

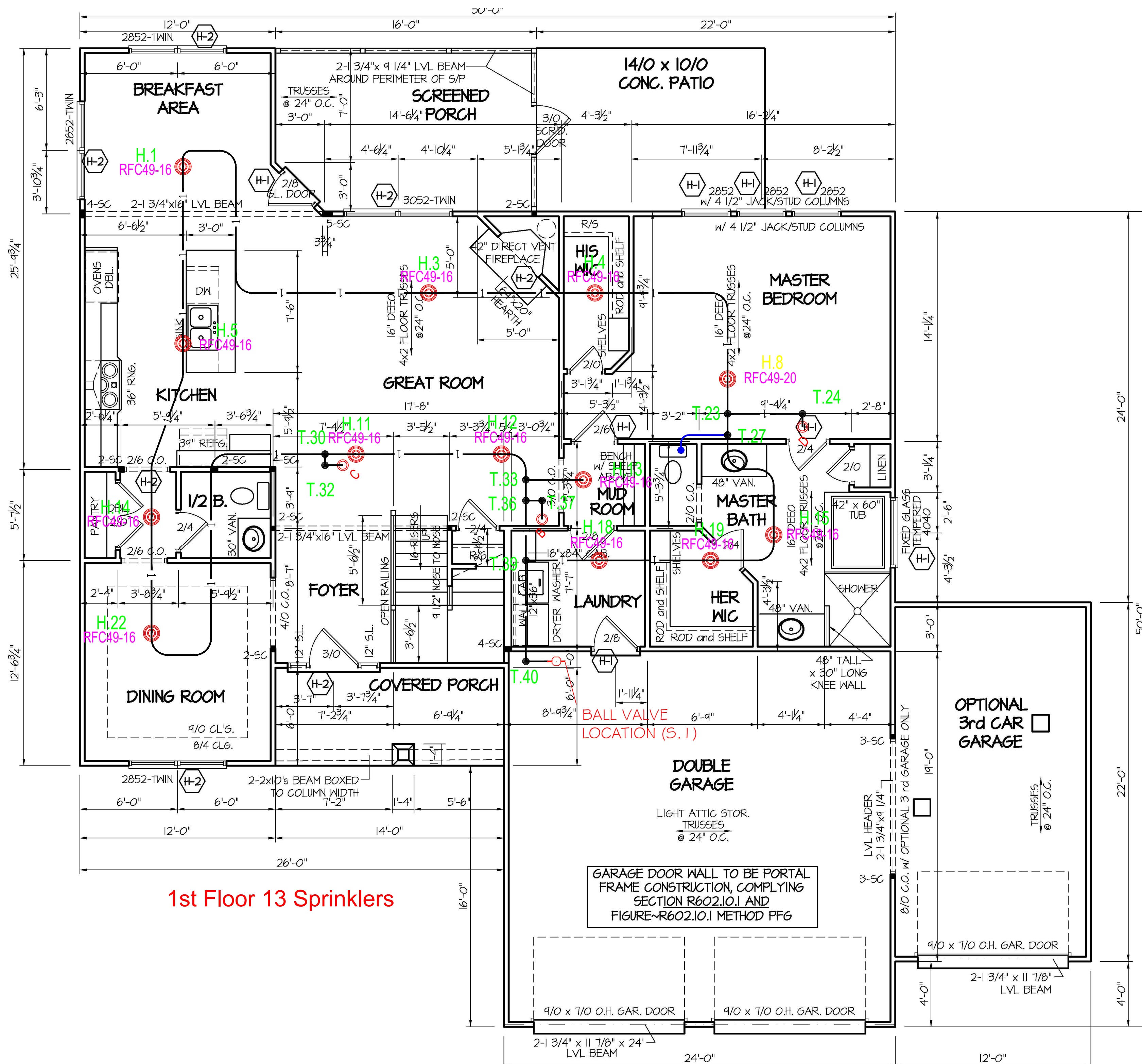
○ --- 21
RFC49-16

RELIABLE Model RFC49 Concealed Pendent Spr FP
K=4.9, 155F°, 7/16" Orifice, Maximum Spacing 16'x16'
Sprinkler head demand: 13 gpm @ 7.04

○ --- 1
RFC49-20

RELIABLE Model RFC49 Concealed Pendent Spr FP
K=4.9, 155F°, 7/16" Orifice, Maximum Spacing 20'x20'
Sprinkler head demand: 20 gpm @ 16.7

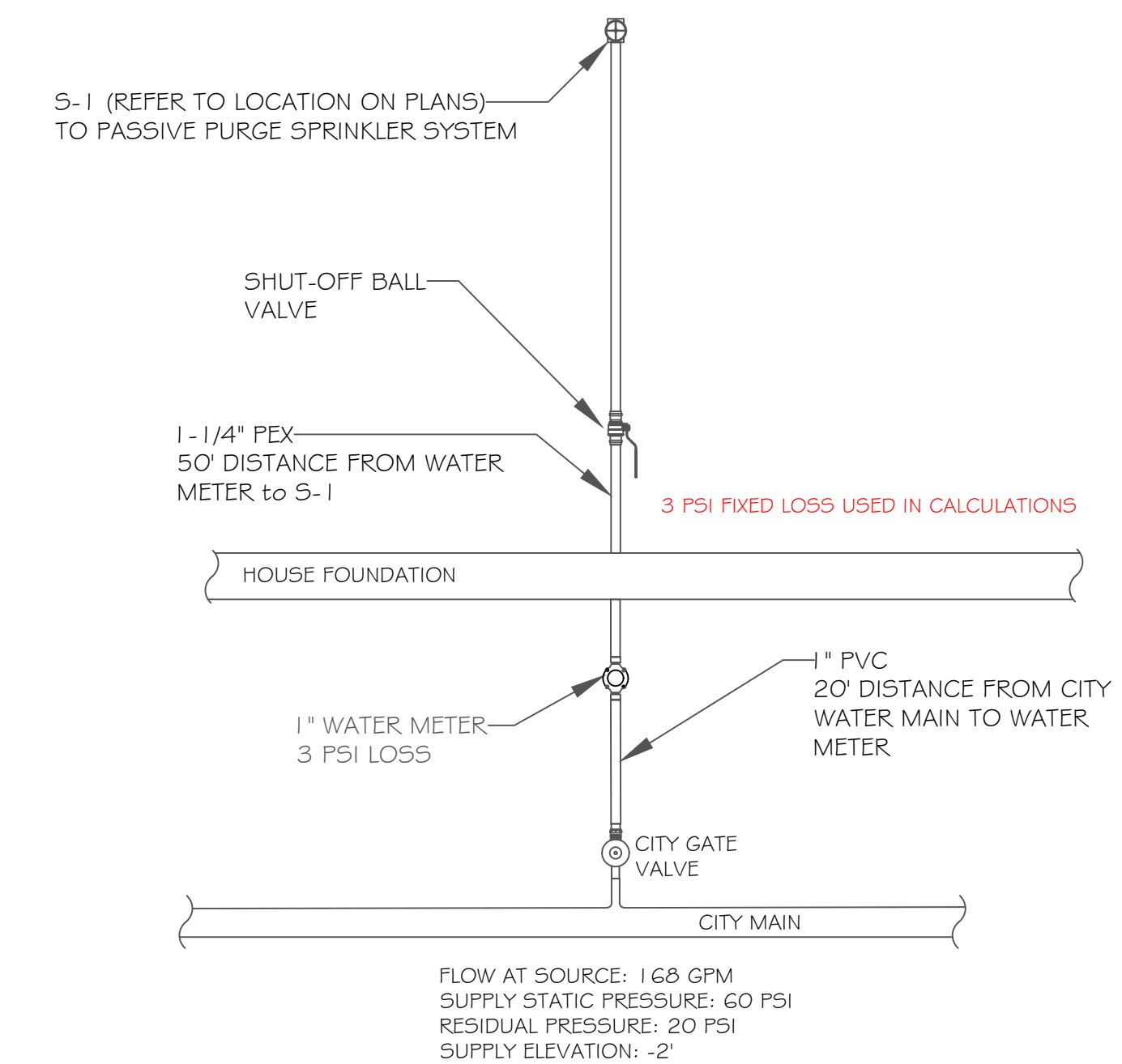
SPRINKLER DESCRIPTIONS



Most Demanding Single Head Information	
Information	Results
Flow Required at Head (GPM):	20
Source Pressure at Head (PSI):	16.7
Maximum Spacing (length):	20
Maximum Spacing (Width):	20
Domestic Flow Added (GPM):	0
Sprinkler Model:	RFC49
Elevation of Highest Head:	108
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	20
Pressure Required at Source (psi)	41.99
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.8

Most Demanding Two Head Information	
Information	Results
Flow Required at Head (GPM):	13
Source Pressure at Head (PSI):	7.04
Maximum Spacing (length):	16
Maximum Spacing (Width):	16
Domestic Flow Added (GPM):	0
Sprinkler Model:	RFC49
Elevation of Highest Head:	118
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	26.0535
Pressure Required at Source (psi)	50.85
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.21 & H.9

LEGEND	
-----	Manifold
○ A	Inter Level Connection
● irAB1+	Hot Water Fixture
● irAB1+	Cold Water Fixture
-----	Type K Copper w/ ProPress Fittings
-----	Type L Copper w/ ProPress Fittings
-----	Type M Copper w/ ProPress Fittings
-----	ViegaPEX Ultra Black
-----	ViegaPEX Ultra Blue - Cold Plumbing
-----	ViegaPEX Ultra Red - Hot Plumbing



WATER SERVICE DETAIL



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Design Services Department
1900 Southwood Drive - Nashua, NH 03063
Tel: 877-843-4262 x 351 Fax: 316-425-8466

Project:
338 OAKHAVEN DRIVE, LOT 11
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 1

Title:
FIRST FLOOR PLAN

Quotation no.: FPNM2102-015 NC

Drawn by: N.M.

