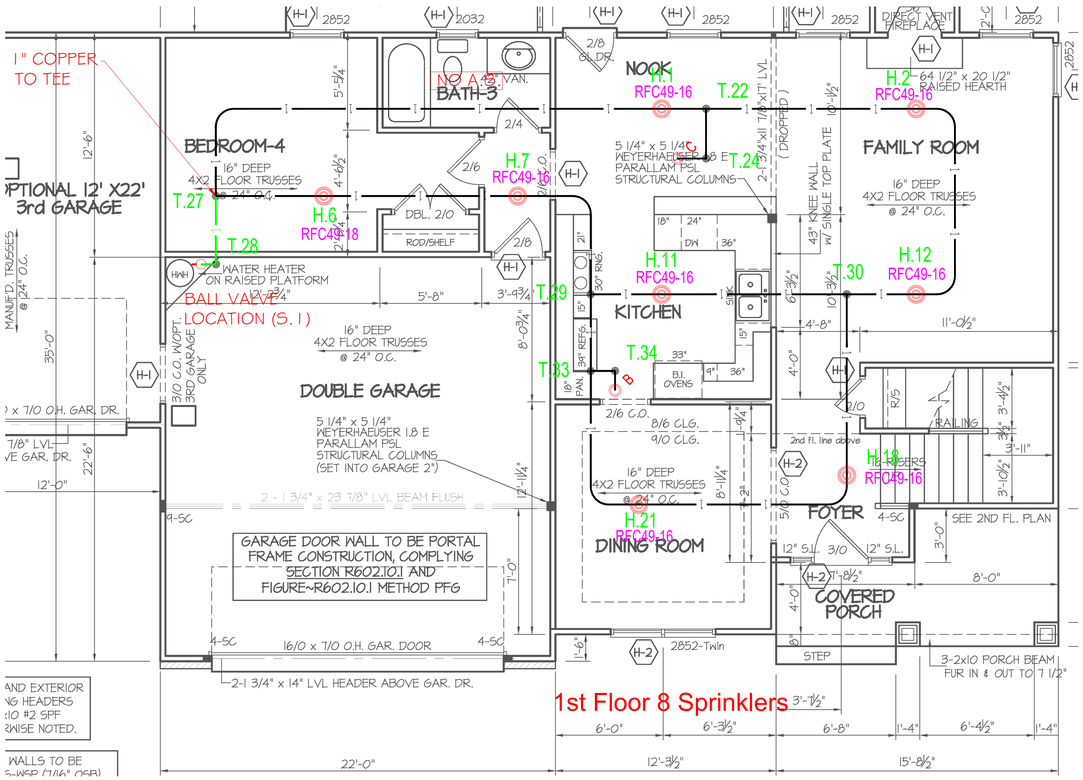
RFC49-16 - - - 18
RELIABLE Model RFC49Concealed Pendent Spr FP
K=4.9, 155F°, 7/16" Orifice, Maximum Spacing 16'x16'
Sprinkler head demand: 13 gpm @ 7.04

RFC49-18 - - - 2
RELIABLE Model RFC49Concealed Pendent Spr FP
K=4.9, 155F°, 7/16" Orifice, Maximum Spacing 18'x18'
Sprinkler head demand: 17 gpm @ 12.03

RFC49-20 - - - 1
RELIABLE Model RFC49Concealed Pendent Spr FP
K=4.9, 155F°, 7/16" Orifice, Maximum Spacing 20'x20'
Sprinkler head demand: 20 gpm @ 16.7

SPRINKLER DESCRIPTIONS

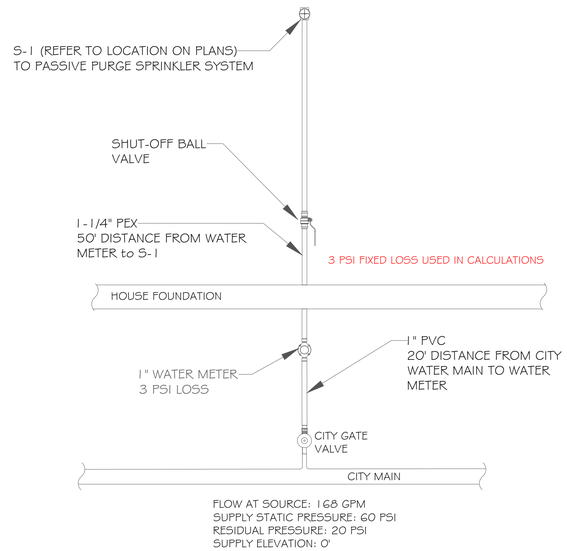


Most Demanding Single Head Information	
Information	Results
Flow Required at Head (GPM):	20
Source Pressure at Head (PSI):	16.7
Maximum Spacing (length):	20
Maximum Spacing (Width):	20
Domestic Flow Added (GPM):	0
Sprinkler Model:	RFC49
Elevation of Highest Head:	120
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	20
Pressure Required at Source (psi)	47.66
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:	120
K-Factor	4.9
Temperature Rating:	155
Flow Required at Source (GPM)	26.0331
Pressure Required at Source (psi)	51.5
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.10 & H.4

