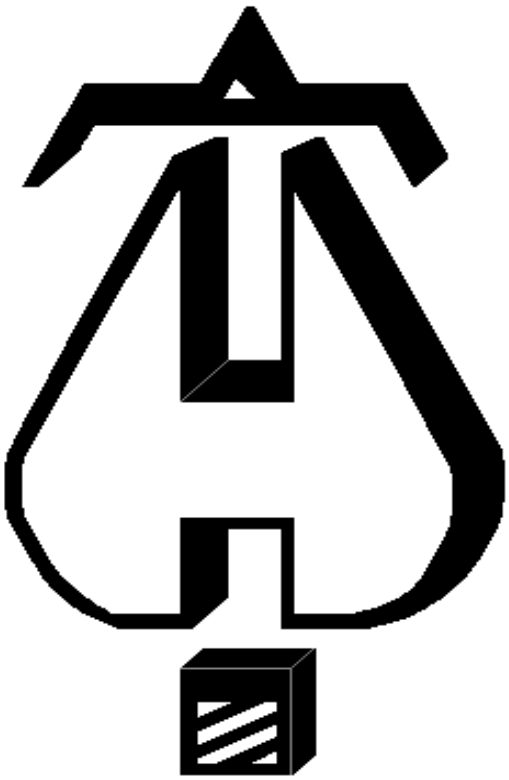


. . . Fire Protection by Computer Design

High Tech Fire Protection
84 Hackett Mills Rd
PO Box 156
Poland, ME, 04274
207-998-2551

Job Name	:	BAYSIDE BOWL
Building	:	2
Location	:	58 Alder Street
System	:	2
Contract	:	033116-2
Data File	:	Wet Calc.WXF

HYDRAULIC CALCULATIONS
for

Project name: BAYSIDE BOWL
Location: 58 Alder Street
Drawing no: 2
Date: 10-7-16

Design

Remote area number: 2
Remote area location: Above Pinsetting Area
Occupancy classification: Light Hazard
Density: .1 - Gpm/SqFt
Area of application: 1500 - SqFt
Coverage per sprinkler: 225 - SqFt
Type of sprinklers calculated: QR
No. of sprinklers calculated: 12
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 340 - GPM @ 91 - Psi
Type of system: NFPA 13 Wet
Volume of dry or preaction system: - Gal

Water supply information

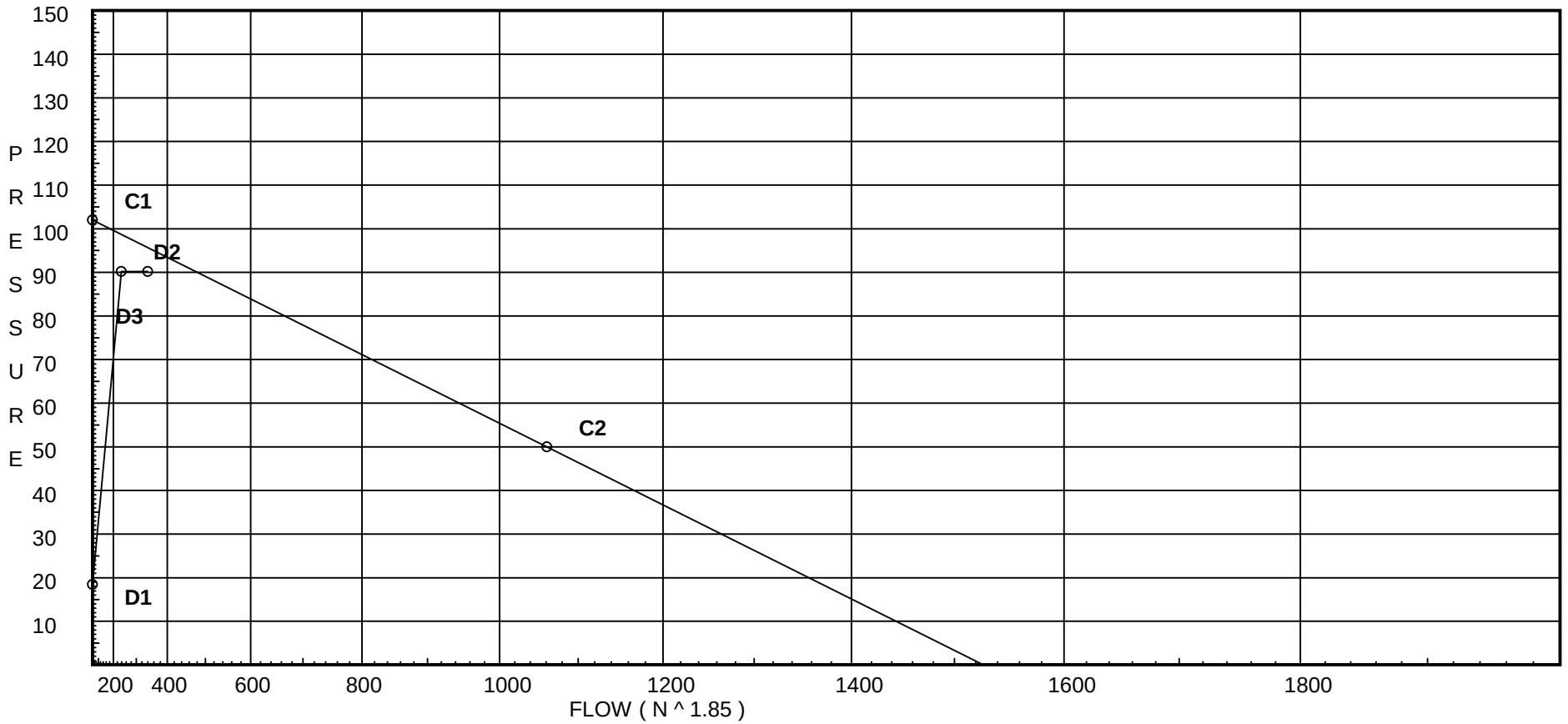
Date: 10/28/2014
Location: Corner of Kennebec St and Preble St
Source: Portland Water District