Approved by:

Date Submitted: 2/25/2021

Scale: 1/4" = 1'

Revision No: Revision Date:

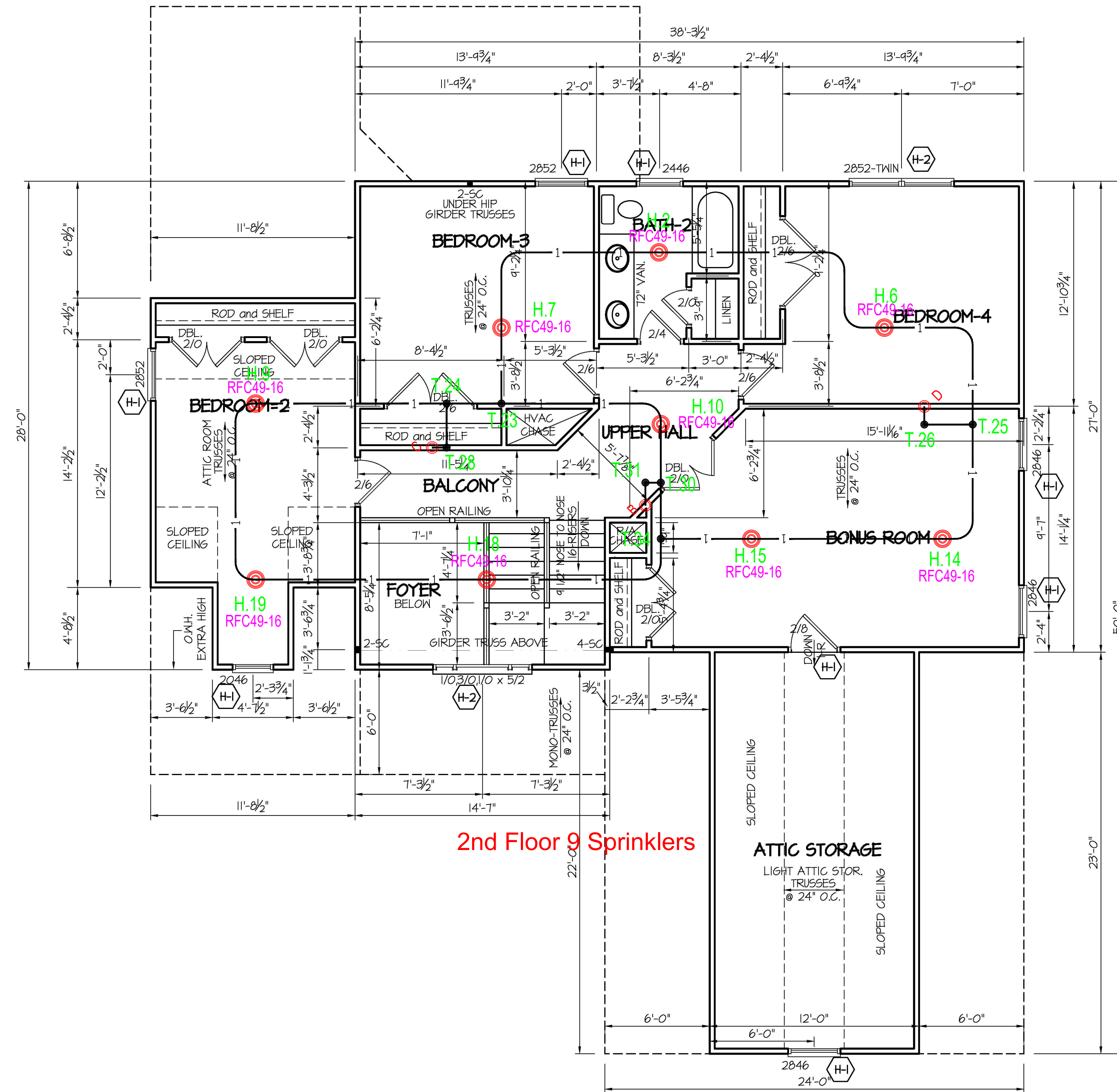
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 Tel: 877-843-4262 x 351 Fax: 316-425-8466



Project:

338 OAKHAVEN DRIVE, LOT 11
HOLLY SPRINGS, NC 27540

Dwg no.:

FP 2

Title:

SECOND FLOOR PLAN

Quotation no.: FPNM2102-015 NC

Drawn by: N.M.

Approved by:

Date Submitted: 2/25/2021

Scale: 1/4" = 1'

Revision No: Revision Date:

FIRE PROTECTION INSTALLATION NOTES:

- INSTALLATION OF THE FIRE PROTECTION SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE 2016 EDITION OF NFPA 13D OR SECTION P2904 OF THE 2018 INTERNATIONAL RESIDENTIAL CODE (IRC). NFPA 13D IS THE STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS IN ONE- AND TWO-FAMILY DWELLINGS AND MANUFACTURED HOMES.
- INSTALLATION OF THE FIRE PROTECTION SYSTEM SHALL COMPLY WITH ALL LOCAL RESIDENTIAL FIRE PROTECTION CODES AND ALL APPLICABLE STATE REGULATIONS.
- SPRINKLER HEADS SHALL MEET ALL GENERAL CARE AND INSTALLATION REQUIREMENTS OF THE SPRINKLER MANUFACTURER. SUBSTITUTION OF SPRINKLER HEADS IS NOT PERMITTED.
- AFTER INSTALLATION OF THE SPRINKLERS, THE ENTIRE SYSTEM SHALL BE PRESSURE TESTED IN ACCORDANCE WITH STATE AND LOCAL CODE REQUIREMENTS. SPRINKLERS SHALL BE LOCATED PER THE LAYOUT. DO NOT INSTALL SPRINKLERS IN AREAS EXPOSED TO TEMPERATURES THAT EXCEED THE MAXIMUM RECOMMENDED AMBIENT TEMPERATURE FOR THE TEMPERATURE RATING USED. MINIMUM DISTANCE OF SPRINKLER HEADS FROM HEAT SOURCES SHALL COMPLY WITH TABLE 7.5.6.3 IN THE 2016 EDITION OF NFPA 13D, INSTALLATION OF SPRINKLER SYSTEMS IN ONE - AND TWO - FAMILY DWELLINGS AND MANUFACTURED HOMES.
- NO DEVIATIONS FROM THE PLAN SHALL BE ALLOWED WITHOUT APPROVAL FROM THE AUTHORITY HAVING JURISDICTION AND DESIGNER.
- PIPING AND SPRINKLER FITTINGS SHALL BE SUPPORTED IN COMPLIANCE WITH LOCAL PLUMBING CODE AND THE 2016 EDITION OF NFPA 13D, INSTALLATION OF SPRINKLER SYSTEMS IN ONE - AND TWO - FAMILY DWELLINGS AND MANUFACTURED HOMES.
- SMOKE DETECTORS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 72, NATIONAL FIRE ALARM CODE. WHEN NOT EQUIPPED WITH SMOKE DETECTORS, LOCAL WATERFLOW ALARMS SHALL BE REQUIRED.
- WATER SOFTENERS AND WATER FILTRATION DEVICES SHALL NOT BE INSTALLED IN THE SYSTEM WITHOUT A REVIEW OF THE HYDRAULIC CALCULATIONS OF THE SYSTEM.
- A SIGN SHALL BE AFFIXED ADJACENT TO THE MAIN SHUTOFF VALVE THAT STATES IN MINIMUM 1/4" LETTERS, "WARNING: THE WATER SYSTEM FOR THIS HOME SUPPLIES FIRE SPRINKLERS THAT REQUIRE CERTAIN FLOWS AND PRESSURES TO FIGHT A FIRE. DEVICES THAT RESTRICT THE FLOW OR DECREASE THE PRESSURE OR AUTOMATICALLY SHUT OFF THE WATER TO THE FIRE SPRINKLER SYSTEM, SUCH AS WATER SOFTENERS, FILTRATION SYSTEMS, AND AUTOMATIC SHUT-OFF VALVES, SHALL NOT BE ADDED TO THIS SYSTEM WITHOUT A REVIEW OF THE FIRE SPRINKLER SYSTEM BY A FIRE PROTECTION SPECIALIST. DO NOT REMOVE THIS SIGN."
- ALL PIPING AND FITTINGS SHALL BE PROPERLY INSULATED AND PROTECTED SO THAT THEY ARE NOT EXPOSED TO TEMPERATURES BELOW 40° F.
- WHEN THE MAXIMUM STATIC PRESSURE EXCEEDS 80 PSI, A PRESSURE-REDUCING VALVE SHALL BE INSTALLED. NFPA 13D RESTRICTS THE OPERATING PRESSURE OF PEX SYSTEMS TO 80 PSI. PRESSURE DROP THROUGH THE PRESSURE-REDUCING DEVICE SHALL BE INCLUDED IN THE HYDRAULIC CALCULATIONS.
- WHEN A FIRE DEPARTMENT CONNECTION IS REQUIRED, PEX TUBING SHALL NOT BE PERMITTED. CONSULT WITH THE AUTHORITY HAVING JURISDICTION (AHJ) ABOUT THIS REQUIREMENT PRIOR TO INSTALLATION.

