



... **Fire Protection by Computer Design**

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

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

HYDRAULIC DESIGN INFORMATION SHEET

Name - BRIAN BORU BASEMENT 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 BASEMENT

S Type of Calculation: ()NFPA 13 Residential ()NFPA 13R ()NFPA 13D
 Y Number of Sprinklers Flowing: ()1 ()2 ()4 ()
 S ()OtherNFPA #13 OH GROUP 1
 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 - 0 Feet Size 1/2" K-Factor 5.6
 G Note:CUSHION 6.9 PSI Temperature Rating 155
 N

Calculation Gpm Required 579.1 Psi Required 74.6 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 Source of Information: PORTLAND WATER DEPT.
 L
 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	*****
51	15.00	1.38		0.0	6.200	7.175				
to		120.0		0.0	0.0	0.0				K Factor = 5.60
52	15.0	0.0200		0.0	6.200	0.124				Vel = 3.22
52	15.13	1.61		0.0	7.000	7.299				K Factor = 5.60
to		120.0		0.0	0.0	0.0				
53	30.13	0.0346		0.0	7.000	0.242				Vel = 4.75
53	15.38	1.61	2E	8.0	6.000	7.541				K Factor = 5.60
to		120.0		0.0	8.000	0.0				
54	45.51	0.0739		0.0	14.000	1.035				Vel = 7.17
54	16.40	1.61	E	4.0	7.000	8.576				K Factor = 5.60
to		120.0	T	8.0	12.000	0.0				
71	61.91	0.1306		0.0	19.000	2.482				Vel = 9.76
	0.0									
	61.91					11.058				K Factor = 18.62
55	15.33	1.049		0.0	6.000	7.492				K Factor = 5.60
to		120.0		0.0	0.0	0.0				
56	15.33	0.0795		0.0	6.000	0.477				Vel = 5.69
56	15.81	1.38	3E	9.0	10.000	7.969				K Factor = 5.60
to		120.0		0.0	9.000	0.0				
70	31.14	0.0776		0.0	19.000	1.475				Vel = 6.68
	0.0									
	31.14					9.444				K Factor = 10.13
57	16.13	1.049		0.0	6.000	8.297				K Factor = 5.60
to		120.0		0.0	0.0	0.0				
58	16.13	0.0873		0.0	6.000	0.524				Vel = 5.99
58	16.63	1.38	T	6.0	1.300	8.821				K Factor = 5.60
to		120.0		0.0	6.000	0.0				
70	32.76	0.0853		0.0	7.300	0.623				Vel = 7.03
	0.0									
	32.76					9.444				K Factor = 10.66
59	18.24	1.049	T	5.0	2.200	10.608				K Factor = 5.60
to		120.0		0.0	5.000	0.0				
72	18.24	0.1097		0.0	7.200	0.790				Vel = 6.77
	0.0									
	18.24					11.398				K Factor = 5.40
60	23.24	1.049	E	2.0	6.300	17.216				K Factor = 5.60
to		120.0	T	5.0	7.000	0.0				
73	23.24	0.1717		0.0	13.300	2.284				Vel = 8.63
	0.0									
	23.24					19.500				K Factor = 5.26
61	192.27	1.61		0.0	1.800	19.910				K Factor = 5.60
to		120.0		0.0	0.0	0.0				
74	192.27	1.0633		0.0	1.800	1.914				Vel = 30.30
	0.0									
	192.27					21.824				K Factor = 41.16
62	25.28	1.049	T	5.0	2.200	20.379				K Factor = 5.60
to		120.0		0.0	5.000	0.0				
74	25.28	0.2007		0.0	7.200	1.445				Vel = 9.38

