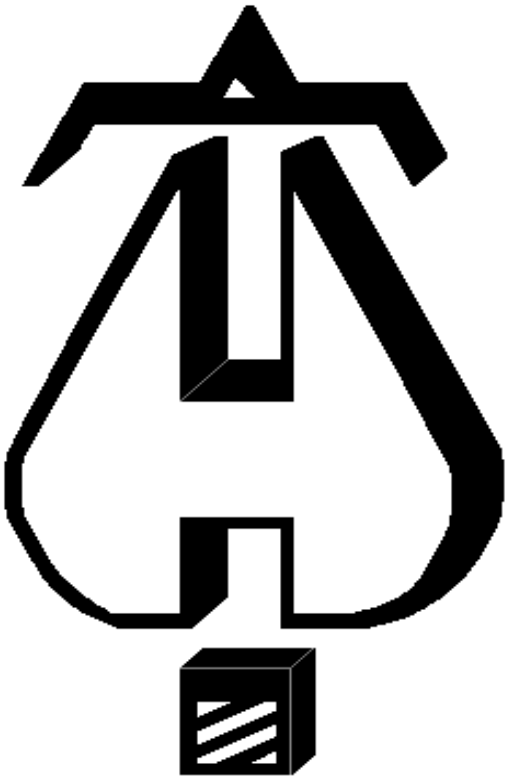

. . . Fire Protection by Computer Design

Dean and Allyn Inc
116 Lewiston Road
Your Street Address 2
Gray ME, 04039
(207)657-5646

Job Name : Portland Jetport Parking Garage Zone 4
Building :
Location : Lower Level Zone 4
System :
Contract :
Data File : PJPZONE4.WXF

HYDRAULIC CALCULATIONS
for

Project name: Portland Jetport Parking Garage Repipe
Location: Lower Level Zone 4
Drawing no:
Date:

Design

Remote area number:
Remote area location:
Occupancy classification: Ordinary I
Density: .15 - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: 122 - SqFt
Type of sprinklers calculated: Reliable F1FR56 1/2" 155
No. of sprinklers calculated: 17
In-rack demand: - GPM
Hose streams: 0 - GPM
Total water required (including hose streams): 853.06 - GPM @ 63.625 - Psi
Type of system: Dry
Volume of dry or preaction system: - Gal

Water supply information

Date:
Location:
Source:

Name of contractor: Dean and Allyn Inc
Address: 116 Lewiston Road / Your Street Address 2 / Gray ME, 04039
Phone number: (207)657-564
Name of designer: Scott Cote
Authority having jurisdiction: CITY OF PORTLAND
Notes: (Include peaking information or gridded systems here.)

Fittings Used Summary

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	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
Dvc	Dry Vic 756	0	0	0	0	3	9	8	17	0	21	0	22	50	0	0	0	0	0	0	0
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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
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
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
Ziu	Wilkins 975	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

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
400	11.667	5.6	10.68	na	18.3	0.15	122	10.68
401	11.667	5.6	10.91	na	18.5	0.15	122	10.68
402	11.542	5.6	11.81	na	19.24	0.15	122	10.68
403	11.417	5.6	13.7	na	20.73	0.15	122	10.68
400A	11.667		11.4	na				
401A	11.667		11.64	na				
402A	11.542		12.6	na				
403A	11.417		14.61	na				
404	13.0	5.6	15.58	na	22.11	0.15	130	12.125
59	12.0		17.22	na				
405	11.667	5.6	12.28	na	19.62	0.15	107.5	8.264
406	11.667	5.6	12.43	na	19.75	0.15	107.5	8.264
407	11.542	5.6	13.05	na	20.23	0.15	107.5	8.264
408	11.417	5.6	14.32	na	21.19	0.15	107.5	8.264
409	13.0	5.6	15.6	na	22.12	0.15	92.5	7.0
58	12.0		17.24	na				
410	11.667	5.6	12.36	na	19.68	0.15	107.5	8.264
411	11.667	5.6	12.51	na	19.81	0.15	107.5	8.264
412	11.542	5.6	13.13	na	20.3	0.15	107.5	8.264
413	11.417	5.6	14.41	na	21.26	0.15	107.5	8.264
414	13.0	5.6	15.71	na	22.19	0.15	107.5	8.264
57	12.0		17.35	na				
415	11.667	5.6	15.21	na	21.84	0.15	120	10.33
416	11.667	5.6	15.4	na	21.97	0.15	120	10.33
59A	10.167		18.26	na				
58A	10.167		18.29	na				
57A	10.167		18.4	na				
56	10.167		18.53	na				
55	10.042		18.71	na				
54	10.0		26.05	na				
53	10.833		29.2	na				
52	10.833		31.86	na				
TR	21.458		28.33	na				
BR	17.458		31.39	na				
BASE	13.417		44.24	na				
HOSE	13.417		44.36	na				
TEST	13.417		46.12	na				

