Inspections Division
Date: 03/22/16

. . . Fire Protection by Computer Design

HAMPSHIRE FIRE PROTECTION
8 N. WENTWORTH AVE.
LONDONDERRY, NH 03053
603-432-8221

Job Name	:	PARK DANFORTH - 1ST AUDITORIUM
Building	:	2016 ADDITION, 1ST AUDITORIUM
Location	:	PORTLAND, ME
System	:	1
Contract	:	4737CME
Data File	:	PD1STA.wxf

Inspections Division
Date: 03/22/16

Hydraulic Design Information Sheet

Name - PARK DANFORTH, 1ST FLOOR AUDITORIUM Date - 2-12-15
Location - PORTLAND, ME
Building - 2016 ADDITION, 1ST AUDITORIUM System No. - 1
Contractor - PC CONSTRUCTION Contract No. - 4737CME
Calculated By - BENOIT Drawing No. - 4
Construction: ( ) Combustible (X) Non-Combustible Ceiling Height - 9-0
Occupancy - AUDITORIUM

SYSTEM DESIGN

(X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other
Specific Ruling Made By Date

Area of Sprinkler Operation	- 900	System Type	Sprinkler/Nozzle
Density	- .1	(X) Wet	Make RELIABLE
Area Per Sprinkler	- 168	( ) Dry	Model F1FR
Elevation at Highest Outlet	- 61	( ) Deluge	Size 1/2
Hose Allowance - Inside	- 0	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance	- 0	( ) Other	Temp.Rat.
Hose Allowance - Outside	- 100		

Note 40% QR HEAD USE REDUCTION

Calculation Summary Flow Required - 292.0 Press Required - 41.0 AT TEST
C-Factor Used: 120 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:		Pump Data:		Tank or Reservoir:
Date of Test	- 10-25-14			Cap. -
Time of Test	- 10 AM	Rated Cap.	- 1000	Elev.-
Static Press	- 62	@ Press	- 70	
Residual Press	- 60	Elev.	- 0	Well
Flow	- 992			Proof Flow
Elevation	- 0			

Location - SEE SITE PLAN

Source of Information - PORTLAND WATER DEPT., MEANS DIVISION

COMMODITY STORAGE

Commodity Class Location
Storage Ht. Area Aisle W.
Storage Method: Solid Piled % Palletized % Rack

( ) Single Row ( ) Conven. Pallet ( ) Auto. Storage ( ) Encap.
( ) Double Row ( ) Slave Pallet ( ) Solid Shelf ( ) Non
( ) Mult. Row ( ) Open Shelf

Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

Water Supply Curve C

HAMPSHIRE FIRE PROTECTION
PARK DANFORTH - 1ST AUDITORIUM

Inspections Division
Date: 03/22/16

City Water Supply:
- C1 - Static Pressure : 62
- C2 - Residual Pressure: 60
- C2 - Residual Flow : 992

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 59.998
- A2 - Adj Resid : 55.899 @ 1000
- A3 - Adj Resid : 51.615 @ 1500

Pump Data:
- P1 - Pump Churn Pressure : 88.2
- P2 - Pump Rated Pressure : 70
- P2 - Pump Rated Flow : 1000
- P3 - Pump Pressure @ Max Flow : 45.5
- P3 - Pump Max Flow : 1500
- City Residual Flow @ 0 = 6348.24
- City Residual Flow @ 20 = 5143.10
- City Water @ 150% of Pump = 57.70

Demand:
- D1 - Elevation : 3.465
- D2 - System Flow : 192.022
- D2 - System Pressure : 126.429
- Hose (Demand) : _____
- D3 - System Demand : 192.022
- Hose (Adj City) : 100
- Safety Margin : 20.821

Fittings Used Summary

Inspections Division
Date: 03/22/16

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	2.25	2	2.5	6	7	10	0	12	9	10	12	19	21	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
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
J	90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
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

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.

