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 #6 Calc 5th Floor Corridor
Building	:	6 of 8
Location	:	Portland ME
System	:	Area #6
Contract	:	4396CME
Data File	:	5th Floor Area #6 Corridor Calc.WXF

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HYDRAULIC CALCULATIONS
for

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

Design

Remote area number: Area #6
Remote area location: 5th 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): 175.97 - GPM @ 49.73 - 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

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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 : 58.160

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Fittings Used Summary

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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

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density		
625	52.75		8.11	na				
601	52.0	5.6	7.17	na	15.0	0.1		
602	52.0	5.6	7.2	na	15.02	0.1		
603	52.0	5.6	7.31	na	15.14	0.1		
604	52.0	5.6	7.49	na	15.33	0.1	150	7.0
605	52.0	5.6	7.65	na	15.48	0.1	150	7.0
621	52.75		7.6	na				
626	52.75		7.61	na				
622	52.75		7.62	na				
623	52.75		7.75	na				
624	52.75		7.94	na				
627	52.75		8.28	na				
628	52.75		10.77	na				
5FL	52.25		21.76	na				
4FL	42.25		26.11	na				
3FL	32.25		30.46	na				
2FL	22.25		34.8	na				
ST03	11.67		39.45	na				
ST02	11.67		39.46	na				
1FL	11.67		39.47	na	50.0			
TOR	11.67		39.47	na				
BOR	2.0		43.69	na				
SPG	2.0		48.7	na				
TEST	0.0		49.73	na	50.0			

The maximum velocity is 6.67 and it occurs in the pipe between nodes 627 and 628

Final Calculations - Hazen-Williams - 2007

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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	**
625	15.48	1.38	1T	6.0	1.790	8.114		
to		120.0		0.0	6.000	0.0		
627	15.48	0.0213		0.0	7.790	0.166		Vel = 3.32
	0.0							
	15.48					8.280		K Factor = 5.38
601	15.00	1.049	1E	2.0	2.790	7.175		K Factor = 5.60
to		120.0	1T	5.0	7.000	-0.325		
621	15.0	0.0764		0.0	9.790	0.748		Vel = 5.57
	0.0							
	15.00					7.598		K Factor = 5.44
602	15.02	1.049	1E	2.0	2.790	7.198		K Factor = 5.60
to		120.0	1T	5.0	7.000	-0.325		
622	15.02	0.0766		0.0	9.790	0.750		Vel = 5.58
	0.0							
	15.02					7.623		K Factor = 5.44
603	15.14	1.049	1E	2.0	2.790	7.310		K Factor = 5.60
to		120.0	1T	5.0	7.000	-0.325		
623	15.14	0.0777		0.0	9.790	0.761		Vel = 5.62
	0.0							
	15.14					7.746		K Factor = 5.44
604	15.33	1.049	1E	2.0	2.790	7.490		K Factor = 5.60
to		120.0	1T	5.0	7.000	-0.325		
624	15.33	0.0795		0.0	9.790	0.778		Vel = 5.69
	0.0							
	15.33					7.943		K Factor = 5.44
605	15.48	1.049	1E	2.0	2.790	7.645		K Factor = 5.60
to		120.0	1T	5.0	7.000	-0.325		
625	15.48	0.0811		0.0	9.790	0.794		Vel = 5.75
	0.0							
	15.48					8.114		K Factor = 5.43
621	15.00	2.157		0.0	3.420	7.598		
to		120.0		0.0	0.0	0.0		
626	15.0	0.0023		0.0	3.420	0.008		Vel = 1.32
626	0.0	2.157		0.0	7.580	7.606		
to		120.0		0.0	0.0	0.0		
622	15.0	0.0022		0.0	7.580	0.017		Vel = 1.32
622	15.02	2.157		0.0	14.880	7.623		
to		120.0		0.0	0.0	0.0		
623	30.02	0.0083		0.0	14.880	0.123		Vel = 2.64
623	15.14	2.157		0.0	11.250	7.746		
to		120.0		0.0	0.0	0.0		
624	45.16	0.0175		0.0	11.250	0.197		Vel = 3.97
624	15.33	2.157		0.0	11.170	7.943		
to		120.0		0.0	0.0	0.0		
627	60.49	0.0302		0.0	11.170	0.337		Vel = 5.31
627	15.48	2.157	1V	4.307	49.960	8.280		
to		120.0		0.0	4.307	0.0		
628	75.97	0.0459		0.0	54.267	2.492		Vel = 6.67

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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	**
628	0.0	2.157	4V	17.229	173.630	10.772		
to		120.0	1X	10.461	60.918	0.217		
5FL	75.97	0.0459	1T	12.307	234.548	10.771		Vel = 6.67
			1S	13.537				
			1B	7.384				
5FL	0.0	4.26		0.0	10.000	21.760		
to		120.0		0.0	0.0	4.331		
4FL	75.97	0.0016		0.0	10.000	0.016		Vel = 1.71
4FL	0.0	4.26		0.0	10.000	26.107		
to		120.0		0.0	0.0	4.331		
3FL	75.97	0.0017		0.0	10.000	0.017		Vel = 1.71
3FL	0.0	4.26		0.0	10.000	30.455		
to		120.0		0.0	0.0	4.331		
2FL	75.97	0.0017		0.0	10.000	0.017		Vel = 1.71
2FL	0.0	4.26	2V	17.907	19.500	34.803		
to		120.0		0.0	17.907	4.582		
ST03	75.97	0.0017		0.0	37.407	0.062		Vel = 1.71
ST03	0.0	6.357	1X	31.433	9.500	39.447		
to		120.0	1B	12.573	44.006	0.0		
ST02	75.97	0.0002		0.0	53.506	0.013		Vel = 0.77
ST02	0.0	6.357		0.0	24.790	39.460		
to		120.0		0.0	0.0	0.0		
1FL	75.97	0.0002		0.0	24.790	0.006		Vel = 0.77
1FL	50.00	6.357	1V	12.573	1.540	39.466		Qa = 50
to		120.0		0.0	12.573	0.0		
TOR	125.97	0.0006		0.0	14.113	0.008		Vel = 1.27
TOR	0.0	6.357	1X	31.433	9.670	39.474		
to		120.0		0.0	31.433	4.188		
BOR	125.97	0.0006		0.0	41.103	0.026		Vel = 1.27
BOR	0.0	6.357	1V	12.573	2.000	43.688		
to		120.0		0.0	12.573	5.000		* * Fixed Loss = 5
SPG	125.97	0.0005		0.0	14.573	0.008		Vel = 1.27
SPG	0.0	6.16	3E	60.252	210.000	48.696		
to		140.0	1T	43.037	107.593	0.866		
TEST	125.97	0.0005	1G	4.304	317.593	0.169		Vel = 1.36
	50.00							Qa = 50.00
	175.97					49.731		K Factor = 24.95