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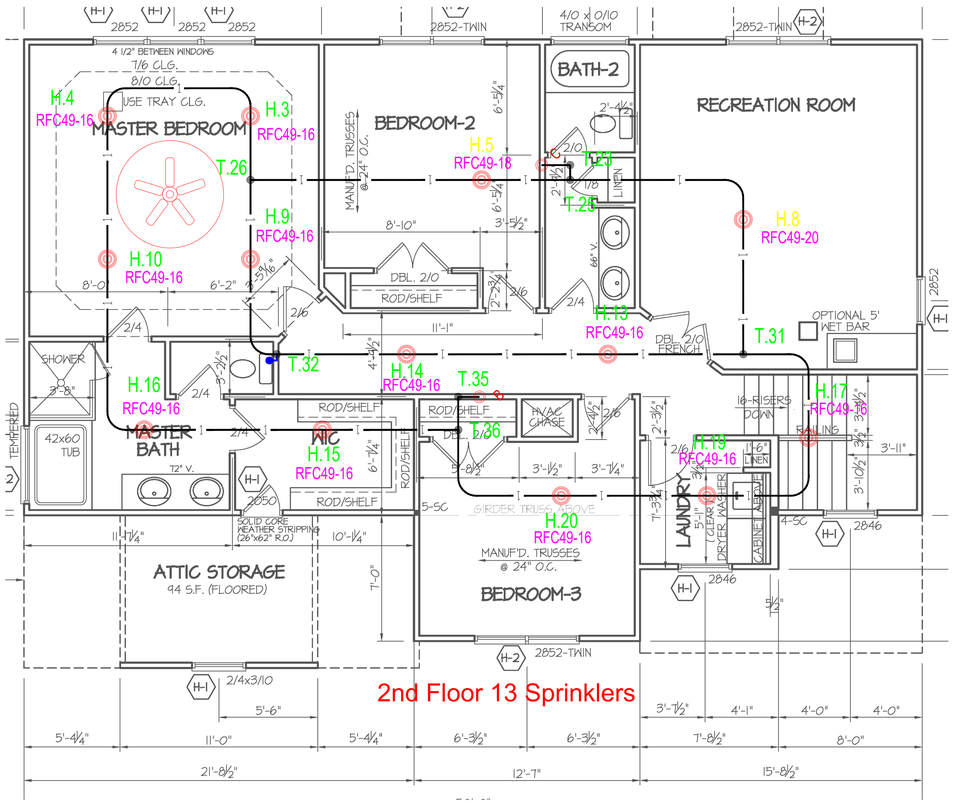
Design Services Department
1900 Southwood Drive - Nashua, NH 03063
Tel: 877-843-4262 x 351 Fax: 316-425-8466

Project:
LOT#10
332 OAKHAVEN DRIVE
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 1 OF 3

Title:
1ST FLOOR PLAN

Quotation no.:	FPMS2102-001 NC
Drawn by:	M.S.
Approv. by:	
Date Submitted:	02/26/2021
Scale:	1/4" = 1'
Revision No:	Revision Date:



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FIRE PROTECTION INSTALLATION NOTES:

1. 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.
2. INSTALLATION OF THE FIRE PROTECTION SYSTEM SHALL COMPLY WITH ALL LOCAL RESIDENTIAL FIRE PROTECTION CODES AND ALL APPLICABLE STATE REGULATIONS.
3. SPRINKLER HEADS SHALL MEET ALL GENERAL CARE AND INSTALLATION REQUIREMENTS OF THE SPRINKLER MANUFACTURER. SUBSTITUTION OF SPRINKLER HEADS IS NOT PERMITTED.
4. AFTER INSTALLATION OF THE SPRINKLERS, THE ENTIRE SYSTEM SHALL BE PRESSURE TESTED IN ACCORDANCE WITH STATE AND LOCAL CODE REQUIREMENTS.
5. 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.
6. NO DEVIATIONS FROM THE PLAN SHALL BE ALLOWED WITHOUT APPROVAL FROM THE AUTHORITY HAVING JURISDICTION AND DESIGNER.
7. 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.
8. 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.
9. WATER SOFTENERS AND WATER FILTRATION DEVICES SHALL NOT BE INSTALLED IN THE SYSTEM WITHOUT A REVIEW OF THE HYDRAULIC CALCULATIONS OF THE SYSTEM.
10. 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."
11. ALL PIPING AND FITTINGS SHALL BE PROPERLY INSULATED AND PROTECTED SO THAT THEY ARE NOT EXPOSED TO TEMPERATURES BELOW 40° F.
12. 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.
13. 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:

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

TESTING:

1. 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.
2. 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.
3. 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.

