



... Fire Protection by Computer Design

DEAN AND ALLYN, INC.
116 LEWISTON ROAD
GRAY MAINE
207 657 5646

Job Name : BRIAN BORU FIRST FLOOR
Building :
Location : 57 CENTER STREET PORTLAND MAINE
System : ONE
Contract : C171475
Data File : BRIAN BORU FIRST FLOOR.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - BRIAN BORU FIRST FLOOR Date - 11-5-17
Location - 57 CENTER STREET PORTLAND MAINE
Building - System No. - ONE
Contractor - DEAN AND ALLYN, INC. Contract No. - C171475
Calculated By - H. KING Drawing No. - 1 OF 1
Construction: (X) Combustible () Non-Combustible Ceiling Height 8'
OCCUPANCY - PUB AND LOUNGE

S Type of Calculation: ()NFPA 13 Residential ()NFPA 13R ()NFPA 13D
Y Number of Sprinklers Flowing: ()1 ()2 ()4 ()
S ()OtherNFPA #13 LIGHT HAZARD AND O H KITCHEN
T ()Specific Ruling Made by Date

E
M Listed Flow at Start Point - 14.8 Gpm System Type
Listed Pres. at Start Point - 7 Psi (X) Wet () Dry
D MAXIMUM LISTED SPACING 10 x 12 () Deluge () PreAction
E Domestic Flow Added - Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make RELIABLE Model F1FR56
I Elevation at Highest Outlet - 9' Feet Size 1/2" K-Factor 5.6
G Note:CUSHION 5.2 PSI Temperature Rating 155
N

Calculation Gpm Required 483.8 Psi Required 76.4 AT CITY
Summary C-Factor Used: Overhead 120 Underground 120

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 6-22-17 Rated Cap. Cap.
T Time of Test - @ Psi Elev.
E Static (Psi) - 82 Elev.
R Residual (Psi) - 80 Other Well
Flow (Gpm) - 1209 Proof Flow Gpm
S Elevation - 0