The maximum velocity is 12.77 and it occurs in the pipe between nodes 413 and 57A

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
400	18.30	1.049	1T	5.0	1.500	10.680		K Factor = 5.60
to		120.0		0.0	5.000	0.0		
400A	18.3	0.1105		0.0	6.500	0.718		Vel = 6.79
	0.0							
	18.30					11.398		K Factor = 5.42
401	18.50	1.049	1T	5.0	1.500	10.912		K Factor = 5.60
to		120.0		0.0	5.000	0.0		
401A	18.5	0.1126		0.0	6.500	0.732		Vel = 6.87
	0.0							
	18.50					11.644		K Factor = 5.42
402	19.24	1.049	1T	5.0	1.500	11.809		K Factor = 5.60
to		120.0		0.0	5.000	0.0		
402A	19.24	0.1212		0.0	6.500	0.788		Vel = 7.14
	0.0							
	19.24					12.597		K Factor = 5.42
403	20.73	1.049	1T	5.0	1.500	13.704		K Factor = 5.60
to		120.0		0.0	5.000	0.0		
403A	20.73	0.1391		0.0	6.500	0.904		Vel = 7.70
	0.0							
	20.73					14.608		K Factor = 5.42
400A	18.30	1.61	1T	8.0	10.000	11.398		
to		120.0		0.0	8.000	0.0		
401A	18.3	0.0137		0.0	18.000	0.246		Vel = 2.88
401A	18.50	1.61	1T	8.0	10.000	11.644		
to		120.0		0.0	8.000	0.054		
402A	36.8	0.0499		0.0	18.000	0.899		Vel = 5.80
402A	19.24	1.61	1T	8.0	10.000	12.597		
to		120.0		0.0	8.000	0.054		
403A	56.04	0.1087		0.0	18.000	1.957		Vel = 8.83
403A	20.73	1.61	1E	4.0	4.000	14.608		
to		120.0	1T	8.0	12.000	0.541		
59A	76.77	0.1946		0.0	16.000	3.113		Vel = 12.10
	0.0							
	76.77					18.262		K Factor = 17.96
404	22.11	1.049	1E	2.0	5.667	15.582		K Factor = 5.60
to		120.0		0.0	2.000	0.433		
59	22.11	0.1566		0.0	7.667	1.201		Vel = 8.21
59	0.0	1.61	1E	4.0	1.000	17.216		
to		120.0	1T	8.0	12.000	0.794		
59A	22.11	0.0194		0.0	13.000	0.252		Vel = 3.48
	0.0							
	22.11					18.262		K Factor = 5.17
405	19.62	1.61		0.0	10.000	12.277		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
406	19.62	0.0156		0.0	10.000	0.156		Vel = 3.09
406	19.75	1.61		0.0	10.000	12.433		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
407	39.37	0.0566		0.0	10.000	0.566		Vel = 6.20