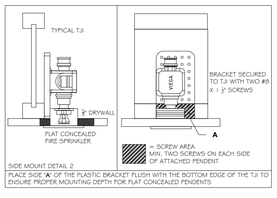
DRAWING AND DESIGN NOTES:

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

MATERIALS LIST NOTES:

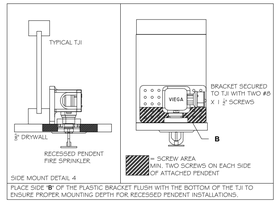
1. SERVICE ENTRANCE MATERIALS FROM WATER MAIN CONNECTION TO DISTRIBUTION MANIFOLD ARE EXCLUDED.
2. SPRINKLERS AND ASSOCIATED ESCUTCHEONS OR COVER PLATES ARE NOT SUPPLIED BY VIEGA.
3. MATERIAL LIST IS SUGGESTED ONLY. CONTRACTOR SHALL CONFIRM REQUIRED MATERIALS PRIOR TO PLACEMENT OF ORDER.

INSTALLATION NOTES



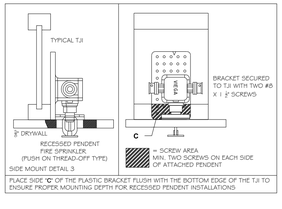
SIDE MOUNT DETAIL 2

PLACE SIDE 'A' OF THE PLASTIC BRACKET FLUSH WITH THE BOTTOM EDGE OF THE TJI TO ENSURE PROPER MOUNTING DEPTH FOR FLAT CONCEALED PENDENTS



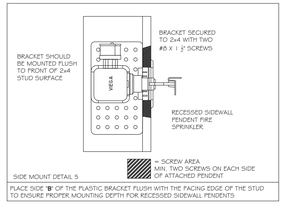
SIDE MOUNT DETAIL 4

PLACE SIDE 'B' OF THE PLASTIC BRACKET FLUSH WITH THE BOTTOM OF THE TJI TO ENSURE PROPER MOUNTING DEPTH FOR RECESSED PENDENT INSTALLATIONS.



SIDE MOUNT DETAIL 3

PLACE SIDE 'C' OF THE PLASTIC BRACKET FLUSH WITH THE BOTTOM EDGE OF THE TJI TO ENSURE PROPER MOUNTING DEPTH FOR RECESSED PENDENT INSTALLATIONS



SIDE MOUNT DETAIL 5

PLACE SIDE 'B' OF THE PLASTIC BRACKET FLUSH WITH THE FACING EDGE OF THE STUD TO ENSURE PROPER MOUNTING DEPTH FOR RECESSED SIDEWALL PENDENTS

INSTALLATION DETAIL - SPRINKLER BRACKETS

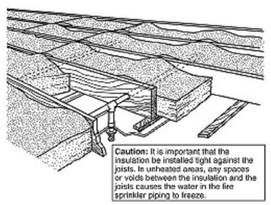


FIGURE A.9.1.1(a) Insulation Recommendations — Arrangement 1.

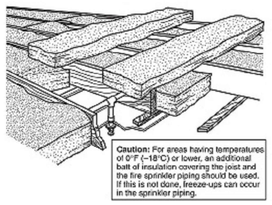


FIGURE A.9.1.1(b) Insulation Recommendations — Arrangement 2.

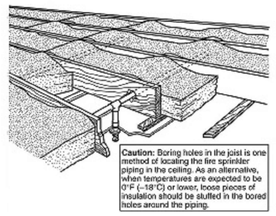


FIGURE A.9.1.1(c) Insulation Recommendations — Arrangement 3.

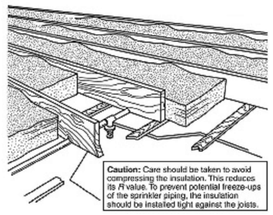


FIGURE A.9.1.1(d) Insulation Recommendations — Arrangement 4.

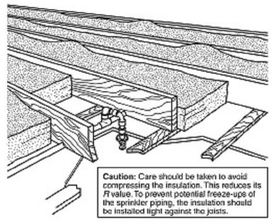


FIGURE A.9.1.1(e) Insulation Recommendations — Arrangement 5.

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°-225°
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)

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Dwg no.:
FP 3 OF 3

Title:
NOTES & DETAILS

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Drawn by:	M.S.
Approv. by:	
Date Submitted:	02/26/2021
Scale:	N/A
Revision No:	Revision Date:

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

Job Name : LOT#10 - One Head Calculation (H.8)
Building : SINGLE FAMILY RESIDENCE
Location : 332 OAKHAVEN DRIVE HOLLY SPRINGS NC 27540
System : NFPA 13D
Contract : FPMS2102-001 NC
Data File : 332 Oakhaven Drive Lot 10.wx1

HYDRAULIC DESIGN INFORMATION SHEET

Name - LOT#10 Date - 02/26/2021
Location - HOLLY SPRINGS NC 27540
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPMS2102-001 NC
Calculated By - VIEGA LLC Drawing No. - FPMS2102-001 NC
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 10 FT
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 - 120 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 155
N

