

... Fire Protection by Computer Design

EASTERN FIRE PROTECTION
170 KITTYHAWK AVE
P.O. BOX 1390
AUBURN MAINE, 04210
207-784-1507

Job Name : 5582 NORWAY SAVINGS BANK
Building : 1 OF 1
Location : 1900 CONGRESS STREET, PORTLAND MAINE
System : WET
Contract : 5582-SPN-17
Data File : 5582 NORWAY SAVINGS BANK THIRD FLOOR.WXF

HYDRAULIC CALCULATIONS
for

Project name: 5582 NORWAY SAVINGS BANK
Location: 1900 CONGRESS STREET, PORTLAND MAINE
Drawing no: 1 OF 1
Date: 04/25/2017

Design

Remote area number: WET
Remote area location: THIRD FLOOR - CONFERENCE 313
Occupancy classification: LIGHT HAZARD
Density: .1 - Gpm/SqFt
Area of application: 900 - SqFt
Coverage per sprinkler: 180 - SqFt
Type of sprinklers calculated: RELIABLE F1FR56 SEMI-RECESSED PENDENT
No. of sprinklers calculated: 7
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 247.251 - GPM @ 67.852 - Psi
Type of system: WET
Volume of dry or preaction system: - Gal

Water supply information

Date:
Location: EXISTING RISER INSIDE OF BUILDING
Source: TEST/INSPECTION CARD

Name of contractor: EASTERN FIRE PROTECTION
Address: 170 KITTYHAWK AVE / P.O. BOX 1390 / AUBURN MAINE, 04210
Phone number: 207-784-1507
Name of designer: JML
Authority having jurisdiction: STATE FIRE MARSHALS OFFICE
Notes: (Include peaking information or gridded systems here.)
HYDRAULICALLY REMOTE AREA REVISED PER NFPA 13 SECTION 11.2.3.2.3.1

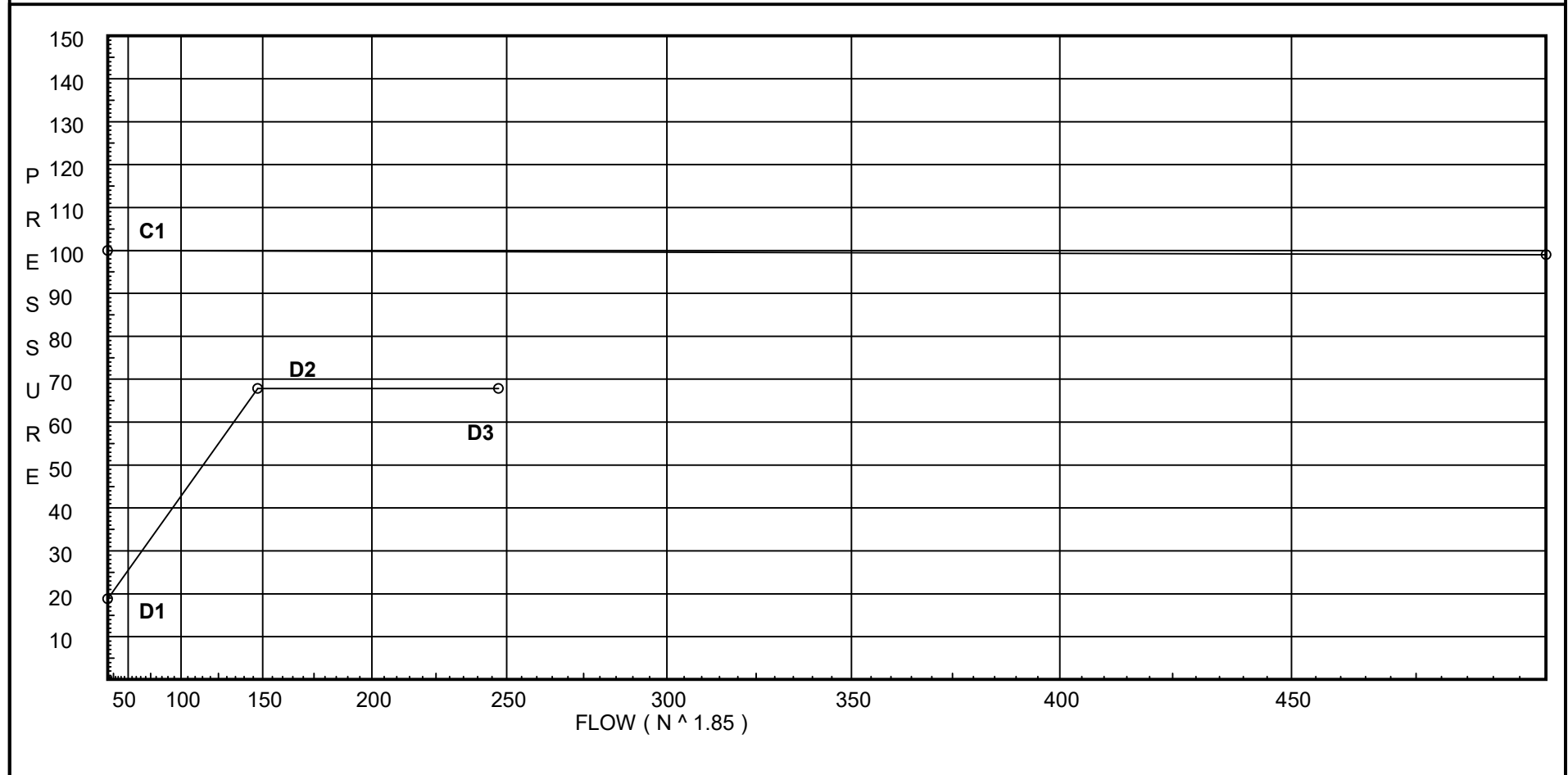
Water Supply Curve C

EASTERN FIRE PROTECTION
5582 NORWAY SAVINGS BANK

Page 2
Date 04/25/2017

City Water Supply:
C1 - Static Pressure : 100
C2 - Residual Pressure: 99
C2 - Residual Flow : 500