PLUMBING INSTALLATION NOTES:

- INSTALLATION OF HOT AND COLD WATER DISTRIBUTION SYSTEMS SHALL BE IN ACCORDANCE WITH THE LOCAL PLUMBING CODE.
- WATER SOFTENERS AND WATER FILTRATION DEVICES SHALL NOT BE INSTALLED WITHOUT A REVIEW OF THE HYDRAULIC CALCULATIONS OF THE SYSTEM.
- FINAL APPROVAL OF MULTIPURPOSE AND PASSIVE PURGE FIRE SPRINKLER INSTALLATIONS SHALL BE FROM THE AUTHORITY HAVING JURISDICTION.

TESTING:

- EVERY VIEGA NFPA 13D FIRE PROTECTION INSTALLATION SHALL BE PRESSURE TESTED IN ACCORDANCE WITH NFPA 13D, WHICH STATES THAT SYSTEMS WITHOUT FIRE DEPARTMENT CONNECTIONS SHALL BE TESTED FOR LEAKAGE AT THE NORMAL SYSTEM OPERATING WATER PRESSURE.
- THE AUTHORITY HAVING JURISDICTION (AHJ) MAY REQUIRE A FLOW VERIFICATION TEST OF THE MOST HYDRAULICALLY REMOTE SPRINKLER HEAD(S). THIS FLOW VERIFICATION TEST IS AVAILABLE TO ENSURE THE INSTALLED FIRE PROTECTION SYSTEM OPERATES AS DESIGNED. DOCUMENTATION ON HOW TO PERFORM A FLOW VERIFICATION TEST IS AVAILABLE THROUGH VIEGA TECHNICAL SERVICES.
- THE FLOW VERIFICATION TEST SHALL BE PERFORMED AFTER ALL PIPING, FITTINGS, SPRINKLER HEADS AND PLUMBING CONNECTIONS HAVE BEEN INSTALLED AND PRESSURE TESTING OF THE SYSTEM HAS BEEN COMPLETED. THE FLOW TEST SHOULD OCCUR WHILE IN THE "ROUGH" STAGE OF CONSTRUCTION. FLOW TEST RESULTS SHOULD BE COMPARED TO THE SYSTEM DESIGN VALUES. RESIDUAL PRESSURE (PSI) AND FLOW (GPM) MUST BE EQUAL TO OR GREATER THEN THE DESIGN VALUES TO ENSURE A PROPERLY FUNCTIONING SYSTEM.

DRAWING AND DESIGN NOTES:

- DESIGN SHALL ENSURE WATER SUPPLY TO THE MOST HYDRAULICALLY DEMANDING SINGLE AND DUAL SPRINKLER HEADS.
- TUBING AND FITTINGS SHALL BE U.L. LISTED FOR RESIDENTIAL FIRE PROTECTION SYSTEMS IN ACCORDANCE WITH NFPA 13D.
- VIEGAFEX ULTRA (BLACK IN COLOR) LISTED TO U.L. 1821 FOR RESIDENTIAL WET-PIPE FIRE PROTECTION SYSTEMS IN ACCORDANCE WITH NFPA 13D.
- VIEGA PEX PRESS FITTINGS (POLYMER AND BRONZE) LISTED TO U.L. 1821 FOR RESIDENTIAL WET-PIPE FIRE PROTECTION SYSTEMS IN ACCORDANCE WITH NFPA 13D.
- APPROVED SMOKE DETECTION SYSTEMS AND/OR WATER FLOW ALARMS SHALL BE INSTALLED WHERE REQUIRED BY THE AUTHORITY HAVING JURISDICTION (AHJ).

MATERIALS LIST NOTES:

- SERVICE ENTRANCE MATERIALS FROM WATER MAIN CONNECTION TO DISTRIBUTION MANIFOLD ARE EXCLUDED.
- SPRINKLERS AND ASSOCIATED ESCUTCHEONS OR COVER PLATES ARE NOT SUPPLIED BY VIEGA.
- MATERIAL LIST IS SUGGESTED ONLY. CONTRACTOR SHALL CONFIRM REQUIRED MATERIALS PRIOR TO PLACEMENT OF ORDER.

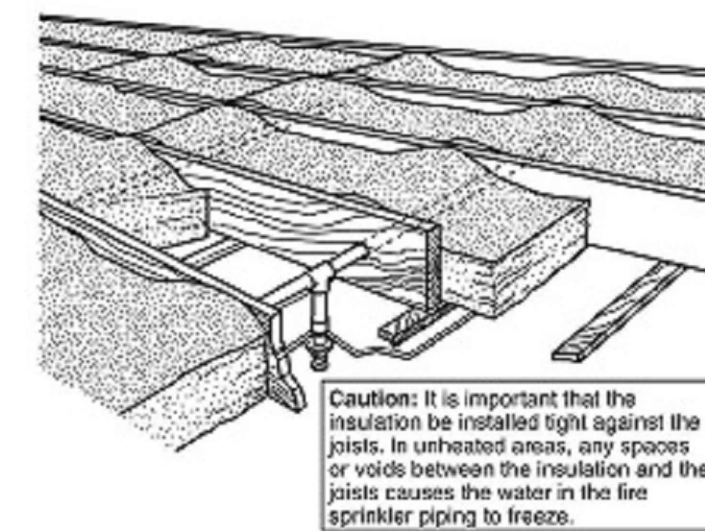


FIGURE A.9.1.1(a) Insulation Recommendations — Arrangement 1.

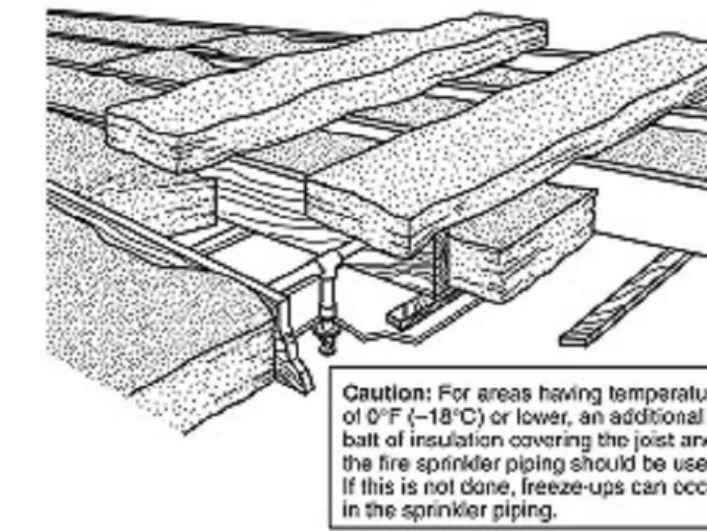


FIGURE A.9.1.1(b) Insulation Recommendations — Arrangement 2.

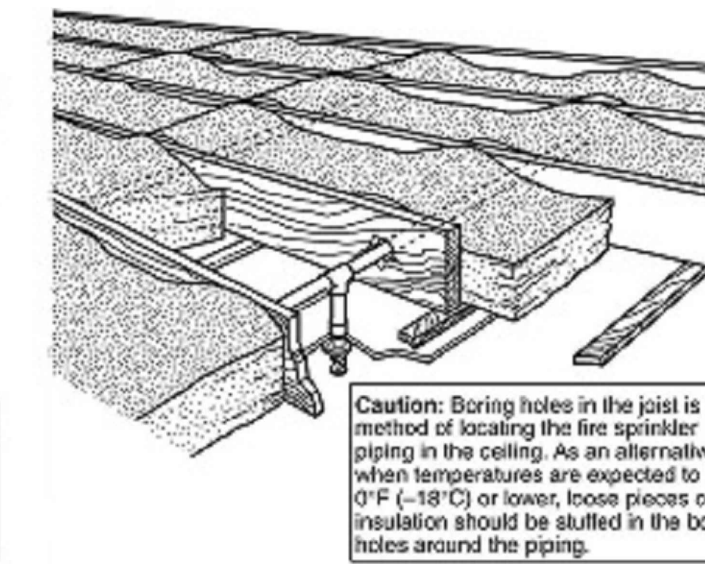


FIGURE A.9.1.1(c) Insulation Recommendations — Arrangement 3.

