

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



# CITY OF PORTLAND BUILDING PERMIT



This is to certify that  
JWAY LLC /ADG Builders

Located at  
116 WINTER ST

PERMIT ID: 2012-65697

CBL: 045 E003001

has permission to **install NFPA 13D sprinkler system**  
provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise cloed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be procured prior to occupancy.

A handwritten signature in black ink, appearing to read 'B. J. ...'.

Fire Prevention Officer

A circular stamp containing the initials 'SB' in a stylized font.

Code Enforcement Officer / Plan Reviewer

**THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY  
THERE IS A PENALTY FOR REMOVING THIS CARD**

**BUILDING PERMIT INSPECTION PROCEDURES**  
Please call 874-8703 (ONLY)  
or email: [buildinginspections@portlandmaine.gov](mailto:buildinginspections@portlandmaine.gov)

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

**REQUIRED INSPECTIONS:**

Final - Fire

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.

**City of Portland, Maine - Building or Use Permit**

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

<b>Permit No:</b> 201265697	<b>Date Applied For:</b> 12/28/2012	<b>CBL:</b> 045 E003001
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<b>Location of Construction:</b> 116 WINTER ST	<b>Owner Name:</b> JWAY LLC	<b>Owner Address:</b> 110 MARGINAL WAY STE 292	<b>Phone:</b>
<b>Business Name:</b>	<b>Contractor Name:</b> ADG Builders	<b>Contractor Address:</b> 70 B Hunts Hill Road Gray	<b>Phone</b> (207) 318-2368
<b>Lessee/Buyer's Name</b>	<b>Phone:</b>	<b>Permit Type:</b> Fire Suppression System	

<b>Proposed Use:</b> Single Family Home	<b>Proposed Project Description:</b> install NFPA 13D sprinkler system
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<b>Dept:</b> Zoning	<b>Status:</b> Approved w/Conditions	<b>Reviewer:</b> Marge Schmuckal	<b>Approval Date:</b> 12/31/2012
<b>Note:</b>			<b>Ok to Issue:</b> <input checked="" type="checkbox"/>
1) This property shall remain a single family dwelling. Any change of use shall require a separate permit application for review and approval.			
2) ANY exterior work requires a separate review and approval thru Historic Preservation. This property is located within an Historic District.			

<b>Dept:</b> Fire	<b>Status:</b> Approved w/Conditions	<b>Reviewer:</b> Ben Wallace Jr	<b>Approval Date:</b> 01/01/2013
<b>Note:</b>			<b>Ok to Issue:</b> <input checked="" type="checkbox"/>
1) The first floor bathroom exceeds 55 ft/sq and requires sprinkler protection.			
2) A copy of the required state sprinkler permit with RMS signoff shall be provided prior to the final inspection.			
3) All control valves shall be supervised in accordance with NFPA 13D. Pad locks shall only be installed on valves designed to be secured in the open position by pad lock.			
4) The sprinkler system shall be installed in accordance with NFPA 13D.			

**City of Portland, Maine - Building or Use Permit Application**

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 2012-65697	Issue Date:	CBL: 045 E003001
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Location of Construction: 116 WINTER ST	Owner Name: JWAY LLC	Owner Address: 110 MARGINAL WAY STE 292 PORTLAND, ME 04101	Phone:
Business Name:	Contractor Name: ADG Builders	Contractor Address: 70 B Hunts Hill Road Gray ME 04039	Phone (207) 318-2368
Lessee/Buyer's Name	Phone:	Permit Type: Fire Suppression System	Zone: R6
Past Use: Single Family Home	Proposed Use: Single Family Home	Permit Fee: \$170.00	Cost of Work: \$15,000.00
Proposed Project Description: install a fire sprinkler system		FIRE DEPT: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied <input type="checkbox"/> N/A <i>v/1/13</i>	INSPECTION: Use Group: Type:
		Signature: <i>[Signature]</i> (58)	Signature:
PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)			
Action: <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied			
		Signature:	Date:

Permit Taken By: Idobson	Date Applied For: 12/28/2012	<b>Zoning Approval</b>
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<p>1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.</p> <p>2. Building permits do not include plumbing, septic or electrical work.</p> <p>3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..</p>	<p><b>Special Zone or Reviews</b></p> <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetland <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan  Maj <input type="checkbox"/> Minor <input type="checkbox"/> MM <input type="checkbox"/> Date: <i>12/21/12</i>	<p><b>Zoning Appeal</b></p> <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied Date:	<p><b>Historic Preservation</b></p> <input type="checkbox"/> Not in District or Landmark <input type="checkbox"/> Does Not Require Review <input type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied Date: <i>12/21/12</i> <i>Review &amp; Approval</i>
	<p><i>OK with conditions</i></p>		

**CERTIFICATION**

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE

2012-65697

# One- or Two-family Fire Sprinkler Permit

If you or the property owner owes real estate or property taxes or user charges on any property within the city, payment arrangements must be made before permits of any kind are accepted.

Installation address: 116 Winter St. 45-E-3

Building owner: Jeremy Flynn Phone: 807-9218

Installer: ADG Builders Phone: 318-2368

Total sq/ft of building floor space per unit: 1868  Single-family home or

Sq/ft of sprinklered floor space per unit: \_\_\_\_\_  Two-family home

Is this a multipurpose piping system? Y / N Sprinkler piping uses Pex?  Y / N

Water supply:  Municipal Water  Well pump  Stored water  Other

Include electronic copy of approved State Sprinkler Permit plans:

Additional cost to the owner for the home fire sprinkler system for each dwelling unit minus costs necessary for domestic needs (See below): **A=** \_\_\_\_\_

Attach cost breakdown:  A City plumbing permit has been pulled:

ADG Builders  
70 B Hunts Hill Rd  
Gry ME 04039  
Houseblox@gmail.com

COST OF WORK: 14500  
(A times number of units)  
  
NO FEE REQUIRED

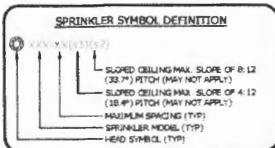
Additional information and Frequently asked questions about home fire sprinkler systems may be found at

[www.portlandmaine.gov/fireprevention](http://www.portlandmaine.gov/fireprevention).

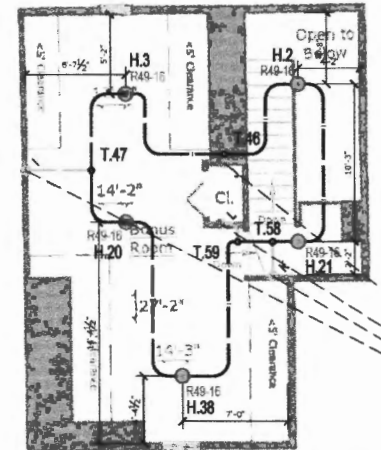
Sprinkler system cost must deduct costs that would have been incurred if the system did not provide sprinkler service. If a well pump system it would include the difference between the well pump to be installed and the one that would have been installed if there were no sprinkler demand on the system. Includes additional piping and valves that are required only because of NFPA Standard 13D, and not already required for domestic needs. Includes cost of sprinkler heads and additional installation costs.

RECEIVED  
DEC 28 2012  
City of Portland  
Dept. of Building Inspections  
City of Portland, Maine

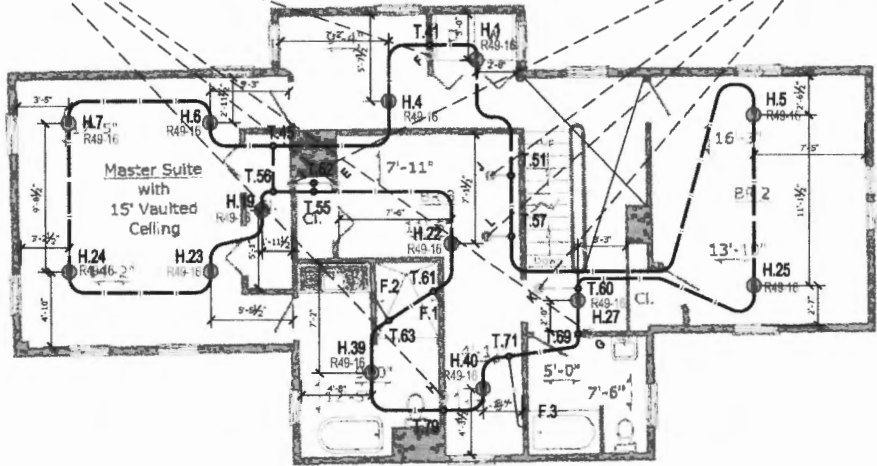
Markup Legend	
Delete Line	
Add Line	
Add Tee	
Add Elbow	
Add Coupling	
Add Head	
Delete Head	
Move Head	



**Table F100-1**  
**Multipurpose Fire Safety Systems**  
 The Uponor Residential Fire Safety System is a residential fire protection system installed in combination with the cold side of the domestic potable water system. Only licensed contractors trained by Uponor can install this system.  
 What to do if Changes are Required  
 If any features or obstructions require the addition or deletion of sprinkler heads, or significant relocation of sprinkler heads, contact the Uponor Design Department to determine if observed changes require a redesign (888.894.7736).



