Reviewed for Code Compliance
Inspections Division
Approved with Conditions

Date: 05/15/13

Planner: Benjamin Wallace Jr

AquaSAFE™ FIRE SAFETY SYSTEM

Uponor
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

Job Name	:	JERRIER RESIDENCE - One Head Calculation (H.22)
Drawing	:	RESIDENTIAL
Location	:	243 TAFT AVE PORTLAND ME 04103
Remote Area	:	1
Contract	:	13262F
Data File	:	13262F Jerrier Residence.wx1

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HYDRAULIC DESIGN INFORMATION SHEET

Name - JERRIER RESIDENCE Date - 4/9/13
Location - PORTLAND ME 04103
Building - RESIDENTIAL System No. - 1
Contractor - FORTIN SERVICES Contract No. - 13262F
Calculated By - BRENT KOTULA SET IV Drawing No. - 1
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height VARIES
OCCUPANCY - RESIDENTIAL

S Type of Calculation: ( )NFPA 13 Residential ( )NFPA 13R (X)NFPA 13D
Y Number of Sprinklers Flowing: (X)1 ( )2 ( )4 ( )
S ( )Other
T ( )Specific Ruling Made by Date
E
M Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 7.04 Psi (X) Wet ( ) Dry
D MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction
E Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make SENJU SPRINKLER Model RC-RES
I Elevation at Highest Outlet - 118 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 162
N

Calculation Summary Gpm Required 13 Psi Required 35.22 At Ref Pt STR
C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - x Rated Cap. Cap.
T Time of Test - x @ Psi Elev.
E Static (Psi) - 80 Elev.
R Residual (Psi) - 75 Other Well
Flow (Gpm) - 300 Proof Flow Gpm
S Elevation - 96

P Location: STREET
P
L Source of Information: CONTRACTOR
Y

Water Supply Curve (C)

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City Water Supply:
- C1 - Static Pressure : 80
- C2 - Residual Pressure: 75
- C2 - Residual Flow : 300

Demand:
- D1 - Elevation
- D2 - System Fl
- D2 - System Pr
- Hose (Adj City) :
- Hose (Demand) :
- D3 - System Demand : 13.0012
- Safety Margin : 44.761

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	12	14				
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35				
G	Generic Gate Valve	1	1	1	1	1	1	1	1	1	2	2	3	4	5	6	7				
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Utb	Aquapex Tee - Branch	2	17	14	9	12	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utr	Aquapex Tee - Run	1	2	2	4	2	1	0	0	0	0	0	0	0	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

Flow Summary - NFPA 2007

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SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	
STR	80.0	75	300.0	79.985	13.0	35.224

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.22	118.0	4.9	7.04	13.0	
H.21	118.0		7.43		
H.19	118.0		7.91		
T.43	118.0		8.18		
T.40	108.0		12.85		
T.38	108.0		13.03		
H.12	108.0		13.04		
T.30	108.0		13.08		
H.9	108.0		13.1		
T.27	108.0		13.12		
H.6	108.0		13.38		
T.25	108.0		13.47		
H.2	108.0		13.78		
H.1	108.0		14.17		
T.24	108.0		14.47		
S.1	104.0		16.98		
MTR	96.0		27.73		
STR	96.0		35.22		
H.23	118.0		7.41		
H.20	118.0		7.77		
H.18	118.0		8.11		
T.42	118.0		8.24		
T.29	108.0		13.14		
H.5	108.0		13.77		
H.16	118.0		8.23		
H.15	118.0		8.27		
T.39	118.0		8.34		
H.11	118.0		8.41		
T.32	118.0		8.45		
T.28	118.0		8.46		
H.17	118.0		8.3		
H.13	118.0		8.35		
T.34	118.0		8.41		
T.33	118.0		8.46		
T.35	108.0		13.04		
H.10	108.0		13.08		
H.8	118.0		8.42		
H.4	118.0		8.43		
H.3	118.0		8.45		
H.7	118.0		8.46		
T.37	108.0		13.04		
T.36	108.0		13.04		

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NODE ANALYSIS (cont.)

Node Tag	*Elevation*	*Node Type*	*Pressure at Node*	*Discharge at Node*	*Notes*
H.14	108.0		13.04		

