Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 04/21/16

. . . Fire Protection by Computer Design

Eastern Fire Protection
170 Kitty Hawk Ave.
P.O. Box 1390
Auburn, Maine, 04211
207-784-1507

Job Name	:	MARGINAL WAY #5378 BUILDING B
Drawing	:	1 OF 1
Location	:	MARGINAL WAY., PORTLAND, MAINE
Remote Area	:	BUILDING B
Contract	:	5378
Data File	:	MARGINAL WAY #5378 Area 1.WXF

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HYDRAULIC CALCULATIONS
for

Project name: MARGINAL WAY #5378 BUILDING B
Location: MARGINAL WAY., PORTLAND, MAINE
Drawing no: 1 OF 1
Date: 10/29/15

Design

Remote area number: BUILDING B
Remote area location: TENANT SPACE 1, BUILDING B
Occupancy classification: ORDINARY HAZARD II
Density: .2 - Gpm/SqFt
Area of application: 1040 - SqFt
Coverage per sprinkler: 123 - SqFt
Type of sprinklers calculated: RELIABLE F1FR 3/4" K=8.0
No. of sprinklers calculated: 10
In-rack demand: - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 542.82 - GPM @ 74.87 - Psi
Type of system: WET
Volume of dry or preaction system: NA - Gal

Water supply information

Date: 09/13/2011
Location: HYDRANT LOCATED ON KENNEBEC STREET
Source: PORTLAND WATER DISTRICT

Name of contractor: Eastern Fire Protection
Address: 170 Kitty Hawk Ave. / P.O. Box 1390 / Auburn, Maine, 04211
Phone number: 207-784-1507
Name of designer: WAF
Authority having jurisdiction: STATE FIRE MARSHAL
Notes: (Include peaking information or gridded systems here.)
REMOTE AREA REDUCED PER NFPA 13 (2007)SECTION 11.2.3.2.3.1

Water Supply Curve C

Eastern Fire Protection
MARGINAL WAY #5378 BUILDING B

City Water Supply:
C1 - Static Pressure : 106
C2 - Residual Pressure: 80
C2 - Residual Flow : 978

Demand:
D1 - Ele
D2 - Sy
D2 - Sy
Hose (
D3 - Sy
Safety Margin : 22.380

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Fittings Used Summary

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Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	1					4
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	2					1
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6					3
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	2					0
L	NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	1					0
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
Zcb	Colt C200 Vert Butt	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.

Flow Summary - NFPA 2007

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SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand
TEST	106.0	80	978.0	97.251	542.82

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
1	125.67	8	9.46	24.6	
2	125.17		10.72		
3	125.17		10.93		
4	125.17		11.46		
5	125.17		14.5		
6	125.17		16.39		
7	125.17		24.73		
8	123.62		30.32		
9	123.62		31.69		
10	123.62		45.23		
TOR	123.62		59.17		
BASE	113.0		73.32		
TEST	110.0		74.87	250.0	
13	125.67	8	9.64	24.84	
14	125.67	8	10.13	25.46	
15	125.67	8	12.77	28.59	
16	125.17		14.37		
17	125.17		14.64		
18	125.17		15.7		
19	125.17		18.0		
20	125.17		21.39		
21	123.62		29.81		
22	125.67	8	12.02	27.74	
23	125.17		12.83		
24	125.67	8	13.02	28.86	
25	125.67	8	13.98	29.91	
26	125.67	8	13.63	29.53	
27	125.17		14.51		
28	125.67	8	16.07	32.07	
29	125.67	8	26.56	41.23	
30	125.17		29.5		
31	125.17		30.47		

EOD

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv.	Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*
*EQUIVALENT K'S										
*REMOTE HEAD TO SUPPLY										
1	125.670	8.00	24.60	1	T	5.0	0.500	120	9.456	
to						0.0	5.000		0.217	
2	125.170		24.6	1.049		0.0	5.500	0.1907	1.049	Vel = 9.13
2	125.170		0.0	1.5		0.0	10.750	120	10.722	
to						0.0	0.0		0.0	
3	125.170		24.6	1.682		0.0	10.750	0.0192	0.206	Vel = 3.55
3	125.170		24.84	1.5		0.0	7.670	120	10.928	
to						0.0	0.0		0.0	
4	125.170		49.44	1.682		0.0	7.670	0.0696	0.534	Vel = 7.14
4	125.170		25.46	1.5	2E	9.9	10.340	120	11.462	
to						0.0	9.900		0.0	
5	125.170		74.9	1.682		0.0	20.240	0.1502	3.040	Vel = 10.81
5	125.170		27.74	1.5		0.0	7.000	120	14.502	
to						0.0	0.0		0.0	
6	125.170		102.64	1.682		0.0	7.000	0.2690	1.883	Vel = 14.82
6	125.170		29.53	1.5	T	9.9	9.530	120	16.385	
to						0.0	9.900		0.0	
7	125.170		132.17	1.682		0.0	19.430	0.4295	8.345	Vel = 19.08
7	125.170		0.0	1.5	T	9.9	1.540	120	24.730	
to						0.0	9.900		0.671	
8	123.620		132.17	1.682		0.0	11.440	0.4295	4.914	Vel = 19.08
8	123.620		119.42	2.5		0.0	8.670	120	30.315	
to						0.0	0.0		0.0	
9	123.620		251.59	2.635		0.0	8.670	0.1588	1.377	Vel = 14.80
9	123.620		41.23	2.5	T	16.474	47.920	120	31.692	
to						0.0	16.474		0.0	
10	123.620		292.82	2.635		0.0	64.394	0.2102	13.536	Vel = 17.23
10	123.620		0.0	2.5	2T	32.948	16.890	120	45.228	
to					2I	16.474	49.422		0.0	
TOR	123.620		292.82	2.635		0.0	66.312	0.2102	13.940	Vel = 17.23
TOR	123.620		0.0	2.5	Zcb	0.0	10.620	120	59.168	
to						0.0	0.0		11.917	* * Fixed Loss = 7.318
BASE	113		292.82	2.635		0.0	10.620	0.2103	2.233	Vel = 17.23
BASE	113		0.0	6	L	12.911	40.000	140	73.318	
to					G	4.304	60.252		1.299	
TEST	110		292.82	6.16	T	43.037	100.252	0.0025	0.253	Vel = 3.15
			250.00							Qa = 250.00
TEST			542.82						74.870	K Factor = 62.73
*NEW PATH										
13	125.670	8.00	24.84	1	T	5.0	0.500	120	9.642	
to						0.0	5.000		0.217	
3	125.170		24.84	1.049		0.0	5.500	0.1944	1.069	Vel = 9.22
			0.0							