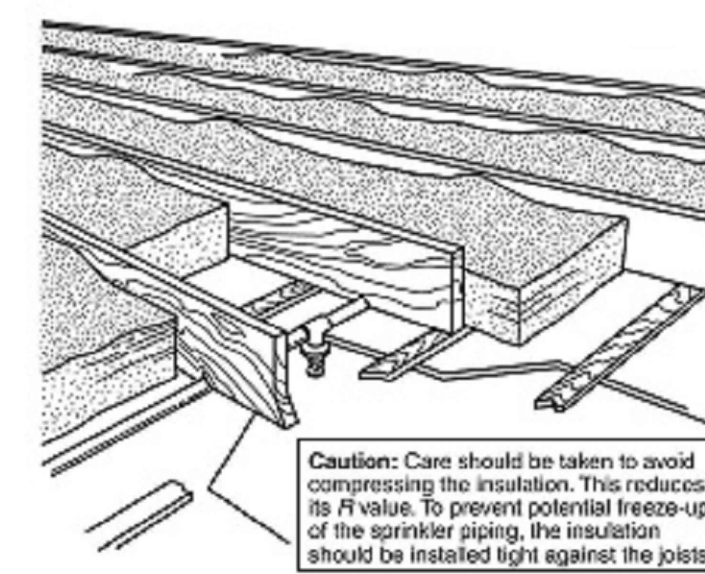


FIGURE A.9.1.1(d) Insulation Recommendations — Arrangement 4.

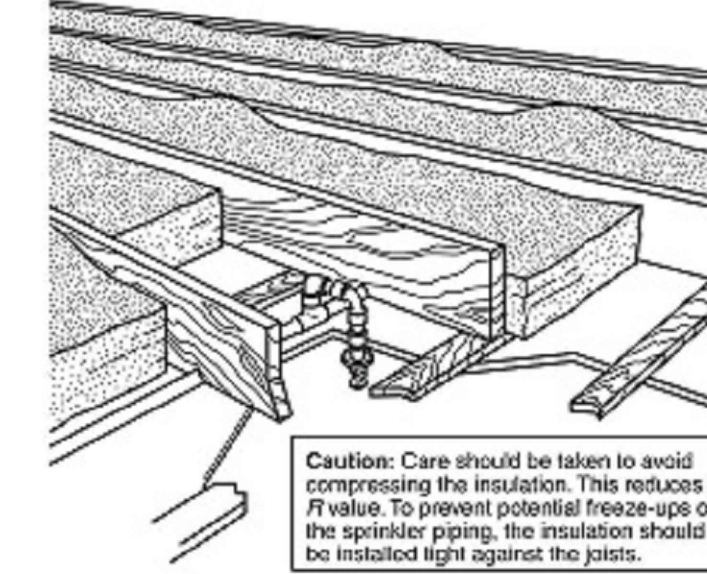


FIGURE A.9.1.1(e) Insulation Recommendations — Arrangement 5.

INSULATION DETAILS - ANNEX A.9.1.1 (NFPA 13D 2016)

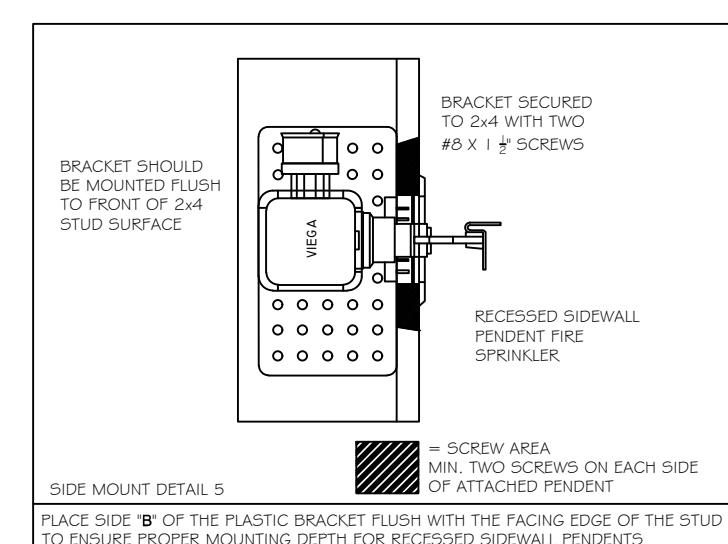
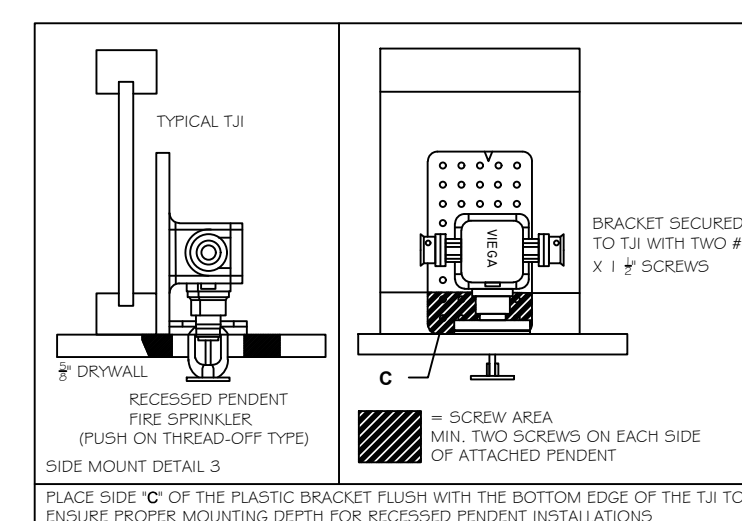
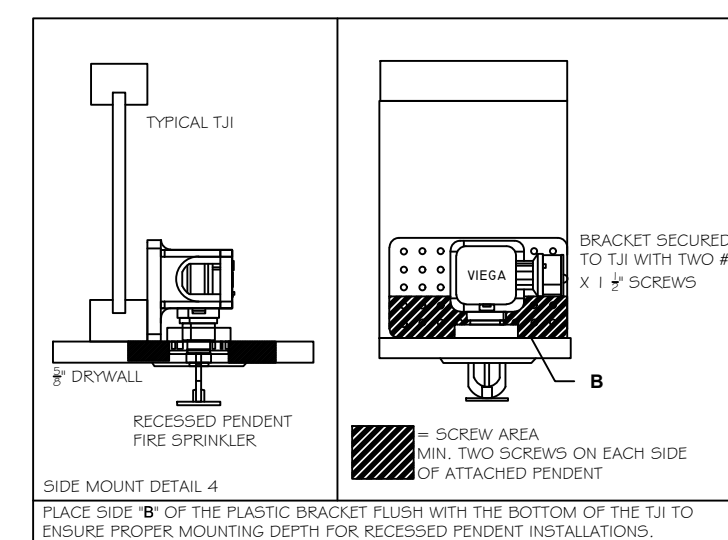
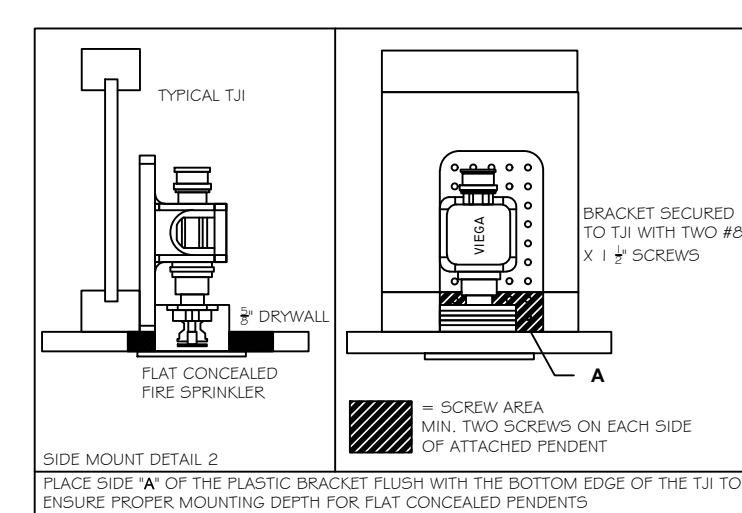
WATER METER PRESSURE LOSSES (PSI) - TABLE 10.4.4(A) NFPA 13D (2016)						
Meter Size (in.)	Flow (gpm)					
	18 or less	23	26	31	39	52
5/8"	9	14	18	26	38	*
3/4"	7	11	14	22	35	*
1"	2	3	3	4	6	10
1-1/2"	1	1	2	2	4	7
2"	1	1	1	1	2	3

TABLE 10.4.4(a) (NFPA 13D 2016)

DISTANCES FROM HEAT SOURCES - TABLE 7.5.6.3 NFPA 13D (2016)		
Heat Source	Ordinary Temp. 135°-170°	Intermediate Temp. 175°-220°
Side of Fireplace	36"	12"
Front of Fireplace	60"	36"
Coal or Wood Burning Stove	42"	12"
Kitchen Range	18"	9"
Wall Oven	18"	9"
Hot Air Flues	18"	9"
Uninsulated Heat Ducts	18"	9"
Uninsulated Hot Water Pipes	12"	6"
Side of Hot Air Diffusers	24"	12"
Front of Hot Air Diffusers	36"	18"
Hot Water Heater or Furnace	6"	3"
Light Fixture 0 W - 250 W	6"	3"
Light Fixture 250 W - 499 W	12"	6"

TABLE 7.5.6.3 (NFPA 13D 2016)

INSTALLATION NOTES



INSTALLATION DETAIL - SPRINKLER BRACKETS

Project:

338 OAKHAVEN DRIVE, LOT 11
HOLLY SPRINGS, NC 27540

Dwg no.:

FP 3

Title:

NOTES & DETAILS

Quotation no.: FPNM2102-015 NC

Drawn by:

N.M.

