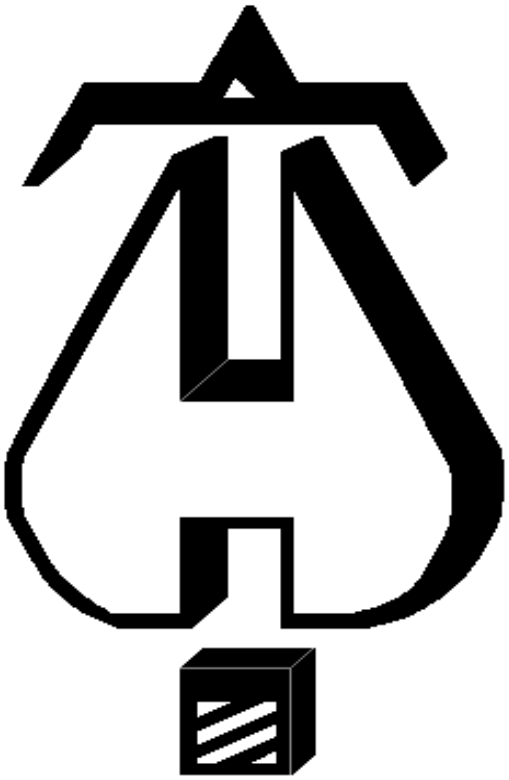


. . . Fire Protection by Computer Design

HTFP
84 HACKETT MILLS ROAD
POLAND 04258
207-998-2551

Job Name : Keeley Banquet Center Attic
Building : FP-01
Location : Attic space
System : #2
Contract :
Data File : DRY ATTIC.WXF

HYDRAULIC CALCULATIONS
for

Project name: Keeley Banquet Center
Location: Attic space
Drawing no: FP-01
Date: 5/8/13

Design

Remote area number: #2
Remote area location: Attic space
Occupancy classification: Light Hazard
Density: .1 - Gpm/SqFt
Area of application: 2535 - SqFt
Coverage per sprinkler: 360/ 120 - SqFt
Type of sprinklers calculated: Attic back to back + conventional uprights
No. of sprinklers calculated: 17
In-rack demand: n/a - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 517 - GPM @ 57 - Psi
Type of system: Dry system
Volume of dry or preaction system: 180 - Gal