Final Calculations - Hazen-Williams

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3			24.84						10.928	K Factor = 7.51
*NEW PATH										
14	125.670	8.00	25.46	1	T	5.0	0.500	120	10.127	
to						0.0	5.000		0.217	
4	125.170		25.46	1.049		0.0	5.500	0.2033	1.118	Vel = 9.45
			0.0							
4			25.46						11.462	K Factor = 7.52
*NEW PATH										
15	125.670	8.00	28.59	1	T	5.0	0.500	120	12.769	
to						0.0	5.000		0.217	
16	125.170		28.59	1.049		0.0	5.500	0.2520	1.386	Vel = 10.61
16	125.170		0.0	1.5		0.0	10.750	120	14.372	
to						0.0	0.0		0.0	
17	125.170		28.59	1.682		0.0	10.750	0.0252	0.271	Vel = 4.13
17	125.170		28.86	1.5		0.0	11.500	120	14.643	
to						0.0	0.0		0.0	
18	125.170		57.45	1.682		0.0	11.500	0.0920	1.058	Vel = 8.30
18	125.170		29.91	1.5		0.0	11.500	120	15.701	
to						0.0	0.0		0.0	
19	125.170		87.36	1.682		0.0	11.500	0.1997	2.296	Vel = 12.61
19	125.170		32.06	1.5		0.0	9.530	120	17.997	
to						0.0	0.0		0.0	
20	125.170		119.42	1.682		0.0	9.530	0.3560	3.393	Vel = 17.24
20	125.170		0.0	1.5	2T	19.799	1.960	120	21.390	
to						0.0	19.799		0.671	
21	123.620		119.42	1.682		0.0	21.759	0.3560	7.747	Vel = 17.24
21	123.620		0.0	2.5		0.0	12.670	120	29.808	
to						0.0	0.0		0.0	
8	123.620		119.42	2.635		0.0	12.670	0.0400	0.507	Vel = 7.03
			0.0							
8			119.42						30.315	K Factor = 21.69
*NEW PATH										
22	125.670	8.00	27.74	1	E	2.0	0.500	120	12.022	
to						0.0	2.000		0.217	
23	125.170		27.74	1.049		0.0	2.500	0.2380	0.595	Vel = 10.30
23	125.170		0.0	1	T	5.0	2.000	120	12.834	
to						0.0	5.000		0.0	
5	125.170		27.74	1.049		0.0	7.000	0.2383	1.668	Vel = 10.30
			0.0							
5			27.74						14.502	K Factor = 7.28
*NEW PATH										
24	125.670	8.00	28.86	1	T	5.0	0.500	120	13.016	
to						0.0	5.000		0.217	
17	125.170		28.86	1.049		0.0	5.500	0.2564	1.410	Vel = 10.71

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			0.0							
17			28.86						14.643	K Factor = 7.54
*NEW PATH										
25	125.670	8.00	29.91	1	T	5.0	0.500	120	13.977	
to						0.0	5.000		0.217	
18	125.170		29.91	1.049		0.0	5.500	0.2740	1.507	Vel = 11.10
			0.0							
18			29.91						15.701	K Factor = 7.55
*NEW PATH										
26	125.670	8.00	29.53	1	E	2.0	0.500	120	13.626	
to						0.0	2.000		0.217	
27	125.170		29.53	1.049		0.0	2.500	0.2676	0.669	Vel = 10.96
27	125.170		0.0	1	T	5.0	2.000	120	14.512	
to						0.0	5.000		0.0	
6	125.170		29.53	1.049		0.0	7.000	0.2676	1.873	Vel = 10.96
			0.0							
6			29.53						16.385	K Factor = 7.30
*NEW PATH										
28	125.670	8.00	32.07	1	T	5.0	0.500	120	16.066	
to						0.0	5.000		0.217	
19	125.170		32.07	1.049		0.0	5.500	0.3116	1.714	Vel = 11.91
			0.0							
19			32.07						17.997	K Factor = 7.56
*NEW PATH										
29	125.670	8.00	41.23	1	T	5.0	0.500	120	26.557	
to						0.0	5.000		0.217	
30	125.170		41.23	1.049		0.0	5.500	0.4960	2.728	Vel = 15.31
30	125.170		0.0	1.5	T	9.9	9.540	120	29.502	
to						0.0	9.900		0.0	
31	125.170		41.23	1.682		0.0	19.440	0.0498	0.968	Vel = 5.95
31	125.170		0.0	1.5	T	9.9	1.170	120	30.470	
to						0.0	9.900		0.671	
9	123.620		41.23	1.682		0.0	11.070	0.0498	0.551	Vel = 5.95
			0.0							
9			41.23						31.692	K Factor = 7.32