DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK

CITY OF PORTLAND

BUILDING PERMIT

This is to certify that
DKC Properties LLC
#5 Rear Industry RD
SOUTH PORTLAND, ME 04106

For installation at
TBA SUMAC ST

CBL: 378- A-022-001

Job ID: 2012-04-3820-SF

has permission to install an NFPA 13D sprinkler system for single-family
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 closed-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

for. Ch. B Wallace

Fire Prevention Officer **Code Enforcement Officer / Plan Reviewer**

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
PENALTY FOR REMOVING THIS CARD

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: 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.**

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.

Director of Planning and Urban Development
Penny St. Louis

Job ID: 2012-04-3820-SF
install NFPA 13D sprinkler system for single-famil

For installation at:
0 SUMAC ST

CBL: 378- A-022-001

Conditions of Approval:

Fire

1. The sprinkler system shall be installed in accordance with NFPA 13D. A compliance letter is required.
2. 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.
3. Application requires State Fire Marshal approval.

City of Portland, Maine - Building or Use Permit Application
389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No:	Date Applied:	CBL:	
2012-04-3820-SF 2012 - 4382P - FSS	**5/11/2012**	**378- A-022-001**	
Location of Construction: **0 SUMAC ST**	Owner Name: **BRENT D BRAASCH**	Owner Address: **25 SUMAC ST** **PORTLAND, 04103 ME - MAINE**	Phone:
Business Name:	Contractor Name: **SPB Plumbing & Heating**	Contractor Address:	Phone: **(207) 252-0698**
Lessee/Buyer's Name: **DKC Properties LLC-Duane Christian**	Phone: **(207) 749-2236**	Permit Type: **FSS-Fire Suppression**	Zone: **R-2**
Past Use: New Single family home	Proposed Use: Same – new single family home – install sprinkler system	Cost of Work:	CEO District:
		Fire Dept: 5/28/12 ✓ Approved w/ conditions ___ Denied ___ N/A Signature: BJ Arbo (SB)	Inspection: Use Group: Type: Signature:
Proposed Project Description: **install fire sprinkler**		Pedestrian Activities District (P.A.D.)	

Permit Taken By:	**Zoning Approval**		
	Special Zone or Reviews	**Zoning Appeal**	**Historic Preservation**
	___ Shoreland ___ Wetlands ___ Flood Zone ___ Subdivision ___ Site Plan ___ Maj ___Min ___MM Date: OK 5/11/12 ABM	___ Variance ___ Miscellaneous ___ Conditional Use ___ Interpretation ___ Approved ___ Denied Date:	✓ Not in Dist or Landmark ___ Does not Require Review ___ Requires Review ___ Approved ___ Approved w/Conditions ___ Denied Date: ABM

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building Permits do not include plumbing, septic or electrial work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.

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 appication 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

Parent - 2012-04-3820
child# - 2012-43829

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: "25A" Sumac St.

Building owner: DKC Properties LLC. Phone: 749-2236

Installer: SPB Plumbing & Heating Phone: 252 0698

Total sq/ft of building floor space per unit: 1664 ± ☒ 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= 1 5800

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

RECEIVED

MAY 11 2012

Dept. of Building Inspections
City of Portland Maine

COST OF WORK: 1 5800
(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.

Sprinkler system cost must deduct costs that would have been incurred if the system did not provide sprinkler service. In 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.

AQUASAFE® Fire Safety System

Uponor
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

3.7.12

Job Name	:	25A SUMAC - One Head Calculation (H.16)
Drawing	:	RESIDENTIAL
Location	:	25A SUMAC PORTLAND ME
Remote Area	:	1
Contract	:	120228-41N
Data File	:	120228-41N 25A Sumac.wx1

Computer Programs by Hydratec Inc. Route 111 Windham N.H. USA 03087

HYDRAULIC DESIGN INFORMATION SHEET

Name - 25A SUMAC Date - 3/05/12
Location - PORTLAND ME
Building - RESIDENTIAL System No. - 1
Contractor - SPB PLG & HTG Contract No. - 120228-41N
Calculated By - DEVON HUYNH Drawing No. - 1
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height VARIES
OCCUPANCY - RESIDENTIAL

SYSTEM DESIGN

Type of Calculation: ( )NFPA 13 Residential ( )NFPA 13R (X)NFPA 13D
Number of Sprinklers Flowing: (X)1 ( )2 ( )4 ( )
( )Other
( )Specific Ruling Made by Date

Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 9.14 Psi (X) Wet ( ) Dry
MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction
Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
Additional Flow Added - Gpm Make RELIABE-ASSEMBLIES Model AFC43
Elevation at Highest Outlet - 128 Feet Size 3/8 K-Factor 4.3
Note: Temperature Rating 155

Calculation Summary: Gpm Required 13 Psi Required 53.3 At Ref Pt STR
C-Factor Used: Overhead 150 Underground 150

Water Flow Test:
Date of Test - x
Time of Test - x
Static (Psi) - 80
Residual (Psi) - 75
Flow (Gpm) - 300
Elevation - 100

Pump Data:
Rated Cap.
@ Psi
Elev.
Other

Tank or Reservoir:
Cap.
Elev.

Well
Proof Flow Gpm

Location: x

Source of Information: CITY SUPPLY

Water Supply Curve (C)