Approved by:

Date Submitted:

2/25/2021

Scale:

N/A

Revision No.:

Revision Date:

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Tel: 877-843-4262 x 351 Fax: 316-425-8466



viega



Viega LLC
Technical Services Department
1900 Southwood Drive
Nashua, NH 03063
603-882-7171

Job Name : 338 OAKHAVEN DRIVE, LOT 11 - One Head Calculation (H.8)
Building : SINGLE FAMILY RESIDENCE
Location : HOLLY SPRINGS NC 27540
System : NFPA 13D
Contract : FPNM2102-015 NC
Data File : FPNM2102-015 NC (338 Oakhaven Drive).wx1

HYDRAULIC DESIGN INFORMATION SHEET

Name - 338 OAKHAVEN DRIVE LOT 11 Date - 2/25/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPNM2102-015 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2102-015 NC
Construction: (X) Combustible () Non-Combustible Ceiling Height 9
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 - 20 Gpm System Type
Listed Pres. at Start Point - 16.7 Psi (X) Wet () Dry
D MAXIMUM LISTED SPACING 20 x 20 () Deluge () PreAction
E Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make RELIABLE Model RFC49
I Elevation at Highest Outlet - 108 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 155
N

Calculation Gpm Required 20 Psi Required 42.09 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 - x Rated Cap. Cap.
T Time of Test - x @ Psi Elev.
E Static (Psi) - 60 Elev.
R Residual (Psi) - 20 Other Well
Flow (Gpm) - 168 Proof Flow Gpm
S Elevation - 100

P Location: x
P
L Source of Information: x
Y

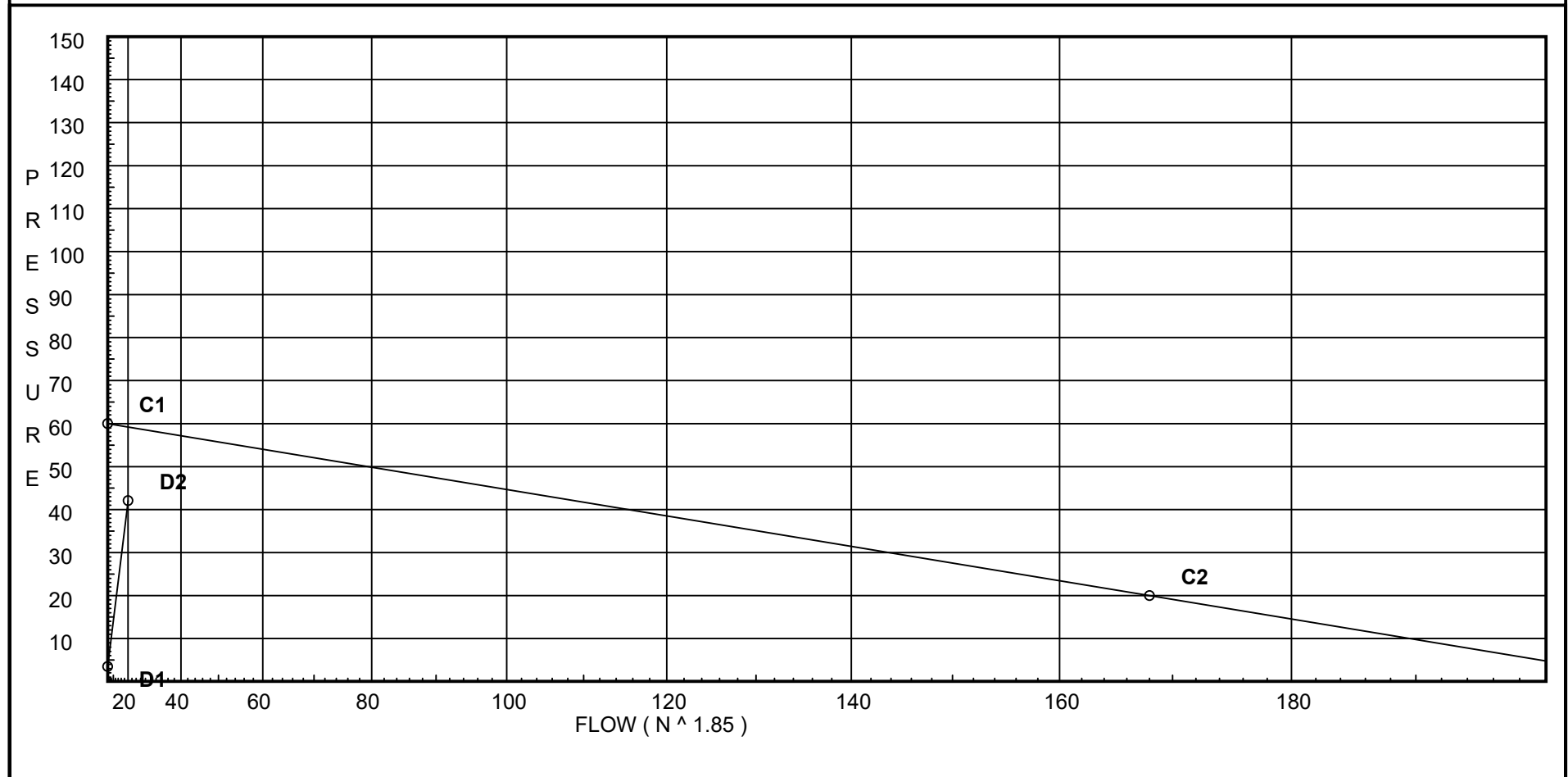
Water Supply Curve C

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - One Head Calculation (H.8)

Page 2
Date 2/25/2021

City Water Supply:
C1 - Static Pressure : 60
C2 - Residual Pressure: 20
C2 - Residual Flow : 168

Demand:
D1 - Elevation : 3.465
D2 - System Flow : 20.024
D2 - System Pressure : 42.086
Hose (Demand) :
D3 - System Demand : 20.024
Safety Margin : 17.132



Fittings Used Summary

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - One Head Calculation (H.8)

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Date 2/25/2021

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	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
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
Vpel *	PEX Press 90 Elbow - Poly	12.6	18.9	17.7	18.6	29.4	36.4	0	0	0											
Vprt *	PEX Press Tee - Run-Poly	3.9	3.6	3.8	6.4	7.9	10.2	0	0	0											
Vptb *	PEX Press Tee - Branch-Poly	14	19.1	18.4	18.7	28.3	37.5	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

Viega LLC
 338 OAKHAVEN DRIVE, LOT 11 - One Head Calculation (H.8)

Page 4
 Date 2/25/2021

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	60.0	20	168.0	59.218	20.02	42.086

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.8	108.0	4.9	16.7	20.02	
T.23	108.0		17.41		
T.24	108.0		17.82		
T.29	118.0		14.02		
T.28	118.0		14.71		
H.16	118.0		14.78		
H.17	118.0		14.88		
T.38	118.0		15.02		
T.34	118.0		15.06		
T.35	118.0		15.28		
T.37	108.0		20.14		
T.36	108.0		20.36		
T.39	108.0		20.9		
T.40	108.0		22.46		
S.1	104.0		30.14		
MTR	100.0		39.32		
STR	100.0		42.09		
H.4	108.0		17.09		
H.3	108.0		17.4		
H.1	108.0		18.0		
H.5	108.0		18.33		
H.14	108.0		18.7		
H.22	108.0		18.87		
T.30	108.0		19.45		
H.11	108.0		19.62		
H.12	108.0		20.02		
T.33	108.0		20.22		
T.27	108.0		17.67		
H.15	108.0		18.43		
H.19	108.0		18.97		
H.18	108.0		19.62		
H.6	118.0		14.77		
H.2	118.0		14.86		
H.7	118.0		14.93		
T.25	118.0		15.02		
H.10	118.0		15.05		
H.20	118.0		15.02		
H.21	118.0		15.03		
H.9	118.0		15.03		
T.26	118.0		15.03		
T.31	118.0		15.05		
T.32	108.0		19.43		

Flow Summary - NFPA 2007

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - One Head Calculation (H.8)

Page 5
Date 2/25/2021

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>
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Final Calculations - Hazen-Williams

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - One Head Calculation (H.8)