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	*******
H.22	6.73	0.862	1Utr	2.0	11.000	7.040		K Factor = 4.90
to		150.0		0.0	2.000	0.0		
H.21	6.73	0.0299		0.0	13.000	0.389		Vel = 3.70
H.21	0.0	0.862	1Utr	2.0	14.000	7.429		
to		150.0		0.0	2.000	0.0		
H.19	6.73	0.0299		0.0	16.000	0.478		Vel = 3.70
H.19	0.0	0.862	1Utr	2.0	7.000	7.907		
to		150.0		0.0	2.000	0.0		
T.43	6.73	0.0299		0.0	9.000	0.269		Vel = 3.70
T.43	-3.19	0.862	1Utb	17.0	23.742	8.176		
to		150.0		0.0	14.000	4.331		
T.40	3.54	0.0091		0.0	37.742	0.344		Vel = 1.95
T.40	0.0	0.862	1Utr	2.0	4.000	12.851		
to		150.0	1Utb	17.0	16.000	0.0		
T.38	3.54	0.0091		0.0	20.000	0.182		Vel = 1.95
T.38	-1.03	0.862		0.0	2.000	13.033		
to		150.0		0.0	0.0	0.0		
H.12	2.51	0.0045		0.0	2.000	0.009		Vel = 1.38
H.12	0.0	0.862	1Utr	2.0	6.000	13.042		
to		150.0		0.0	2.000	0.0		
T.30	2.51	0.0049		0.0	8.000	0.039		Vel = 1.38
T.30	0.0	0.862	1Utr	2.0	3.000	13.081		
to		150.0		0.0	2.000	0.0		
H.9	2.51	0.0048		0.0	5.000	0.024		Vel = 1.38
H.9	0.0	0.862	1Utr	2.0	2.000	13.105		
to		150.0		0.0	2.000	0.0		
T.27	2.51	0.0048		0.0	4.000	0.019		Vel = 1.38
T.27	3.16	0.862	1Utr	2.0	10.000	13.124		
to		150.0		0.0	2.000	0.0		
H.6	5.67	0.0218		0.0	12.000	0.261		Vel = 3.12
H.6	0.0	0.862	1Utr	2.0	2.000	13.385		
to		150.0		0.0	2.000	0.0		
T.25	5.67	0.0217		0.0	4.000	0.087		Vel = 3.12
T.25	0.0	0.862	1Utr	2.0	12.000	13.472		
to		150.0		0.0	2.000	0.0		
H.2	5.67	0.0218		0.0	14.000	0.305		Vel = 3.12
H.2	0.0	0.862	1Utr	2.0	16.000	13.777		
to		150.0		0.0	2.000	0.0		
H.1	5.67	0.0217		0.0	18.000	0.391		Vel = 3.12
H.1	0.0	0.862	1Utr	2.0	12.000	14.168		
to		150.0		0.0	2.000	0.0		
T.24	5.67	0.0218		0.0	14.000	0.305		Vel = 3.12
T.24	7.33	1.054	1T	2.44	18.000	14.473		
to		150.0		0.0	2.440	1.732		
S.1	13.0	0.0380		0.0	20.440	0.776		Vel = 4.78
S.1	0.0	1.054	2E	2.44	5.000	16.981		
to		150.0		0.0	2.440	10.465		* Fixed loss = 7
MTR	13.0	0.0379		0.0	7.440	0.282		Vel = 4.78

Final Calculations - Hazen-Williams

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MTR	0.0	0.745	1E	1.85	30.000	27.728		
to		150.0	1T	3.7	6.475	0.0		
STR	13.0	0.2055	1G	0.925	36.475	7.496		Vel = 9.57
	0.0							
	13.00					35.224		K Factor = 2.19
H.22	6.27	0.862		0.0	14.000	7.040		
to		150.0		0.0	0.0	0.0		
H.23	6.27	0.0262		0.0	14.000	0.367		Vel = 3.45
H.23	0.0	0.862	1Utr	2.0	12.000	7.407		
to		150.0		0.0	2.000	0.0		
H.20	6.27	0.0261		0.0	14.000	0.366		Vel = 3.45
H.20	0.0	0.862	1Utr	2.0	11.000	7.773		
to		150.0		0.0	2.000	0.0		
H.18	6.27	0.0262		0.0	13.000	0.341		Vel = 3.45
H.18	0.0	0.862	1Utr	2.0	3.000	8.114		
to		150.0		0.0	2.000	0.0		
T.42	6.27	0.0262		0.0	5.000	0.131		Vel = 3.45
T.42	-2.68	0.862	2Utb	34.0	32.689	8.245		
to		150.0		0.0	28.000	4.331		
T.29	3.59	0.0093		0.0	60.689	0.567		Vel = 1.97
T.29	3.74	0.862	1Utr	2.0	16.000	13.143		
to		150.0		0.0	2.000	0.0		
H.5	7.33	0.0350		0.0	18.000	0.630		Vel = 4.03
H.5	0.0	0.862	1Utb	17.0	4.000	13.773		
to		150.0	1Utr	2.0	16.000	0.0		
T.24	7.33	0.0350		0.0	20.000	0.700		Vel = 4.03
	0.0							
	7.33					14.473		K Factor = 1.93
T.43	3.19	0.862	1Utr	2.0	5.000	8.176		
to		150.0		0.0	2.000	0.0		
H.16	3.19	0.0076		0.0	7.000	0.053		Vel = 1.75
H.16	0.0	0.862	1Utr	2.0	4.000	8.229		
to		150.0		0.0	2.000	0.0		
H.15	3.19	0.0075		0.0	6.000	0.045		Vel = 1.75
H.15	0.0	0.862	1Utr	2.0	7.000	8.274		
to		150.0		0.0	2.000	0.0		
T.39	3.19	0.0074		0.0	9.000	0.067		Vel = 1.75
T.39	0.0	0.862	1Utr	2.0	7.000	8.341		
to		150.0		0.0	2.000	0.0		
H.11	3.19	0.0076		0.0	9.000	0.068		Vel = 1.75
H.11	0.0	0.862	1Utr	2.0	3.000	8.409		
to		150.0		0.0	2.000	0.0		
T.32	3.19	0.0074		0.0	5.000	0.037		Vel = 1.75
T.32	-1.00	0.862	1Utr	2.0	3.000	8.446		
to		150.0		0.0	2.000	0.0		
T.28	2.19	0.0038		0.0	5.000	0.019		Vel = 1.20
T.28	0.97	0.862	2Utb	34.0	16.576	8.465		
to		150.0		0.0	28.000	4.331		
T.27	3.16	0.0074		0.0	44.576	0.328		Vel = 1.74