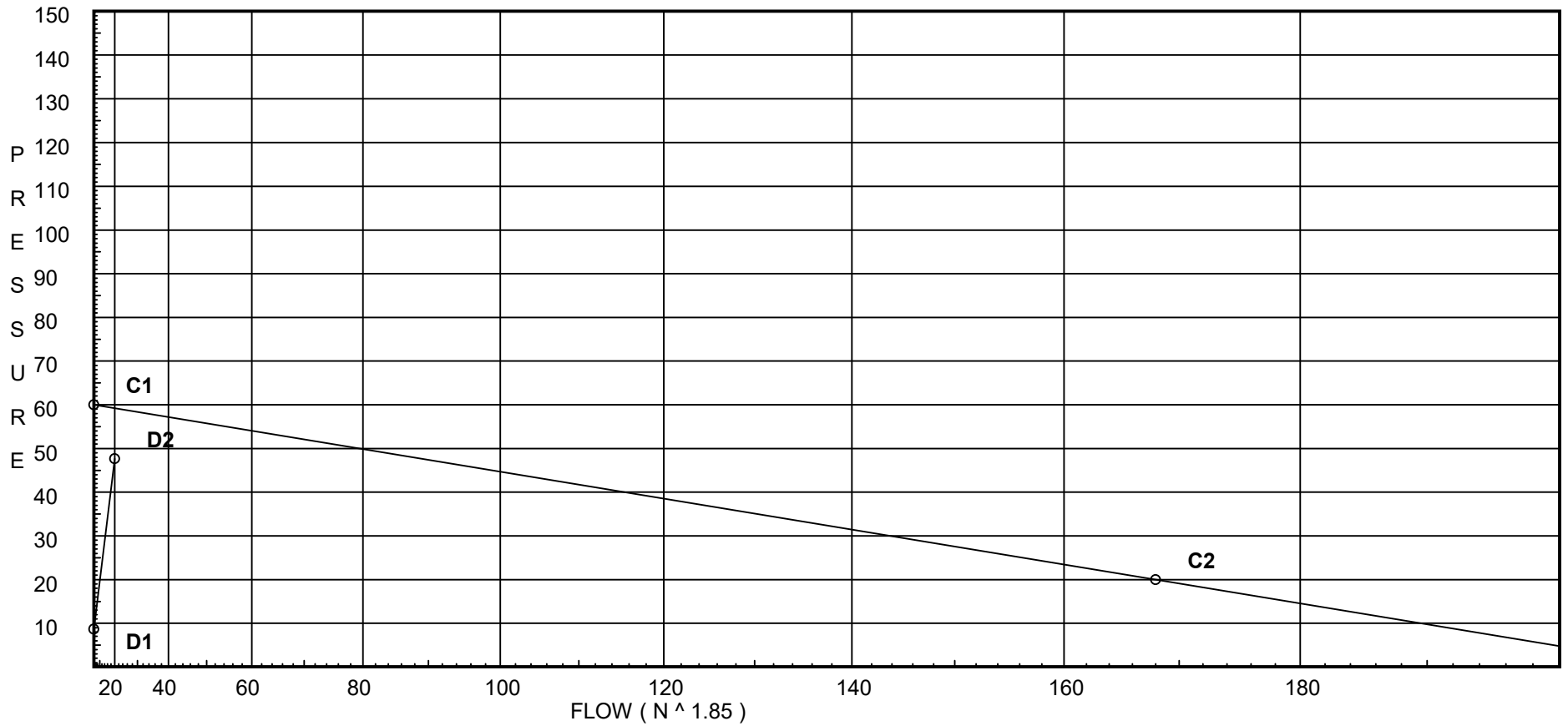
Calculation Gpm Required 20 Psi Required 47.66 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

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

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

Demand:
- D1 - Elevation : 8.662
- D2 - System Flow : 20.024
- D2 - System Pressure : 47.660
- Hose (Demand) : _____
- D3 - System Demand : 20.024
- Safety Margin : 11.558



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
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

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
STR	60.0	20	168.0	59.218	20.02	47.66

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.8	120.0	4.9	16.7	20.02	
T.25	120.0		18.06		
T.23	120.0		20.41		
T.24	109.0		27.24		
T.22	109.0		28.59		
H.1	109.0		29.07		
T.27	109.0		31.67		
T.28	109.0		32.06		
S.1	104.0		35.72		
MTR	100.0		44.89		
STR	100.0		47.66		
T.31	120.0		17.9		
H.17	120.0		18.21		
H.19	120.0		18.55		
H.20	120.0		18.76		
T.36	120.0		19.1		
T.35	120.0		20.53		
T.34	109.0		27.15		
T.33	109.0		28.33		
T.29	109.0		28.66		
H.7	109.0		29.46		
H.6	109.0		30.31		
H.13	120.0		17.95		
H.14	120.0		18.02		
T.32	120.0		18.05		
H.9	120.0		18.1		
T.26	120.0		18.14		
H.3	120.0		18.22		
H.4	120.0		18.36		
H.10	120.0		18.49		
H.16	120.0		18.67		
H.15	120.0		18.78		
H.5	120.0		18.08		
H.21	109.0		28.39		
H.18	109.0		28.44		
T.30	109.0		28.58		
H.11	109.0		28.61		
H.12	109.0		28.58		
H.2	109.0		28.59		