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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.8 to T.23	14.46	0.863 150.0	Vprt	3.8 0.0	2.000 3.800	16.700 0.0			K Factor = 4.90	
T.23 to T.24	14.46	0.1222		0.0	5.800	0.709			Vel = 7.93	
T.23 to T.24	-9.38	0.863 150.0	Vptb	18.4 0.0	5.000 18.400	17.409 0.0				
T.24 to T.29	5.08	0.0177		0.0	23.400	0.414			Vel = 2.79	
T.24 to T.29	0.0	0.863 150.0	Vpel	17.7 0.0	12.000 17.700	17.823 -4.331				
T.29 to T.28	5.08	0.0176		0.0	29.700	0.524			Vel = 2.79	
T.29 to T.28	0.0	0.863 150.0	Vpel Vptb	17.7 18.4	3.000 36.100	14.016 0.0				
T.28 to H.16	5.08	0.0177		0.0	39.100	0.691			Vel = 2.79	
T.28 to H.16	-2.25	0.863 150.0	Vprt	3.8 0.0	9.000 3.800	14.707 0.0				
H.16 to H.17	2.83	0.0059		0.0	12.800	0.076			Vel = 1.55	
H.16 to H.17	0.0	0.863 150.0	Vprt	3.8 0.0	12.000 3.800	14.783 0.0				
H.17 to T.38	2.83	0.0059		0.0	15.800	0.094			Vel = 1.55	
H.17 to T.38	0.0	0.863 150.0	Vptb	18.4 0.0	6.000 18.400	14.877 0.0				
T.38 to T.34	2.83	0.0060		0.0	24.400	0.146			Vel = 1.55	
T.38 to T.34	-0.27	0.863 150.0	Vprt	3.8 0.0	4.000 3.800	15.023 0.0				
T.34 to T.35	2.56	0.0050		0.0	7.800	0.039			Vel = 1.40	
T.34 to T.35	1.42	0.863 150.0	Vptb	18.4 0.0	1.000 18.400	15.062 0.0				
T.35 to T.37	3.98	0.0112		0.0	19.400	0.218			Vel = 2.18	
T.35 to T.37	0.0	0.863 150.0	2Vpel	35.4 0.0	12.000 35.400	15.280 4.331				
T.37 to T.36	3.98	0.0112		0.0	47.400	0.532			Vel = 2.18	
T.37 to T.36	0.0	0.863 150.0	Vptb	18.4 0.0	1.000 18.400	20.143 0.0				
T.36 to T.39	3.98	0.0112		0.0	19.400	0.218			Vel = 2.18	
T.36 to T.39	6.66	0.863 150.0	Vprt	3.8 0.0	4.000 3.800	20.361 0.0				
T.39 to T.40	10.64	0.0694		0.0	7.800	0.541			Vel = 5.84	
T.39 to T.40	9.38	0.863 150.0		0.0 0.0	7.000 0.0	20.902 0.0				
T.40 to S.1	20.02	0.2233		0.0	7.000	1.563			Vel = 10.98	
T.40 to S.1	0.0	0.863 150.0	Vpel T	17.7 2.92	6.000 20.620	22.465 1.732				
S.1 to MTR	20.02	0.2233		0.0	26.620	5.945			Vel = 10.98	
S.1 to MTR	0.0	1.053 150.0	2E	2.429 0.0	50.000 2.429	30.142 4.732			** Fixed Loss = 3	
MTR to STR	20.02	0.0847		0.0	52.429	4.442			Vel = 7.38	
MTR to STR	0.0	1.049 150.0	E T	3.022 7.555	20.000 12.089	39.316 0.0				
STR	20.02	0.0863	G	1.511	32.089	2.770			Vel = 7.43	

Final Calculations - Hazen-Williams

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - One Head Calculation (H.8)

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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	*****
	0.0 20.02					42.086			K Factor = 3.09	
H.8 to H.4	5.56	0.863 150.0	Vprt	3.8 0.0	15.000 3.800	16.700 0.0			Vel = 3.05	
H.4 to H.3	5.56	0.0209		0.0	18.800	0.392			Vel = 3.05	
H.4 to H.3	0.0	0.863 150.0	Vprt	3.8 0.0	11.000 3.800	17.092 0.0			Vel = 3.05	
H.3 to H.1	5.56	0.0209		0.0	14.800	0.309			Vel = 3.05	
H.3 to H.1	0.0	0.863 150.0	Vprt	3.8 0.0	25.000 3.800	17.401 0.0			Vel = 3.05	
H.1 to H.5	5.56	0.0209		0.0	28.800	0.601			Vel = 3.05	
H.1 to H.5	0.0	0.863 150.0	Vprt	3.8 0.0	12.000 3.800	18.002 0.0			Vel = 3.05	
H.5 to H.14	5.56	0.0209		0.0	15.800	0.330			Vel = 3.05	
H.5 to H.14	0.0	0.863 150.0	Vprt	3.8 0.0	14.000 3.800	18.332 0.0			Vel = 3.05	
H.14 to H.22	5.56	0.0209		0.0	17.800	0.372			Vel = 3.05	
H.14 to H.22	0.0	0.863 150.0		0.0 0.0	8.000 0.0	18.704 0.0			Vel = 3.05	
H.22 to T.30	5.56	0.0209		0.0	8.000	0.167			Vel = 3.05	
H.22 to T.30	0.0	0.863 150.0	Vprt	3.8 0.0	24.000 3.800	18.871 0.0			Vel = 3.05	
T.30 to H.11	5.56	0.0209		0.0	27.800	0.580			Vel = 3.05	
T.30 to H.11	1.10	0.863 150.0	Vprt	3.8 0.0	2.000 3.800	19.451 0.0			Vel = 3.65	
H.11 to H.12	6.66	0.0291		0.0	5.800	0.169			Vel = 3.65	
H.11 to H.12	0.0	0.863 150.0	Vprt	3.8 0.0	10.000 3.800	19.620 0.0			Vel = 3.65	
H.12 to T.33	6.66	0.0292		0.0	13.800	0.403			Vel = 3.65	
H.12 to T.33	0.0	0.863 150.0	Vprt	3.8 0.0	3.000 3.800	20.023 0.0			Vel = 3.65	
T.33 to T.36	6.66	0.0291		0.0	6.800	0.198			Vel = 3.65	
T.33 to T.36	0.0	0.863 150.0	Vprt	3.8 0.0	1.000 3.800	20.221 0.0			Vel = 3.65	
	0.0 6.66					20.361			K Factor = 1.48	
T.23 to T.27	9.38	0.863 150.0	Vprt	3.8 0.0	1.000 3.800	17.409 0.0			Vel = 5.14	
T.27 to H.15	9.38	0.0550		0.0	4.800	0.264			Vel = 5.14	
T.27 to H.15	0.0	0.863 150.0	Vprt	3.8 0.0	10.000 3.800	17.673 0.0			Vel = 5.14	
H.15 to H.19	9.38	0.0549		0.0	13.800	0.758			Vel = 5.14	
H.15 to H.19	0.0	0.863 150.0	Vprt	3.8 0.0	6.000 3.800	18.431 0.0			Vel = 5.14	
H.19 to H.18	9.38	0.0549		0.0	9.800	0.538			Vel = 5.14	
H.19 to H.18	0.0	0.863 150.0	Vprt	3.8 0.0	8.000 3.800	18.969 0.0			Vel = 5.14	

Final Calculations - Hazen-Williams

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - One Head Calculation (H.8)

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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	*****
H.18 to T.39	0.0 9.38	0.863 150.0 0.0549	Vptb	18.4 0.0 0.0	5.000 18.400 23.400	19.617 0.0 1.285				Vel = 5.14
	0.0 9.38					20.902				K Factor = 2.05
T.28 to H.6	2.25 2.25	0.863 150.0 0.0039	Vprt	3.8 0.0 0.0	12.000 3.800 15.800	14.707 0.0 0.062				Vel = 1.23
H.6 to H.2	0.0 2.25	0.863 150.0 0.0039	Vprt	3.8 0.0 0.0	19.000 3.800 22.800	14.769 0.0 0.089				Vel = 1.23
H.2 to H.7	0.0 2.25	0.863 150.0 0.0039	Vprt	3.8 0.0 0.0	15.000 3.800 18.800	14.858 0.0 0.074				Vel = 1.23
H.7 to T.25	0.0 2.25	0.863 150.0 0.0039	Vptb	18.4 0.0 0.0	5.000 18.400 23.400	14.932 0.0 0.092				Vel = 1.23
T.25 to H.10	-0.83 1.42	0.863 150.0 0.0017	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	15.024 0.0 0.025				Vel = 0.78
H.10 to T.34	0.0 1.42	0.863 150.0 0.0017	Vprt	3.8 0.0 0.0	4.000 3.800 7.800	15.049 0.0 0.013				Vel = 0.78
	0.0 1.42					15.062				K Factor = 0.37
T.38 to H.20	0.27 0.27	0.863 150.0 0.0001	Vprt	3.8 0.0 0.0	14.000 3.800 17.800	15.023 0.0 0.001				Vel = 0.15
H.20 to H.21	0.0 0.27	0.863 150.0 0.0001		0.0 0.0 0.0	15.000 0.0 15.000	15.024 0.0 0.002				Vel = 0.15
H.21 to H.9	0.0 0.27	0.863 150.0 0.0001	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	15.026 0.0 0.001				Vel = 0.15
H.9 to T.26	0.0 0.27	0.863 150.0 0.0001	Vprt	3.8 0.0 0.0	12.000 3.800 15.800	15.027 0.0 0.001				Vel = 0.15
T.26 to T.31	0.83 1.1	0.863 150.0 0.0010	Vptb	18.4 0.0 0.0	3.000 18.400 21.400	15.028 0.0 0.022				Vel = 0.60
T.31 to T.32	0.0 1.1	0.863 150.0 0.0011	2Vpel	35.4 0.0 0.0	12.000 35.400 47.400	15.050 4.331 0.050				Vel = 0.60
T.32 to T.30	0.0 1.1	0.863 150.0 0.0010	Vptb	18.4 0.0 0.0	1.000 18.400 19.400	19.431 0.0 0.020				Vel = 0.60
	0.0 1.10					19.451				K Factor = 0.25

