

. . . Fire Protection by Computer Design

Residential Fire Protection
64 Daggett Hill Rd.
Greene, ME 04236
(207)946-343

Job Name : PLEASANT STREET APARTMENTS
Building : WOOD STRUCTURE
Location : BASEMENT
System : 1
Contract : C16015
Data File : PLEASANT AVE APTS-BASEMENT.WXF

Hydraulic Design Information Sheet

Name - PLEASANT AVE APARTMENTS Date - 6/30/2016
 Location - BASEMENT
 Building - WOOD STRUCTURE System No. - 1
 Contractor - RESIDENTIAL FIRE PROTECTION Contract No. - C16015
 Calculated By - T. PRAY Drawing No. - 1 OF 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 7'-0"
 Occupancy - BASEMENT

S (X) NFPA 13 () Lt. Haz. Ord.Haz.Gp. (X) 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	- 901	System Type	Sprinkler/Nozzle
	Density	- .15	(X) Wet	Make VIKING
D	Area Per Sprinkler	- 121	() Dry	Model VK300
E	Elevation at Highest Outlet	- 98.42'	() 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	- 250		

N Note

Calculation Flow Required - 443.99 Press Required - 72.87 AT TEST
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 6-22-2016		Cap. -
T	Time of Test - 9:00 AM	Rated Cap.-	Elev.-
E	Static Press - 82	@ Press -	
R	Residual Press - 80	Elev. -	Well
S	Flow - 1209		Proof Flow
U	Elevation - 99.0'		

P Location - HYDRANTS ARE LOCATED ON PLEASANT AVE, SEE PLOT PLAN

L Source of Information - PORTLAND WATER DISTRICT

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	Solid Piled %	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

E Horizontal Barriers Provided:

Water Supply Curve (C)

