Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 01/23/14

. . . 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 Repipe '13 ZONE 2
Building	:	Parking Garage
Location	:	Portland Maine
System	:	
Contract	:	C131180
Data File	:	PJPREPIPEzone2.WXF

Water Supply Curve (C)

Dean and Allyn Inc
Portland Jetport Repipe '13 ZONE 2

Date

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

Demand:

D1 - Elevation	:	-0.866
D2 - System Flow	:	323.152
D2 - System Pressure	:	44.604
Hose (Adj City)	:	_____
Hose (Demand)	:	_____
D3 - System Demand	:	323.152
Safety Margin	:	41.154

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CITY OF PORTLAND, MAINE RESURGAM

Fittings Used Summary

Dean and Allyn Inc
Portland Jetport Repipe '13 ZONE 2

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
H	45' Grvd-Vic Elbow #11	0	0	1	1.5	2	2	3	3	3.5	3.5	4.5	5	6.5	8.5	10	18	20	23	25	30
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

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CITY OF PORTLAND, MAINE
RESURGAM

Pressure / Flow Summary - STANDARD

Dean and Allyn Inc
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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density		
99	0.0		75.34	na				
99A	0.0		75.34	na				
100	0.0		75.34	na				
101	0.0		75.34	na				
102	0.0		75.34	na				
103	0.0		75.34	na				
104	0.0		75.34	na				
104A	0.0		75.34	na				
105	0.0		75.34	na				
106	0.0		75.34	na				
107	0.0		75.34	na				
108	0.0		75.34	na				
109	0.0		75.34	na				
109A	0.0		75.34	na				
110	0.0		75.34	na				
111	0.0		75.34	na				
112	0.0		75.34	na				
113	0.0		75.34	na				
114	0.0		75.34	na				
115	0.0		75.34	na				
89	0.0		75.34	na				
88	0.0		75.34	na				
87	0.0		75.34	na				
86	0.0		75.34	na				
86A	0.0		75.34	na				
85	0.0		75.34	na				
84	0.0		75.34	na				
83	0.0		75.34	na				
200	98.0	5.6	8.43	na	16.26	0.15	97.125	7.0
201	98.0	5.6	8.63	na	16.45	0.15	97.125	7.0
202	97.875	5.6	9.42	na	17.18	0.15	97.125	7.0
203	97.75	5.6	11.07	na	18.63	0.15	97.125	7.0
204	97.75	5.6	13.95	na	20.92	0.15	97.125	7.0
200A	98.0		8.54	na				
201A	98.0		8.75	na				
202A	97.875		9.54	na				
203A	97.75		11.22	na				
204A	97.75		14.14	na				
205	98.0	5.6	10.09	na	17.79	0.15	97.125	7.0
206	98.0	5.6	10.23	na	17.91	0.15	97.125	7.0
207	97.875	5.6	10.78	na	18.38	0.15	97.125	7.0
208	97.75	5.6	11.9	na	19.32	0.15	97.125	7.0
209	97.75	5.6	13.78	na	20.79	0.15	97.125	7.0
210	98.0	5.6	10.24	na	17.92	0.15	119.438	10.24
211	98.0	5.6	10.38	na	18.04	0.15	119.438	10.24
212	97.875	5.6	10.93	na	18.52	0.15	119.438	10.24
213	97.75	5.6	12.07	na	19.46	0.15	119.438	10.24
214	97.75	5.6	13.98	na	20.94	0.15	119.438	10.24
215	98.0	5.6	15.79	na	22.25	0.15	125.559	12.208
216	98.0	5.6	16.0	na	22.4	0.15	125.559	12.208
79	96.75		18.96	na				
78	96.75		19.04	na				
77	96.75		19.3	na				
76	96.75		20.0	na				
76A	96.125		21.03	na				
75	96.75		26.97	na				
74	96.042		28.5	na				
73	95.792		32.93	na				
TR	107.0		29.0	na				
BR	103.0		31.89	na				
BASE	100.0		44.28	na				
HOSE	100.0		44.38	na				