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
407	20.23	1.61		0.0	10.000	13.053		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
408	59.6	0.1218		0.0	10.000	1.218		Vel = 9.39
408	21.19	1.61	1E	4.0	4.000	14.325		K Factor = 5.60
to		120.0	1T	8.0	12.000	0.541		
58A	80.79	0.2138		0.0	16.000	3.421		Vel = 12.73
	0.0							
	80.79					18.287		K Factor = 18.89
409	22.12	1.049	1E	2.0	5.667	15.605		K Factor = 5.60
to		120.0		0.0	2.000	0.433		
58	22.12	0.1568		0.0	7.667	1.202		Vel = 8.21
58	0.0	1.61	1E	4.0	1.000	17.240		
to		120.0	1T	8.0	12.000	0.794		
58A	22.12	0.0195		0.0	13.000	0.253		Vel = 3.49
	0.0							
	22.12					18.287		K Factor = 5.17
410	19.68	1.61		0.0	10.000	12.355		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
411	19.68	0.0157		0.0	10.000	0.157		Vel = 3.10
411	19.81	1.61		0.0	10.000	12.512		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
412	39.49	0.0569		0.0	10.000	0.569		Vel = 6.22
412	20.30	1.61		0.0	10.000	13.135		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
413	59.79	0.1225		0.0	10.000	1.225		Vel = 9.42
413	21.26	1.61	1E	4.0	4.000	14.414		K Factor = 5.60
to		120.0	1T	8.0	12.000	0.541		
57A	81.05	0.2151		0.0	16.000	3.442		Vel = 12.77
	0.0							
	81.05					18.397		K Factor = 18.90
414	22.19	1.049	1E	2.0	5.667	15.706		K Factor = 5.60
to		120.0		0.0	2.000	0.433		
57	22.19	0.1577		0.0	7.667	1.209		Vel = 8.24
57	0.0	1.61	1E	4.0	1.000	17.348		
to		120.0	1T	8.0	12.000	0.794		
57A	22.19	0.0196		0.0	13.000	0.255		Vel = 3.50
	0.0							
	22.19					18.397		K Factor = 5.17
415	21.84	1.61		0.0	10.000	15.207		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
416	21.84	0.0190		0.0	10.000	0.190		Vel = 3.44
416	21.97	1.61	1E	4.0	24.000	15.397		K Factor = 5.60
to		120.0	1T	8.0	12.000	0.650		
56	43.81	0.0689		0.0	36.000	2.481		Vel = 6.90
	0.0							
	43.81					18.528		K Factor = 10.18
59A	98.88	4.26		0.0	9.250	18.262		
to		120.0		0.0	0.0	0.0		
58A	98.88	0.0027		0.0	9.250	0.025		Vel = 2.23

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
58A	102.92	4.26		0.0	10.750	18.287		
to		120.0		0.0	0.0	0.0		
57A	201.8	0.0102		0.0	10.750	0.110		Vel = 4.54
57A	103.24	4.26		0.0	6.000	18.397		
to		120.0		0.0	0.0	0.0		
56	305.04	0.0218		0.0	6.000	0.131		Vel = 6.87
56	43.81	4.26		0.0	4.500	18.528		
to		120.0		0.0	0.0	0.054		
55	348.85	0.0280		0.0	4.500	0.126		Vel = 7.85
55	0.0	4.26	1T	26.334	182.500	18.708		
to		120.0	4E	52.668	79.002	0.018		
54	348.85	0.0280		0.0	261.502	7.325		Vel = 7.85
54	0.0	4.26	2E	26.334	98.875	26.051		
to		120.0		0.0	26.334	-0.361		
53	348.85	0.0280		0.0	125.209	3.507		Vel = 7.85
53	0.0	4.26	3E	39.501	55.542	29.197		
to		120.0		0.0	39.501	0.0		
52	348.85	0.0280		0.0	95.043	2.662		Vel = 7.85
52	0.0	4.26	2E	26.334	12.000	31.859		
to		120.0		0.0	26.334	-4.602		
TR	348.85	0.0280		0.0	38.334	1.074		Vel = 7.85
TR	0.0	4.26	1Dvc	27.651	4.000	28.331		
to		120.0	1B	15.8	43.451	1.732		
BR	348.85	0.0280		0.0	47.451	1.330		Vel = 7.85
BR	0.0	8.249	1Ziu	0.0	7.000	31.393		
to		120.0		0.0	0.0	12.844		* Fixed loss = 11.094
BASE	348.85	0.0010		0.0	7.000	0.007		Vel = 2.09
BASE	0.0	8.27	3E	85.404	50.000	44.244		
to		140.0	1G	6.326	91.730	0.0		
HOSE	348.85	0.0008		0.0	141.730	0.118		Vel = 2.08
HOSE	0.0	8.27	6F	85.404	2000.000	44.362		
to		140.0	1E	28.468	113.872	0.0		
TEST	348.85	0.0008		0.0	2113.872	1.760		Vel = 2.08
	0.0							
	348.85					46.122		K Factor = 51.37

Water Supply Curve (C)

Dean and Allyn Inc
Portland Jetport Parking Garage Zone 4

Date

City Water Supply:
- C1 - Static Pressure : 86
- C2 - Residual Pressure: 73
- C2 - Residual Flow : 2781

Demand:

D1 - Elevation	:	-0.758
D2 - System Flow	:	348.849
D2 - System Pressure	:	46.122
Hose (Adj City)	:	
Hose (Demand)	:	
D3 - System Demand	:	348.849
Safety Margin	:	39.598