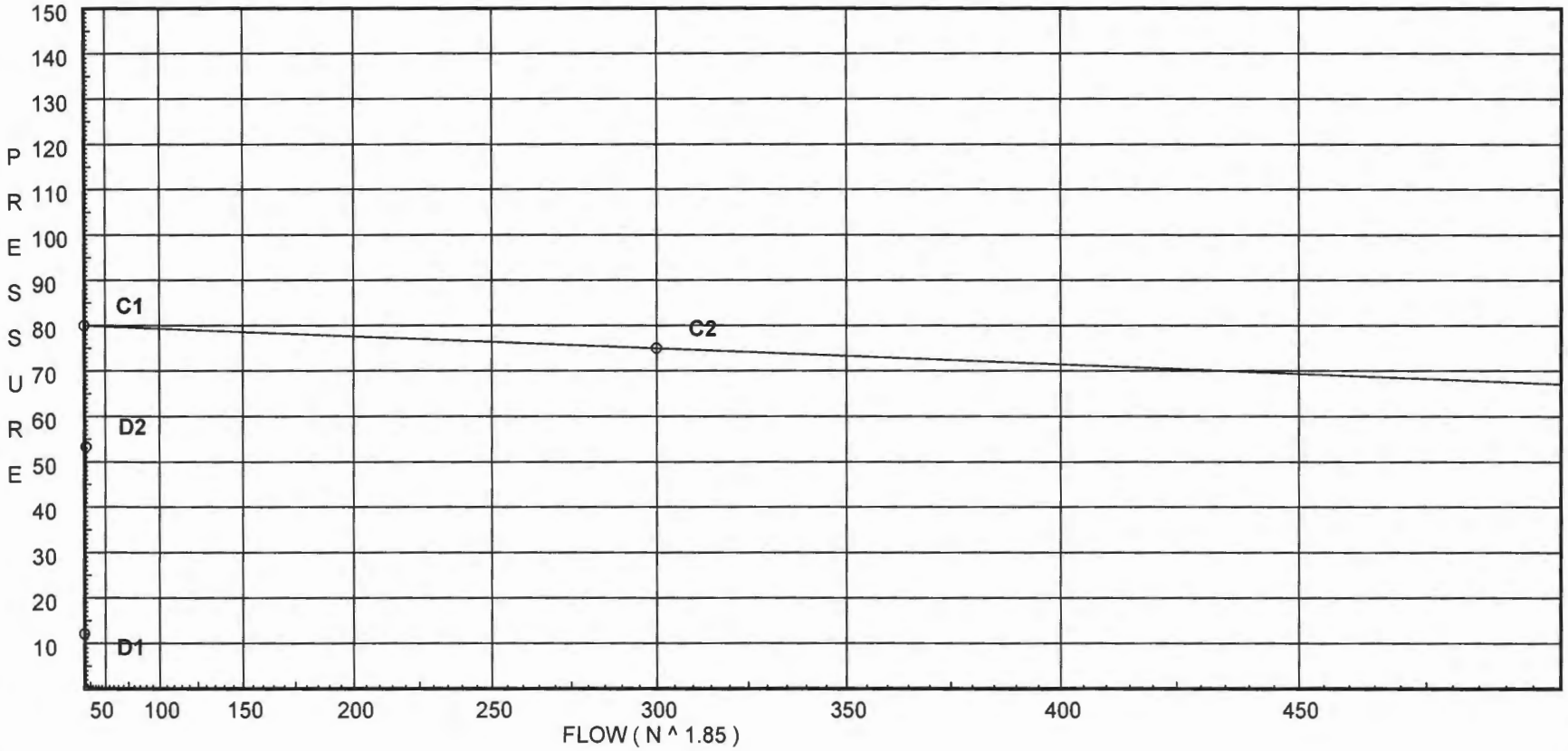
Uponor
25A SUMAC - One Head Calculation (H.16)

Date 3/5/2012

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

Demand:

D1 - Elevation	:	12.127
D2 - System Flow	:	12.9999
D2 - System Pressure	:	53.303
Hose (Adj City)	:	_____
Hose (Demand)	:	_____
D3 - System Demand	:	12.9999
Safety Margin	:	26.682



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
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
R	CPVC Coupling Tee - Run	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
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
U	UnAdjusted Fitting	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Utb	Aquapex Tee - Branch	2	6	6	9.08	12.88	13.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utr	Aquapex Tee - Run	1	2	2	1.64	2.39	2.39	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

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
STR	80.0	75	300.0	79.985	13.0	53.303

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.16	128.0	4.3	9.14	13.0	
H.12	128.0		17.39		
H.2	128.0		19.09		
H.3	128.0		19.0		
H.4	128.0		19.12		
H.9	118.0		24.43		
M.22	128.0		19.3		
H.1	128.0		19.04		
T.23	128.0		18.16		
H.7	128.0		18.97		
M.25	108.0		30.0		
H.5	108.0		29.57		
H.8	118.0		24.4		
H.6	108.0		29.52		
H.10	128.0		17.36		
H.13	108.0		29.48		
T.24	108.0		30.03		
M.27	118.0		24.53		
T.26	118.0		24.54		
H.17	118.0		24.1		
H.11	128.0		17.4		
T.30	128.0		13.39		
H.15	118.0		24.53		
H.14	118.0		24.57		
T.28	118.0		24.46		
H.20	108.0		29.61		
T.29	128.0		13.27		
H.19	108.0		29.54		
T.33	118.0		24.53		
H.18	128.0		17.4		
T.31	118.0		24.31		
T.32	118.0		24.1		
H.21	118.0		24.1		
T.34	118.0		23.19		
S.1	104.0		32.46		
MTR	100.0		40.75		
STR	100.0		53.3		

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - One Head Calculation (H.16)

Date 3/5/2012

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.16	3.28	0.475	42U	42.0	15.000	9.140		K Factor = 4.30
to		150.0		0.0	42.300	0.0		
H.12	3.28	0.1440		0.0	57.300	8.254		Vel = 5.94
	0.0							
	3.28					17.394		K Factor = 0.79
H.2	-0.18	0.475	42U	42.0	22.000	19.086		
to		150.0		0.0	42.300	0.0		
H.1	-0.18	-0.0007		0.0	64.300	-0.043		Vel = 0.33
	0.0							
	-0.18					19.043		K Factor = -0.04
H.3	0.20	0.475	42U	42.0	10.000	18.999		
to		150.0		0.0	42.300	0.0		
H.1	0.2	0.0008		0.0	52.300	0.044		Vel = 0.36
	0.0							
	0.20					19.043		K Factor = 0.05
H.4	-0.28	0.475	42U	42.0	8.000	19.118		
to		150.0		0.0	42.300	0.0		
H.1	-0.28	-0.0015		0.0	50.300	-0.075		Vel = 0.51
	0.0							
	-0.28					19.043		K Factor = -0.06
H.9	-1.02	0.475	42U	42.0	17.000	24.431		
to		150.0		0.0	42.300	-4.331		
H.4	-1.02	-0.0166		0.0	59.300	-0.982		Vel = 1.85
H.4	0.68	0.475	42U	42.0	12.000	19.118		
to		150.0		0.0	42.300	0.0		
H.3	-0.34	-0.0022		0.0	54.300	-0.119		Vel = 0.62
	0.0							
	-0.34					18.999		K Factor = -0.08
M.22	-0.76	0.475	1T	1.219	9.000	19.301		
to		150.0	21U	21.0	22.369	0.0		
H.3	-0.76	-0.0096		0.0	31.369	-0.302		Vel = 1.38
	0.0							
	-0.76					18.999		K Factor = -0.17
H.1	-0.26	0.475	42U	42.0	16.000	19.043		
to		150.0		0.0	42.300	0.0		
H.7	-0.26	-0.0013		0.0	58.300	-0.075		Vel = 0.47
	0.0							
	-0.26					18.968		K Factor = -0.06
T.23	1.33	0.475	1R	1.0	11.000	18.156		
to		150.0	21U	21.0	23.150	0.0		
H.2	1.33	0.0272	1Utr	1.0	34.150	0.930		Vel = 2.41
	0.0							
	1.33					19.086		K Factor = 0.30
M.22	-0.55	0.475	1T	1.219	18.000	19.301		
to		150.0	21U	21.0	22.369	0.0		
H.2	-0.55	-0.0053		0.0	40.369	-0.215		Vel = 1.00
H.2	1.51	0.475	42U	42.0	23.000	19.086		
to		150.0		0.0	42.300	4.331		
H.8	0.96	0.0150		0.0	65.300	0.978		Vel = 1.74