Flow Summary - Standard

Dean and Allyn Inc
Portland Jetport Repipe '13 ZONE 2

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density
TEST	100.0		44.6	na		

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The maximum velocity is 14.95 and it occurs in the pipe between nodes 214 and 77

Final Calculations - Hazen-Williams

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Portland Jetport Repipe '13 ZONE 2

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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	**
99	0.0	1.049	4E	8.0	9.208	75.345		
to		120.0		0.0	8.000	0.0		
99A	0.0	0.0		0.0	17.208	0.0		Vel = 0
99A	0.0	1.61		0.0	0.500	75.345		
to		120.0		0.0	0.0	0.0		
100	0.0	0.0		0.0	0.500	0.0		Vel = 0
100	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
101	0.0	0.0		0.0	10.000	0.0		Vel = 0
101	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
102	0.0	0.0		0.0	10.000	0.0		Vel = 0
102	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
103	0.0	0.0		0.0	10.000	0.0		Vel = 0
103	0.0	1.61	2E	8.0	23.500	75.345		
to		120.0		0.0	8.000	0.0		
89	0.0	0.0		0.0	31.500	0.0		Vel = 0
	0.0							
	0.0					75.345		K Factor = 0
104	0.0	1.049	4E	8.0	9.208	75.345		
to		120.0		0.0	8.000	0.0		
104A	0.0	0.0		0.0	17.208	0.0		Vel = 0
104A	0.0	1.61		0.0	0.500	75.345		
to		120.0		0.0	0.0	0.0		
105	0.0	0.0		0.0	0.500	0.0		Vel = 0
105	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
106	0.0	0.0		0.0	10.000	0.0		Vel = 0
106	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
107	0.0	0.0		0.0	10.000	0.0		Vel = 0
107	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
108	0.0	0.0		0.0	10.000	0.0		Vel = 0
108	0.0	1.61	3E	12.0	24.542	75.345		
to		120.0		0.0	12.000	0.0		
88	0.0	0.0		0.0	36.542	0.0		Vel = 0
	0.0							
	0.0					75.345		K Factor = 0
109	0.0	1.049	3E	6.0	9.208	75.345		
to		120.0		0.0	6.000	0.0		
109A	0.0	0.0		0.0	15.208	0.0		Vel = 0
109A	0.0	1.61		0.0	0.500	75.345		
to		120.0		0.0	0.0	0.0		
110	0.0	0.0		0.0	0.500	0.0		Vel = 0
110	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
111	0.0	0.0		0.0	10.000	0.0		Vel = 0

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	**
111	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
112	0.0	0.0		0.0	10.000	0.0		Vel = 0
112	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
113	0.0	0.0		0.0	10.000	0.0		Vel = 0
113	0.0	1.61	3E	12.0	24.583	75.345		
to		120.0		0.0	12.000	0.0		
87	0.0	0.0		0.0	36.583	0.0		Vel = 0
	0.0							
	0.0					75.345		K Factor = 0
114	0.0	1.61		0.0	10.000	75.345		
to		120.0		0.0	0.0	0.0		
115	0.0	0.0		0.0	10.000	0.0		Vel = 0
115	0.0	1.61	2E	8.0	23.500	75.345		
to		120.0		0.0	8.000	0.0		
86	0.0	0.0		0.0	31.500	0.0		Vel = 0
	0.0							
	0.0					75.345		K Factor = 0
89	0.0	4.26		0.0	9.250	75.345		
to		120.0		0.0	0.0	0.0		
88	0.0	0.0		0.0	9.250	0.0		Vel = 0
88	0.0	4.26		0.0	4.750	75.345		
to		120.0		0.0	0.0	0.0		
87	0.0	0.0		0.0	4.750	0.0		Vel = 0
87	0.0	4.26		0.0	11.375	75.345		
to		120.0		0.0	0.0	0.0		
86	0.0	0.0		0.0	11.375	0.0		Vel = 0
86	0.0	4.26		0.0	31.333	75.345		
to		120.0		0.0	0.0	0.0		
86A	0.0	0.0		0.0	31.333	0.0		Vel = 0
86A	0.0	4.26	2F	10.534	246.125	75.345		
to		120.0		0.0	10.534	0.0		
85	0.0	0.0		0.0	256.659	0.0		Vel = 0
85	0.0	4.26	2E	26.334	34.125	75.345		
to		120.0		0.0	26.334	0.0		
84	0.0	0.0		0.0	60.459	0.0		Vel = 0
84	0.0	4.26	3E	39.501	130.917	75.345		
to		120.0		0.0	39.501	0.0		
83	0.0	0.0		0.0	170.418	0.0		Vel = 0
83	0.0	4.26	2E	26.334	12.000	75.345		
to		120.0		0.0	26.334	-46.342		
TR	0.0	0.0		0.0	38.334	0.0		Vel = 0
	0.0							
	0.0					29.003		K Factor = 0
200	16.26	1.049		0.0	1.290	8.429		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
200A	16.26	0.0884		0.0	1.290	0.114		Vel = 6.04