Final Calculations - Hazen-Williams

Viega LLC
 338 OAKHAVEN DRIVE, LOT 11 - One Head Calculation (H.8)

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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.25	0.83	0.863	Vprt 3.8	3.000	15.024				
to		150.0	0.0	3.800	0.0				
T.26	0.83	0.0006	0.0	6.800	0.004		Vel = 0.46		
	0.0								
	0.83				15.028		K Factor = 0.21		



viega

Viega LLC
Technical Services Department
1900 Southwood Drive
Nashua, NH 03063
603-882-7171

Job Name : 338 OAKHAVEN DRIVE, LOT 11 - Two Head Calculation (H.21 & H.9)
Building : SINGLE FAMILY RESIDENCE
Location : HOLLY SPRINGS NC 27540
System : NFPA 13D
Contract : FPNM2102-015 NC
Data File : FPNM2102-015 NC (338 Oakhaven Drive).wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - 338 OAKHAVEN DRIVE LOT 11 Date - 2/25/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPNM2102-015 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2102-015 NC
Construction: (X) Combustible () Non-Combustible Ceiling Height 9
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 RFC49
I Elevation at Highest Outlet - 118 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 155
N

Calculation Gpm Required 26.0534 Psi Required 50.9 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 - x Rated Cap. Cap.
T Time of Test - x @ Psi Elev.
E Static (Psi) - 60 Elev.
R Residual (Psi) - 20 Other Well
Flow (Gpm) - 168 Proof Flow Gpm
S Elevation - 100

P Location: x
P
L Source of Information: x
Y

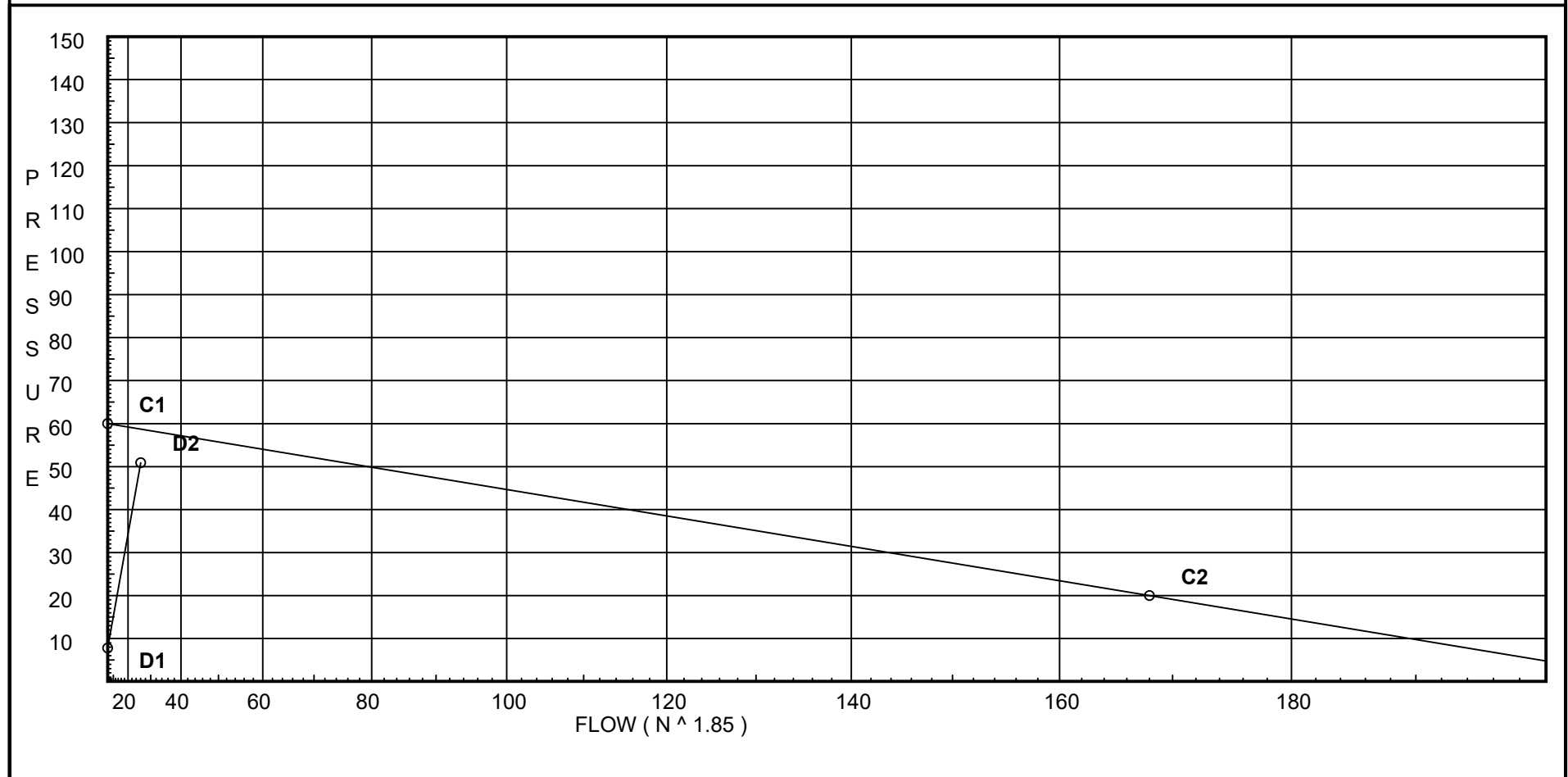
Water Supply Curve C

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - Two Head Calculation (H.21 & H.9)

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City Water Supply:
C1 - Static Pressure : 60
C2 - Residual Pressure: 20
C2 - Residual Flow : 168

Demand:
D1 - Elevation : 7.796
D2 - System Flow : 26.053
D2 - System Pressure : 50.898
Hose (Demand) :
D3 - System Demand : 26.053
Safety Margin : 7.830



Fittings Used Summary

Viega LLC
 338 OAKHAVEN DRIVE, LOT 11 - Two Head Calculation (H.21 & H.9)

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	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
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
Vpel *	PEX Press 90 Elbow - Poly	12.6	18.9	17.7	18.6	29.4	36.4	0	0	0											
Vprt *	PEX Press Tee - Run-Poly	3.9	3.6	3.8	6.4	7.9	10.2	0	0	0											
Vptb *	PEX Press Tee - Branch-Poly	14	19.1	18.4	18.7	28.3	37.5	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

Viega LLC
 338 OAKHAVEN DRIVE, LOT 11 - Two Head Calculation (H.21 & H.9)

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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	60.0	20	168.0	58.728	26.05	50.898

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.21	118.0	4.9	7.04	13.0	
H.20	118.0		8.11		
T.38	118.0		9.38		
H.17	118.0		9.69		
H.16	118.0		9.9		
T.28	118.0		10.06		
T.29	118.0		11.5		
T.24	108.0		16.93		
T.23	108.0		17.8		
T.27	108.0		18.0		
H.15	108.0		18.58		
H.19	108.0		18.99		
H.18	108.0		19.49		
T.39	108.0		20.48		
T.40	108.0		23.02		
S.1	104.0		34.43		
MTR	100.0		46.39		
STR	100.0		50.9		
H.9	118.0	4.9	7.1	13.05	
T.26	118.0		9.23		
T.31	118.0		10.24		
T.32	108.0		16.83		
T.30	108.0		17.75		
H.11	108.0		18.0		
H.12	108.0		18.58		
T.33	108.0		18.86		
T.36	108.0		19.06		
T.25	118.0		9.42		
H.7	118.0		9.6		
H.2	118.0		9.75		
H.6	118.0		9.94		
T.34	118.0		9.6		
T.35	118.0		10.75		
T.37	108.0		17.91		
H.10	118.0		9.54		
H.22	108.0		17.76		
H.14	108.0		17.76		
H.5	108.0		17.77		
H.1	108.0		17.77		
H.3	108.0		17.78		
H.4	108.0		17.79		
H.8	108.0		17.79		

Flow Summary - NFPA 2007

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - Two Head Calculation (H.21 & H.9)

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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>
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Final Calculations - Hazen-Williams

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - Two Head Calculation (H.21 & H.9)