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - One Head Calculation (H.16)

Date 3/5/2012

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
	0.0									
	0.96					24.395		K Factor = 0.19		
H.3	-1.30	0.475	42U	42.0	19.000	18.999				
to		150.0		0.0	42.300	0.0				
H.11	-1.3	-0.0262		0.0	61.300	-1.604		Vel = 2.35		
	0.0									
	-1.30					17.395		K Factor = -0.31		
H.7	0.40	0.475	42U	42.0	9.000	18.968				
to		150.0		0.0	42.300	0.0				
H.4	0.4	0.0029		0.0	51.300	0.150		Vel = 0.72		
	0.0									
	0.40					19.118		K Factor = 0.09		
M.22	7.81	0.862	1Utb	6.0	17.000	19.301				
to		150.0		0.0	6.000	4.331				
T.26	7.81	0.0393		0.0	23.000	0.904		Vel = 4.29		
	0.0									
	7.81					24.536		K Factor = 1.58		
M.22	-0.83	0.475	1T	1.219	7.000	19.301				
to		150.0	21U	21.0	22.369	0.0				
H.7	-0.83	-0.0113		0.0	29.369	-0.333		Vel = 1.50		
	0.0									
	-0.83					18.968		K Factor = -0.19		
M.25	-0.88	0.475	1T	1.219	12.000	30.002				
to		150.0	21U	21.0	22.369	0.0				
H.5	-0.88	-0.0127		0.0	34.369	-0.435		Vel = 1.59		
	0.0									
	-0.88					29.567		K Factor = -0.16		
H.9	0.84	0.475	42U	42.0	24.000	24.431				
to		150.0		0.0	42.300	4.331				
H.6	0.84	0.0115		0.0	66.300	0.761		Vel = 1.52		
	0.0									
	0.84					29.523		K Factor = 0.15		
H.8	0.18	0.475	42U	42.0	14.000	24.395				
to		150.0		0.0	42.300	0.0				
H.9	0.18	0.0006		0.0	56.300	0.036		Vel = 0.33		
	0.0									
	0.18					24.431		K Factor = 0.04		
H.6	-0.16	0.475	42U	42.0	28.000	29.523				
to		150.0		0.0	42.300	0.0				
H.13	-0.16	-0.0005		0.0	70.300	-0.038		Vel = 0.29		
	0.0									
	-0.16					29.485		K Factor = -0.03		
H.10	1.33	0.475	21U	21.0	7.000	17.361				
to		150.0	1R	1.0	22.150	0.0				
T.23	1.33	0.0273		0.0	29.150	0.795		Vel = 2.41		
	0.0									
	1.33					18.156		K Factor = 0.31		

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - One Head Calculation (H.16)

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
M.22	-2.02	0.475	1T	1.219	10.000	19.301		
to		150.0	21U	21.0	22.369	0.0		
H.11	-2.02	-0.0589		0.0	32.369	-1.906		Vel = 3.66
	0.0							
	-2.02					17.395		K Factor = -0.48
M.22	-1.96	0.475	1T	1.219	12.000	19.301		
to		150.0	21U	21.0	22.369	0.0		
H.12	-1.96	-0.0555		0.0	34.369	-1.907		Vel = 3.55
	0.0							
	-1.96					17.394		K Factor = -0.47
M.25	-0.90	0.475	1T	1.219	14.000	30.002		
to		150.0	21U	21.0	22.369	0.0		
H.6	-0.9	-0.0132		0.0	36.369	-0.479		Vel = 1.63
	0.0							
	-0.90					29.523		K Factor = -0.17
H.13	0.27	0.475	42U	42.0	17.000	29.485		
to		150.0		0.0	42.300	0.0		
H.5	0.27	0.0014		0.0	59.300	0.082		Vel = 0.49
	0.0							
	0.27					29.567		K Factor = 0.05
H.7	-1.49	0.475	42U	42.0	5.000	18.968		
to		150.0		0.0	42.300	0.0		
H.12	-1.49	-0.0333		0.0	47.300	-1.574		Vel = 2.70
	0.0							
	-1.49					17.394		K Factor = -0.36
H.8	0.34	0.475	21U	21.0	5.000	24.395		
to		150.0	1R	1.0	23.150	0.0		
T.28	0.34	0.0021	1Utr	1.0	28.150	0.060		Vel = 0.62
	0.0							
	0.34					24.455		K Factor = 0.07
T.24	13.00	1.054	1T	2.44	16.000	30.027		
to		150.0		0.0	2.440	1.732		
S.1	13.0	0.0380		0.0	18.440	0.700		Vel = 4.78
	0.0							
	13.00					32.459		K Factor = 2.28
H.10	0.16	0.475	42U	42.0	18.000	17.361		
to		150.0		0.0	42.300	0.0		
H.12	0.16	0.0005		0.0	60.300	0.033		Vel = 0.29
	0.0							
	0.16					17.394		K Factor = 0.04
M.25	3.37	0.862	1Utr	2.0	1.000	30.002		
to		150.0		0.0	2.000	0.0		
T.24	3.37	0.0083		0.0	3.000	0.025		Vel = 1.85
T.24	-13.00	0.862	1Utb	6.0	12.000	30.027		
to		150.0	1Utr	2.0	8.000	-4.331		
T.26	-9.63	-0.0580		0.0	20.000	-1.160		Vel = 5.29
	0.0							
	-9.63					24.536		K Factor = -1.94

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - One Head Calculation (H.16)