Demand:
D1 - Elevation : 18.840
D2 - System Flow : 147.251
D2 - System Pressure : 67.852
Hose (Demand) : 100
D3 - System Demand : 247.251
Safety Margin : 31.876



Fittings Used Summary

EASTERN FIRE PROTECTION
5582 NORWAY SAVINGS BANK

Page 3
Date 04/25/2017

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	
A	Alarm Rel E1 & E3							7.7	21.5		17		27	29								
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	
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	
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	
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65						
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	

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

EASTERN FIRE PROTECTION
5582 NORWAY SAVINGS BANK

Page 4
Date 04/25/2017

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
FL1	0.0	5.6	10.33	na	18.0	0.1	180	7.0
1	73.5	K = K @ LN1	20.72	na	18.0			
2	73.5	K = K @ LN1	21.77	na	18.45			
3	73.5	K = K @ LN1	26.26	na	20.26			
4	73.5	K = K @ LN1	28.34	na	21.05			
5	74.08		36.72	na				
10	73.5	K = K @ LN1	33.58	na	22.92			
11	73.5	K = K @ LN1	34.15	na	23.11			
12	73.5	K = K @ LN1	35.2	na	23.46			
6	74.08		36.84	na				
7	74.08		39.36	na				
8	74.08		44.22	na				
13	62.71		49.82	na				
TOR	36.42		64.48	na				
BASE	33.125		66.31	na				
TEST	30.0		67.85	na	100.0			

The maximum velocity is 16.68 and it occurs in the pipe between nodes 4 and 5

Final Calculations - Hazen-Williams

EASTERN FIRE PROTECTION
5582 NORWAY SAVINGS BANK

Page 5
Date 04/25/2017

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
FL1 to LN1	18.00 18.0	1.049 120.0 0.1071	E T	2.0 5.0 0.0	90.000 7.000 97.000	10.332 0.0 10.387			K Factor = 5.60	
	0.0 18.00						20.719		K Factor = 3.95	
1 to 2	18.00 18.0	1.049 120.0 0.1070		0.0 0.0 0.0	9.790 0.0 9.790	20.719 0.0 1.048			K Factor @ node LN1	Vel = 6.68
2 to 3	18.45 36.45	1.049 120.0 0.3951		0.0 0.0 0.0	11.375 0.0 11.375	21.767 0.0 4.494			K Factor @ node LN1	Vel = 13.53
3 to 4	20.26 56.71	1.38 120.0 0.2353		0.0 0.0 0.0	8.830 0.0 8.830	26.261 0.0 2.078			K Factor @ node LN1	Vel = 12.16
4 to 5	21.06 77.77	1.38 120.0 0.4221	T	6.0 0.0 0.0	14.460 6.000 20.460	28.339 -0.251 8.636			K Factor @ node LN1	Vel = 16.68
5 to 6	0.0 77.77	2.635 120.0 0.0180		0.0 0.0 0.0	6.210 0.0 6.210	36.724 0.0 0.112				Vel = 4.58
	0.0 77.77						36.836		K Factor = 12.81	
10 to 11	22.92 22.92	1.38 120.0 0.0440		0.0 0.0 0.0	12.790 0.0 12.790	33.582 0.0 0.563			K Factor @ node LN1	Vel = 4.92
11 to 12	23.10 46.02	1.61 120.0 0.0755		0.0 0.0 0.0	13.960 0.0 13.960	34.145 0.0 1.054			K Factor @ node LN1	Vel = 7.25
12 to 6	23.47 69.49	1.61 120.0 0.1618	T	8.0 0.0 0.0	3.670 8.000 11.670	35.199 -0.251 1.888			K Factor @ node LN1	Vel = 10.95
6 to 7	77.76 147.25	2.635 120.0 0.0589	I	8.237 0.0 0.0	34.580 8.237 42.817	36.836 0.0 2.523				Vel = 8.66
7 to 8	0.0 147.25	2.635 120.0 0.0589	2I J	16.474 14.827 0.0	51.170 31.301 82.471	39.359 0.0 4.861				Vel = 8.66
8 to 13	0.0 147.25	2.635 120.0 0.0589		0.0 0.0 0.0	11.420 0.0 11.420	44.220 4.924 0.673				Vel = 8.66
13 to TOR	0.0 147.25	2.635 120.0 0.0589	5I	41.186 0.0 0.0	14.375 41.186 55.561	49.817 11.386 3.275				Vel = 8.66
TOR to BASE	0.0 147.25	4.26 120.0 0.0057	A S G	22.384 28.968 2.633	17.210 53.985 71.195	64.478 1.427 0.404				Vel = 3.31
BASE to TEST	0.0 147.25	6.16 140.0 0.0007	E G T	20.084 4.304 43.037	200.000 67.425 267.425	66.309 1.353 0.190				Vel = 1.59

Final Calculations - Hazen-Williams

EASTERN FIRE PROTECTION
5582 NORWAY SAVINGS BANK

Page 6
Date 04/25/2017

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	100.00								
	247.25				67.852				
							Qa = 100.00		
							K Factor = 30.02		