Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 08/01/13

. . . Fire Protection by Computer Design

Hampshire Fire Protection
8 N Wentworth Ave
Londonderry, NH 03053
603-432-8221

Job Name	:	Courtyard by Marriott Area #8 Calc 6th Floor Corridor
Building	:	7 of 8
Location	:	Portland ME
System	:	Area #8
Contract	:	4396CME
Data File	:	6th Floor Area #8 Corridor Calc.WXF

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 08/01/13

HYDRAULIC CALCULATIONS
for

Project name: Courtyard by Marriott
Location: Portland ME
Drawing no: 7 of 8
Date: 6-5-13

Design

Remote area number: Area #8
Remote area location: 6th Floor Corridor
Occupancy classification: Light Hazard
Density: .10 - Gpm/SqFt
Area of application: Room Design - SqFt
Coverage per sprinkler: Varies - SqFt
Type of sprinklers calculated: QR Recessed Pendent
No. of sprinklers calculated: 5
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 176.17 - GPM @ 46.71 - Psi
Type of system: Wet
Volume of dry or preaction system: N/A - Gal

Water supply information

Date: 5-11-13
Location: Commercial St & Maple St
Source: Portland Water

Name of contractor: Hampshire Fire
Address: N Wentworth AVe Londonderry NH 03053
Phone number: 603-432-8221
Name of designer: E Vance Wooten
Authority having jurisdiction: Portland
Notes: (Include peaking information or gridded systems here.) Room design method for corridor with self closing fire doors - 5 Heads

Water Supply Curve C

Hampshire Fire Protection
Courtyard by Marriott Area #8 Calc 6th Floor Corridor

City Water Supply:
- C1 - Static Pressure : 108
- C2 - Residual Pressure: 102
- C2 - Residual Flow : 1537

Demand:
- D1 - Ele
- D2 - Sys
- D2 - Sys
- Hose (I
- D3 - Sys
- Safety Margin : 61.183

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/01/13

Fittings Used Summary

Hampshire Fire Protection
Courtyard by Marriott Area #8 Calc 6th Floor Corridor

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 08/01/13

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	1				4
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	2				
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	2				1
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6				3
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	6				
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
V	90' Ell Firelock #001	0	0	0	0	0	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
X	90'Tee-BranchFirelock002	0	0	0	0	0	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0

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
Courtyard by Marriott Area #8 Calc 6th Floor Corridor

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 08/01/13

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density
801	62.0	5.6	7.17	na	15.0	0.1
802	62.0	5.6	7.2	na	15.02	0.1
803	62.0	5.6	7.27	na	15.1	0.1
804	62.0	5.6	7.48	na	15.32	0.1
805	62.0	5.6	7.89	na	15.73	0.1
821	62.58		7.64	na		
822	62.58		7.67	na		
823	62.58		7.75	na		
824	62.58		7.98	na		
825	62.58		8.43	na		
733	62.58		9.88	na		
6FL	62.58		14.24	na		
5FL	52.25		18.74	na		
4FL	42.25		23.08	na		
3FL	32.25		27.43	na		
2FL	22.25		31.78	na		
ST03	11.67		36.42	na		
ST02	11.67		36.44	na		
1FL	11.67		36.44	na	50.0	
TOR	11.67		36.45	na		
BOR	2.0		40.66	na		
SPG	2.0		45.67	na		
TEST	0.0		46.71	na	50.0	