Date 3/5/2012

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
M.27	-0.45	0.475	1T	1.219	15.000	24.533		
to		150.0	21U	21.0	22.369	0.0		
H.8	-0.45	-0.0037		0.0	37.369	-0.138		Vel = 0.81
	0.0							
	-0.45					24.395		K Factor = -0.09
T.26	-1.83	0.862		0.0	1.000	24.536		
to		150.0		0.0	0.0	0.0		
M.27	-1.83	-0.0030		0.0	1.000	-0.003		Vel = 1.01
	0.0							
	-1.83					24.533		K Factor = -0.37
H.17	-1.69	0.475	42U	42.0	15.000	24.104		
to		150.0		0.0	42.300	-4.331		
H.10	-1.69	-0.0421		0.0	57.300	-2.412		Vel = 3.06
	0.0							
	-1.69					17.361		K Factor = -0.41
H.11	-3.31	0.475	21U	21.0	5.000	17.395		
to		150.0	1R	1.0	23.150	0.0		
T.29	-3.31	-0.1466	1Utr	1.0	28.150	-4.127		Vel = 5.99
	0.0							
	-3.31					13.268		K Factor = -0.91
T.30	3.18	0.475	1R	1.0	5.000	13.387		
to		150.0	21U	21.0	24.150	0.0		
H.10	3.18	0.1363	1Utb	2.0	29.150	3.974		Vel = 5.76
	0.0							
	3.18					17.361		K Factor = 0.76
H.15	0.79	0.475	42U	42.0	26.000	24.527		
to		150.0		0.0	42.300	4.331		
H.5	0.79	0.0104		0.0	68.300	0.709		Vel = 1.43
	0.0							
	0.79					29.567		K Factor = 0.15
H.14	-0.36	0.475	42U	42.0	14.000	24.567		
to		150.0		0.0	42.300	0.0		
H.9	-0.36	-0.0024		0.0	56.300	-0.136		Vel = 0.65
	0.0							
	-0.36					24.431		K Factor = -0.07
M.27	0.22	0.475	1T	1.219	13.000	24.533		
to		150.0	21U	21.0	22.369	0.0		
H.14	0.22	0.0010		0.0	35.369	0.034		Vel = 0.40
	0.0							
	0.22					24.567		K Factor = 0.04
T.28	0.34	0.475	1R	1.0	12.000	24.455		
to		150.0	21U	21.0	22.150	0.0		
H.15	0.34	0.0021		0.0	34.150	0.072		Vel = 0.62
	0.0							
	0.34					24.527		K Factor = 0.07
H.20	-0.18	0.475	42U	42.0	21.000	29.607		
to		150.0		0.0	42.300	0.0		
H.5	-0.18	-0.0006		0.0	63.300	-0.040		Vel = 0.33

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							
	-0.18					29.567		K Factor = -0.03
M.22	-1.68	0.475	1T	1.219	23.000	19.301		
to		150.0	21U	21.0	22.369	0.0		
H.18	-1.68	-0.0420		0.0	45.369	-1.906		Vel = 3.04
	0.0							
	-1.68					17.395		K Factor = -0.40
H.14	0.76	0.475	42U	42.0	18.000	24.567		
to		150.0		0.0	42.300	4.331		
H.13	0.76	0.0097		0.0	60.300	0.587		Vel = 1.38
	0.0							
	0.76					29.485		K Factor = 0.14
H.6	0.10	0.475	42U	42.0	18.000	29.523		
to		150.0		0.0	42.300	0.0		
H.19	0.1	0.0002		0.0	60.300	0.013		Vel = 0.18
	0.0							
	0.10					29.536		K Factor = 0.02
T.29	-3.31	0.475	1R	1.0	4.000	13.268		
to		150.0	21U	21.0	24.150	0.0		
H.16	-3.31	-0.1466	1Utb	2.0	28.150	-4.128		Vel = 5.99
H.16	6.49	0.475	21U	21.0	9.000	9.140		
to		150.0	1R	1.0	22.150	0.0		
T.30	3.18	0.1363		0.0	31.150	4.247		Vel = 5.76
	0.0							
	3.18					13.387		K Factor = 0.87
H.11	-0.02	0.475	42U	42.0	22.000	17.395		
to		150.0		0.0	42.300	0.0		
H.18	-0.02	0.0		0.0	64.300	0.0		Vel = 0.04
	0.0							
	-0.02					17.395		K Factor = 0
M.25	-0.77	0.475	1T	1.219	18.000	30.002		
to		150.0	21U	21.0	22.369	0.0		
H.20	-0.77	-0.0098		0.0	40.369	-0.395		Vel = 1.39
	0.0							
	-0.77					29.607		K Factor = -0.14
H.14	-0.19	0.475	42U	42.0	12.000	24.567		
to		150.0		0.0	42.300	0.0		
H.15	-0.19	-0.0007		0.0	54.300	-0.040		Vel = 0.34
	0.0							
	-0.19					24.527		K Factor = -0.04
M.27	-0.77	0.475	1T	1.219	21.000	24.533		
to		150.0	21U	21.0	22.369	0.0		
H.17	-0.77	-0.0099		0.0	43.369	-0.429		Vel = 1.39
	0.0							
	-0.77					24.104		K Factor = -0.16
M.25	-0.82	0.475	1T	1.219	20.000	30.002		
to		150.0	21U	21.0	22.369	0.0		
H.19	-0.82	-0.0110		0.0	42.369	-0.466		Vel = 1.48

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - One Head Calculation (H.16)

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							
	-0.82					29.536		K Factor = -0.15
H.20	-0.34	0.475	42U	42.0	15.000	29.607		
to		150.0		0.0	42.300	0.0		
H.13	-0.34	-0.0021		0.0	57.300	-0.122		Vel = 0.62
	0.0							
	-0.34					29.485		K Factor = -0.06
H.15	-0.64	0.475	21U	21.0	8.000	24.527		
to		150.0	1R	1.0	23.150	0.0		
T.31	-0.64	-0.0071	1Utr	1.0	31.150	-0.221		Vel = 1.16
	0.0							
	-0.64					24.306		K Factor = -0.13
M.27	-0.82	0.475	1T	1.219	17.000	24.533		
to		150.0	21U	21.0	22.369	0.0		
H.21	-0.82	-0.0110		0.0	39.369	-0.434		Vel = 1.48
	0.0							
	-0.82					24.099		K Factor = -0.17
H.16	3.22	0.475	42U	42.0	17.000	9.140		
to		150.0		0.0	42.300	0.0		
H.18	3.22	0.1392		0.0	59.300	8.255		Vel = 5.83
	0.0							
	3.22					17.395		K Factor = 0.77
H.19	0.25	0.475	42U	42.0	14.000	29.536		
to		150.0		0.0	42.300	0.0		
H.20	0.25	0.0013		0.0	56.300	0.071		Vel = 0.45
	0.0							
	0.25					29.607		K Factor = 0.05
T.33	-0.97	0.475	1R	1.0	5.000	24.533		
to		150.0	21U	21.0	23.150	0.0		
H.17	-0.97	-0.0152	1Utr	1.0	28.150	-0.429		Vel = 1.76
	0.0							
	-0.97					24.104		K Factor = -0.20
H.18	1.52	0.475	21U	21.0	19.000	17.395		
to		150.0	1R	1.0	23.150	4.331		
T.34	1.52	0.0347	1Utr	1.0	42.150	1.464		Vel = 2.75
	0.0							
	1.52					23.190		K Factor = 0.32
T.31	-0.64	0.475	1R	1.0	7.000	24.306		
to		150.0	21U	21.0	22.150	0.0		
H.21	-0.64	-0.0071		0.0	29.150	-0.207		Vel = 1.16
	0.0							
	-0.64					24.099		K Factor = -0.13
T.32	0.06	0.475	1R	1.0	10.000	24.101		
to		150.0	21U	21.0	23.150	0.0		
H.17	0.06	0.0001	1Utr	1.0	33.150	0.003		Vel = 0.11
	0.0							
	0.06					24.104		K Factor = 0.01