**2 THIRD FLOOR**  
 1/4" = 1'-0"



**1 SECOND FLOOR**  
 1/4" = 1'-0"



**uponor**

UPONOR RESIDENTIAL FIRE SAFETY SYSTEM  
 116 WINTER STREET, PORTLAND, ME 04102  
 F 888.894.7736 • 503.997.7311  
 WWW.UPONOR.COM  
 WWW.UPONOR.USA.COM

**DISCLAIMER**  
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**116 WINTER STREET**  
**PORTLAND, ME 04102**

**SHEET DESCRIPTION**  
 SECOND & THIRD FLOOR

**SHEET NUMBER**  
**F101**



**AquaSAFE™ FIRE SAFETY SYSTEM**

Uponor  
5925 148th Street West

Apple Valley, MN 55124  
800-321-4739

Job Name : 116 WINTER STREET - Two Head Calculation (H.38 & H.20)  
Drawing : RESIDENTIAL  
Location : PORTLAND ME 04102  
Remote Area : 1  
Contract : 120817-40L  
Data File : 120817-40L 116 Winter Street.wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - 116 WINTER STREET Date - 8/22/12  
Location - PORTLAND ME 04102  
Building - RESIDENTIAL System No. - 1  
Contractor - ALLYN GEE Contract No. - 120817-40L  
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: ( )1 (X)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 RELIABLE Model F1-R49  
I Elevation at Highest Outlet - 126 Feet Size 7/16 K-Factor 4.9  
G Note: Temperature Rating 155  
N

Calculation Gpm Required 26.0155 Psi Required 54.4 At Ref Pt STR  
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 2011 Rated Cap. Cap.  
T Time of Test - x @ Psi Elev.  
E Static (Psi) - 64 Elev.  
R Residual (Psi) - 59 Other Well  
Flow (Gpm) - 300 Proof Flow Gpm  
S Elevation - 90

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

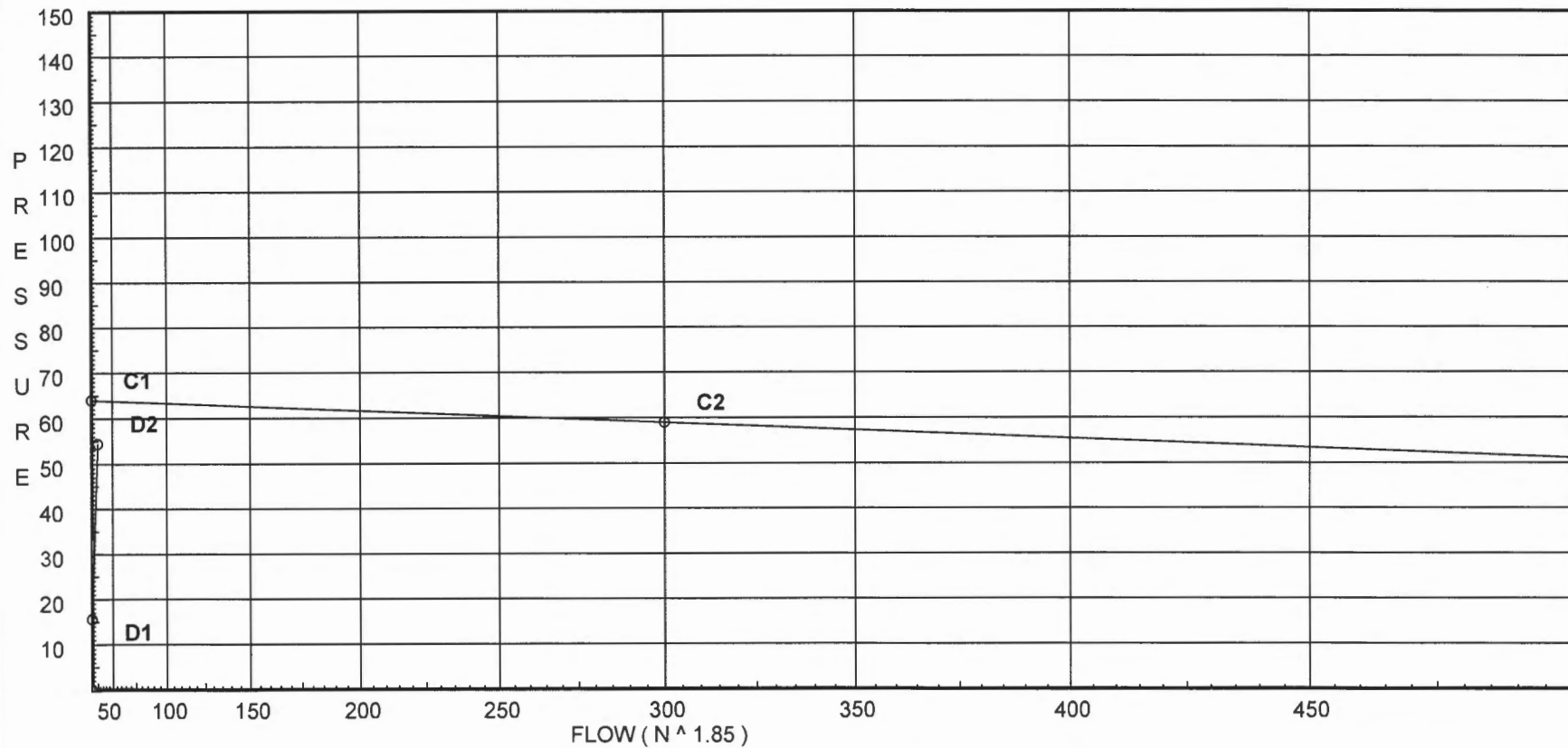


# Water Supply Curve (C)

Uponor  
 116 WINTER STREET - Two Head Calculation (H.38 & H.20)

City Water Supply:  
 C1 - Static Pressure : 64  
 C2 - Residual Pressure: 59  
 C2 - Residual Flow : 300

Demand:  
 D1 - Elevation : 15.592  
 D2 - System Flow : 26.0155  
 D2 - System Pressure : 54.402  
 Hose ( Adj City ) : \_\_\_\_\_  
 Hose ( Demand ) : \_\_\_\_\_  
 D3 - System Demand : 26.0155  
 Safety Margin : 9.543



# Fittings Used Summary

Uponor  
116 WINTER STREET - Two Head Calculation (H.38 & H.20)

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Date 8/23/2012

Fitting Legend		½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24	
Abbrev.	Name																					
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61	
G	Generic Gate Valve	1	1	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13	
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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116 WINTER STREET - Two Head Calculation (H.38 & H.20)

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**SUPPLY ANALYSIS**

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
STR	64.0	59	300.0	63.946	26.02	54.402

**NODE ANALYSIS**

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
H.38	126.0	4.9	7.04	13.0	
T.59	126.0		8.28		
T.57	117.0		13.0		
H.5	117.0		13.29		
H.25	117.0		13.43		
T.60	117.0		13.59		
H.27	117.0		13.79		
T.69	117.0		14.07		
T.73	108.0		19.02		
T.76	99.0		23.36		
H.36	99.0		23.65		
H.28	99.0		24.0		
H.17	99.0		24.21		
T.53	99.0		24.43		
H.12	99.0		25.29		
H.11	99.0		26.72		
H.14	99.0		28.07		
T.44	99.0		29.31		
S.1	95.0		40.95		
MTR	90.0		47.7		
STR	90.0		54.4		
H.20	126.0	4.9	7.05	13.01	
T.47	126.0		7.99		
T.52	117.0		13.5		
T.54	108.0		18.21		
T.49	108.0		18.4		
T.48	108.0		18.43		
H.9	108.0		18.49		
H.8	108.0		18.66		
H.31	108.0		18.89		
H.32	108.0		19.03		
T.64	108.0		19.13		
T.68	99.0		24.26		
T.67	99.0		24.69		
T.66	99.0		24.96		
H.34	99.0		25.5		
T.72	99.0		25.94		
H.33	99.0		27.02		
H.13	99.0		28.77		
H.3	126.0		8.17		
T.46	126.0		8.43		
T.51	117.0		13.01		