P Location: IN FRONT OF BUILDING ON 10" CITY MAIN

P
L Source of Information: PORTLAND WATER DEPT.
Y

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
81 to 82	14.82	1.38 120.0	2E	6.0 0.0	8.700 6.000	7.000 0.0			K Factor = 5.60	
82 to 83	14.82	0.0197		0.0	14.700	0.289			Vel = 3.18	
82 to 83	15.12	1.61 120.0		0.0 0.0	10.500 0.0	7.289 0.0			K Factor = 5.60	
83 to 84	29.94	0.0341		0.0	10.500	0.358			Vel = 4.72	
83 to 84	15.48	1.61 120.0	2E	8.0 0.0	14.000 8.000	7.647 0.0			K Factor = 5.60	
84 to 40	45.42	0.0736		0.0	22.000	1.620			Vel = 7.16	
84 to 40	17.05	1.61 120.0	T	8.0 0.0	7.500 8.000	9.267 0.0			K Factor = 5.60	
40	62.47	0.1329		0.0	15.500	2.060			Vel = 9.84	
	0.0 62.47						11.327		K Factor = 18.56	
85 to 86	15.74	1.049 120.0	2E	4.0 0.0	6.700 4.000	7.899 0.0			K Factor = 5.60	
86 to 40	15.74	0.0836		0.0	10.700	0.894			Vel = 5.84	
86 to 40	16.61	1.049 120.0	T	5.0 0.0	3.000 5.000	8.793 0.0			K Factor = 5.60	
40	32.35	0.3167		0.0	8.000	2.534			Vel = 12.01	
	0.0 32.35						11.327		K Factor = 9.61	
87 to 41T	17.36	1.049 120.0	T	5.0 0.0	8.600 5.000	9.607 0.0			K Factor = 5.60	
41T	17.36	0.1001		0.0	13.600	1.362			Vel = 6.44	
	0.0 17.36						10.969		K Factor = 5.24	
88 to 41T	17.91	1.049 120.0	T	5.0 0.0	2.000 5.000	10.226 0.0			K Factor = 5.60	
41T	17.91	0.1061		0.0	7.000	0.743			Vel = 6.65	
	0.0 17.91						10.969		K Factor = 5.41	
89 to 42	20.33	1.049 120.0	E T	2.0 5.0	2.000 7.000	13.181 0.0			K Factor = 5.60	
42	20.33	0.1341		0.0	9.000	1.207			Vel = 7.55	
	0.0 20.33						14.388		K Factor = 5.36	
90 to 91	18.20	1.049 120.0		0.0 0.0	8.000 0.0	10.562 0.0			K Factor = 5.60	
91 to 43	18.2	0.1094		0.0	8.000	0.875			Vel = 6.76	
91 to 43	18.94	1.049 120.0	E T	2.0 5.0	1.000 7.000	11.437 0.0			K Factor = 5.60	
43	37.14	0.4089		0.0	8.000	3.271			Vel = 13.79	
	0.0 37.14						14.708		K Factor = 9.68	
92 to 48	23.08	1.049 120.0	2E	4.0 0.0	4.500 4.000	16.981 0.0			K Factor = 5.60	
48	23.08	0.1696		0.0	8.500	1.442			Vel = 8.57	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 23.08						18.423		K Factor = 5.38	
93 to 48	23.13	1.049 120.0	E T	2.0 5.0 0.0	1.000 7.000 8.000	17.060 0.0 1.363			K Factor = 5.60	
	23.13	0.1704							Vel = 8.59	
	0.0 23.13						18.423		K Factor = 5.39	
41T to 41	35.27	1.049 120.0	T	5.0 0.0 0.0	0.500 5.000 5.500	10.969 0.0 2.043				
	35.27	0.3715							Vel = 13.09	
	0.0 35.27						13.012		K Factor = 9.78	
40 to 41	94.81	2.067 120.0	2E	10.0 0.0 0.0	9.800 10.000 19.800	11.327 0.0 1.685				
	94.81	0.0851							Vel = 9.06	
41 to 42	35.27	2.067 120.0		0.0 0.0 0.0	9.000 0.0 9.000	13.012 0.0 1.376				
	130.08	0.1529							Vel = 12.44	
42 to 43	20.33	2.067 120.0		0.0 0.0 0.0	1.600 0.0 1.600	14.388 0.0 0.320				
	150.41	0.2000							Vel = 14.38	
43 to 44	37.14	2.067 120.0	E T	5.0 10.0 0.0	11.000 15.000 26.000	14.708 0.0 7.819				
	187.55	0.3007							Vel = 17.93	
	0.0 187.55						22.527		K Factor = 39.52	
48 to 44	46.21	1.049 120.0	T	5.0 0.0 0.0	1.700 5.000 6.700	18.423 0.0 4.104				
	46.21	0.6125							Vel = 17.15	
44 to 45	187.54	2.067 120.0		0.0 0.0 0.0	3.200 0.0 3.200	22.527 0.0 1.447				
	233.75	0.4522							Vel = 22.35	
45 to 46	0.0	2.067 120.0		0.0 0.0 0.0	8.000 0.0 8.000	23.974 0.0 3.616				
	233.75	0.4520							Vel = 22.35	
46 to 23	0.0	2.067 120.0		0.0 0.0 0.0	3.500 0.0 3.500	27.590 0.0 1.582				
	233.75	0.4520							Vel = 22.35	
23 to 24	0.0	2.067 120.0	T	10.0 0.0 0.0	2.300 10.000 12.300	29.172 0.0 5.560				
	233.75	0.4520							Vel = 22.35	
	0.0 233.75						34.732		K Factor = 39.66	
47 to 24	0.0	2.067 120.0	T	10.0 0.0 0.0	4.300 10.000 14.300	34.732 0.0 0.0				
	0.0	0.0							Vel = 0	
24 to 25	233.75	2.067 120.0	E	5.0 0.0 0.0	1.800 5.000 6.800	34.732 0.0 3.073				
	233.75	0.4519							Vel = 22.35	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
25 to 26	0.0 233.75	2.067 120.0 0.4520	E 0.0	5.0 0.0 10.000	37.805 3.898 6.780		Vel = 22.35		
26 to TR	0.0 233.75	2.067 120.0 0.4520	2E T 0.0	10.0 10.0 30.500	48.483 0.0 13.787		Vel = 22.35		
TR to FF	0.0 233.75	2.067 120.0 0.4520	S 0.0	11.0 0.0 18.000	62.270 5.000 8.136		** Fixed Loss = 5 Vel = 22.35		
FF to CTY	0.0 233.75	4.1 120.0 0.0161	T 0.0	21.855 0.0 61.855	75.406 0.0 0.995		Vel = 5.68		
	250.00 483.75				76.401		Qa = 250.00 K Factor = 55.34		

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
81	9.0	5.6	7.0	na	14.82	0.15	80	7.0
82	9.0	5.6	7.29	na	15.12	0.15	80	7.0
83	9.0	5.6	7.65	na	15.49	0.15	80	7.0
84	9.0	5.6	9.27	na	17.05	0.15	80	7.0
85	9.0	5.6	7.9	na	15.74	0.15	80	7.0
86	9.0	5.6	8.79	na	16.61	0.15	80	7.0
87	9.0	5.6	9.61	na	17.36	0.15	80	7.0
88	9.0	5.6	10.23	na	17.91	0.15	80	7.0
89	9.0	5.6	13.18	na	20.33	0.15	80	7.0
90	9.0	5.6	10.56	na	18.2	0.15	80	7.0
91	9.0	5.6	11.44	na	18.94	0.15	80	7.0
92	9.0	5.6	16.98	na	23.08	0.15	80	7.0
93	9.0	5.6	17.06	na	23.13	0.15	80	7.0
41T	9.0		10.97	na				
40	9.0		11.33	na				
41	9.0		13.01	na				
42	9.0		14.39	na				
43	9.0		14.71	na				
48	9.0		18.42	na				
44	9.0		22.53	na				
45	9.0		23.97	na				
46	9.0		27.59	na				
23	9.0		29.17	na				
47	9.0		34.73	na				
24	9.0		34.73	na				
25	9.0		37.81	na				
26	0.0		48.48	na				
TR	0.0		62.27	na				
FF	0.0		75.41	na				
CTY	0.0		76.4	na	250.0			

The maximum velocity is 22.35 and it occurs in the pipe between nodes 44 and 45

Water Supply Curve C

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City Water Supply:
C1 - Static Pressure : 82
C2 - Residual Pressure: 80
C2 - Residual Flow : 1209

Demand:
D1 - Elevation : 3.898
D2 - System Flow : 233.754
D2 - System Pressure : 76.401
Hose (Demand) : 250
D3 - System Demand : 483.754
Safety Margin : 5.231

