PORTLAND WATER DEPT.  
Y

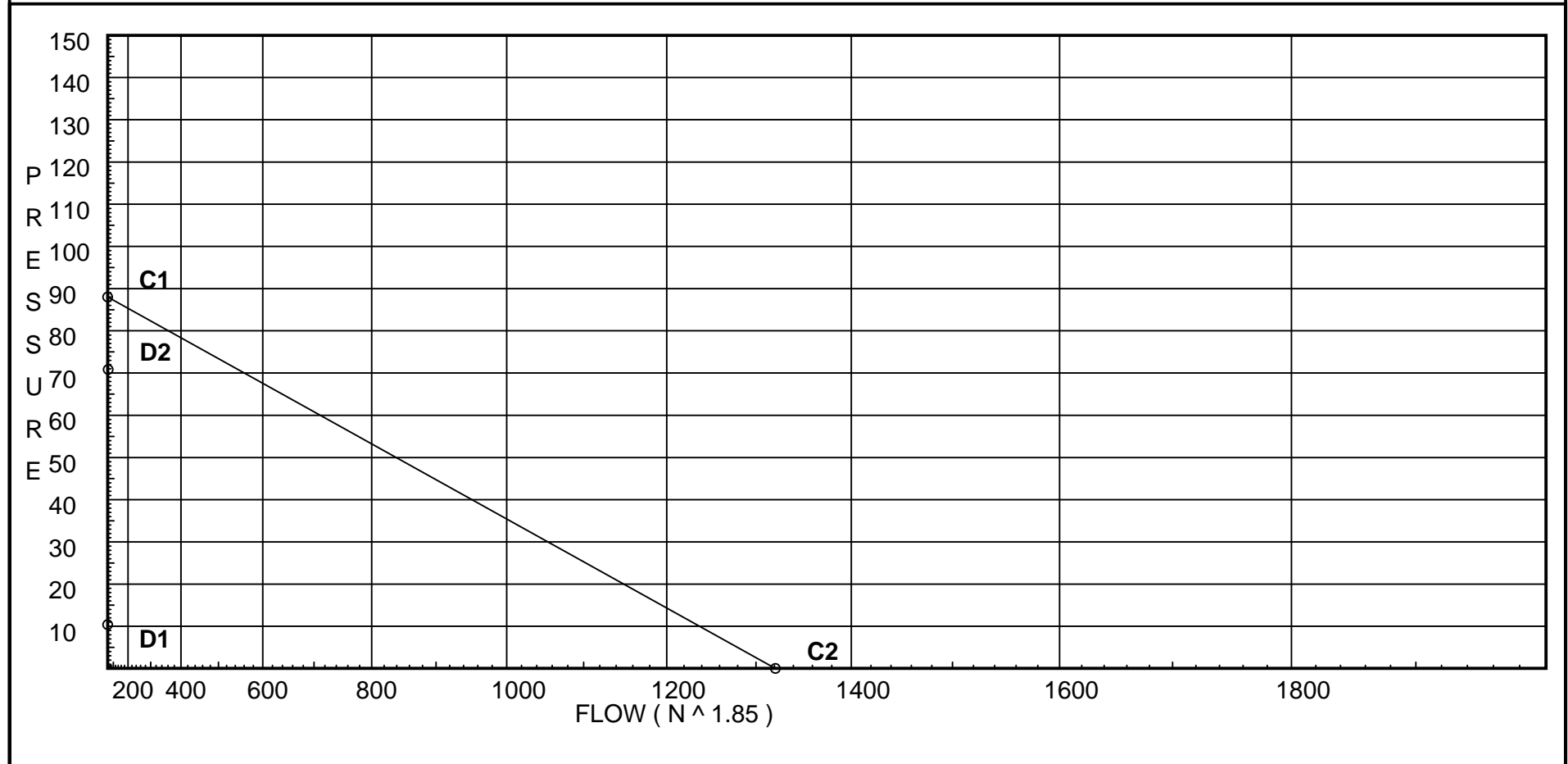
# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 88  
C2 - Residual Pressure: 0  
C2 - Residual Flow : 1321

Demand:  
D1 - Elevation : 10.394  
D2 - System Flow : 28.2385  
D2 - System Pressure : 70.814  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : \_\_\_\_\_  
D3 - System Demand : 28.2385  
Safety Margin : 17.114