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - One Head Calculation (H.16)

Date 3/5/2012

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.21	0.06	0.475	21U	21.0	9.000	24.099		
to		150.0	1R	1.0	22.150	0.0		
T.32	0.06	0.0001		0.0	31.150	0.002		Vel = 0.11
	0.0							
	0.06					24.101		K Factor = 0.01
T.34	1.52	0.475	1R	1.0	4.000	23.190		
to		150.0	21U	21.0	22.150	0.0		
H.21	1.52	0.0348		0.0	26.150	0.909		Vel = 2.75
	0.0							
	1.52					24.099		K Factor = 0.31
H.19	-0.97	0.475	21U	21.0	20.000	29.536		
to		150.0	1R	1.0	24.150	-4.331		
T.33	-0.97	-0.0152	1Utb	2.0	44.150	-0.672		Vel = 1.76
	0.0							
	-0.97					24.533		K Factor = -0.20
S.1	13.00	0.785	2E	4.773	5.000	32.459		
to		150.0		0.0	4.773	6.732		* Fixed loss = 5
MTR	13.0	0.1593		0.0	9.773	1.557		Vel = 8.62
MTR	0.0	0.911	1E	1.521	40.000	40.748		
to		150.0	1T	3.801	6.082	9.000		* Fixed loss = 9
STR	13.0	0.0771	1G	0.76	46.082	3.555		Vel = 6.40
	0.0							
	13.00					53.303		K Factor = 1.78

uponor

AQUASAFE® Fire Safety System

Uponor
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

Job Name	:	25A SUMAC - Two Head Calculation (H.18 & H.12)
Drawing	:	RESIDENTIAL
Location	:	25A SUMAC PORTLAND ME
Remote Area	:	1
Contract	:	120228-41N
Data File	:	120228-41N 25A Sumac.wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - 25A SUMAC Date - 3/05/12
Location - PORTLAND ME
Building - RESIDENTIAL System No. - 1
Contractor - SPB PLG & HTG Contract No. - 120228-41N
Calculated By - DEVON HUYNH Drawing No. - 1
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height VARIES
OCCUPANCY - RESIDENTIAL

SYSTEM DESIGN

Type of Calculation: ( )NFPA 13 Residential ( )NFPA 13R (X)NFPA 13D
Number of Sprinklers Flowing: ( )1 (X)2 ( )4 ( )
( )Other
( )Specific Ruling Made by Date

Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 9.14 Psi (X) Wet ( ) Dry
MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction
Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
Additional Flow Added - Gpm Make RELIABE-ASSEMBLIES Model AFC43
Elevation at Highest Outlet - 128 Feet Size 3/8 K-Factor 4.3
Note: Temperature Rating 155

Calculation Summary: Gpm Required 26.411 Psi Required 75.53 At Ref Pt STR
C-Factor Used: Overhead 150 Underground 150

Water Flow Test:
Date of Test - x
Time of Test - x
Static (Psi) - 80
Residual (Psi) - 75
Flow (Gpm) - 300
Elevation - 100

Pump Data:
Rated Cap.
@ Psi
Elev.
Other

Tank or Reservoir:
Cap.
Elev.

Well
Proof Flow Gpm

PLAN

Location: x

Source of Information: CITY SUPPLY

Water Supply Curve (C)

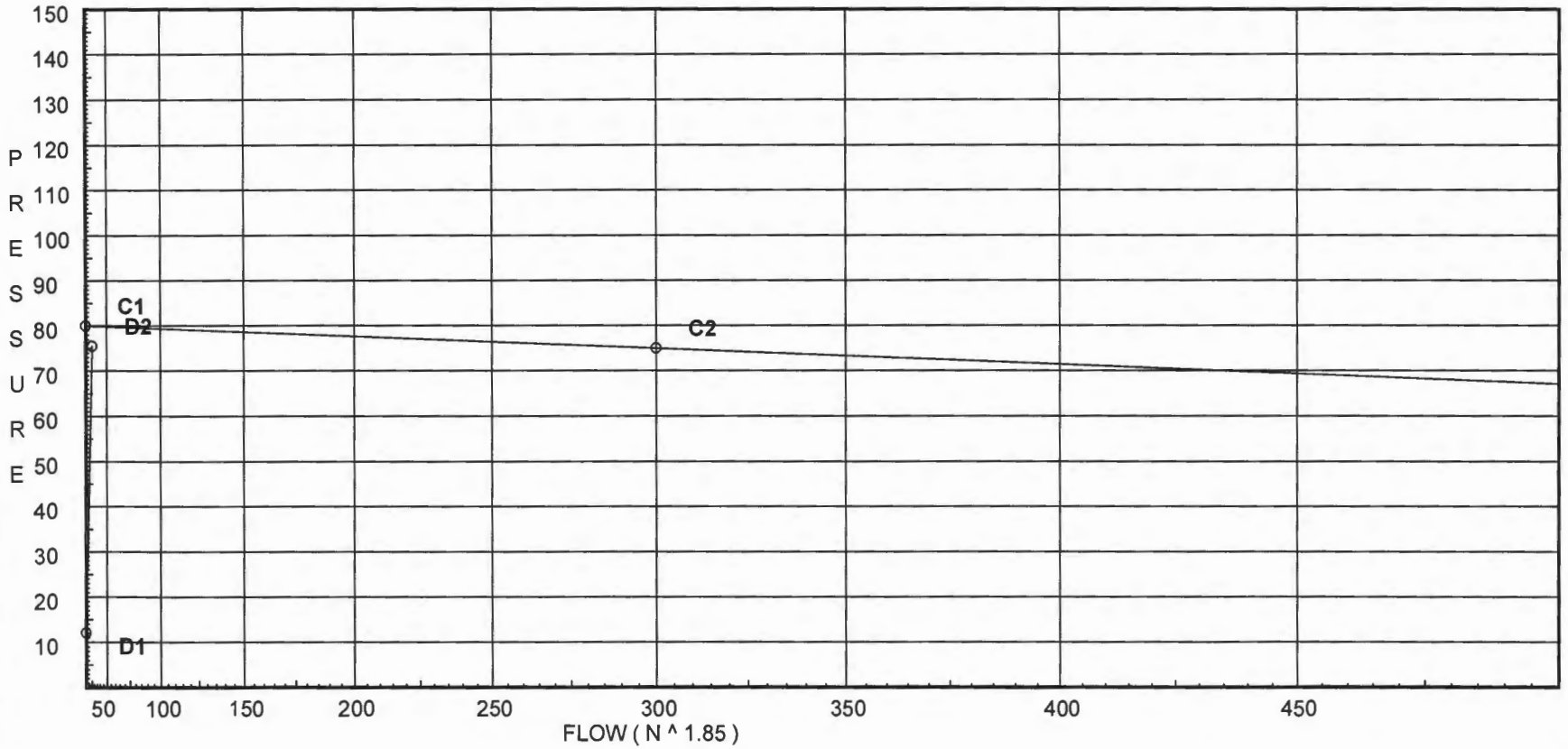
Uponor
25A SUMAC - Two Head Calculation (H.18 & H.12)