Flow Summary - NFPA 2007

Uponsor  
116 WINTER STREET - Two Head Calculation (H.38 & H.20)

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**NODE ANALYSIS (cont.)**

<b>Node Tag</b>	<b>Elevation</b>	<b>Node Type</b>	<b>Pressure at Node</b>	<b>Discharge at Node</b>	<b>Notes</b>
H.1	117.0		13.4		
T.41	117.0		13.57		
T.42	108.0		18.25		
T.43	108.0		18.45		
H.10	108.0		18.78		
T.50	108.0		19.05		
T.58	126.0		8.43		
H.2	126.0		8.43		
H.21	126.0		8.43		
T.55	117.0		13.64		
H.22	117.0		13.82		
T.61	117.0		13.9		
T.63	117.0		13.98		
H.39	117.0		14.06		
T.79	117.0		14.18		
T.80	108.0		18.98		
T.74	99.0		23.38		
H.35	99.0		23.77		
H.4	117.0		13.59		
T.45	117.0		13.61		
T.56	117.0		13.63		
H.6	117.0		13.62		
H.7	117.0		13.62		
H.24	117.0		13.62		
H.23	117.0		13.63		
H.19	117.0		13.63		
T.71	117.0		14.12		
H.40	117.0		14.15		
H.15	108.0		18.23		
H.18	108.0		18.41		
T.77	108.0		19.04		
H.37	108.0		19.07		
T.65	108.0		19.1		
T.70	108.0		19.04		
T.78	108.0		19.04		
H.30	108.0		19.04		
H.29	108.0		19.04		
H.16	108.0		19.04		
T.75	99.0		23.37		
H.26	99.0		24.81		

# Final Calculations - Hazen-Williams

Uponor  
116 WINTER STREET - Two Head Calculation (H.38 & H.20)

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Date 8/23/2012

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
H.38 to T.59	12.03	0.86 150.0		0.0	14.000	7.040			K Factor = 4.90	
T.59 to T.57	12.03	0.0885		0.0	14.000	1.239			Vel = 6.64	
T.59 to T.57	-6.63	0.86 150.0	2Utb	28.0	13.000	8.279				
T.57 to H.5	5.4	0.0201		0.0	41.000	0.824			Vel = 2.98	
T.57 to H.5	-1.64	0.86 150.0	1Utr	2.0	26.000	13.001				
H.5 to H.25	3.76	0.0103		0.0	28.000	0.288			Vel = 2.08	
H.5 to H.25	0.0	0.86 150.0	1Utr	2.0	12.000	13.289				
H.25 to T.60	3.76	0.0103		0.0	14.000	0.144			Vel = 2.08	
H.25 to T.60	0.0	0.86 150.0	1Utr	2.0	13.000	13.433				
T.60 to H.27	3.76	0.0103		0.0	15.000	0.155			Vel = 2.08	
T.60 to H.27	6.72	0.86 150.0	1Utr	2.0	1.000	13.588				
H.27 to T.69	10.48	0.0683		0.0	3.000	0.205			Vel = 5.79	
H.27 to T.69	0.0	0.86 150.0	1Utr	2.0	2.000	13.793				
T.69 to T.73	10.48	0.0688		0.0	4.000	0.275			Vel = 5.79	
T.69 to T.73	-2.75	0.86 150.0	1Utr 1Utb	2.0 14.0	11.000 16.000	14.068 3.898				
T.73 to T.76	7.73	0.0390		0.0	27.000	1.054			Vel = 4.27	
T.73 to T.76	-0.81	0.86 150.0	1Utr	2.0	12.000	19.020				
T.76 to H.36	6.92	0.0319		0.0	14.000	0.446			Vel = 3.82	
T.76 to H.36	-1.88	0.86 150.0	1Utb	14.0	2.000	23.364				
H.36 to H.28	5.04	0.0177		0.0	16.000	0.283			Vel = 2.78	
H.36 to H.28	0.0	0.86 150.0	1Utr	2.0	18.000	23.647				
H.28 to H.17	5.04	0.0177		0.0	20.000	0.354			Vel = 2.78	
H.28 to H.17	0.0	0.86 150.0	1Utr	2.0	10.000	24.001				
H.17 to T.53	5.04	0.0177		0.0	12.000	0.213			Vel = 2.78	
H.17 to T.53	0.0	0.86 150.0	1Utr	2.0	10.000	24.214				
T.53 to H.12	5.04	0.0177		0.0	12.000	0.212			Vel = 2.78	
T.53 to H.12	7.52	0.86 150.0	1Utr	2.0	7.000	24.426				
H.12 to H.11	12.56	0.0958		0.0	9.000	0.862			Vel = 6.94	
H.12 to H.11	0.0	0.86 150.0	1Utr	2.0	13.000	25.288				
H.11 to H.14	12.56	0.0958		0.0	15.000	1.437			Vel = 6.94	
H.11 to H.14	0.0	0.86 150.0		0.0	14.000	26.725				
H.14	12.56	0.0958		0.0	14.000	1.341			Vel = 6.94	

Final Calculations - Hazen-Williams

Uponsor  
116 WINTER STREET - Two Head Calculation (H.38 & H.20)

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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	*****	Notes	*****
H.14 to T.44	0.0 12.56	0.86 150.0 0.0958	1Utr 2.0 0.0 0.0	11.000 2.000 13.000	28.066 0.0 1.245		Vel = 6.94		
T.44 to S.1	13.46 26.02	0.86 150.0 0.3686	1Utb 14.0 1T 2.871 0.0	10.000 16.871 26.871	29.311 1.732 9.905		Vel = 14.37		
S.1 to MTR	0.0 26.02	0.86 150.0 0.3686	2E 2.297 0.0 0.0	2.000 2.297 4.297	40.948 5.166 1.584		* Fixed loss = 3 Vel = 14.37		
MTR to STR	0.0 26.02	0.911 150.0 0.2784	1E 1.521 1T 3.801 1G 0.76	18.000 6.082 24.082	47.698 0.0 6.704		Vel = 12.81		
	0.0 26.02				54.402		K Factor = 3.53		
H.38 to H.20	0.97 0.97	0.86 150.0 0.0008	1Utr 2.0 0.0 0.0	15.000 2.000 17.000	7.040 0.0 0.014		Vel = 0.54		
H.20 to T.47	13.01 13.98	0.86 150.0 0.1170	1Utr 2.0 0.0 0.0	6.000 2.000 8.000	7.054 0.0 0.936		K Factor = 4.90 Vel = 7.72		
T.47 to T.52	-5.11 8.87	0.86 150.0 0.0504	1Utr 2.0 1Utb 14.0 0.0	16.000 16.000 32.000	7.990 3.898 1.612		Vel = 4.90		
T.52 to T.54	-2.52 6.35	0.86 150.0 0.0271	1Utb 14.0 0.0 0.0	16.000 14.000 30.000	13.500 3.898 0.814		Vel = 3.51		
T.54 to T.49	-1.88 4.47	0.86 150.0 0.0142	0.0 0.0 0.0	13.000 0.0 13.000	18.212 0.0 0.184		Vel = 2.47		
T.49 to T.48	-0.47 4.0	0.86 150.0 0.0117	1Utr 2.0 0.0 0.0	1.000 2.000 3.000	18.396 0.0 0.035		Vel = 2.21		
T.48 to H.9	0.47 4.47	0.86 150.0 0.0142	1Utr 2.0 0.0 0.0	2.000 2.000 4.000	18.431 0.0 0.057		Vel = 2.47		
H.9 to H.8	0.0 4.47	0.86 150.0 0.0142	1Utr 2.0 0.0 0.0	10.000 2.000 12.000	18.488 0.0 0.170		Vel = 2.47		
H.8 to H.31	0.0 4.47	0.86 150.0 0.0142	1Utr 2.0 0.0 0.0	14.000 2.000 16.000	18.658 0.0 0.227		Vel = 2.47		
H.31 to H.32	0.0 4.47	0.86 150.0 0.0142	0.0 0.0 0.0	10.000 0.0 10.000	18.885 0.0 0.142		Vel = 2.47		
H.32 to T.64	0.0 4.47	0.86 150.0 0.0143	1Utr 2.0 0.0 0.0	5.000 2.000 7.000	19.027 0.0 0.100		Vel = 2.47		
T.64 to T.68	2.00 6.47	0.86 150.0 0.0281	2Utb 28.0 0.0 0.0	15.762 28.000 43.762	19.127 3.898 1.230		Vel = 3.57		

# Final Calculations - Hazen-Williams

Uponor  
116 WINTER STREET - Two Head Calculation (H.38 & H.20)