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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	**
	0.0							
	16.26					8.543		K Factor = 5.56
201	16.45	1.049		0.0	1.290	8.630		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
201A	16.45	0.0907		0.0	1.290	0.117		Vel = 6.11
	0.0							
	16.45					8.747		K Factor = 5.56
202	17.18	1.049		0.0	1.290	9.417		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
202A	17.18	0.0984		0.0	1.290	0.127		Vel = 6.38
	0.0							
	17.18					9.544		K Factor = 5.56
203	18.63	1.049		0.0	1.290	11.072		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
203A	18.63	0.1140		0.0	1.290	0.147		Vel = 6.92
	0.0							
	18.63					11.219		K Factor = 5.56
204	20.92	1.049		0.0	1.290	13.954		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
204A	20.92	0.1411		0.0	1.290	0.182		Vel = 7.77
	0.0							
	20.92					14.136		K Factor = 5.56
200A	16.26	1.61	1T	8.0	10.500	8.543		
to		120.0		0.0	8.000	0.0		
201A	16.26	0.0110		0.0	18.500	0.204		Vel = 2.56
201A	16.45	1.61	1T	8.0	10.500	8.747		
to		120.0		0.0	8.000	0.054		
202A	32.71	0.0402		0.0	18.500	0.743		Vel = 5.15
202A	17.18	1.61	1T	8.0	10.500	9.544		
to		120.0		0.0	8.000	0.054		
203A	49.89	0.0876		0.0	18.500	1.621		Vel = 7.86
203A	18.64	1.61	1T	8.0	10.500	11.219		
to		120.0		0.0	8.000	0.0		
204A	68.53	0.1577		0.0	18.500	2.917		Vel = 10.80
204A	20.92	1.61	1E	4.0	5.000	14.136		
to		120.0	1T	8.0	12.000	0.433		
79	89.45	0.2581		0.0	17.000	4.388		Vel = 14.10
	0.0							
	89.45					18.957		K Factor = 20.54
205	17.79	1.61		0.0	10.500	10.089		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
206	17.79	0.0130		0.0	10.500	0.137		Vel = 2.80
206	17.91	1.61		0.0	10.500	10.226		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
207	35.7	0.0471		0.0	10.500	0.495		Vel = 5.63
207	18.38	1.61		0.0	10.500	10.775		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
208	54.08	0.1018		0.0	10.500	1.069		Vel = 8.52