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	11.57	0.863	Vprt	3.8	13.000	16.700		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
T.25	11.57	0.0810		0.0	16.800	1.360		Vel = 6.35
T.25	-1.45	0.863	Vptb	18.4	1.000	18.060		
to		150.0	Vpel	17.7	36.100	0.0		
T.23	10.12	0.0632		0.0	37.100	2.346		Vel = 5.55
T.23	0.0	0.863	Vpel	17.7	15.000	20.406		
to		150.0		0.0	17.700	4.764		
T.24	10.12	0.0633		0.0	32.700	2.069		Vel = 5.55
T.24	0.0	0.863	Vptb	18.4	3.000	27.239		
to		150.0		0.0	18.400	0.0		
T.22	10.12	0.0632		0.0	21.400	1.353		Vel = 5.55
T.22	0.63	0.863	Vprt	3.8	3.000	28.592		
to		150.0		0.0	3.800	0.0		
H.1	10.75	0.0706		0.0	6.800	0.480		Vel = 5.90
H.1	0.0	0.863	Vprt	3.8	33.000	29.072		
to		150.0		0.0	3.800	0.0		
T.27	10.75	0.0706		0.0	36.800	2.599		Vel = 5.90
T.27	9.27	1.025		0.0	4.000	31.671		
to		150.0		0.0	0.0	0.0		
T.28	20.02	0.0968		0.0	4.000	0.387		Vel = 7.78
T.28	0.0	1.025	E	2.7	6.000	32.058		
to		150.0	T	6.75	9.450	2.166		
S.1	20.02	0.0966		0.0	15.450	1.492		Vel = 7.78
S.1	0.0	1.053	2E	2.429	50.000	35.716		
to		150.0		0.0	2.429	4.732		* * Fixed Loss = 3
MTR	20.02	0.0847		0.0	52.429	4.442		Vel = 7.38
MTR	0.0	1.049	E	3.022	20.000	44.890		
to		150.0	T	7.555	12.089	0.0		
STR	20.02	0.0863	G	1.511	32.089	2.770		Vel = 7.43
	0.0							
	20.02					47.660		K Factor = 2.90
H.8	8.45	0.863	Vptb	18.4	8.000	16.700		
to		150.0		0.0	18.400	0.0		
T.31	8.45	0.0453		0.0	26.400	1.195		Vel = 4.63
T.31	-2.40	0.863	Vprt	3.8	9.000	17.895		
to		150.0		0.0	3.800	0.0		
H.17	6.05	0.0245		0.0	12.800	0.313		Vel = 3.32
H.17	0.0	0.863	Vprt	3.8	10.000	18.208		
to		150.0		0.0	3.800	0.0		
H.19	6.05	0.0244		0.0	13.800	0.337		Vel = 3.32
H.19	0.0	0.863		0.0	9.000	18.545		
to		150.0		0.0	0.0	0.0		
H.20	6.05	0.0244		0.0	9.000	0.220		Vel = 3.32
H.20	0.0	0.863	Vprt	3.8	10.000	18.765		
to		150.0		0.0	3.800	0.0		
T.36	6.05	0.0244		0.0	13.800	0.337		Vel = 3.32
T.36	3.85	0.863	Vprt	3.8	2.000	19.102		
to		150.0	Vpel	17.7	21.500	0.0		
T.35	9.9	0.0606		0.0	23.500	1.425		Vel = 5.43