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
T.68 to T.67	6.99 13.46	0.86 150.0 0.1088	1Utr 2.0 0.0	2.000 2.000 4.000	24.255 0.0 0.435			Vel = 7.43	
T.67 to T.66	-1.44 12.02	0.86 150.0 0.0887	1Utr 2.0 0.0	1.000 2.000 3.000	24.690 0.0 0.266			Vel = 6.64	
T.66 to H.34	1.44 13.46	0.86 150.0 0.1088	1Utr 2.0 0.0	3.000 2.000 5.000	24.956 0.0 0.544			Vel = 7.43	
H.34 to T.72	0.0 13.46	0.86 150.0 0.1090	0.0 0.0	4.000 0.0 4.000	25.500 0.0 0.436			Vel = 7.43	
T.72 to H.33	0.0 13.46	0.86 150.0 0.1088	1Utr 2.0 0.0	8.000 2.000 10.000	25.936 0.0 1.088			Vel = 7.43	
H.33 to H.13	0.0 13.46	0.86 150.0 0.1089	1Utr 2.0 0.0	14.000 2.000 16.000	27.024 0.0 1.743			Vel = 7.43	
H.13 to T.44	0.0 13.46	0.86 150.0 0.1088	1Utr 2.0 0.0	3.000 2.000 5.000	28.767 0.0 0.544			Vel = 7.43	
	0.0 13.46				29.311			K Factor = 2.49	
T.47 to H.3	5.11 5.11	0.86 150.0 0.0181	1Utr 2.0 0.0	8.000 2.000 10.000	7.990 0.0 0.181			Vel = 2.82	
H.3 to T.46	0.0 5.11	0.86 150.0 0.0182	1Utr 2.0 0.0	12.000 2.000 14.000	8.171 0.0 0.255			Vel = 2.82	
T.46 to T.51	-0.08 5.03	0.86 150.0 0.0176	2Utb 28.0 0.0	11.000 28.000 39.000	8.426 3.898 0.686			Vel = 2.78	
T.51 to H.1	1.63 6.66	0.86 150.0 0.0297	1Utr 2.0 0.0	11.000 2.000 13.000	13.010 0.0 0.386			Vel = 3.68	
H.1 to T.41	0.0 6.66	0.86 150.0 0.0297	1Utr 2.0 0.0	4.000 2.000 6.000	13.396 0.0 0.178			Vel = 3.68	
T.41 to T.42	-1.44 5.22	0.86 150.0 0.0189	2Utb 28.0 0.0	13.000 28.000 41.000	13.574 3.898 0.774			Vel = 2.88	
T.42 to T.43	1.88 7.1	0.86 150.0 0.0333	1Utr 2.0 0.0	4.000 2.000 6.000	18.246 0.0 0.200			Vel = 3.92	
T.43 to H.10	0.0 7.1	0.86 150.0 0.0333	1Utr 2.0 0.0	8.000 2.000 10.000	18.446 0.0 0.333			Vel = 3.92	
H.10 to T.50	0.0 7.1	0.86 150.0 0.0334	1Utr 2.0 0.0	6.000 2.000 8.000	18.779 0.0 0.267			Vel = 3.92	

Final Calculations - Hazen-Williams

Uponsor  
116 WINTER STREET - Two Head Calculation (H.38 & H.20)

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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	*****	Notes	*****
T.50 to T.53	0.42 7.52	0.86 150.0 0.0370	2Utb	28.0 0.0 0.0	12.000 28.000 40.000	19.046 3.898 1.482			Vel = 4.15	
	0.0 7.52					24.426			K Factor = 1.52	
T.59 to T.58	6.63 6.63	0.86 150.0 0.0294	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	8.279 0.0 0.147			Vel = 3.66	
T.58 to T.60	0.09 6.72	0.86 150.0 0.0301	2Utb	28.0 0.0 0.0	14.000 28.000 42.000	8.426 3.898 1.264			Vel = 3.71	
	0.0 6.72					13.588			K Factor = 1.82	
T.46 to H.2	0.09 0.09	0.86 150.0 0.0	1Utr	2.0 0.0 0.0	10.000 2.000 12.000	8.426 0.0 0.0			Vel = 0.05	
H.2 to H.21	0.0 0.09	0.86 150.0 0.0	1Utr	2.0 0.0 0.0	11.000 2.000 13.000	8.426 0.0 0.0			Vel = 0.05	
H.21 to T.58	0.0 0.09	0.86 150.0 0.0		0.0 0.0 0.0	2.000 0.0 2.000	8.426 0.0 0.0			Vel = 0.05	
	0.0 0.09					8.426			K Factor = 0.03	
T.57 to T.51	1.64 1.64	0.86 150.0 0.0022		0.0 0.0 0.0	4.000 0.0 4.000	13.001 0.0 0.009			Vel = 0.91	
	0.0 1.64					13.010			K Factor = 0.45	
T.52 to T.55	2.52 2.52	0.86 150.0 0.0049	2Utb	28.0 0.0 0.0	1.000 28.000 29.000	13.500 0.0 0.142			Vel = 1.39	
T.55 to H.22	1.45 3.97	0.86 150.0 0.0114	1Utr	2.0 0.0 0.0	14.000 2.000 16.000	13.642 0.0 0.182			Vel = 2.19	
H.22 to T.61	0.0 3.97	0.86 150.0 0.0114	1Utr	2.0 0.0 0.0	5.000 2.000 7.000	13.824 0.0 0.080			Vel = 2.19	
T.61 to T.63	0.0 3.97	0.86 150.0 0.0113	1Utr	2.0 0.0 0.0	5.000 2.000 7.000	13.904 0.0 0.079			Vel = 2.19	
T.63 to H.39	0.0 3.97	0.86 150.0 0.0114	1Utr	2.0 0.0 0.0	5.000 2.000 7.000	13.983 0.0 0.080			Vel = 2.19	
H.39 to T.79	0.0 3.97	0.86 150.0 0.0114	1Utr	2.0 0.0 0.0	8.000 2.000 10.000	14.063 0.0 0.114			Vel = 2.19	
T.79 to T.80	2.74 6.71	0.86 150.0 0.0300	1Utr 1Utb	2.0 14.0 0.0	14.000 16.000 30.000	14.177 3.898 0.901			Vel = 3.71	



# Final Calculations - Hazen-Williams

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116 WINTER STREET - Two Head Calculation (H.38 & H.20)

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
T.80 to T.74	-1.61 5.1	0.86 150.0 0.0181	1Utb	14.0 0.0	14.000 14.000 28.000	18.976 3.898 0.507			Vel = 2.82	
T.74 to H.35	1.88 6.98	0.86 150.0 0.0324	1Utr	2.0 0.0 0.0	10.000 2.000 12.000	23.381 0.0 0.389			Vel = 3.86	
H.35 to T.68	0.0 6.98	0.86 150.0 0.0323	1Utr	2.0 0.0 0.0	13.000 2.000 15.000	23.770 0.0 0.485			Vel = 3.86	
	0.0 6.98					24.255			K Factor = 1.42	
T.41 to H.4	1.44 1.44	0.86 150.0 0.0018	1Utr	2.0 0.0 0.0	7.000 2.000 9.000	13.574 0.0 0.016			Vel = 0.80	
H.4 to T.45	0.0 1.44	0.86 150.0 0.0017	1Utr	2.0 0.0 0.0	12.000 2.000 14.000	13.590 0.0 0.024			Vel = 0.80	
T.45 to T.56	-0.61 0.83	0.86 150.0 0.0006	2Utb	28.0 0.0 0.0	3.000 28.000 31.000	13.614 0.0 0.020			Vel = 0.46	
T.56 to T.55	0.61 1.44	0.86 150.0 0.0016	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	13.634 0.0 0.008			Vel = 0.80	
	0.0 1.44					13.642			K Factor = 0.39	
T.45 to H.6	0.61 0.61	0.86 150.0 0.0003		0.0 0.0 0.0	6.000 0.0 6.000	13.614 0.0 0.002			Vel = 0.34	
H.6 to H.7	0.0 0.61	0.86 150.0 0.0003	1Utr	2.0 0.0 0.0	10.000 2.000 12.000	13.616 0.0 0.004			Vel = 0.34	
H.7 to H.24	0.0 0.61	0.86 150.0 0.0004	1Utr	2.0 0.0 0.0	11.000 2.000 13.000	13.620 0.0 0.005			Vel = 0.34	
H.24 to H.23	0.0 0.61	0.86 150.0 0.0004		0.0 0.0 0.0	10.000 0.0 10.000	13.625 0.0 0.004			Vel = 0.34	
H.23 to H.19	0.0 0.61	0.86 150.0 0.0003	1Utr	2.0 0.0 0.0	8.000 2.000 10.000	13.629 0.0 0.003			Vel = 0.34	
H.19 to T.56	0.0 0.61	0.86 150.0 0.0005	1Utr	2.0 0.0 0.0	2.000 2.000 4.000	13.632 0.0 0.002			Vel = 0.34	
	0.0 0.61					13.634			K Factor = 0.17	
T.69 to T.71	2.74 2.74	0.86 150.0 0.0057	1Utr	2.0 0.0 0.0	7.000 2.000 9.000	14.068 0.0 0.051			Vel = 1.51	