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftn'g's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 25.28						21.824		K Factor = 5.41	
63 to 75	26.24	1.049 120.0 0.2151	T	5.0 0.0 0.0	4.500 5.000 9.500	21.958 0.0 2.043			K Factor = 5.60	Vel = 9.74
	0.0 26.24						24.001		K Factor = 5.36	
64 to 76	26.85	1.049 120.0 0.2244	T	5.0 0.0 0.0	3.000 5.000 8.000	22.988 0.0 1.795			K Factor = 5.60	Vel = 9.97
	0.0 26.85						24.783		K Factor = 5.39	
65 to 77	29.04	1.049 120.0 0.2594	T	5.0 0.0 0.0	4.500 5.000 9.500	26.883 0.0 2.464			K Factor = 5.60	Vel = 10.78
	0.0 29.04						29.347		K Factor = 5.36	
66 to 78	29.41	1.049 120.0 0.2656	T	5.0 0.0 0.0	3.000 5.000 8.000	27.580 0.0 2.125			K Factor = 5.60	Vel = 10.92
	0.0 29.41						29.705		K Factor = 5.40	
70 to 71	63.90	1.38 120.0		0.0 0.0	5.500 0.0	9.444 0.0				Vel = 13.71
71 to 72	63.9	0.2935		0.0	5.500	1.614				
71 to 72	61.91	1.61 120.0		0.0 0.0	0.700 0.0	11.058 0.0				Vel = 19.83
72 to 73	125.81	0.4857		0.0	0.700	0.340				
72 to 73	18.23	1.61 120.0	2E	8.0 0.0	5.000 8.000	11.398 0.0				Vel = 22.70
73 to 61	144.04	0.6232		0.0	13.000	8.102				
73 to 61	23.24	1.61 120.0		0.0 0.0	0.500 0.0	19.500 0.0				Vel = 26.36
	0.0 167.28						19.910		K Factor = 37.49	
74 to 75	217.55	2.067 120.0		0.0 0.0	5.500 0.0	21.824 0.0				Vel = 20.80
75 to 76	217.55	0.3958		0.0	5.500	2.177				
75 to 76	26.24	2.067 120.0		0.0 0.0	1.600 0.0	24.001 0.0				Vel = 23.31
76 to 77	243.79	0.4888		0.0	1.600	0.782				
76 to 77	26.85	2.067 120.0		0.0 0.0	7.700 0.0	24.783 0.0				Vel = 25.88
77 to 78	270.64	0.5927		0.0	7.700	4.564				
77 to 78	29.04	2.067 120.0		0.0 0.0	0.500 0.0	29.347 0.0				Vel = 28.65
77 to 78	299.68	0.7160		0.0	0.500	0.358				

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	*****
78 to TR	29.40 329.08	2.067 120.0 0.8510	2E 10.0 T 10.0	6.700 20.000 26.700	29.705 0.0 22.723		Vel = 31.46		
TR to FF	0.0 329.08	2.067 120.0 0.8511	S 11.0	7.000 11.000 18.000	52.428 5.000 15.319		** Fixed Loss = 5 Vel = 31.46		
FF to CTY	0.0 329.08	4.1 120.0 0.0303	T 21.855	40.000 21.855 61.855	72.747 0.0 1.875		Vel = 8.00		
	250.00 579.08						Qa = 250.00 K Factor = 67.04		
					74.622				

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
51	0.0	5.6	7.17	na	15.0	0.15	100	7.0
52	0.0	5.6	7.3	na	15.13	0.15	100	7.0
53	0.0	5.6	7.54	na	15.38	0.15	100	7.0
54	0.0	5.6	8.58	na	16.4	0.15	100	7.0
55	0.0	5.6	7.49	na	15.33	0.15	100	7.0
56	0.0	5.6	7.97	na	15.81	0.15	100	7.0
57	0.0	5.6	8.3	na	16.13	0.15	100	7.0
58	0.0	5.6	8.82	na	16.63	0.15	100	7.0
59	0.0	5.6	10.61	na	18.24	0.15	100	7.0
60	0.0	5.6	17.22	na	23.24	0.15	100	7.0
61	0.0	5.6	19.91	na	24.99	0.15	100	7.0
62	0.0	5.6	20.38	na	25.28	0.15	100	7.0
63	0.0	5.6	21.96	na	26.24	0.15	100	7.0
64	0.0	5.6	22.99	na	26.85	0.15	100	7.0
65	0.0	5.6	26.88	na	29.04	0.15	100	7.0
66	0.0	5.6	27.58	na	29.41	0.15	100	7.0
70	0.0		9.44	na				
71	0.0		11.06	na				
72	0.0		11.4	na				
73	0.0		19.5	na				
74	0.0		21.82	na				
75	0.0		24.0	na				
76	0.0		24.78	na				
77	0.0		29.35	na				
78	0.0		29.7	na				
TR	0.0		52.43	na				
FF	0.0		72.75	na				
CTY	0.0		74.62	na	250.0			

The maximum velocity is 31.46 and it occurs in the pipe between nodes 78 and TR

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 : _____
D2 - System Flow : 329.084
D2 - System Pressure : 74.622
Hose (Demand) : 250
D3 - System Demand : 579.084
Safety Margin : 6.866