Pressure / Flow Summary - STANDARD

HAMPSHIRE FIRE PROTECTION
PARK DANFORTH - 1ST AUDITORIUM

Date 2-12-

Inspections Division
Date: 03/22/16

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
30	17.0	5.6	7.0	na	14.82	0.1	148	7.0
31	17.0	5.6	7.81	na	15.65	0.1	148	7.0
31T	17.0		7.9	na				
32	17.0	5.6	11.44	na	18.94	0.1	168	9.0
33	17.0	5.6	13.81	na	20.81	0.1	148	7.0
34	19.5	5.6	11.22	na	18.76	0.1	148	7.0
35	19.5	5.6	11.81	na	19.25	0.1	148	7.0
34T	19.5		12.72	na				
36	17.0	5.6	10.25	na	17.93	0.1	148	7.0
37	17.0	5.6	11.29	na	18.82	0.1	168	9.0
38	17.0	5.6	15.75	na	22.23	0.1	148	7.0
37T	17.0		12.16	na				
38T	17.0		17.18	na				
39	17.0	5.6	19.64	na	24.82	0.1	148	7.0
L	17.0		17.01	na				
M	17.0		17.31	na				
N	17.0		20.72	na				
O	17.0		21.38	na				
P	17.0		39.73	na				
Q	16.0		75.99	na				
CFC	14.0		120.56	na				
SD	17.0		119.33	na				
SF	9.0		123.15	na				
TOR	9.0		123.25	na				
BOR	2.0		126.35	na				
DISC	2.0		126.43	na				
SUCT	2.0		59.73	na				
BF1	2.0		59.73	na				
BF2	2.0		64.73	na				
FLG	1.0		65.18	na				
HOSE	5.0		63.49	na	100.0			
TEST	9.0		61.79	na				

The maximum velocity is 27.73 and it occurs in the pipe between nodes O and P

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
30	14.82	1.049	T	5.0	7.000	7.000		K Factor = 5.60
to		120.0		0.0	5.000	0.0		
31T	14.82	0.0747		0.0	12.000	0.896		Vel = 5.50
	0.0							
	14.82					7.896		K Factor = 5.27
31	15.65	1.049		0.0	1.000	7.814		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
31T	15.65	0.0820		0.0	1.000	0.082		Vel = 5.81
31T	14.82	1.049		0.0	12.500	7.896		
to		120.0		0.0	0.0	0.0		
32	30.47	0.2836		0.0	12.500	3.545		Vel = 11.31
32	18.94	1.38		0.0	13.000	11.441		K Factor = 5.60
to		120.0		0.0	0.0	0.0		
33	49.41	0.1824		0.0	13.000	2.371		Vel = 10.60
33	20.81	1.38	T	6.0	4.000	13.812		K Factor = 5.60
to		120.0		0.0	6.000	0.0		
M	70.22	0.3495		0.0	10.000	3.495		Vel = 15.06
	0.0							
	70.22					17.307		K Factor = 16.88
34	18.76	1.049	T	5.0	8.000	11.221		K Factor = 5.60
to		120.0		0.0	5.000	0.0		
34T	18.76	0.1156		0.0	13.000	1.503		Vel = 6.96
	0.0							
	18.76					12.724		K Factor = 5.26
35	19.25	1.049	T	5.0	2.500	11.814		K Factor = 5.60
to		120.0		0.0	5.000	0.0		
34T	19.25	0.1213		0.0	7.500	0.910		Vel = 7.15
34T	18.76	1.049	T	5.0	2.500	12.724		
to		120.0		0.0	5.000	1.083		
L	38.01	0.4267		0.0	7.500	3.200		Vel = 14.11
	0.0							
	38.01					17.007		K Factor = 9.22
36	17.93	1.049	2E	4.0	14.000	10.251		K Factor = 5.60
to		120.0		0.0	4.000	0.0		
37T	17.93	0.1063		0.0	18.000	1.914		Vel = 6.66
	0.0							
	17.93					12.165		K Factor = 5.14
37	18.82	1.049	T	5.0	2.500	11.293		K Factor = 5.60
to		120.0		0.0	5.000	0.0		
37T	18.82	0.1163		0.0	7.500	0.872		Vel = 6.99
	0.0							
	18.82					12.165		K Factor = 5.40
38	22.23	1.049	E	2.0	2.000	15.754		K Factor = 5.60
to		120.0	T	5.0	7.000	0.0		
38T	22.23	0.1582		0.0	9.000	1.424		Vel = 8.25
	0.0							
	22.23					17.178		K Factor = 5.36