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.35	0.0	0.863	Vpel	17.7	13.000	20.527		
to		150.0		0.0	17.700	4.764		
T.34	9.9	0.0607		0.0	30.700	1.862		Vel = 5.43
T.34	0.0	0.863	Vptb	18.4	1.000	27.153		
to		150.0		0.0	18.400	0.0		
T.33	9.9	0.0607		0.0	19.400	1.177		Vel = 5.43
T.33	-2.26	0.863	Vprt	3.8	5.000	28.330		
to		150.0		0.0	3.800	0.0		
T.29	7.64	0.0375		0.0	8.800	0.330		Vel = 4.19
T.29	1.64	0.863	Vprt	3.8	11.000	28.660		
to		150.0		0.0	3.800	0.0		
H.7	9.28	0.0538		0.0	14.800	0.796		Vel = 5.09
H.7	0.0	0.863	Vprt	3.8	12.000	29.456		
to		150.0		0.0	3.800	0.0		
H.6	9.28	0.0538		0.0	15.800	0.850		Vel = 5.09
H.6	0.0	0.863	Vptb	18.4	7.000	30.306		
to		150.0		0.0	18.400	0.0		
T.27	9.28	0.0537		0.0	25.400	1.365		Vel = 5.09
	0.0							
	9.28					31.671		K Factor = 1.65
T.31	2.40	0.863	Vprt	3.8	8.000	17.895		
to		150.0		0.0	3.800	0.0		
H.13	2.4	0.0044		0.0	11.800	0.052		Vel = 1.32
H.13	0.0	0.863	Vprt	3.8	12.000	17.947		
to		150.0		0.0	3.800	0.0		
H.14	2.4	0.0044		0.0	15.800	0.070		Vel = 1.32
H.14	0.0	0.863		0.0	8.000	18.017		
to		150.0		0.0	0.0	0.0		
T.32	2.4	0.0044		0.0	8.000	0.035		Vel = 1.32
T.32	0.0	0.863	Vprt	3.8	7.000	18.052		
to		150.0		0.0	3.800	0.0		
H.9	2.4	0.0044		0.0	10.800	0.047		Vel = 1.32
H.9	0.0	0.863	Vprt	3.8	5.000	18.099		
to		150.0		0.0	3.800	0.0		
T.26	2.4	0.0044		0.0	8.800	0.039		Vel = 1.32
T.26	1.44	0.863	Vprt	3.8	4.000	18.138		
to		150.0		0.0	3.800	0.0		
H.3	3.84	0.0105		0.0	7.800	0.082		Vel = 2.11
H.3	0.0	0.863	Vprt	3.8	9.000	18.220		
to		150.0		0.0	3.800	0.0		
H.4	3.84	0.0105		0.0	12.800	0.135		Vel = 2.11
H.4	0.0	0.863	Vprt	3.8	9.000	18.355		
to		150.0		0.0	3.800	0.0		
H.10	3.84	0.0105		0.0	12.800	0.135		Vel = 2.11
H.10	0.0	0.863	Vprt	3.8	13.000	18.490		
to		150.0		0.0	3.800	0.0		
H.16	3.84	0.0105		0.0	16.800	0.177		Vel = 2.11
H.16	0.0	0.863		0.0	11.000	18.667		
to		150.0		0.0	0.0	0.0		
H.15	3.84	0.0105		0.0	11.000	0.116		Vel = 2.11

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.15	0.0	0.863	Vptb	18.4	8.000	18.783		
to		150.0	Vprt	3.8	22.200	0.0		
T.36	3.84	0.0106		0.0	30.200	0.319		Vel = 2.11
	0.0							
	3.84					19.102		K Factor = 0.88
T.25	1.45	0.863	Vprt	3.8	5.000	18.060		
to		150.0		0.0	3.800	0.0		
H.5	1.45	0.0018		0.0	8.800	0.016		Vel = 0.80
H.5	0.0	0.863	Vptb	18.4	14.000	18.076		
to		150.0	Vprt	3.8	22.200	0.0		
T.26	1.45	0.0017		0.0	36.200	0.062		Vel = 0.80
	0.0							
	1.45					18.138		K Factor = 0.34
T.33	2.26	0.863	Vprt	3.8	11.000	28.330		
to		150.0		0.0	3.800	0.0		
H.21	2.26	0.0039		0.0	14.800	0.058		Vel = 1.24
H.21	0.0	0.863		0.0	14.000	28.388		
to		150.0		0.0	0.0	0.0		
H.18	2.26	0.0040		0.0	14.000	0.056		Vel = 1.24
H.18	0.0	0.863	Vptb	18.4	12.000	28.444		
to		150.0	Vprt	3.8	22.200	0.0		
T.30	2.26	0.0039		0.0	34.200	0.135		Vel = 1.24
T.30	-0.62	0.863	Vprt	3.8	11.000	28.579		
to		150.0		0.0	3.800	0.0		
H.11	1.64	0.0022		0.0	14.800	0.032		Vel = 0.90
H.11	0.0	0.863	Vptb	18.4	4.000	28.611		
to		150.0		0.0	18.400	0.0		
T.29	1.64	0.0022		0.0	22.400	0.049		Vel = 0.90
	0.0							
	1.64					28.660		K Factor = 0.31
T.30	0.62	0.863		0.0	4.000	28.579		
to		150.0		0.0	0.0	0.0		
H.12	0.62	0.0002		0.0	4.000	0.001		Vel = 0.34
H.12	0.0	0.863	Vprt	3.8	11.000	28.580		
to		150.0		0.0	3.800	0.0		
H.2	0.62	0.0004		0.0	14.800	0.006		Vel = 0.34
H.2	0.0	0.863	Vprt	3.8	13.000	28.586		
to		150.0		0.0	3.800	0.0		
T.22	0.62	0.0004		0.0	16.800	0.006		Vel = 0.34
	0.0							
	0.62					28.592		K Factor = 0.12