# 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
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'Ell 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
R *	CPVC Coupling Tee-Run	1	1	1	1	1	1	2	2	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
Zik	Wilkins 950XL	Fitting generates a Fixed Loss Based on Flow																			

## Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with \*. The fittings marked with a \* show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a \* will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
10	24.0	4.4	10.2	na	14.05	0.05	196	10.2
11	24.0	4.4	10.39	na	14.19	0.05	196	10.2
12	24.0		11.1	na				
13	16.0		16.5	na				
14	16.0		20.76	na				
15	16.0		21.51	na				
16	8.0		25.63	na				
17	8.0		26.27	na				
18	8.0		26.53	na				
TOR	8.0		27.66	na				
BOR	3.0		36.97	na				
UG	3.0		69.51	na				
UG1	3.0		69.51	na				
UG2	3.0		69.51	na				
UG3	3.0		69.51	na				
TEST	0.0		70.81	na				

The maximum velocity is 13.9 and it occurs in the pipe between nodes BOR and UG

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftgng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
10 to 11	14.05	1.101 150.0	1O	5.0 0.0	0.500 5.000	10.200 0.0			K Factor = 4.40	
11 to 12	14.05	0.0355 150.0		0.0	5.500	0.195			Vel = 4.73	
11 to 12	14.19	1.101 150.0	1O	5.0 0.0	0.500 5.000	10.395 0.0			K Factor = 4.40	
12 to 13	28.24	0.1287 150.0		0.0	5.500	0.708			Vel = 9.52	
12 to 13	0.0	1.101 150.0	1N	7.0 0.0	8.000 7.000	11.103 3.465				
13 to 14	28.24	0.1288 150.0		0.0	15.000	1.932			Vel = 9.52	
13 to 14	0.0	1.101 150.0	2N 1R	14.0 1.0	13.100 20.000	16.500 0.0				
14 to 15	28.24	0.1288 150.0	1O	5.0	33.100	4.263			Vel = 9.52	
14 to 15	0.0	1.394 150.0	2R 1O	2.0 6.0	10.300 8.000	20.763 0.0				
15 to 16	28.24	0.0408 150.0		0.0	18.300	0.747			Vel = 5.94	
15 to 16	0.0	1.394 150.0	1N	8.0 0.0	8.000 8.000	21.510 3.465				
16 to 17	28.24	0.0408 150.0		0.0	16.000	0.653			Vel = 5.94	
16 to 17	0.0	1.394 150.0	1N	8.0 0.0	7.700 8.000	25.628 0.0				
17 to 18	28.24	0.0408 150.0		0.0	15.700	0.641			Vel = 5.94	
17 to 18	0.0	1.394 150.0	1O	6.0 0.0	0.500 6.000	26.269 0.0				
18 to TOR	28.24	0.0408 150.0		0.0	6.500	0.265			Vel = 5.94	
18 to TOR	0.0	1.394 150.0	2N	16.0 0.0	11.500 16.000	26.534 0.0				
TOR to BOR	28.24	0.0408 150.0		0.0	27.500	1.123			Vel = 5.94	
TOR to BOR	0.0	1.394 150.0	1Zik	0.0 0.0	5.000 0.0	27.657 9.106			* Fixed loss = 6.94	
BOR to UG	28.24	0.0408 150.0		0.0	5.000	0.204			Vel = 5.94	
BOR to UG	0.0	0.911 150.0	10T 1G	38.013 0.76	65.000 4.561	36.967 10.000			* Fixed loss = 10	
UG to UG1	28.24	0.3240 140.0		0.0	69.561	22.539			Vel = 13.90	
UG to UG1	0.0	8.27 140.0	1T	55.354 0.0	375.000 55.354	69.506 0.0				
UG1 to UG2	28.24	0.0 140.0		0.0	430.354	0.003			Vel = 0.17	
UG1 to UG2	0.0	12.34 140.0	1T	93.767 0.0	800.000 93.767	69.509 0.0				
UG2 to UG3	28.24	0.0 140.0		0.0	893.767	0.001			Vel = 0.08	
UG2 to UG3	0.0	6.16 140.0	1T	43.037 0.0	60.000 43.037	69.510 0.0				
UG3	28.24	0.0		0.0	103.037	0.004			Vel = 0.30	

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	*****
UG3 to TEST	0.0  28.24	12.34 140.0 0.0	1T  0.0	93.767 0.0 993.767	900.000 93.767 0.001	69.514 1.299 0.001		Vel = 0.08	
	0.0 28.24					70.814		K Factor = 3.36	