Name of contractor: High Tech Fire Protection
Address: 84 Hackett Mills Rd / PO Box 156 / Poland, ME, 04274
Phone number: 207-998-2551
Name of designer: Ed Pennell
Authority having jurisdiction: Portland Fire Department
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve (C)

City Water Supply:
- C1 - Static Pressure : 102
- C2 - Residual Pressure: 50
- C2 - Residual Flow : 1061

Demand:
- D1 - Elevation : 18.450
- D2 - System Flow : 239.421
- D2 - System Pressure : 90.191
- Hose (Demand) : 100
- D3 - System Demand : 339.421
- Safety Margin : 5.495



Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
V	90' Ell Firelock #001	0	0	0	0	3.5	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
X	90'Tee-BranchFirelock002	0	0	0	0	8	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0

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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
W1	42.6	5.6	16.14	na	22.5	0.1	225	7.0
W2	42.6	5.6	16.37	na	22.66	0.1	225	7.0
W3	42.6	5.6	17.2	na	23.22	0.1	225	7.0
W4	42.6	5.6	18.97	na	24.39	0.1	225	7.0
W5	37.6		27.88	na				
W6	37.6		29.03	na				
P*	0.0		34.59	na				
W7	42.6	5.6	16.31	na	22.62	0.1	225	7.0
W8	42.6	5.6	16.54	na	22.78	0.1	225	7.0
W9	42.6	5.6	17.37	na	23.34	0.1	225	7.0
W10	42.6	5.6	19.17	na	24.52	0.1	225	7.0
W11	37.6		28.14	na				
W12	37.6		29.3	na				
W13	42.6	5.6	22.58	na	26.61	0.1	225	7.0
W14	42.6	5.6	22.89	na	26.79	0.1	225	7.0
W15	37.6		29.73	na				
W16	37.6		30.14	na				
W17	17.4		55.48	na				
W18	17.4		59.26	na				
W19	17.4		74.52	na				
W20	6.6		79.32	na				
W21	6.6		79.36	na				
TOR	1.0		81.82	na				
BOR	-1.0		89.7	na				
UG1	-1.0		89.86	na				
UG2	-1.0		90.37	na				
UG3	-1.0		90.57	na				
TEST	0.0		90.19	na	100.0			

The maximum velocity is 14.09 and it occurs in the pipe between nodes W16 and W17