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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	*****
H.21 to H.20	10.80 10.8	0.863 150.0 0.0713		0.0 0.0 0.0	15.000 0.0 15.000	7.040 0.0 1.070			K Factor = 4.90 Vel = 5.92	
H.20 to T.38	0.0 10.8	0.863 150.0 0.0713	Vprt	3.8 0.0 0.0	14.000 3.800 17.800	8.110 0.0 1.269			Vel = 5.92	
T.38 to H.17	-6.52 4.28	0.863 150.0 0.0128	Vptb	18.4 0.0 0.0	6.000 18.400 24.400	9.379 0.0 0.313			Vel = 2.35	
H.17 to H.16	0.0 4.28	0.863 150.0 0.0128	Vprt	3.8 0.0 0.0	12.000 3.800 15.800	9.692 0.0 0.203			Vel = 2.35	
H.16 to T.28	0.0 4.28	0.863 150.0 0.0129	Vprt	3.8 0.0 0.0	9.000 3.800 12.800	9.895 0.0 0.165			Vel = 2.35	
T.28 to T.29	3.29 7.57	0.863 150.0 0.0369	Vpel Vptb	17.7 18.4 0.0	3.000 36.100 39.100	10.060 0.0 1.444			Vel = 4.15	
T.29 to T.24	0.0 7.57	0.863 150.0 0.0369	Vpel	17.7 0.0 0.0	12.000 17.700 29.700	11.504 4.331 1.096			Vel = 4.15	
T.24 to T.23	0.0 7.57	0.863 150.0 0.0370	Vptb	18.4 0.0 0.0	5.000 18.400 23.400	16.931 0.0 0.865			Vel = 4.15	
T.23 to T.27	0.57 8.14	0.863 150.0 0.0421	Vprt	3.8 0.0 0.0	1.000 3.800 4.800	17.796 0.0 0.202			Vel = 4.46	
T.27 to H.15	0.0 8.14	0.863 150.0 0.0422	Vprt	3.8 0.0 0.0	10.000 3.800 13.800	17.998 0.0 0.583			Vel = 4.46	
H.15 to H.19	0.0 8.14	0.863 150.0 0.0421	Vprt	3.8 0.0 0.0	6.000 3.800 9.800	18.581 0.0 0.413			Vel = 4.46	
H.19 to H.18	0.0 8.14	0.863 150.0 0.0422	Vprt	3.8 0.0 0.0	8.000 3.800 11.800	18.994 0.0 0.498			Vel = 4.46	
H.18 to T.39	0.0 8.14	0.863 150.0 0.0422	Vptb	18.4 0.0 0.0	5.000 18.400 23.400	19.492 0.0 0.988			Vel = 4.46	
T.39 to T.40	17.91 26.05	0.863 150.0 0.3634		0.0 0.0 0.0	7.000 0.0 7.000	20.480 0.0 2.544			Vel = 14.29	
T.40 to S.1	0.0 26.05	0.863 150.0 0.3634	Vpel T	17.7 2.92 0.0	6.000 20.620 26.620	23.024 1.732 9.673			Vel = 14.29	
S.1 to MTR	0.0 26.05	1.053 150.0 0.1379	2E	2.429 0.0 0.0	50.000 2.429 52.429	34.429 4.732 7.230			** Fixed Loss = 3 Vel = 9.60	

Final Calculations - Hazen-Williams

Viega LLC
338 OAKHAVEN DRIVE, LOT 11 - Two Head Calculation (H.21 & H.9)

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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	*****
MTR to STR	0.0 26.05	1.049 150.0 0.1405	E T G	3.022 7.555 1.511	20.000 12.089 32.089	46.391 0.0 4.507				
	0.0 26.05					50.898				K Factor = 3.65
H.21 to H.9	2.20 2.2	0.863 150.0 0.0037	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	7.040 0.0 0.055				Vel = 1.21
H.9 to T.26	13.05 15.25	0.863 150.0 0.1349	Vprt	3.8 0.0 0.0	12.000 3.800 15.800	7.095 0.0 2.132				K Factor = 4.90 Vel = 8.36
T.26 to T.31	-6.57 8.68	0.863 150.0 0.0476	Vptb	18.4 0.0 0.0	3.000 18.400 21.400	9.227 0.0 1.018				Vel = 4.76
T.31 to T.32	0.0 8.68	0.863 150.0 0.0476	2Vpel	35.4 0.0 0.0	12.000 35.400 47.400	10.245 4.331 2.254				Vel = 4.76
T.32 to T.30	0.0 8.68	0.863 150.0 0.0476	Vptb	18.4 0.0 0.0	1.000 18.400 19.400	16.830 0.0 0.923				Vel = 4.76
T.30 to H.11	-0.57 8.11	0.863 150.0 0.0421	Vprt	3.8 0.0 0.0	2.000 3.800 5.800	17.753 0.0 0.244				Vel = 4.45
H.11 to H.12	0.0 8.11	0.863 150.0 0.0420	Vprt	3.8 0.0 0.0	10.000 3.800 13.800	17.997 0.0 0.579				Vel = 4.45
H.12 to T.33	0.0 8.11	0.863 150.0 0.0419	Vprt	3.8 0.0 0.0	3.000 3.800 6.800	18.576 0.0 0.285				Vel = 4.45
T.33 to T.36	0.0 8.11	0.863 150.0 0.0421	Vprt	3.8 0.0 0.0	1.000 3.800 4.800	18.861 0.0 0.202				Vel = 4.45
T.36 to T.39	9.81 17.92	0.863 150.0 0.1817	Vprt	3.8 0.0 0.0	4.000 3.800 7.800	19.063 0.0 1.417				Vel = 9.83
	0.0 17.92					20.480				K Factor = 3.96
T.26 to T.25	6.57 6.57	0.863 150.0 0.0284	Vprt	3.8 0.0 0.0	3.000 3.800 6.800	9.227 0.0 0.193				Vel = 3.60
T.25 to H.7	-3.28 3.29	0.863 150.0 0.0079	Vptb	18.4 0.0 0.0	5.000 18.400 23.400	9.420 0.0 0.185				Vel = 1.80
H.7 to H.2	0.0 3.29	0.863 150.0 0.0079	Vprt	3.8 0.0 0.0	15.000 3.800 18.800	9.605 0.0 0.149				Vel = 1.80
H.2 to H.6	0.0 3.29	0.863 150.0 0.0079	Vprt	3.8 0.0 0.0	19.000 3.800 22.800	9.754 0.0 0.181				Vel = 1.80

Final Calculations - Hazen-Williams

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338 OAKHAVEN DRIVE, LOT 11 - Two Head Calculation (H.21 & H.9)

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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	*****
H.6 to T.28	0.0 3.29	0.863 150.0 0.0079	Vprt	3.8 0.0 0.0	12.000 3.800 15.800	9.935 0.0 0.125				Vel = 1.80
	0.0 3.29					10.060				K Factor = 1.04
T.38 to T.34	6.52 6.52	0.863 150.0 0.0279	Vprt	3.8 0.0 0.0	4.000 3.800 7.800	9.379 0.0 0.218				Vel = 3.58
T.34 to T.35	3.28 9.8	0.863 150.0 0.0596	Vptb	18.4 0.0 0.0	1.000 18.400 19.400	9.597 0.0 1.156				Vel = 5.38
T.35 to T.37	0.0 9.8	0.863 150.0 0.0596	2Vpel	35.4 0.0 0.0	12.000 35.400 47.400	10.753 4.331 2.823				Vel = 5.38
T.37 to T.36	0.0 9.8	0.863 150.0 0.0596	Vptb	18.4 0.0 0.0	1.000 18.400 19.400	17.907 0.0 1.156				Vel = 5.38
	0.0 9.80					19.063				K Factor = 2.24
T.25 to H.10	3.28 3.28	0.863 150.0 0.0078	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	9.420 0.0 0.116				Vel = 1.80
H.10 to T.34	0.0 3.28	0.863 150.0 0.0078	Vprt	3.8 0.0 0.0	4.000 3.800 7.800	9.536 0.0 0.061				Vel = 1.80
	0.0 3.28					9.597				K Factor = 1.06
T.30 to H.22	0.57 0.57	0.863 150.0 0.0003	Vprt	3.8 0.0 0.0	24.000 3.800 27.800	17.753 0.0 0.009				Vel = 0.31
H.22 to H.14	0.0 0.57	0.863 150.0 0.0002		0.0 0.0 0.0	8.000 0.0 8.000	17.762 0.0 0.002				Vel = 0.31
H.14 to H.5	0.0 0.57	0.863 150.0 0.0003	Vprt	3.8 0.0 0.0	14.000 3.800 17.800	17.764 0.0 0.006				Vel = 0.31
H.5 to H.1	0.0 0.57	0.863 150.0 0.0003	Vprt	3.8 0.0 0.0	12.000 3.800 15.800	17.770 0.0 0.005				Vel = 0.31
H.1 to H.3	0.0 0.57	0.863 150.0 0.0003	Vprt	3.8 0.0 0.0	25.000 3.800 28.800	17.775 0.0 0.008				Vel = 0.31
H.3 to H.4	0.0 0.57	0.863 150.0 0.0003	Vprt	3.8 0.0 0.0	11.000 3.800 14.800	17.783 0.0 0.005				Vel = 0.31
H.4 to H.8	0.0 0.57	0.863 150.0 0.0003	Vprt	3.8 0.0 0.0	15.000 3.800 18.800	17.788 0.0 0.006				Vel = 0.31

Final Calculations - Hazen-Williams

Viega LLC
 338 OAKHAVEN DRIVE, LOT 11 - Two Head Calculation (H.21 & H.9)

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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.8 to T.23	0.0 0.57	0.863 150.0 0.0003	Vprt 3.8 0.0 0.0	2.000 3.800 5.800	17.794 0.0 0.002		Vel = 0.31		
	0.0 0.57				17.796		K Factor = 0.14		