Final Calculations - Hazen-Williams

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116 WINTER STREET - Two Head Calculation (H.38 & H.20)

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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	*****	Notes	*****
T.71 to H.40	0.0 2.74	0.86 150.0 0.0058	1Utr 2.0 0.0 0.0	4.000 2.000 6.000	14.119 0.0 0.035		Vel = 1.51		
H.40 to T.79	0.0 2.74	0.86 150.0 0.0058	0.0 0.0 0.0	4.000 0.0 4.000	14.154 0.0 0.023		Vel = 1.51		
	0.0 2.74				14.177		K Factor = 0.73		
T.54 to H.15	1.88 1.88	0.86 150.0 0.0028	1Utr 2.0 0.0 0.0	3.000 2.000 5.000	18.212 0.0 0.014		Vel = 1.04		
H.15 to T.42	0.0 1.88	0.86 150.0 0.0029	1Utr 2.0 0.0 0.0	5.000 2.000 7.000	18.226 0.0 0.020		Vel = 1.04		
	0.0 1.88				18.246		K Factor = 0.44		
T.49 to H.18	0.47 0.47	0.67 150.0 0.0008	1Utb 17.0 0.0 0.0	5.000 17.000 22.000	18.396 0.0 0.017		Vel = 0.43		
H.18 to T.48	0.0 0.47	0.67 150.0 0.0007	1Utb 17.0 1Utr 2.0 0.0	6.000 19.000 25.000	18.413 0.0 0.018		Vel = 0.43		
	0.0 0.47				18.431		K Factor = 0.11		
T.80 to T.77	1.61 1.61	0.86 150.0 0.0021	2Utb 28.0 0.0 0.0	2.000 28.000 30.000	18.976 0.0 0.064		Vel = 0.89		
T.77 to H.37	0.39 2.0	0.86 150.0 0.0032	1Utr 2.0 0.0 0.0	8.000 2.000 10.000	19.040 0.0 0.032		Vel = 1.10		
H.37 to T.65	0.0 2.0	0.86 150.0 0.0032	1Utr 2.0 0.0 0.0	7.000 2.000 9.000	19.072 0.0 0.029		Vel = 1.10		
T.65 to T.64	0.0 2.0	0.86 150.0 0.0032	1Utr 2.0 0.0 0.0	6.000 2.000 8.000	19.101 0.0 0.026		Vel = 1.10		
	0.0 2.00				19.127		K Factor = 0.46		
T.73 to T.70	0.81 0.81	0.86 150.0 0.0006	2Utb 28.0 0.0 0.0	2.000 28.000 30.000	19.020 0.0 0.018		Vel = 0.45		
T.70 to T.78	-0.42 0.39	0.86 150.0 0.0003	1Utr 2.0 0.0 0.0	5.000 2.000 7.000	19.038 0.0 0.002		Vel = 0.22		
T.78 to T.77	0.0 0.39	0.86 150.0 0.0	0.0 0.0 0.0	5.000 0.0 5.000	19.040 0.0 0.0		Vel = 0.22		
	0.0								

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	*****	Notes	*****
	0.39					19.040			K Factor = 0.09	
T.70 to H.30	0.42	0.86 150.0	1Utr	2.0 0.0	1.000 2.000	19.038 0.0				
	0.42	0.0003		0.0	3.000	0.001			Vel = 0.23	
H.30 to H.29	0.0	0.86 150.0	1Utr	2.0 0.0	14.000 2.000	19.039 0.0				
	0.42	0.0002		0.0	16.000	0.003			Vel = 0.23	
H.29 to H.16	0.0	0.86 150.0	1Utr	2.0 0.0	11.000 2.000	19.042 0.0				
	0.42	0.0002		0.0	13.000	0.002			Vel = 0.23	
H.16 to T.50	0.0	0.86 150.0	1Utr	2.0 0.0	9.000 2.000	19.044 0.0				
	0.42	0.0002		0.0	11.000	0.002			Vel = 0.23	
	0.0 0.42					19.046			K Factor = 0.10	
T.76 to T.75	1.88	0.86 150.0		0.0 0.0	2.000 0.0	23.364 0.0				
	1.88	0.0030		0.0	2.000	0.006			Vel = 1.04	
T.75 to T.74	0.0	0.86 150.0	1Utr	2.0 0.0	2.000 2.000	23.370 0.0				
	1.88	0.0028		0.0	4.000	0.011			Vel = 1.04	
	0.0 1.88					23.381			K Factor = 0.39	
T.67 to H.26	1.44	0.67 150.0	1Utb	17.0 0.0	4.000 17.000	24.690 0.0				
	1.44	0.0059		0.0	21.000	0.124			Vel = 1.31	
H.26 to T.66	0.0	0.67 150.0	1Utb 1Utr	17.0 2.0	5.000 19.000	24.814 0.0				
	1.44	0.0059		0.0	24.000	0.142			Vel = 1.31	
	0.0 1.44					24.956			K Factor = 0.29	



## AquaSAFE™ FIRE SAFETY SYSTEM

Uponor  
5925 148th Street West

Apple Valley, MN 55124  
800-321-4739

Job Name : 116 WINTER STREET - One Head Calculation (H.38)  
Drawing : RESIDENTIAL  
Location : PORTLAND ME 04102  
Remote Area : 1  
Contract : 120817-40L  
Data File : 120817-40L 116 Winter Street.wx1

HYDRAULIC DESIGN INFORMATION SHEET

Name - 116 WINTER STREET Date - 8/22/12  
Location - PORTLAND ME 04102  
Building - RESIDENTIAL System No. - 1  
Contractor - ALLYN GEE Contract No. - 120817-40L  
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 RELIABLE Model F1-R49  
I Elevation at Highest Outlet - 126 Feet Size 7/16 K-Factor 4.9  
G Note: Temperature Rating 155  
N

Calculation Gpm Required 13 Psi Required 33.82 At Ref Pt STR  
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 2011 Rated Cap. Cap.  
T Time of Test - x @ Psi Elev.  
E Static (Psi) - 64 Elev.  
R Residual (Psi) - 59 Other Well  
Flow (Gpm) - 300 Proof Flow Gpm  
S Elevation - 90