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
W1	22.50	1.682		0.0	14.000	16.143		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
W2	22.5	0.0162		0.0	14.000	0.227		Vel = 3.25
W2	22.66	1.682		0.0	14.000	16.370		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
W3	45.16	0.0589		0.0	14.000	0.825		Vel = 6.52
W3	23.22	1.682		0.0	14.000	17.195		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
W4	68.38	0.1269		0.0	14.000	1.777		Vel = 9.87
W4	24.39	1.682	1V	4.331	25.900	18.972		K Factor = 5.60
to		120.0		0.0	4.331	2.166		
W5	92.77	0.2231		0.0	30.231	6.745		Vel = 13.40
W5	0.0	2.157	1T	12.307	5.000	27.883		
to		120.0		0.0	12.307	0.0		
W6	92.77	0.0664		0.0	17.307	1.150		Vel = 8.15
W6	0.0	2.635		0.0	10.800	29.033		
to		120.0		0.0	0.0	0.0		
W12	92.77	0.0251		0.0	10.800	0.271		Vel = 5.46
	0.0							
	92.77					29.304		K Factor = 17.14
W7	22.62	1.682		0.0	14.000	16.311		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
W8	22.62	0.0164		0.0	14.000	0.230		Vel = 3.27
W8	22.77	1.682		0.0	14.000	16.541		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
W9	45.39	0.0594		0.0	14.000	0.832		Vel = 6.55
W9	23.34	1.682		0.0	14.000	17.373		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
W10	68.73	0.1281		0.0	14.000	1.794		Vel = 9.92
W10	24.52	1.682	1V	4.331	25.900	19.167		K Factor = 5.60
to		120.0		0.0	4.331	2.166		
W11	93.25	0.2253		0.0	30.231	6.810		Vel = 13.46
W11	0.0	2.157	1T	12.307	5.000	28.143		
to		120.0		0.0	12.307	0.0		
W12	93.25	0.0671		0.0	17.307	1.161		Vel = 8.19
W12	92.77	2.635		0.0	9.250	29.304		
to		120.0		0.0	0.0	0.0		
W16	186.02	0.0908		0.0	9.250	0.840		Vel = 10.94
	0.0							
	186.02					30.144		K Factor = 33.88
W13	26.61	1.682		0.0	14.000	22.578		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
W14	26.61	0.0221		0.0	14.000	0.310		Vel = 3.84
W14	26.79	1.682	1V	4.331	53.900	22.888		K Factor = 5.60
to		120.0		0.0	4.331	2.166		
W15	53.4	0.0803		0.0	58.231	4.676		Vel = 7.71
W15	0.0	2.157	1T	12.307	5.000	29.730		
to		120.0		0.0	12.307	0.0		
W16	53.4	0.0239		0.0	17.307	0.414		Vel = 4.69

Final Calculations - Hazen-Williams

High Tech Fire Protection
BAYSIDE BOWL

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
W16	186.02	2.635	1X	14.827	99.700	30.144		
to		120.0		0.0	14.827	8.749		
W17	239.42	0.1448		0.0	114.527	16.588		Vel = 14.09
W17	0.0	2.635	1V	5.903	20.200	55.481		
to		120.0		0.0	5.903	0.0		
W18	239.42	0.1448		0.0	26.103	3.781		Vel = 14.09
W18	0.0	2.635	1V	5.903	69.800	59.262		
to		120.0	2X	29.654	35.557	0.0		
W19	239.42	0.1449		0.0	105.357	15.261		Vel = 14.09
W19	0.0	6.357	2V	25.147	33.300	74.523		
to		120.0		0.0	25.147	4.677		
W20	239.42	0.0020		0.0	58.447	0.116		Vel = 2.42
W20	0.0	6.357	1V	12.573	11.500	79.316		
to		120.0		0.0	12.573	0.0		
W21	239.42	0.0020		0.0	24.073	0.048		Vel = 2.42
W21	0.0	6.357	1V	12.573	4.750	79.364		
to		120.0		0.0	12.573	2.425		
TOR	239.42	0.0020		0.0	17.323	0.035		Vel = 2.42
TOR	0.0	6.357	1Fsp	0.0	5.600	81.824		
to		120.0		0.0	0.0	7.866		* Fixed loss = 7
BOR	239.42	0.0020		0.0	5.600	0.011		Vel = 2.42
BOR	0.0	6.16	1E	20.084	22.000	89.701		
to		140.0	1G	4.304	67.425	0.0		
UG1	239.42	0.0017	1T	43.037	89.425	0.156		Vel = 2.58
UG1	0.0	6.16	1T	43.037	250.000	89.857		
to		140.0		0.0	43.037	0.0		
UG2	239.42	0.0017		0.0	293.037	0.510		Vel = 2.58
UG2	0.0	6.16	1T	43.037	75.000	90.367		
to		140.0		0.0	43.037	0.0		
UG3	239.42	0.0017		0.0	118.037	0.206		Vel = 2.58
UG3	0.0	6.16	1E	20.084	5.000	90.573		
to		140.0	1G	4.304	24.388	-0.433		
TEST	239.42	0.0017		0.0	29.388	0.051		Vel = 2.58
	100.00							Qa = 100.00
	339.42					90.191		K Factor = 35.74