Date 3/5/2012

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

Demand:

D1 - Elevation	:	12.127
D2 - System Flow	:	26.411
D2 - System Pressure	:	75.534
Hose (Adj City)	:	_____
Hose (Demand)	:	_____
D3 - System Demand	:	26.411
Safety Margin	:	4.411



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
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
R	CPVC Coupling Tee - Run	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
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
U	UnAdjusted Fitting	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Utb	Aquapex Tee - Branch	2	6	6	9.08	12.88	13.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utr	Aquapex Tee - Run	1	2	2	1.64	2.39	2.39	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

SUPPLY ANALYSIS

Node at Source	*Static Pressure*	*Residual Pressure*	*Flow*	*Available Pressure*	*Total Demand*	*Required Pressure*
STR	80.0	75	300.0	79.944	26.41	75.534

NODE ANALYSIS

Node Tag	*Elevation*	*Node Type*	*Pressure at Node*	*Discharge at Node*	*Notes*
H.12	128.0	4.3	9.73	13.41	
H.18	128.0	4.3	9.14	13.0	
H.2	128.0		19.77		
H.3	128.0		19.37		
H.4	128.0		19.61		
H.9	118.0		27.51		
M.22	128.0		20.11		
H.1	128.0		19.4		
T.23	128.0		17.82		
H.7	128.0		18.66		
M.25	108.0		36.41		
H.5	108.0		34.8		
H.8	118.0		27.38		
H.6	108.0		34.65		
H.10	128.0		16.16		
H.13	108.0		34.5		
T.24	108.0		36.5		
M.27	118.0		27.84		
T.26	118.0		27.85		
H.17	118.0		26.48		
H.11	128.0		16.19		
T.30	128.0		14.54		
H.15	118.0		27.81		
H.14	118.0		27.98		
T.28	118.0		27.58		
H.20	108.0		34.96		
H.16	128.0		12.81		
T.29	128.0		14.5		
H.19	108.0		34.71		
T.33	118.0		28.0		
T.31	118.0		26.91		
T.32	118.0		26.26		
H.21	118.0		26.06		
T.34	118.0		21.24		
S.1	104.0		40.83		
MTR	100.0		53.34		
STR	100.0		75.53		

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - Two Head Calculation (H.18 & H.12)

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.12	4.90	0.475	1T	1.219	12.000	9.727		K Factor = 4.30
to		150.0	21U	21.0	22.369	0.0		
M.22	4.9	0.3021		0.0	34.369	10.384		Vel = 8.87
	0.0							
	4.90					20.111		K Factor = 1.09
H.18	4.34	0.475	1T	1.219	23.000	9.140		K Factor = 4.30
to		150.0	21U	21.0	22.369	0.0		
M.22	4.34	0.2418		0.0	45.369	10.971		Vel = 7.86
	0.0							
	4.34					20.111		K Factor = 0.97
H.2	-0.57	0.475	42U	42.0	22.000	19.771		
to		150.0		0.0	42.300	0.0		
H.1	-0.57	-0.0057		0.0	64.300	-0.367		Vel = 1.03
	0.0							
	-0.57					19.404		K Factor = -0.13
H.3	0.17	0.475	42U	42.0	10.000	19.374		
to		150.0		0.0	42.300	0.0		
H.1	0.17	0.0006		0.0	52.300	0.030		Vel = 0.31
	0.0							
	0.17					19.404		K Factor = 0.04
H.4	-0.48	0.475	42U	42.0	8.000	19.608		
to		150.0		0.0	42.300	0.0		
H.1	-0.48	-0.0041		0.0	50.300	-0.204		Vel = 0.87
	0.0							
	-0.48					19.404		K Factor = -0.11
H.9	-2.05	0.475	42U	42.0	17.000	27.509		
to		150.0		0.0	42.300	-4.331		
H.4	-2.05	-0.0602		0.0	59.300	-3.570		Vel = 3.71
H.4	1.56	0.475	42U	42.0	12.000	19.608		
to		150.0		0.0	42.300	0.0		
H.3	-0.49	-0.0043		0.0	54.300	-0.234		Vel = 0.89
	0.0							
	-0.49					19.374		K Factor = -0.11
M.22	-1.23	0.475	1T	1.219	9.000	20.111		
to		150.0	21U	21.0	22.369	0.0		
H.3	-1.23	-0.0235		0.0	31.369	-0.737		Vel = 2.23
	0.0							
	-1.23					19.374		K Factor = -0.28
H.1	-0.88	0.475	42U	42.0	16.000	19.404		
to		150.0		0.0	42.300	0.0		
H.7	-0.88	-0.0127		0.0	58.300	-0.740		Vel = 1.59
	0.0							
	-0.88					18.664		K Factor = -0.20
T.23	1.99	0.475	1R	1.0	11.000	17.821		
to		150.0	21U	21.0	23.150	0.0		
H.2	1.99	0.0571	1Utr	1.0	34.150	1.950		Vel = 3.60
	0.0							
	1.99					19.771		K Factor = 0.45

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - Two Head Calculation (H.18 & H.12)

Date 3/5/2012

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
M.22	-0.71	0.475	1T	1.219	18.000	20.111		
to		150.0	21U	21.0	22.369	0.0		
H.2	-0.71	-0.0084		0.0	40.369	-0.340		Vel = 1.29
H.2	2.57	0.475	42U	42.0	23.000	19.771		
to		150.0		0.0	42.300	4.331		
H.8	1.86	0.0502		0.0	65.300	3.279		Vel = 3.37
	0.0							
	1.86					27.381		K Factor = 0.36
H.3	-1.89	0.475	42U	42.0	19.000	19.374		
to		150.0		0.0	42.300	0.0		
H.11	-1.89	-0.0519		0.0	61.300	-3.182		Vel = 3.42
	0.0							
	-1.89					16.192		K Factor = -0.47
H.7	1.08	0.475	42U	42.0	9.000	18.664		
to		150.0		0.0	42.300	0.0		
H.4	1.08	0.0184		0.0	51.300	0.944		Vel = 1.96
	0.0							
	1.08					19.608		K Factor = 0.24
M.22	16.00	0.862	1Utb	6.0	17.000	20.111		
to		150.0		0.0	6.000	4.331		
T.26	16.0	0.1483		0.0	23.000	3.410		Vel = 8.80
	0.0							
	16.00					27.852		K Factor = 3.03
M.22	-1.84	0.475	1T	1.219	7.000	20.111		
to		150.0	21U	21.0	22.369	0.0		
H.7	-1.84	-0.0493		0.0	29.369	-1.447		Vel = 3.33
	0.0							
	-1.84					18.664		K Factor = -0.43
M.25	-1.79	0.475	1T	1.219	12.000	36.412		
to		150.0	21U	21.0	22.369	0.0		
H.5	-1.79	-0.0468		0.0	34.369	-1.610		Vel = 3.24
	0.0							
	-1.79					34.802		K Factor = -0.30
H.9	1.70	0.475	42U	42.0	24.000	27.509		
to		150.0		0.0	42.300	4.331		
H.6	1.7	0.0424		0.0	66.300	2.814		Vel = 3.08
	0.0							
	1.70					34.654		K Factor = 0.29
H.8	0.35	0.475	42U	42.0	14.000	27.381		
to		150.0		0.0	42.300	0.0		
H.9	0.35	0.0023		0.0	56.300	0.128		Vel = 0.63
	0.0							
	0.35					27.509		K Factor = 0.07
H.6	-0.34	0.475	42U	42.0	28.000	34.654		
to		150.0		0.0	42.300	0.0		
H.13	-0.34	-0.0022		0.0	70.300	-0.152		Vel = 0.62
	0.0							
	-0.34					34.502		K Factor = -0.06