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

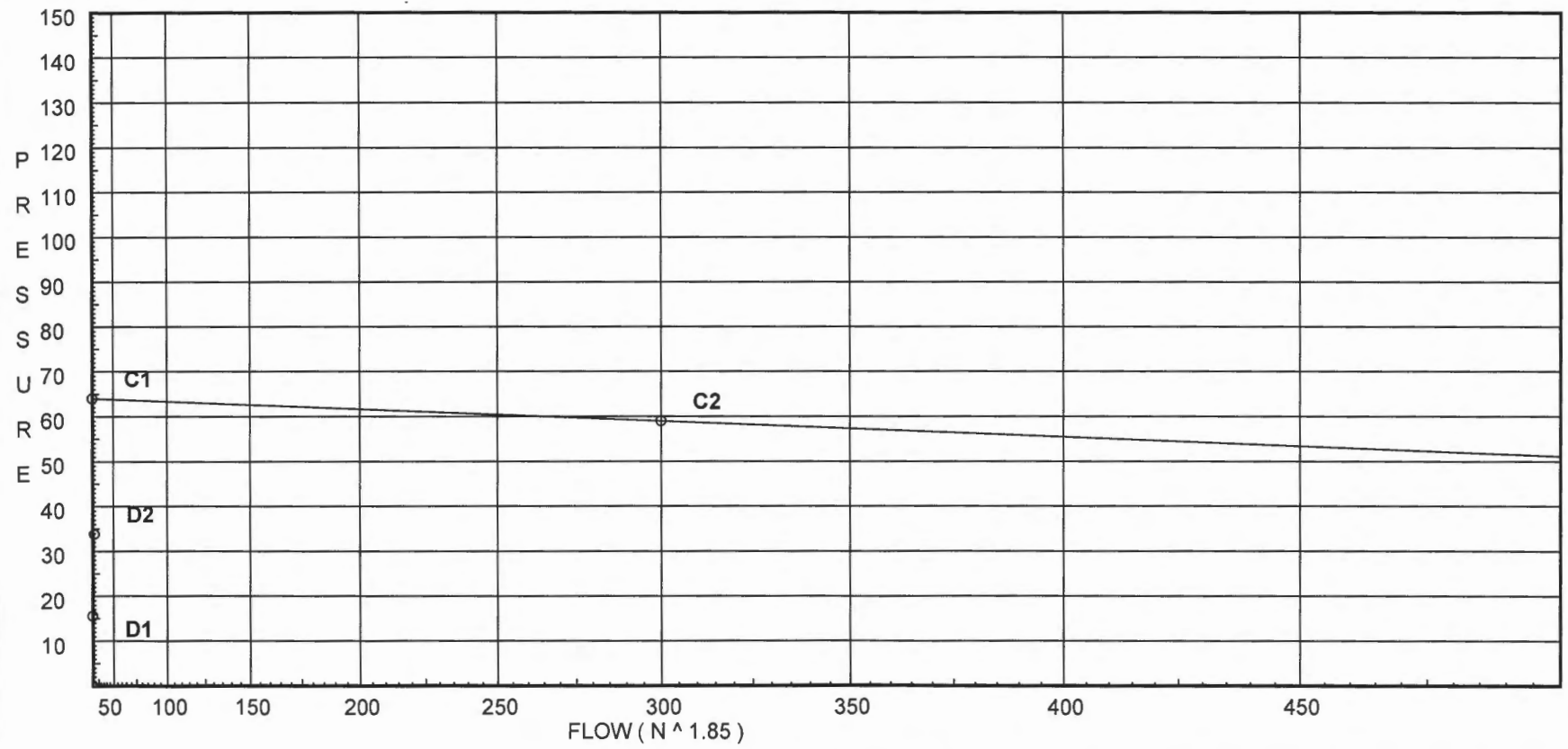
# Water Supply Curve (C)

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 116 WINTER STREET - One Head Calculation (H.38)

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City Water Supply:  
 C1 - Static Pressure : 64  
 C2 - Residual Pressure: 59  
 C2 - Residual Flow : 300

Demand:  
 D1 - Elevation : 15.592  
 D2 - System Flow : 13.0012  
 D2 - System Pressure : 33.818  
 Hose ( Adj City ) : \_\_\_\_\_  
 Hose ( Demand ) : \_\_\_\_\_  
 D3 - System Demand : 13.0012  
 Safety Margin : 30.166



# Fittings Used Summary

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116 WINTER STREET - One Head Calculation (H.38)

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Fitting Legend		½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24	
Abbrev.	Name																					
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61	
G	Generic Gate Valve	1	1	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13	
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	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	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**

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
STR	64.0	59	300.0	63.985	13.0	33.818

**NODE ANALYSIS**

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
H.38	126.0	4.9	7.04	13.0	
T.59	126.0		7.54		
T.57	117.0		11.71		
H.5	117.0		11.79		
H.25	117.0		11.83		
T.60	117.0		11.87		
H.27	117.0		11.93		
T.69	117.0		12.01		
T.73	108.0		16.21		
T.76	99.0		20.23		
H.36	99.0		20.31		
H.28	99.0		20.41		
H.17	99.0		20.47		
T.53	99.0		20.52		
H.12	99.0		20.76		
H.11	99.0		21.16		
H.14	99.0		21.53		
T.44	99.0		21.88		
S.1	95.0		26.36		
MTR	90.0		31.96		
STR	90.0		33.82		
H.20	126.0		7.41		
T.47	126.0		7.58		
T.52	117.0		11.88		
T.54	108.0		15.99		
T.49	108.0		16.04		
T.48	108.0		16.05		
H.9	108.0		16.07		
H.8	108.0		16.11		
H.31	108.0		16.17		
H.32	108.0		16.21		
T.64	108.0		16.24		
T.68	99.0		20.48		
T.67	99.0		20.6		
T.66	99.0		20.67		
H.34	99.0		20.82		
T.72	99.0		20.94		
H.33	99.0		21.24		
H.13	99.0		21.73		
T.58	126.0		7.61		
H.3	126.0		7.6		
T.46	126.0		7.63		



Flow Summary - NFPA 2007

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**NODE ANALYSIS (cont.)**

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
T.51	117.0		11.71		
H.1	117.0		11.83		
T.41	117.0		11.88		
T.42	108.0		16.0		
T.43	108.0		16.05		
H.10	108.0		16.14		
T.50	108.0		16.22		
H.21	126.0		7.61		
H.2	126.0		7.62		
T.55	117.0		11.91		
H.22	117.0		11.95		
T.61	117.0		11.98		
T.63	117.0		12.0		
H.39	117.0		12.02		
T.79	117.0		12.05		
T.80	108.0		16.2		
T.74	99.0		20.24		
H.35	99.0		20.34		
H.4	117.0		11.89		
T.45	117.0		11.9		
T.56	117.0		11.9		
H.6	117.0		11.9		
H.7	117.0		11.9		
H.24	117.0		11.9		
H.23	117.0		11.9		
H.19	117.0		11.9		
T.71	117.0		12.03		
H.40	117.0		12.04		
H.15	108.0		15.99		
H.18	108.0		16.05		
T.77	108.0		16.22		
H.37	108.0		16.22		
T.65	108.0		16.23		
T.70	108.0		16.21		
T.78	108.0		16.21		
H.30	108.0		16.21		
H.29	108.0		16.22		
H.16	108.0		16.22		
T.75	99.0		20.23		
H.26	99.0		20.63		

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Hyd. Ref. Point	Qa Qt	Dia. "C" P/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
H.38 to T.59	7.36	0.86 150.0		0.0 0.0	14.000 0.0	7.040 0.0		K Factor = 4.90	
T.59 to T.57	7.36	0.0356		0.0	14.000	0.499		Vel = 4.07	
T.59 to T.57	-4.41	0.86 150.0	2Utb	28.0 0.0	13.000 28.000	7.539 3.898			
T.57 to H.5	2.95	0.0066		0.0	41.000	0.269		Vel = 1.63	
T.57 to H.5	-1.04	0.86 150.0	1Utr	2.0 0.0	26.000 2.000	11.706 0.0			
H.5 to H.25	1.91	0.0030		0.0	28.000	0.083		Vel = 1.05	
H.5 to H.25	0.0	0.86 150.0	1Utr	2.0 0.0	12.000 2.000	11.789 0.0			
H.25 to T.60	1.91	0.0029		0.0	14.000	0.041		Vel = 1.05	
H.25 to T.60	0.0	0.86 150.0	1Utr	2.0 0.0	13.000 2.000	11.830 0.0			
T.60 to H.27	1.91	0.0029		0.0	15.000	0.044		Vel = 1.05	
T.60 to H.27	3.45	0.86 150.0	1Utr	2.0 0.0	1.000 2.000	11.874 0.0			
H.27 to T.69	5.36	0.0197		0.0	3.000	0.059		Vel = 2.96	
H.27 to T.69	0.0	0.86 150.0	1Utr	2.0 0.0	2.000 2.000	11.933 0.0			
T.69 to T.73	5.36	0.0198		0.0	4.000	0.079		Vel = 2.96	
T.69 to T.73	-1.46	0.86 150.0	1Utr 1Utb	2.0 14.0	11.000 16.000	12.012 3.898			
T.73 to T.76	3.9	0.0110		0.0	27.000	0.298		Vel = 2.15	
T.73 to T.76	-0.44	0.86 150.0	1Utr	2.0 0.0	12.000 2.000	16.208 3.898			
T.76 to H.36	3.46	0.0089		0.0	14.000	0.124		Vel = 1.91	
T.76 to H.36	-0.94	0.86 150.0	1Utb	14.0 0.0	2.000 14.000	20.230 0.0			
H.36 to H.28	2.52	0.0049		0.0	16.000	0.078		Vel = 1.39	
H.36 to H.28	0.0	0.86 150.0	1Utr	2.0 0.0	18.000 2.000	20.308 0.0			
H.28 to H.17	2.52	0.0050		0.0	20.000	0.099		Vel = 1.39	
H.28 to H.17	0.0	0.86 150.0	1Utr	2.0 0.0	10.000 2.000	20.407 0.0			
H.17 to T.53	2.52	0.0049		0.0	12.000	0.059		Vel = 1.39	
H.17 to T.53	0.0	0.86 150.0	1Utr	2.0 0.0	10.000 2.000	20.466 0.0			
T.53 to H.12	2.52	0.0049		0.0	12.000	0.059		Vel = 1.39	
T.53 to H.12	3.76	0.86 150.0	1Utr	2.0 0.0	7.000 2.000	20.525 0.0			
H.12 to H.11	6.28	0.0266		0.0	9.000	0.239		Vel = 3.47	
H.12 to H.11	0.0	0.86 150.0	1Utr	2.0 0.0	13.000 2.000	20.764 0.0			
H.11 to H.14	6.28	0.0265		0.0	15.000	0.398		Vel = 3.47	
H.11 to H.14	0.0	0.86 150.0		0.0 0.0	14.000 0.0	21.162 0.0			
H.11 to H.14	6.28	0.0266		0.0	14.000	0.372		Vel = 3.47	