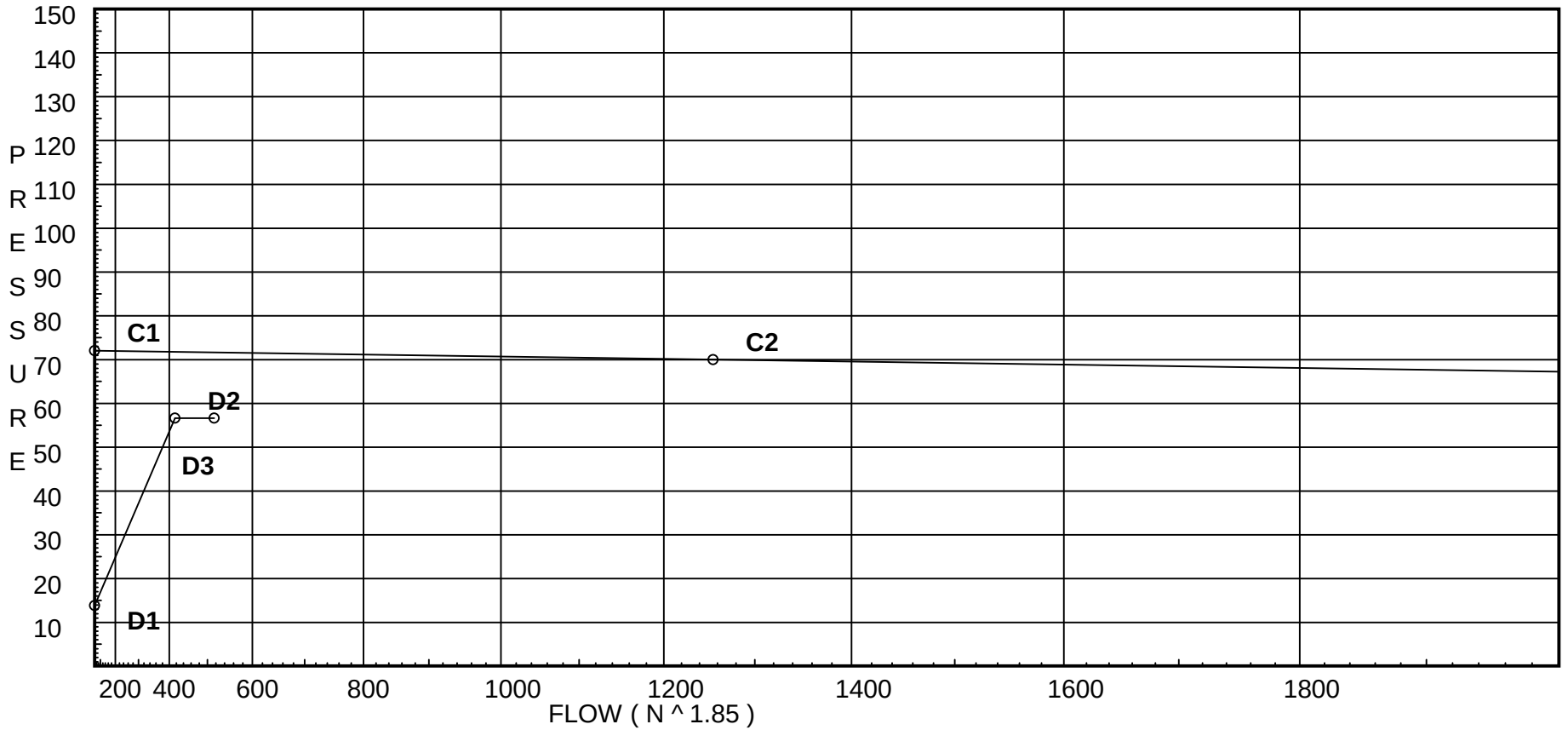
Water supply information

Date: 5/2/2013
Location: hydrant 1516 on warren ave
Source: Portland Water District

Name of contractor: HIGH TECH FIRE PROTECTION
Address: PO BOX 156 / / MINOT, ME 04258-156
Phone number: 207-998-2551
Name of designer: Ed Poulin
Authority having jurisdiction: State of Maine/City of Portland
Notes: (Include peaking information or gridded systems here.)

City Water Supply:
C1 - Static Pressure : 72
C2 - Residual Pressure: 70
C2 - Residual Flow : 1255

Demand:
D1 - Elevation : 13.859
D2 - System Flow : 416.215
D2 - System Pressure : 56.601
Hose (Adj City) :
Hose (Demand) : 100
D3 - System Demand : 516.215
Safety Margin : 15.012



Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	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
D	Generic Dry Pipe Valve	0	0	0	0	0	0	9.5	17	0	28	0	47	0	0	0	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
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
V	90' Ell Firelock #001	0	0	0	0	0	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	0	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Zia	Wilkins 350	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.

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
DP1	-1.0	14	21.6	na	65.07	0.2	324	21.6
DP2	-1.0	14	21.6	na	65.07	0.2	324	21.6
100	15.0	5.6	11.23	na	18.76	0.1	120	7.0
101	15.0	5.6	11.42	na	18.92	0.1	120	7.0
102	15.0	5.6	12.22	na	19.58	0.1	120	7.0
103	15.0	5.6	14.14	na	21.06	0.1	120	7.0
105	15.0	5.6	15.88	na	22.31	0.1	120	7.0
104	15.0		16.33	na				
AA	13.0		20.49	na				
110	19.0	5.6	11.47	na	18.96	0.1	120	7.0
111	19.0	5.6	11.65	na	19.12	0.1	120	7.0
112	19.0	5.6	12.49	na	19.79	0.1	120	7.0
113	19.0		13.74	na				
115	19.0	5.6	12.35	na	19.68	0.1	120	7.0
116	19.0	5.6	12.55	na	19.84	0.1	120	7.0
AB	13.0		20.81	na				
120	21.0	5.6	14.9	na	21.61	0.1	120	7.0
121	21.0	5.6	15.13	na	21.78	0.1	120	7.0
125	21.0	5.6	15.52	na	22.06	0.1	120	7.0
122	21.0		15.86	na				
AC	13.0		21.8	na				
130	23.0	8	22.6	na	38.03	0.1	360	22.6
131	23.0	8	22.64	na	38.07	0.1	360	22.6
132	23.0	8	22.79	na	38.19	0.1	360	22.6
133	23.0	8	23.1	na	38.45	0.1	360	22.6
134	23.0		25.33	na				
AD	13.0		30.38	na				
AE	13.0		30.52	na				
TOD	13.0		36.68	na				
BOD	3.0		44.4	na				
BASE	0.0		51.54	na				
HOSE	0.0		52.55	na				
H2	0.0		52.56	na				
TEST	-9.0		56.6	na	100.0			