Residential Fire Protection
PLEASANT STREET APARTMENTS

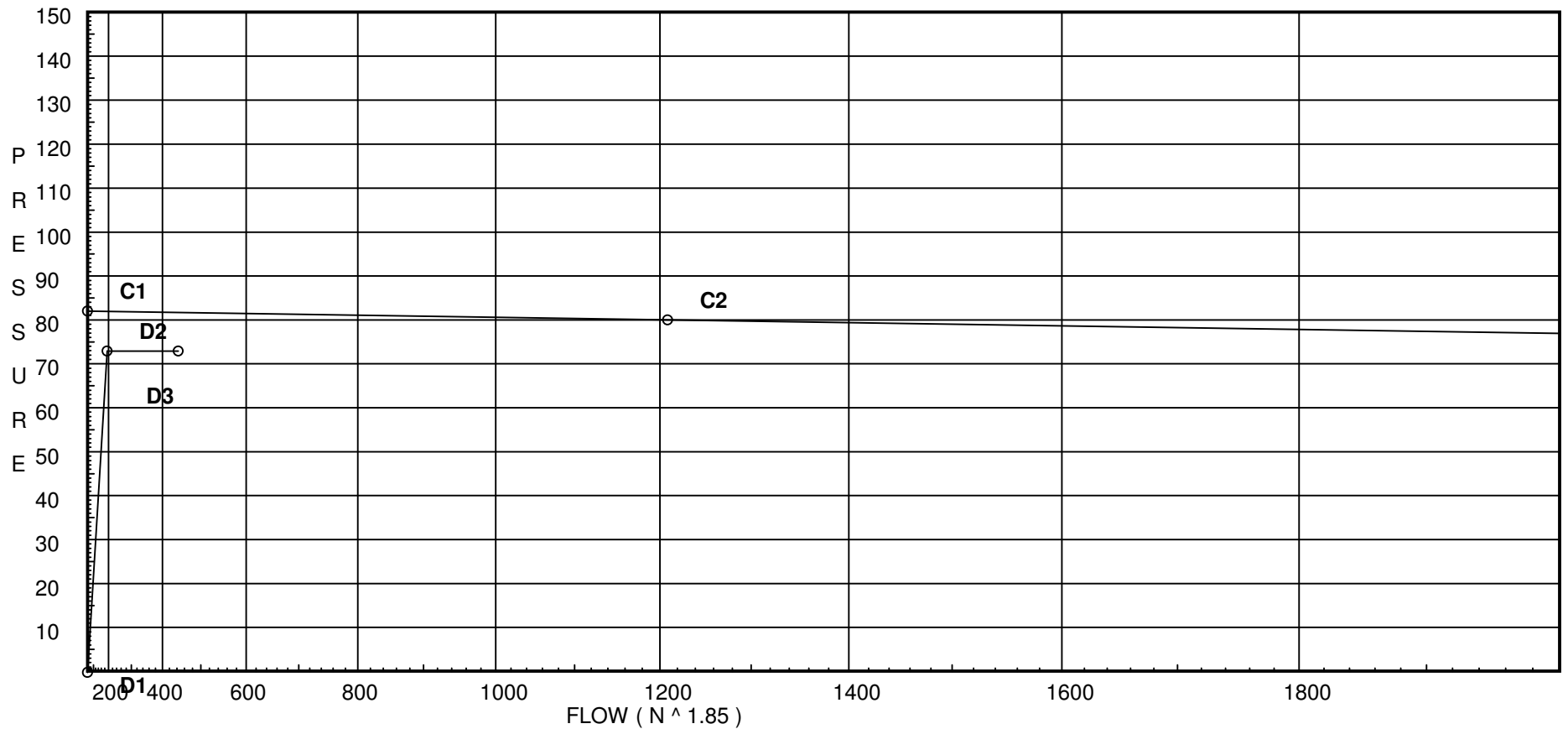
Page 2
Date 6-30-16

City Water Supply:

C1 - Static Pressure : 82
C2 - Residual Pressure: 80
C2 - Residual Flow : 1209

Demand:

D1 - Elevation : -0.251
D2 - System Flow : 193.994
D2 - System Pressure : 72.873
Hose (Adj City) : _____
Hose (Demand) : 250
D3 - System Demand : 443.994
Safety Margin : 8.813



Fittings Used Summary

Residential Fire Protection
PLEASANT STREET APARTMENTS

Page 3
Date 6-30-16

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
G	Generic Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
L	Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
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

Residential Fire Protection
PLEASANT STREET APARTMENTS

Page 4
Date 6-30-16

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
BA01	0.0	5.6	7.17	na	15.0	0.15	100	0.0
1	98.42	5.6	7.17	na	15.0	0.15	100	7.0
2	98.42	K = K @ EQ01	8.02	na	15.4			
3	98.42	K = K @ EQ01	9.67	na	16.9			
4	98.42	K = K @ EQ01	10.68	na	17.77			
5	98.42	K = K @ EQ01	11.56	na	18.48			
6	98.42	K = K @ EQ01	12.93	na	19.54			
20	99.17		20.28	na				
7	98.42	5.6	27.98	na	29.62	0.15	121	7.0
8	98.42	5.6	28.48	na	29.88	0.15	121	7.0
22	98.42		32.68	na				
9	98.42	5.6	31.43	na	31.4	0.15	121	7.0
23A	98.42		32.17	na				
21	98.42		32.12	na				
22A	98.42		33.36	na				
23	98.42		33.52	na				
24	98.42		34.28	na				
25	98.42		43.35	na				
26	98.42		54.94	na				
27	98.375		56.25	na				
28	98.42		59.71	na				
TOR	98.42		65.64	na				
BOR	92.92		75.37	na				
TEST	99.0		72.87	na	250.0			