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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	*
208	19.31	1.61		0.0	10.500	11.898		K
to		120.0		0.0	0.0	0.0		
209	73.39	0.1790		0.0	10.500	1.880		Vel = 11.57
209	20.79	1.61	1E	4.0	5.000	13.778		K Factor = 5.60
to		120.0	1T	8.0	12.000	0.433		
78	94.18	0.2839		0.0	17.000	4.827		Vel = 14.84
	0.0							
	94.18					19.038		K Factor = 21.58
210	17.92	1.61		0.0	10.500	10.240		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
211	17.92	0.0131		0.0	10.500	0.138		Vel = 2.82
211	18.04	1.61		0.0	10.500	10.378		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
212	35.96	0.0479		0.0	10.500	0.503		Vel = 5.67
212	18.52	1.61		0.0	10.500	10.935		K Factor = 5.60
to		120.0		0.0	0.0	0.054		
213	54.48	0.1031		0.0	10.500	1.083		Vel = 8.59
213	19.46	1.61		0.0	10.500	12.072		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
214	73.94	0.1814		0.0	10.500	1.905		Vel = 11.65
214	20.93	1.61	1E	4.0	5.000	13.977		K Factor = 5.60
to		120.0	1T	8.0	12.000	0.433		
77	94.87	0.2878		0.0	17.000	4.893		Vel = 14.95
	0.0							
	94.87					19.303		K Factor = 21.59
215	22.25	1.61		0.0	10.500	15.792		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
216	22.25	0.0197		0.0	10.500	0.207		Vel = 3.51
216	22.40	1.61	1E	4.0	36.458	15.999		K Factor = 5.60
to		120.0	1T	8.0	12.000	0.541		
76	44.65	0.0714		0.0	48.458	3.460		Vel = 7.04
	0.0							
	44.65					20.000		K Factor = 9.98
79	89.45	4.26	1T	26.334	9.250	18.957		
to		120.0		0.0	26.334	0.0		
78	89.45	0.0023		0.0	35.584	0.081		Vel = 2.01
78	94.18	4.26	1T	26.334	4.750	19.038		
to		120.0		0.0	26.334	0.0		
77	183.63	0.0085		0.0	31.084	0.265		Vel = 4.13
77	94.87	4.26	1T	26.334	11.375	19.303		
to		120.0		0.0	26.334	0.0		
76	278.5	0.0185		0.0	37.709	0.697		Vel = 6.27
76	44.65	4.26		0.0	31.333	20.000		
to		120.0		0.0	0.0	0.271		
76A	323.15	0.0243		0.0	31.333	0.761		Vel = 7.27
76A	0.0	4.26	2H	9.217	246.125	21.032		
to		120.0		0.0	9.217	-0.271		
75	323.15	0.0243		0.0	255.342	6.208		Vel = 7.27

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	**
75	0.0	4.26	1E	13.167	32.417	26.969		
to		120.0	1H	4.608	17.775	0.307		
74	323.15	0.0243		0.0	50.192	1.220		Vel = 7.27
74	0.0	4.26	4E	52.668	125.042	28.496		
to		120.0		0.0	52.668	0.108		
73	323.15	0.0243		0.0	177.710	4.321		Vel = 7.27
73	0.0	4.26	2E	26.334	12.000	32.925		
to		120.0		0.0	26.334	-4.854		
TR	323.15	0.0243		0.0	38.334	0.932		Vel = 7.27
TR	0.0	4.26	1Dvc	27.651	4.000	29.003		
to		120.0	1B	15.8	43.451	1.732		
BR	323.15	0.0243		0.0	47.451	1.154		Vel = 7.27
BR	0.0	8.249	1Ziu	0.0	7.000	31.889		
to		120.0		0.0	0.0	12.383		* Fixed loss = 11.084
BASE	323.15	0.0010		0.0	7.000	0.007		Vel = 1.94
BASE	0.0	8.27	3E	85.404	50.000	44.279		
to		140.0	1G	6.326	91.730	0.0		
HOSE	323.15	0.0007		0.0	141.730	0.102		Vel = 1.93
HOSE	0.0	12.34	6F	121.897	2000.000	44.381		
to		140.0	1E	42.195	164.092	0.0		
TEST	323.15	0.0001		0.0	2164.092	0.223		Vel = 0.87
	0.0							
	323.15					44.604		K Factor = 48.39