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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	*****	Notes	*****
H.14 to T.44	0.0 6.28	0.86 150.0 0.0265	1Utr 2.0 0.0	11.000 2.000	21.534 0.0			Vel = 3.47	
T.44 to S.1	6.72 13.0	0.86 150.0 0.1022	1Utb 14.0 1T 2.871 0.0	10.000 16.871 26.871	21.879 1.732 2.745			Vel = 7.18	
S.1 to MTR	0.0 13.0	0.86 150.0 0.1019	2E 2.297 0.0	2.000 2.297 4.297	26.356 5.166 0.438		* Fixed loss = 3	Vel = 7.18	
MTR to STR	0.0 13.0	0.911 150.0 0.0772	1E 1.521 1T 3.801 1G 0.76	18.000 6.082 24.082	31.960 0.0 1.858			Vel = 6.40	
	0.0 13.00					33.818		K Factor = 2.24	
H.38 to H.20	5.64 5.64	0.86 150.0 0.0218	1Utr 2.0 0.0	15.000 2.000 17.000	7.040 0.0 0.371			Vel = 3.12	
H.20 to T.47	0.0 5.64	0.86 150.0 0.0217	1Utr 2.0 0.0	6.000 2.000 8.000	7.411 0.0 0.174			Vel = 3.12	
T.47 to T.52	-1.49 4.15	0.86 150.0 0.0123	1Utr 2.0 1Utb 14.0 0.0	16.000 16.000 32.000	7.585 3.898 0.395			Vel = 2.29	
T.52 to T.54	-1.06 3.09	0.86 150.0 0.0071	1Utb 14.0 0.0	16.000 14.000 30.000	11.878 3.898 0.214			Vel = 1.71	
T.54 to T.49	-0.88 2.21	0.86 150.0 0.0039		13.000 0.0 13.000	15.990 0.0 0.051			Vel = 1.22	
T.49 to T.48	-0.23 1.98	0.86 150.0 0.0030	1Utr 2.0 0.0	1.000 2.000 3.000	16.041 0.0 0.009			Vel = 1.09	
T.48 to H.9	0.23 2.21	0.86 150.0 0.0040	1Utr 2.0 0.0	2.000 2.000 4.000	16.050 0.0 0.016			Vel = 1.22	
H.9 to H.8	0.0 2.21	0.86 150.0 0.0038	1Utr 2.0 0.0	10.000 2.000 12.000	16.066 0.0 0.046			Vel = 1.22	
H.8 to H.31	0.0 2.21	0.86 150.0 0.0039	1Utr 2.0 0.0	14.000 2.000 16.000	16.112 0.0 0.062			Vel = 1.22	
H.31 to H.32	0.0 2.21	0.86 150.0 0.0038		10.000 0.0 10.000	16.174 0.0 0.038			Vel = 1.22	
H.32 to T.64	0.0 2.21	0.86 150.0 0.0039	1Utr 2.0 0.0	5.000 2.000 7.000	16.212 0.0 0.027			Vel = 1.22	
T.64 to T.68	1.02 3.23	0.86 150.0 0.0078	2Utb 28.0 0.0	15.762 28.000 43.762	16.239 3.898 0.340			Vel = 1.78	

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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	*****	Notes	*****
T.68 to T.67	3.50 6.73	0.86 150.0 0.0302	1Utr	2.0 0.0	2.000 2.000 4.000	20.477 0.0 0.121			Vel = 3.72	
T.67 to T.66	-0.72 6.01	0.86 150.0 0.0247	1Utr	2.0 0.0	1.000 2.000 3.000	20.598 0.0 0.074			Vel = 3.32	
T.66 to H.34	0.72 6.73	0.86 150.0 0.0300	1Utr	2.0 0.0	3.000 2.000 5.000	20.672 0.0 0.150			Vel = 3.72	
H.34 to T.72	0.0 6.73	0.86 150.0 0.0302		0.0 0.0	4.000 0.0 4.000	20.822 0.0 0.121			Vel = 3.72	
T.72 to H.33	0.0 6.73	0.86 150.0 0.0302	1Utr	2.0 0.0	8.000 2.000 10.000	20.943 0.0 0.302			Vel = 3.72	
H.33 to H.13	0.0 6.73	0.86 150.0 0.0302	1Utr	2.0 0.0	14.000 2.000 16.000	21.245 0.0 0.483			Vel = 3.72	
H.13 to T.44	0.0 6.73	0.86 150.0 0.0302	1Utr	2.0 0.0	3.000 2.000 5.000	21.728 0.0 0.151			Vel = 3.72	
	0.0 6.73					21.879			K Factor = 1.44	
T.59 to T.58	4.41 4.41	0.86 150.0 0.0138	1Utr	2.0 0.0	3.000 2.000 5.000	7.539 0.0 0.069			Vel = 2.44	
T.58 to T.60	-0.96 3.45	0.86 150.0 0.0088	2Utb	28.0 0.0	14.000 28.000 42.000	7.608 3.898 0.368			Vel = 1.91	
	0.0 3.45					11.874			K Factor = 1.00	
T.47 to H.3	1.49 1.49	0.86 150.0 0.0019	1Utr	2.0 0.0	8.000 2.000 10.000	7.585 0.0 0.019			Vel = 0.82	
H.3 to T.46	0.0 1.49	0.86 150.0 0.0019	1Utr	2.0 0.0	12.000 2.000 14.000	7.604 0.0 0.026			Vel = 0.82	
T.46 to T.51	0.96 2.45	0.86 150.0 0.0047	2Utb	28.0 0.0	11.000 28.000 39.000	7.630 3.898 0.182			Vel = 1.35	
T.51 to H.1	1.05 3.5	0.86 150.0 0.0090	1Utr	2.0 0.0	11.000 2.000 13.000	11.710 0.0 0.117			Vel = 1.93	
H.1 to T.41	0.0 3.5	0.86 150.0 0.0090	1Utr	2.0 0.0	4.000 2.000 6.000	11.827 0.0 0.054			Vel = 1.93	
T.41 to T.42	-0.86 2.64	0.86 150.0 0.0054	2Utb	28.0 0.0	13.000 28.000 41.000	11.881 3.898 0.220			Vel = 1.46	

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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	*****	Notes	*****
T.42 to T.43	0.87 3.51	0.86 150.0 0.0090	1Utr 2.0 0.0 0.0	4.000 2.000 6.000	15.999 0.0 0.054		Vel = 1.94		
T.43 to H.10	0.0 3.51	0.86 150.0 0.0091	1Utr 2.0 0.0 0.0	8.000 2.000 10.000	16.053 0.0 0.091		Vel = 1.94		
H.10 to T.50	0.0 3.51	0.86 150.0 0.0091	1Utr 2.0 0.0 0.0	6.000 2.000 8.000	16.144 0.0 0.073		Vel = 1.94		
T.50 to T.53	0.24 3.75	0.86 150.0 0.0102	2Utb 28.0 0.0 0.0	12.000 28.000 40.000	16.217 3.898 0.410		Vel = 2.07		
	0.0 3.75				20.525		K Factor = 0.83		
T.58 to H.21	0.96 0.96	0.86 150.0 0.0010	0.0 0.0 0.0	2.000 0.0 2.000	7.808 0.0 0.002		Vel = 0.53		
H.21 to H.2	0.0 0.96	0.86 150.0 0.0008	1Utr 2.0 0.0 0.0	11.000 2.000 13.000	7.610 0.0 0.010		Vel = 0.53		
H.2 to T.46	0.0 0.96	0.86 150.0 0.0008	1Utr 2.0 0.0 0.0	10.000 2.000 12.000	7.620 0.0 0.010		Vel = 0.53		
	0.0 0.96				7.630		K Factor = 0.35		
T.57 to T.51	1.04 1.04	0.86 150.0 0.0010	0.0 0.0 0.0	4.000 0.0 4.000	11.706 0.0 0.004		Vel = 0.57		
	0.0 1.04				11.710		K Factor = 0.30		
T.52 to T.55	1.06 1.06	0.86 150.0 0.0010	2Utb 28.0 0.0 0.0	1.000 28.000 29.000	11.878 0.0 0.029		Vel = 0.59		
T.55 to H.22	0.86 1.92	0.86 150.0 0.0029	1Utr 2.0 0.0 0.0	14.000 2.000 16.000	11.907 0.0 0.047		Vel = 1.06		
H.22 to T.61	0.0 1.92	0.86 150.0 0.0030	1Utr 2.0 0.0 0.0	5.000 2.000 7.000	11.954 0.0 0.021		Vel = 1.06		
T.61 to T.63	0.0 1.92	0.86 150.0 0.0030	1Utr 2.0 0.0 0.0	5.000 2.000 7.000	11.975 0.0 0.021		Vel = 1.06		
T.63 to H.39	0.0 1.92	0.86 150.0 0.0029	1Utr 2.0 0.0 0.0	5.000 2.000 7.000	11.996 0.0 0.020		Vel = 1.06		
H.39 to T.79	0.0 1.92	0.86 150.0 0.0030	1Utr 2.0 0.0 0.0	8.000 2.000 10.000	12.016 0.0 0.030		Vel = 1.06		