150 7.0

The maximum velocity is 6.69 and it occurs in the pipe between nodes 825 and 733

Final Calculations - Hazen-Williams - 2007

Hampshire Fire Protection
Courtyard by Marriott Area #8 Calc 6th Floor Corridor

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 08/01/13

Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	**
801	15.00	1.049	1E	2.0	2.420	7.175		K [illegible]
to		120.0	1T	5.0	7.000	-0.251		
821	15.0	0.0763		0.0	9.420	0.719		Vel = 5.57
	0.0							
	15.00					7.643		K Factor = 5.43
802	15.02	1.049	1E	2.0	2.420	7.196		K Factor = 5.60
to		120.0	1T	5.0	7.000	-0.251		
822	15.02	0.0765		0.0	9.420	0.721		Vel = 5.58
	0.0							
	15.02					7.666		K Factor = 5.42
803	15.10	1.049	1E	2.0	2.420	7.271		K Factor = 5.60
to		120.0	1T	5.0	7.000	-0.251		
823	15.1	0.0774		0.0	9.420	0.729		Vel = 5.61
	0.0							
	15.10					7.749		K Factor = 5.42
804	15.32	1.049	1E	2.0	2.420	7.480		K Factor = 5.60
to		120.0	1T	5.0	7.000	-0.251		
824	15.32	0.0794		0.0	9.420	0.748		Vel = 5.69
	0.0							
	15.32					7.977		K Factor = 5.42
805	15.73	1.049	1E	2.0	2.420	7.893		K Factor = 5.60
to		120.0	1T	5.0	7.000	-0.251		
825	15.73	0.0834		0.0	9.420	0.786		Vel = 5.84
	0.0							
	15.73					8.428		K Factor = 5.42
821	15.00	2.157		0.0	10.000	7.643		
to		120.0		0.0	0.0	0.0		
822	15.0	0.0023		0.0	10.000	0.023		Vel = 1.32
822	15.02	2.157		0.0	10.000	7.666		
to		120.0		0.0	0.0	0.0		
823	30.02	0.0083		0.0	10.000	0.083		Vel = 2.64
823	15.10	2.157		0.0	13.040	7.749		
to		120.0		0.0	0.0	0.0		
824	45.12	0.0175		0.0	13.040	0.228		Vel = 3.96
824	15.32	2.157		0.0	15.000	7.977		
to		120.0		0.0	0.0	0.0		
825	60.44	0.0301		0.0	15.000	0.451		Vel = 5.31
825	15.73	2.157	1V	4.307	27.130	8.428		
to		120.0		0.0	4.307	0.0		
733	76.17	0.0462		0.0	31.437	1.451		Vel = 6.69
733	0.0	2.635	4V	23.613	167.000	9.879		
to		120.0	1X	14.827	83.744	0.0		
6FL	76.17	0.0174	1T	16.474	250.744	4.365		Vel = 4.48
			1S	19.22				
			1B	9.61				
6FL	0.0	4.26		0.0	10.330	14.244		
to		120.0		0.0	0.0	4.474		
5FL	76.17	0.0016		0.0	10.330	0.017		Vel = 1.71

Final Calculations - Hazen-Williams

Hampshire Fire Protection
Courtyard by Marriott Area #8 Calc 6th Floor Corridor

Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 08/01/13

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	**
5FL	0.0	4.26		0.0	10.000	18.735		
to		120.0		0.0	0.0	4.331		
4FL	76.17	0.0017		0.0	10.000	0.017		Vel = 1.71
4FL	0.0	4.26		0.0	10.000	23.083		
to		120.0		0.0	0.0	4.331		
3FL	76.17	0.0017		0.0	10.000	0.017		Vel = 1.71
3FL	0.0	4.26		0.0	10.000	27.431		
to		120.0		0.0	0.0	4.331		
2FL	76.17	0.0017		0.0	10.000	0.017		Vel = 1.71
2FL	0.0	4.26	2V	17.907	19.500	31.779		
to		120.0		0.0	17.907	4.582		
ST03	76.17	0.0017		0.0	37.407	0.063		Vel = 1.71
ST03	0.0	6.357	1X	31.433	9.500	36.424		
to		120.0	1B	12.573	44.006	0.0		
ST02	76.17	0.0002		0.0	53.506	0.012		Vel = 0.77
ST02	0.0	6.357		0.0	24.790	36.436		
to		120.0		0.0	0.0	0.0		
1FL	76.17	0.0002		0.0	24.790	0.006		Vel = 0.77
1FL	50.00	6.357	1V	12.573	1.540	36.442		Qa = 50
to		120.0		0.0	12.573	0.0		
TOR	126.17	0.0006		0.0	14.113	0.009		Vel = 1.28
TOR	0.0	6.357	1X	31.433	9.670	36.451		
to		120.0		0.0	31.433	4.188		
BOR	126.17	0.0006		0.0	41.103	0.025		Vel = 1.28
BOR	0.0	6.357	1V	12.573	2.000	40.664		
to		120.0		0.0	12.573	5.000		* * Fixed Loss = 5
SPG	126.17	0.0006		0.0	14.573	0.009		Vel = 1.28
SPG	0.0	6.16	3E	60.252	210.000	45.673		
to		140.0	1T	43.037	107.593	0.866		
TEST	126.17	0.0005	1G	4.304	317.593	0.169		Vel = 1.36
	50.00							Qa = 50.00
	176.17					46.708		K Factor = 25.78