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - Two Head Calculation (H.18 & H.12)

Date 3/5/2012

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.10	1.99	0.475	21U	21.0	7.000	16.157		
to		150.0	1R	1.0	22.150	0.0		
T.23	1.99	0.0571		0.0	29.150	1.664		Vel = 3.60
	0.0							
	1.99					17.821		K Factor = 0.47
M.22	-2.99	0.475	1T	1.219	10.000	20.111		
to		150.0	21U	21.0	22.369	0.0		
H.11	-2.99	-0.1211		0.0	32.369	-3.919		Vel = 5.41
	0.0							
	-2.99					16.192		K Factor = -0.74
M.25	-1.82	0.475	1T	1.219	14.000	36.412		
to		150.0	21U	21.0	22.369	0.0		
H.6	-1.82	-0.0483		0.0	36.369	-1.758		Vel = 3.30
	0.0							
	-1.82					34.654		K Factor = -0.31
H.13	0.54	0.475	42U	42.0	17.000	34.502		
to		150.0		0.0	42.300	0.0		
H.5	0.54	0.0051		0.0	59.300	0.300		Vel = 0.98
	0.0							
	0.54					34.802		K Factor = 0.09
H.7	-3.80	0.475	42U	42.0	5.000	18.664		
to		150.0		0.0	42.300	0.0		
H.12	-3.8	-0.1889		0.0	47.300	-8.937		Vel = 6.88
	0.0							
	-3.80					9.727		K Factor = -1.22
H.8	0.64	0.475	21U	21.0	5.000	27.381		
to		150.0	1R	1.0	23.150	0.0		
T.28	0.64	0.0070	1Utr	1.0	28.150	0.196		Vel = 1.16
	0.0							
	0.64					27.577		K Factor = 0.12
T.24	26.41	1.054	1T	2.44	16.000	36.503		
to		150.0		0.0	2.440	1.732		
S.1	26.41	0.1408		0.0	18.440	2.596		Vel = 9.71
	0.0							
	26.41					40.831		K Factor = 4.13
H.10	-2.79	0.475	42U	42.0	18.000	16.157		
to		150.0		0.0	42.300	0.0		
H.12	-2.79	-0.1066		0.0	60.300	-6.430		Vel = 5.05
	0.0							
	-2.79					9.727		K Factor = -0.89
M.25	6.80	0.862	1Utr	2.0	1.000	36.412		
to		150.0		0.0	2.000	0.0		
T.24	6.8	0.0303		0.0	3.000	0.091		Vel = 3.74
T.24	-26.41	0.862	1Utb	6.0	12.000	36.503		
to		150.0	1Utr	2.0	8.000	-4.331		
T.26	-19.61	-0.2160		0.0	20.000	-4.320		Vel = 10.78
	0.0							
	-19.61					27.852		K Factor = -3.72

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - Two Head Calculation (H.18 & H.12)

Date 3/5/2012

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
M.27	-0.87	0.475	1T	1.219	15.000	27.842		
to		150.0	21U	21.0	22.369	0.0		
H.8	-0.87	-0.0123		0.0	37.369	-0.461		Vel = 1.58
	0.0							
	-0.87					27.381		K Factor = -0.17
T.26	-3.61	0.862		0.0	1.000	27.852		
to		150.0		0.0	0.0	0.0		
M.27	-3.61	-0.0100		0.0	1.000	-0.010		Vel = 1.98
	0.0							
	-3.61					27.842		K Factor = -0.68
H.17	-2.76	0.475	42U	42.0	15.000	26.477		
to		150.0		0.0	42.300	-4.331		
H.10	-2.76	-0.1045		0.0	57.300	-5.989		Vel = 5.00
	0.0							
	-2.76					16.157		K Factor = -0.69
H.11	-2.04	0.475	21U	21.0	5.000	16.192		
to		150.0	1R	1.0	23.150	0.0		
T.29	-2.04	-0.0601	1Utr	1.0	28.150	-1.691		Vel = 3.69
	0.0							
	-2.04					14.501		K Factor = -0.54
T.30	1.96	0.475	1R	1.0	5.000	14.539		
to		150.0	21U	21.0	24.150	0.0		
H.10	1.96	0.0555	1Utb	2.0	29.150	1.618		Vel = 3.55
	0.0							
	1.96					16.157		K Factor = 0.49
H.15	1.62	0.475	42U	42.0	26.000	27.814		
to		150.0		0.0	42.300	4.331		
H.5	1.62	0.0389		0.0	68.300	2.657		Vel = 2.93
	0.0							
	1.62					34.802		K Factor = 0.27
H.14	-0.70	0.475	42U	42.0	14.000	27.975		
to		150.0		0.0	42.300	0.0		
H.9	-0.7	-0.0083		0.0	56.300	-0.466		Vel = 1.27
	0.0							
	-0.70					27.509		K Factor = -0.13
M.27	0.46	0.475	1T	1.219	13.000	27.842		
to		150.0	21U	21.0	22.369	0.0		
H.14	0.46	0.0038		0.0	35.369	0.133		Vel = 0.83
	0.0							
	0.46					27.975		K Factor = 0.09
T.28	0.64	0.475	1R	1.0	12.000	27.577		
to		150.0	21U	21.0	22.150	0.0		
H.15	0.64	0.0069		0.0	34.150	0.237		Vel = 1.16
	0.0							
	0.64					27.814		K Factor = 0.12
H.20	-0.36	0.475	42U	42.0	21.000	34.959		
to		150.0		0.0	42.300	0.0		
H.5	-0.36	-0.0025		0.0	63.300	-0.157		Vel = 0.65

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - Two Head Calculation (H.18 & H.12)