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

Job Name : LOT#10 - Two Head Calculation (H.10 & H.4)
Building : SINGLE FAMILY RESIDENCE
Location : 332 OAKHAVEN DRIVE HOLLY SPRINGS NC 27540
System : NFPA 13D
Contract : FPMS2102-001 NC
Data File : 332 Oakhaven Drive Lot 10.wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - LOT#10 Date - 02/26/2021
Location - HOLLY SPRINGS NC 27540
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPMS2102-001 NC
Calculated By - VIEGA LLC Drawing No. - FPMS2102-001 NC
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 10 FT
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 - 120 Feet Size 7/16 K-Factor 4.9
G Note: Temperature Rating 155
N

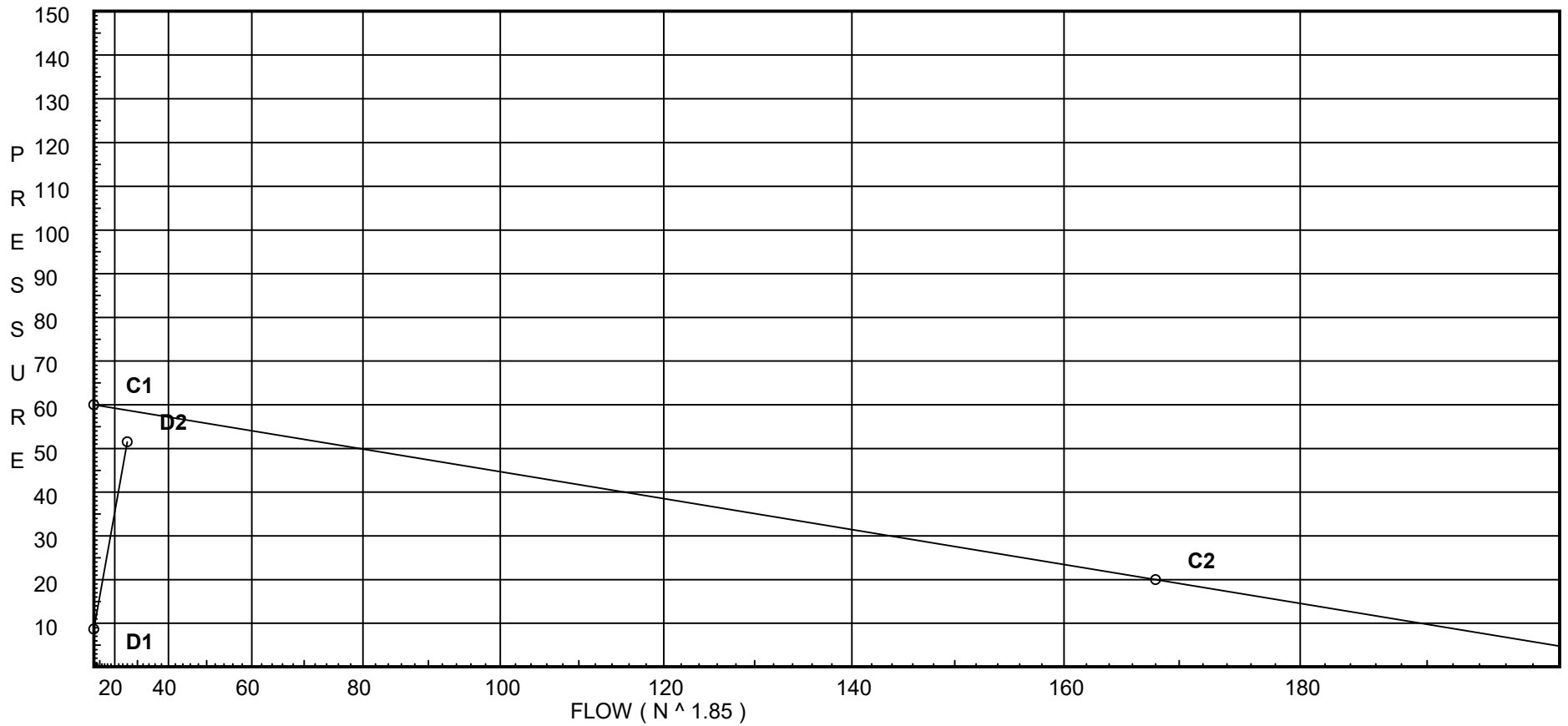
Calculation Gpm Required 26.0331 Psi Required 51.5 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

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

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

Demand:
- D1 - Elevation : 8.662
- D2 - System Flow : 26.033
- D2 - System Pressure : 51.497
- Hose (Demand) : _____
- D3 - System Demand : 26.033
- Safety Margin : 7.233



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
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

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
STR	60.0	20	168.0	58.73	26.03	51.497