Final Calculations - Hazen-Williams

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	0.0							
	3.16					13.124		K Factor = 0.87
T.42	2.68	0.862	1Utr	2.0	8.000	8.245		
to		150.0		0.0	2.000	0.0		
H.17	2.68	0.0054		0.0	10.000	0.054		Vel = 1.47
H.17	0.0	0.862	1Utr	2.0	8.000	8.299		
to		150.0		0.0	2.000	0.0		
H.13	2.68	0.0055		0.0	10.000	0.055		Vel = 1.47
H.13	0.0	0.862	1Utr	2.0	8.000	8.354		
to		150.0		0.0	2.000	0.0		
T.34	2.68	0.0054		0.0	10.000	0.054		Vel = 1.47
T.34	-0.96	0.862	1Utb	17.0	7.000	8.408		
to		150.0	1Utr	2.0	16.000	0.0		
T.33	1.72	0.0024		0.0	23.000	0.055		Vel = 0.95
T.33	0.99	0.862	2Utb	34.0	16.543	8.463		
to		150.0		0.0	28.000	4.331		
T.35	2.71	0.0056		0.0	44.543	0.248		Vel = 1.49
T.35	1.03	0.862	1Utr	2.0	2.000	13.042		
to		150.0		0.0	2.000	0.0		
H.10	3.74	0.0100		0.0	4.000	0.040		Vel = 2.06
H.10	0.0	0.862	1Utr	2.0	4.000	13.082		
to		150.0		0.0	2.000	0.0		
T.29	3.74	0.0102		0.0	6.000	0.061		Vel = 2.06
	0.0							
	3.74					13.143		K Factor = 1.03
T.34	0.96	0.862	1Utr	2.0	8.000	8.408		
to		150.0		0.0	2.000	0.0		
H.8	0.96	0.0008		0.0	10.000	0.008		Vel = 0.53
H.8	0.0	0.862	1Utr	2.0	15.000	8.416		
to		150.0		0.0	2.000	0.0		
H.4	0.96	0.0008		0.0	17.000	0.014		Vel = 0.53
H.4	0.0	0.862	1Utr	2.0	17.000	8.430		
to		150.0		0.0	2.000	0.0		
H.3	0.96	0.0008		0.0	19.000	0.016		Vel = 0.53
H.3	0.0	0.862	1Utr	2.0	15.000	8.446		
to		150.0		0.0	2.000	0.0		
H.7	0.96	0.0008		0.0	17.000	0.013		Vel = 0.53
H.7	0.0	0.862	1Utr	2.0	5.000	8.459		
to		150.0		0.0	2.000	0.0		
T.28	0.96	0.0009		0.0	7.000	0.006		Vel = 0.53
	0.0							
	0.96					8.465		K Factor = 0.33
T.32	1.00	0.862	1Utb	17.0	5.000	8.446		
to		150.0		0.0	14.000	0.0		
T.33	1.0	0.0009		0.0	19.000	0.017		Vel = 0.55
	0.0							
	1.00					8.463		K Factor = 0.34
T.38	1.03	0.862	1Utr	2.0	2.000	13.033		
to		150.0		0.0	2.000	0.0		
T.37	1.03	0.0008		0.0	4.000	0.003		Vel = 0.57

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T.37	-0.05	0.862		0.0	1.000	13.036		
to		150.0		0.0	0.0	0.0		
T.36	0.98	0.0010		0.0	1.000	0.001		Vel = 0.54
T.36	0.05	0.862	1Utr	2.0	3.000	13.037		
to		150.0		0.0	2.000	0.0		
T.35	1.03	0.0010		0.0	5.000	0.005		Vel = 0.57
	0.0							
	1.03					13.042		K Factor = 0.29
T.37	0.05	0.671	1Utb	17.0	15.000	13.036		
to		150.0		0.0	17.000	0.0		
H.14	0.05	0.0		0.0	32.000	0.001		Vel = 0.05
H.14	0.0	0.671	1Utb	17.0	14.000	13.037		
to		150.0	1Utr	2.0	19.000	0.0		
T.36	0.05	0.0		0.0	33.000	0.0		Vel = 0.05
	0.0							
	0.05					13.037		K Factor = 0.01