Date 3/5/2012

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
	0.0							
	-0.36					34.802		K Factor = -0.06
H.16	-1.93	0.475	42U	42.0	15.000	12.810		
to		150.0		0.0	42.300	0.0		
H.12	-1.93	-0.0538		0.0	57.300	-3.083		Vel = 3.49
	0.0							
	-1.93					9.727		K Factor = -0.62
H.14	1.56	0.475	42U	42.0	18.000	27.975		
to		150.0		0.0	42.300	4.331		
H.13	1.56	0.0364		0.0	60.300	2.196		Vel = 2.82
	0.0							
	1.56					34.502		K Factor = 0.27
H.6	0.22	0.475	42U	42.0	18.000	34.654		
to		150.0		0.0	42.300	0.0		
H.19	0.22	0.0009		0.0	60.300	0.056		Vel = 0.40
	0.0							
	0.22					34.710		K Factor = 0.04
T.29	-2.04	0.475	1R	1.0	4.000	14.501		
to		150.0	21U	21.0	24.150	0.0		
H.16	-2.04	-0.0601	1Utb	2.0	28.150	-1.691		Vel = 3.69
H.16	4.00	0.475	21U	21.0	9.000	12.810		
to		150.0	1R	1.0	22.150	0.0		
T.30	1.96	0.0555		0.0	31.150	1.729		Vel = 3.55
	0.0							
	1.96					14.539		K Factor = 0.51
H.11	-2.83	0.475	42U	42.0	22.000	16.192		
to		150.0		0.0	42.300	0.0		
H.18	-2.83	-0.1097		0.0	64.300	-7.052		Vel = 5.12
	0.0							
	-2.83					9.140		K Factor = -0.94
M.25	-1.55	0.475	1T	1.219	18.000	36.412		
to		150.0	21U	21.0	22.369	0.0		
H.20	-1.55	-0.0360		0.0	40.369	-1.453		Vel = 2.81
	0.0							
	-1.55					34.959		K Factor = -0.26
H.14	-0.40	0.475	42U	42.0	12.000	27.975		
to		150.0		0.0	42.300	0.0		
H.15	-0.4	-0.0030		0.0	54.300	-0.161		Vel = 0.72
	0.0							
	-0.40					27.814		K Factor = -0.08
M.27	-1.44	0.475	1T	1.219	21.000	27.842		
to		150.0	21U	21.0	22.369	0.0		
H.17	-1.44	-0.0315		0.0	43.369	-1.365		Vel = 2.61
	0.0							
	-1.44					26.477		K Factor = -0.28
M.25	-1.64	0.475	1T	1.219	20.000	36.412		
to		150.0	21U	21.0	22.369	0.0		
H.19	-1.64	-0.0402		0.0	42.369	-1.702		Vel = 2.97

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - Two Head Calculation (H.18 & H.12)

Date 3/5/2012

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
	0.0							
	-1.64					34.710		K Factor = -0.28
H.20	-0.69	0.475	42U	42.0	15.000	34.959		
to		150.0		0.0	42.300	0.0		
H.13	-0.69	-0.0080		0.0	57.300	-0.457		Vel = 1.25
	0.0							
	-0.69					34.502		K Factor = -0.12
H.15	-1.38	0.475	21U	21.0	8.000	27.814		
to		150.0	1R	1.0	23.150	0.0		
T.31	-1.38	-0.0291	1Utr	1.0	31.150	-0.905		Vel = 2.50
	0.0							
	-1.38					26.909		K Factor = -0.27
M.27	-1.75	0.475	1T	1.219	17.000	27.842		
to		150.0	21U	21.0	22.369	0.0		
H.21	-1.75	-0.0452		0.0	39.369	-1.781		Vel = 3.17
	0.0							
	-1.75					26.061		K Factor = -0.34
H.16	-2.08	0.475	42U	42.0	17.000	12.810		
to		150.0		0.0	42.300	0.0		
H.18	-2.08	-0.0619		0.0	59.300	-3.670		Vel = 3.77
	0.0							
	-2.08					9.140		K Factor = -0.69
H.19	0.50	0.475	42U	42.0	14.000	34.710		
to		150.0		0.0	42.300	0.0		
H.20	0.5	0.0044		0.0	56.300	0.249		Vel = 0.91
	0.0							
	0.50					34.959		K Factor = 0.08
T.33	-1.93	0.475	1R	1.0	5.000	27.996		
to		150.0	21U	21.0	23.150	0.0		
H.17	-1.93	-0.0540	1Utr	1.0	28.150	-1.519		Vel = 3.49
	0.0							
	-1.93					26.477		K Factor = -0.38
H.18	3.75	0.475	21U	21.0	19.000	9.140		
to		150.0	1R	1.0	23.150	4.331		
T.34	3.75	0.1843	1Utr	1.0	42.150	7.770		Vel = 6.79
	0.0							
	3.75					21.241		K Factor = 0.81
T.31	-1.38	0.475	1R	1.0	7.000	26.909		
to		150.0	21U	21.0	22.150	0.0		
H.21	-1.38	-0.0291		0.0	29.150	-0.848		Vel = 2.50
	0.0							
	-1.38					26.061		K Factor = -0.27
T.32	0.61	0.475	1R	1.0	10.000	26.263		
to		150.0	21U	21.0	23.150	0.0		
H.17	0.61	0.0065	1Utr	1.0	33.150	0.214		Vel = 1.10
	0.0							
	0.61					26.477		K Factor = 0.12

Final Calculations - Hazen-Williams

Uponor
25A SUMAC - Two Head Calculation (H.18 & H.12)

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.21	0.61	0.475	21U	21.0	9.000	26.061		
to		150.0	1R	1.0	22.150	0.0		
T.32	0.61	0.0065		0.0	31.150	0.202		Vel = 1.10
	0.0							
	0.61					26.263		K Factor = 0.12
T.34	3.75	0.475	1R	1.0	4.000	21.241		
to		150.0	21U	21.0	22.150	0.0		
H.21	3.75	0.1843		0.0	26.150	4.820		Vel = 6.79
	0.0							
	3.75					26.061		K Factor = 0.73
H.19	-1.93	0.475	21U	21.0	20.000	34.710		
to		150.0	1R	1.0	24.150	-4.331		
T.33	-1.93	-0.0540	1Utb	2.0	44.150	-2.383		Vel = 3.49
	0.0							
	-1.93					27.996		K Factor = -0.36
S.1	26.41	0.785	2E	4.773	5.000	40.831		
to		150.0		0.0	4.773	6.732		* Fixed loss = 5
MTR	26.41	0.5911		0.0	9.773	5.777		Vel = 17.51
MTR	0.0	0.911	1E	1.521	40.000	53.340		
to		150.0	1T	3.801	6.082	9.000		* Fixed loss = 9
STR	26.41	0.2863	1G	0.76	46.082	13.194		Vel = 13.00
	0.0							
	26.41					75.534		K Factor = 3.04