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
37T	36.75	1.049		0.0	12.500	12.165		
to		120.0		0.0	0.0	0.0		
38T	36.75	0.4010		0.0	12.500	5.013		Vel = 13.64
38T	22.23	1.38	E	3.0	5.000	17.178		
to		120.0	T	6.0	9.000	0.0		
N	58.98	0.2530		0.0	14.000	3.542		Vel = 12.65
	0.0							
	58.98					20.720		K Factor = 12.96
39	24.82	1.049	T	5.0	4.000	19.638		K Factor = 5.60
to		120.0		0.0	5.000	0.0		
O	24.82	0.1940		0.0	9.000	1.746		Vel = 9.21
	0.0							
	24.82					21.384		K Factor = 5.37
L	38.01	1.682		0.0	7.000	17.007		
to		120.0		0.0	0.0	0.0		
M	38.01	0.0429		0.0	7.000	0.300		Vel = 5.49
M	70.22	1.682		0.0	11.500	17.307		
to		120.0		0.0	0.0	0.0		
N	108.23	0.2968		0.0	11.500	3.413		Vel = 15.63
N	58.98	1.682		0.0	1.000	20.720		
to		120.0		0.0	0.0	0.0		
O	167.21	0.6640		0.0	1.000	0.664		Vel = 24.14
O	24.81	1.682	J	9.9	11.500	21.384		
to		120.0		0.0	9.900	0.0		
P	192.02	0.8572		0.0	21.400	18.344		Vel = 27.73
P	0.0	1.682	2I	9.9	22.000	39.728		
to		120.0	J	9.9	19.800	0.433		
Q	192.02	0.8572		0.0	41.800	35.830		Vel = 27.73
Q	0.0	1.682	3I	14.849	12.000	75.991		
to		120.0	J	9.9	38.980	0.866		
CFC	192.02	0.8572	B	3.094	50.980	43.700		Vel = 27.73
			S	11.137				
CFC	0.0	6.357	I	12.573	12.000	120.557		
to		120.0	J	31.433	44.006	-1.299		
SD	192.02	0.0013		0.0	56.006	0.074		Vel = 1.94
SD	0.0	6.357	8I	100.587	135.000	119.332		
to		120.0	J	31.433	132.020	3.465		
SF	192.02	0.0013		0.0	267.020	0.353		Vel = 1.94
SF	0.0	6.357	3I	37.72	40.000	123.150		
to		120.0		0.0	37.720	0.0		
TOR	192.02	0.0013		0.0	77.720	0.103		Vel = 1.94
TOR	0.0	6.357	J	31.433	7.000	123.253		
to		120.0	B	12.573	44.006	3.032		
BOR	192.02	0.0013		0.0	51.006	0.067		Vel = 1.94
BOR	0.0	6.357	B	12.573	6.000	126.352		
to		120.0	S	40.235	52.808	0.0		
DISC	192.02	0.0013		0.0	58.808	0.077		Vel = 1.94
	0.0							

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
	192.02					126.429		K Factor = 17.08
System Demand Pressure						126.429		
Safety Margin						20.821		
Continuation Pressure						147.250		
Pressure @ Pump Outlet						147.250		
Pressure From Pump Curve						-87.524		
Pressure @ Pump Inlet						59.726		
SUCT	0.0	8.249	G	4.698	10.000	59.726		
to		120.0		0.0	4.698	0.0		
BF1	192.02	0.0004		0.0	14.698	0.006		Vel = 1.15
BF1	0.0	8.249		0.0	1.000	59.732		
to		120.0		0.0	0.0	5.000		* * Fixed Loss = 5
BF2	192.02	0.0		0.0	1.000	0.0		Vel = 1.15
BF2	0.0	8.249	2I	30.537	5.000	64.732		
to		120.0		0.0	30.537	0.433		
FLG	192.02	0.0004		0.0	35.537	0.013		Vel = 1.15
FLG	0.0	8.27	T	55.354	90.000	65.178		
to		140.0	G	6.326	61.680	-1.732		
HOSE	192.02	0.0003		0.0	151.680	0.042		Vel = 1.15
HOSE	100.00	12.34	E	42.195	280.000	63.488		Qa = 100
to		140.0	T	93.767	145.339	-1.732		
TEST	292.02	0.0001	G	9.377	425.339	0.036		Vel = 0.78
	0.0							
	292.02					61.792		K Factor = 37.15