The maximum velocity is 17.03 and it occurs in the pipe between nodes 24 and 25

Final Calculations - Hazen-Williams

Residential Fire Protection
PLEASANT STREET APARTMENTS

Page 5
Date 6-30-16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
BA01 to EQ01	15.00 15.0 0.0 15.00	1.049 120 0.0763	1T	5.0 0.0 0.0	0.750 5.000 5.750	7.175 0.0 0.439			K Factor = 5.60 Vel = 5.57	
							7.614		K Factor = 5.44	
1 to 2	15.00 15.0	1.049 120 0.0764	2E	4.0 0.0 0.0	7.080 4.000 11.080	7.175 0.0 0.847			K Factor = 5.60 Vel = 5.57	
2 to 3	15.40 30.4	1.049 120 0.2822		0.0 0.0 0.0	5.830 0.0 5.830	8.022 0.0 1.645			K Factor @ node EQ01 Vel = 11.29	
3 to 4	16.90 47.3	1.38 120 0.1682		0.0 0.0 0.0	6.040 0.0 6.040	9.667 0.0 1.016			K Factor @ node EQ01 Vel = 10.15	
4 to 5	17.77 65.07	1.61 120 0.1433		0.0 0.0 0.0	6.125 0.0 6.125	10.683 0.0 0.878			K Factor @ node EQ01 Vel = 10.25	
5 to 6	18.48 83.55	1.61 120 0.2275		0.0 0.0 0.0	6.000 0.0 6.000	11.561 0.0 1.365			K Factor @ node EQ01 Vel = 13.17	
6 to 20	19.54 103.09	1.61 120 0.3357	1E 1T	4.0 8.0 0.0	10.875 12.000 22.875	12.926 -0.325 7.678			K Factor @ node EQ01 Vel = 16.25	
20 to 24	0.0 103.09	1.61 120 0.3356	1E 1T	4.0 8.0 0.0	28.750 12.000 40.750	20.279 0.325 13.677			Vel = 16.25	
	0.0 103.09						34.281		K Factor = 17.61	
7 to 21	29.62 29.62	1.049 120 0.2691	1T	5.0 0.0 0.0	10.375 5.000 15.375	27.980 0.0 4.138			K Factor = 5.60 Vel = 11.00	
	0.0 29.62						32.118		K Factor = 5.23	
8 to 22	29.88 29.88	1.049 120 0.2735	1T	5.0 0.0 0.0	10.375 5.000 15.375	28.478 0.0 4.205			K Factor = 5.60 Vel = 11.09	
22 to 23	-9.59 20.29	1.049 120 0.1337	1T	5.0 0.0 0.0	1.290 5.000 6.290	32.683 0.0 0.841			Vel = 7.53	
	0.0 20.29						33.524		K Factor = 3.50	
9 to 23A	31.40 31.4	1.049 120 0.3000		0.0 0.0 0.0	2.460 0.0 2.460	31.430 0.0 0.738			K Factor = 5.60 Vel = 11.66	
23A to 23	0.0 31.4	1.38 120 0.0788	1T	6.0 0.0 0.0	11.210 6.000 17.210	32.168 0.0 1.356			Vel = 6.74	
	0.0									

Final Calculations - Standard

Residential Fire Protection
PLEASANT STREET APARTMENTS

Page 6
Date 6-30-16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	31.40					33.524		K Factor = 5.42	
21 to 22	29.62	1.61 120 0.0334	1T	8.0 0.0	8.920 8.000	32.118 0.0		Vel = 4.67	
22 to 22A	9.59	1.61 120 0.0562	1T	8.0 0.0	4.000 8.000	32.683 0.0		Vel = 6.18	
22A to 23	0.0	2.067 120 0.0166		0.0 0.0	10.050 0.0	33.357 0.0		Vel = 3.75	
23 to 24	39.21	2.157 120 0.0640		0.0 0.0	11.830 0.0	33.524 0.0		Vel = 7.98	
24 to 25	103.09	2.157 120 0.2601	2I	8.615 0.0	26.250 8.615	34.281 0.0		Vel = 17.03	
25 to 26	193.99	2.157 120 0.2601	1T	12.307 0.0	32.250 12.307	43.351 0.0		Vel = 17.03	
26 to 27	0.0	2.635 120 0.0982		0.0 0.0	13.170 0.0	54.942 0.019		Vel = 11.41	
27 to 28	193.99	2.635 120 0.0981	1J	14.827 0.0	20.540 14.827	56.254 -0.019		Vel = 11.41	
28 to TOR	0.0	2.635 120 0.0981	2I	16.474 0.0	43.960 16.474	59.706 0.0		Vel = 11.41	
TOR to BOR	193.99	2.635 120 0.0981	1Z	8.237 0.0	5.500 8.237	65.637 8.382		* Fixed loss = 6 Vel = 11.41	
BOR to TEST	0.0	6.16 140 0.0012	2L 1G 1T	25.822 4.304 43.037	45.000 73.163 118.163	75.367 -2.633 0.139		Vel = 2.09	
	250.00 443.99					72.873		Qa = 250.00 K Factor = 52.01	