The maximum velocity is 24.16 and it occurs in the pipe between nodes DP1 and EQ01

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
DP1	65.07	1.049	1T	5.0	1.000	21.600		K Factor = 14.00
to		120.0		0.0	5.000	-0.433		
EQ01	65.07	1.1538		0.0	6.000	6.923		Vel = 24.16
	0.0							
	65.07					28.090		K Factor = 12.28
DP2	65.07	1.049	1E	2.0	0.500	21.600		K Factor = 14.00
to		120.0		0.0	2.000	-0.433		
EQ02	65.07	1.1540		0.0	2.500	2.885		Vel = 24.16
	0.0							
	65.07					24.052		K Factor = 13.27
100	18.76	1.682		0.0	12.000	11.226		K Factor = 5.60
to		100.0		0.0	0.0	0.0		
101	18.76	0.0162		0.0	12.000	0.195		Vel = 2.71
101	18.93	1.682	1E	3.533	10.000	11.421		K Factor = 5.60
to		100.0		0.0	3.533	0.0		
102	37.69	0.0590		0.0	13.533	0.799		Vel = 5.44
102	19.57	1.682		0.0	15.000	12.220		K Factor = 5.60
to		100.0		0.0	0.0	0.0		
103	57.26	0.1281		0.0	15.000	1.921		Vel = 8.27
103	21.06	1.682	1T	7.065	2.500	14.141		K Factor = 5.60
to		100.0		0.0	7.066	0.0		
104	78.32	0.2286		0.0	9.566	2.187		Vel = 11.31
	0.0							
	78.32					16.328		K Factor = 19.38
105	22.31	1.682	1T	7.065	13.000	15.878		K Factor = 5.60
to		100.0		0.0	7.066	0.0		
104	22.31	0.0224		0.0	20.066	0.450		Vel = 3.22
104	78.33	1.682	1T	7.065	2.000	16.328		
to		100.0		0.0	7.066	0.866		
AA	100.64	0.3634		0.0	9.066	3.295		Vel = 14.53
AA	0.0	2.635		0.0	7.900	20.489		
to		100.0		0.0	0.0	0.0		
AB	100.64	0.0409		0.0	7.900	0.323		Vel = 5.92
	0.0							
	100.64					20.812		K Factor = 22.06
110	18.96	1.682	1E	3.533	7.500	11.468		K Factor = 5.60
to		100.0		0.0	3.533	0.0		
111	18.96	0.0166		0.0	11.033	0.183		Vel = 2.74
111	19.12	1.682		0.0	14.000	11.651		K Factor = 5.60
to		100.0		0.0	0.0	0.0		
112	38.08	0.0602		0.0	14.000	0.843		Vel = 5.50