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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	*****	Notes	*****
T.79 to T.80	1.45 3.37	0.86 150.0 0.0084	1Utr 1Utb	2.0 14.0 0.0	14.000 16.000 30.000	12.046 3.898 0.252			Vel = 1.86	
T.80 to T.74	-0.82 2.55	0.86 150.0 0.0050	1Utb	14.0 0.0 0.0	14.000 14.000 28.000	16.196 3.898 0.141			Vel = 1.41	
T.74 to H.35	0.95 3.5	0.86 150.0 0.0089	1Utr	2.0 0.0 0.0	10.000 2.000 12.000	20.235 0.0 0.107			Vel = 1.93	
H.35 to T.68	0.0 3.5	0.86 150.0 0.0090	1Utr	2.0 0.0 0.0	13.000 2.000 15.000	20.342 0.0 0.135			Vel = 1.93	
	0.0 3.50					20.477			K Factor = 0.77	
T.41 to H.4	0.85 0.85	0.86 150.0 0.0007	1Utr	2.0 0.0 0.0	7.000 2.000 9.000	11.881 0.0 0.006			Vel = 0.47	
H.4 to T.45	0.0 0.85	0.86 150.0 0.0006	1Utr	2.0 0.0 0.0	12.000 2.000 14.000	11.887 0.0 0.009			Vel = 0.47	
T.45 to T.56	-0.36 0.49	0.86 150.0 0.0003	2Utb	28.0 0.0 0.0	3.000 28.000 31.000	11.896 0.0 0.008			Vel = 0.27	
T.56 to T.55	0.36 0.85	0.86 150.0 0.0006	1Utr	2.0 0.0 0.0	3.000 2.000 5.000	11.904 0.0 0.003			Vel = 0.47	
	0.0 0.85					11.907			K Factor = 0.25	
T.45 to H.6	0.36 0.36	0.86 150.0 0.0002		0.0 0.0 0.0	6.000 0.0 6.000	11.896 0.0 0.001			Vel = 0.20	
H.6 to H.7	0.0 0.36	0.86 150.0 0.0002	1Utr	2.0 0.0 0.0	10.000 2.000 12.000	11.897 0.0 0.002			Vel = 0.20	
H.7 to H.24	0.0 0.36	0.86 150.0 0.0001	1Utr	2.0 0.0 0.0	11.000 2.000 13.000	11.899 0.0 0.001			Vel = 0.20	
H.24 to H.23	0.0 0.36	0.86 150.0 0.0002		0.0 0.0 0.0	10.000 0.0 10.000	11.900 0.0 0.002			Vel = 0.20	
H.23 to H.19	0.0 0.36	0.86 150.0 0.0001	1Utr	2.0 0.0 0.0	8.000 2.000 10.000	11.902 0.0 0.001			Vel = 0.20	
H.19 to T.56	0.0 0.36	0.86 150.0 0.0002	1Utr	2.0 0.0 0.0	2.000 2.000 4.000	11.903 0.0 0.001			Vel = 0.20	
	0.0 0.36					11.904			K Factor = 0.10	

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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	*****	Notes	*****
T.69 to T.71	1.45	0.86 150.0	1Utr	2.0 0.0	7.000 2.000	12.012 0.0			Vel = 0.80	
T.71 to H.40	0.0	0.86 150.0	1Utr	2.0 0.0	4.000 2.000	12.028 0.0			Vel = 0.80	
H.40 to T.79	1.45	0.86 150.0		0.0	4.000	12.039 0.0			Vel = 0.80	
	0.0									
	1.45					12.046			K Factor = 0.42	
T.54 to H.15	0.87	0.86 150.0	1Utr	2.0 0.0	3.000 2.000	15.990 0.0			Vel = 0.48	
H.15 to T.42	0.0	0.86 150.0	1Utr	2.0 0.0	5.000 2.000	15.994 0.0			Vel = 0.48	
	0.0									
	0.87					15.999			K Factor = 0.22	
T.49 to H.18	0.23	0.67 150.0	1Utb	17.0 0.0	5.000 17.000	16.041 0.0			Vel = 0.21	
H.18 to T.48	0.0	0.67 150.0	1Utb 1Utr	17.0 2.0	6.000 19.000	16.045 0.0			Vel = 0.21	
	0.0									
	0.23					16.050			K Factor = 0.06	
T.80 to T.77	0.82	0.86 150.0	2Utb	28.0 0.0	2.000 28.000	16.196 0.0			Vel = 0.45	
T.77 to H.37	0.20	0.86 150.0	1Utr	2.0 0.0	8.000 2.000	16.215 0.0			Vel = 0.56	
H.37 to T.65	1.02	0.86 150.0	1Utr	2.0 0.0	7.000 2.000	16.224 0.0			Vel = 0.56	
T.65 to T.64	0.0	0.86 150.0	1Utr	2.0 0.0	6.000 2.000	16.232 0.0			Vel = 0.56	
	0.0									
	1.02					16.239			K Factor = 0.25	
T.73 to T.70	0.44	0.86 150.0	2Utb	28.0 0.0	2.000 28.000	16.208 0.0			Vel = 0.24	
T.70 to T.78	-0.24	0.86 150.0	1Utr	2.0 0.0	5.000 2.000	16.214 0.0			Vel = 0.11	
T.78 to T.77	0.2	0.86 150.0		0.0	5.000	16.214 0.0			Vel = 0.11	
	0.2	0.0002		0.0	5.000	0.001				

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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	*****	Notes	*****
	0.0 0.20						16.215		K Factor = 0.05	
T.70 to H.30	0.24	0.86 150.0	1Utr	2.0 0.0	1.000 2.000	16.214 0.0			Vel = 0.13	
H.30 to H.29	0.24	0.0		0.0	3.000	0.0				
H.30 to H.29	0.0	0.86 150.0	1Utr	2.0 0.0	14.000 2.000	16.214 0.0			Vel = 0.13	
H.29 to H.16	0.24	0.0001		0.0	16.000	0.001				
H.29 to H.16	0.0	0.86 150.0	1Utr	2.0 0.0	11.000 2.000	16.215 0.0			Vel = 0.13	
H.16 to T.50	0.24	0.0001		0.0	13.000	0.001				
H.16 to T.50	0.0	0.86 150.0	1Utr	2.0 0.0	9.000 2.000	16.216 0.0			Vel = 0.13	
T.50	0.24	0.0001		0.0	11.000	0.001				
	0.0 0.24						16.217		K Factor = 0.06	
T.76 to T.75	0.94	0.86 150.0		0.0 0.0	2.000 0.0	20.230 0.0			Vel = 0.52	
T.75 to T.74	0.94	0.0010		0.0	2.000	0.002				
T.75 to T.74	0.0	0.86 150.0	1Utr	2.0 0.0	2.000 2.000	20.232 0.0			Vel = 0.52	
T.74	0.94	0.0008		0.0	4.000	0.003				
	0.0 0.94						20.235		K Factor = 0.21	
T.67 to H.26	0.72	0.67 150.0	1Utb	17.0 0.0	4.000 17.000	20.598 0.0			Vel = 0.66	
H.26 to T.66	0.72	0.0016		0.0	21.000	0.034				
H.26 to T.66	0.0	0.67 150.0	1Utb 1Utr	17.0 2.0	5.000 19.000	20.632 0.0			Vel = 0.66	
T.66	0.72	0.0017		0.0	24.000	0.040				
	0.0 0.72						20.672		K Factor = 0.16	