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
112	19.79	1.682	1T	7.065	2.500	12.494		K Factor = 5.60
to		100.0		0.0	7.066	0.0		
113	57.87	0.1307		0.0	9.566	1.250		Vel = 8.36
113	39.52	1.682	1T	7.065	6.000	13.744		
to		100.0		0.0	7.066	2.599		
AB	97.39	0.3420		0.0	13.066	4.469		Vel = 14.06
	0.0							
	97.39					20.812		K Factor = 21.35
115	19.68	1.682	1E	3.533	7.500	12.351		K Factor = 5.60
to		100.0		0.0	3.533	0.0		
116	19.68	0.0177		0.0	11.033	0.195		Vel = 2.84
116	19.84	1.682	1T	7.065	11.500	12.546		K Factor = 5.60
to		100.0		0.0	7.066	0.0		
113	39.52	0.0645		0.0	18.566	1.198		Vel = 5.71
	0.0							
	39.52					13.744		K Factor = 10.66
AB	198.03	2.635		0.0	6.900	20.812		
to		100.0		0.0	0.0	0.0		
AC	198.03	0.1428		0.0	6.900	0.985		Vel = 11.65
	0.0							
	198.03					21.797		K Factor = 42.42
120	21.61	1.682		0.0	11.000	14.896		K Factor = 5.60
to		100.0		0.0	0.0	0.0		
121	21.61	0.0211		0.0	11.000	0.232		Vel = 3.12
121	21.78	1.682	1T	7.065	2.500	15.128		K Factor = 5.60
to		100.0		0.0	7.066	0.0		
122	43.39	0.0767		0.0	9.566	0.734		Vel = 6.27
	0.0							
	43.39					15.862		K Factor = 10.89
125	22.06	1.682	1T	7.065	8.500	15.520		K Factor = 5.60
to		100.0		0.0	7.066	0.0		
122	22.06	0.0220		0.0	15.566	0.342		Vel = 3.19
122	43.40	1.682	1T	7.065	8.000	15.862		
to		100.0		0.0	7.066	3.465		
AC	65.46	0.1639		0.0	15.066	2.470		Vel = 9.45
AC	198.02	2.635		0.0	36.000	21.797		
to		100.0		0.0	0.0	0.0		
AE	263.48	0.2423		0.0	36.000	8.723		Vel = 15.50
	0.0							
	263.48					30.520		K Factor = 47.69

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
130	38.03	2.635		0.0	6.000	22.600		K Factor = 8.00
to		100.0		0.0	0.0	0.0		
131	38.03	0.0067		0.0	6.000	0.040		Vel = 2.24
131	38.07	2.635		0.0	6.000	22.640		K Factor = 8.00
to		100.0		0.0	0.0	0.0		
132	76.1	0.0245		0.0	6.000	0.147		Vel = 4.48
132	38.18	2.635		0.0	6.000	22.787		K Factor = 8.00
to		100.0		0.0	0.0	0.0		
133	114.28	0.0517		0.0	6.000	0.310		Vel = 6.72
133	38.45	2.635	1T	11.758	13.500	23.097		K Factor = 8.00
to		100.0		0.0	11.757	0.0		
134	152.73	0.0883		0.0	25.257	2.231		Vel = 8.99
134	0.0	3.26	1X	12.469	10.500	25.328		
to		100.0		0.0	12.469	4.331		
AD	152.73	0.0313		0.0	22.969	0.720		Vel = 5.87
AD	0.0	4.26	1X	15.036	1.500	30.379		
to		100.0		0.0	15.035	0.0		
AE	152.73	0.0085		0.0	16.535	0.141		Vel = 3.44
AE	263.49	4.26	1X	15.036	79.000	30.520		
to		100.0	3V	19.171	34.205	0.0		
TOD	416.22	0.0544		0.0	113.205	6.159		Vel = 9.37
TOD	0.0	4.26	1D	26.313	6.000	36.679		
to		100.0	1B	11.277	56.384	4.331		
BOD	416.22	0.0544	1T	18.795	62.384	3.394		Vel = 9.37
BOD	0.0	4.26	1Zia	0.0	2.000	44.404		
to		120.0	3E	39.501	39.501	5.529		* Fixed loss = 4.23
BASE	416.22	0.0388		0.0	41.501	1.612		Vel = 9.37
BASE	0.0	6.16	2E	40.168	120.000	51.545		
to		140.0	1T	43.037	87.509	0.0		
HOSE	416.22	0.0048	1G	4.304	207.509	1.005		Vel = 4.48
HOSE	0.0	20.57	1T	207.444	575.000	52.550		
to		140.0		0.0	207.444	0.0		
H2	416.22	0.0		0.0	782.444	0.011		Vel = 0.40
H2	0.0	6.16	1G	4.304	5.000	52.561		
to		140.0	1E	20.084	24.388	3.898		
TEST	416.22	0.0048		0.0	29.388	0.142		Vel = 4.48
	100.00							Qa = 100.00
	516.22					56.601		K Factor = 68.62