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.10	120.0	4.9	7.04	13.0	
H.16	120.0		8.32		
H.15	120.0		9.16		
T.36	120.0		11.46		
T.35	120.0		14.04		
T.34	109.0		22.17		
T.33	109.0		24.3		
T.29	109.0		24.89		
H.7	109.0		26.19		
H.6	109.0		27.59		
T.27	109.0		29.83		
T.28	109.0		30.46		
S.1	104.0		35.05		
MTR	100.0		47.0		
STR	100.0		51.5		
H.4	120.0	4.9	7.07	13.03	
H.3	120.0		8.72		
T.26	120.0		9.72		
H.5	120.0		11.33		
T.25	120.0		11.72		
T.23	120.0		15.13		
T.24	109.0		22.9		
T.22	109.0		24.86		
H.1	109.0		25.64		
H.9	120.0		9.96		
T.32	120.0		10.25		
H.14	120.0		10.47		
H.13	120.0		10.91		
T.31	120.0		11.23		
H.8	120.0		11.53		
H.17	120.0		11.29		
H.19	120.0		11.35		
H.20	120.0		11.39		
H.21	109.0		24.42		
H.18	109.0		24.53		
T.30	109.0		24.8		
H.11	109.0		24.83		
H.12	109.0		24.8		
H.2	109.0		24.83		

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	11.20	0.863	Vprt	3.8	13.000	7.040		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
H.16	11.2	0.0762		0.0	16.800	1.280		Vel = 6.14
H.16	0.0	0.863		0.0	11.000	8.320		
to		150.0		0.0	0.0	0.0		
H.15	11.2	0.0761		0.0	11.000	0.837		Vel = 6.14
H.15	0.0	0.863	Vptb	18.4	8.000	9.157		
to		150.0	Vprt	3.8	22.200	0.0		
T.36	11.2	0.0762		0.0	30.200	2.301		Vel = 6.14
T.36	2.44	0.863	Vprt	3.8	2.000	11.458		
to		150.0	Vpel	17.7	21.500	0.0		
T.35	13.64	0.1098		0.0	23.500	2.580		Vel = 7.48
T.35	0.0	0.863	Vpel	17.7	13.000	14.038		
to		150.0		0.0	17.700	4.764		
T.34	13.64	0.1098		0.0	30.700	3.372		Vel = 7.48
T.34	0.0	0.863	Vptb	18.4	1.000	22.174		
to		150.0		0.0	18.400	0.0		
T.33	13.64	0.1098		0.0	19.400	2.130		Vel = 7.48
T.33	-3.26	0.863	Vprt	3.8	5.000	24.304		
to		150.0		0.0	3.800	0.0		
T.29	10.38	0.0662		0.0	8.800	0.583		Vel = 5.69
T.29	1.74	0.863	Vprt	3.8	11.000	24.887		
to		150.0		0.0	3.800	0.0		
H.7	12.12	0.0882		0.0	14.800	1.305		Vel = 6.65
H.7	0.0	0.863	Vprt	3.8	12.000	26.192		
to		150.0		0.0	3.800	0.0		
H.6	12.12	0.0882		0.0	15.800	1.394		Vel = 6.65
H.6	0.0	0.863	Vptb	18.4	7.000	27.586		
to		150.0		0.0	18.400	0.0		
T.27	12.12	0.0882		0.0	25.400	2.241		Vel = 6.65
T.27	13.91	1.025		0.0	4.000	29.827		
to		150.0		0.0	0.0	0.0		
T.28	26.03	0.1570		0.0	4.000	0.628		Vel = 10.12
T.28	0.0	1.025	E	2.7	6.000	30.455		
to		150.0	T	6.75	9.450	2.166		
S.1	26.03	0.1570		0.0	15.450	2.425		Vel = 10.12
S.1	0.0	1.053	2E	2.429	50.000	35.046		
to		150.0		0.0	2.429	4.732		* * Fixed Loss = 3
MTR	26.03	0.1377		0.0	52.429	7.218		Vel = 9.59
MTR	0.0	1.049	E	3.022	20.000	46.996		
to		150.0	T	7.555	12.089	0.0		
STR	26.03	0.1403	G	1.511	32.089	4.501		Vel = 9.66
	0.0							
	26.03					51.497		K Factor = 3.63
H.10	1.80	0.863	Vprt	3.8	9.000	7.040		
to		150.0		0.0	3.800	0.0		
H.4	1.8	0.0026		0.0	12.800	0.033		Vel = 0.99
H.4	13.04	0.863	Vprt	3.8	9.000	7.073		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
H.3	14.84	0.1283		0.0	12.800	1.642		Vel = 8.14

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.3	0.0	0.863	Vprt	3.8	4.000	8.715		
to		150.0		0.0	3.800	0.0		
T.26	14.84	0.1282		0.0	7.800	1.000		Vel = 8.14
T.26	-6.46	0.863	Vptb	18.4	14.000	9.715		
to		150.0	Vprt	3.8	22.200	0.0		
H.5	8.38	0.0446		0.0	36.200	1.615		Vel = 4.60
H.5	0.0	0.863	Vprt	3.8	5.000	11.330		
to		150.0		0.0	3.800	0.0		
T.25	8.38	0.0445		0.0	8.800	0.392		Vel = 4.60
T.25	4.01	0.863	Vptb	18.4	1.000	11.722		
to		150.0	Vpel	17.7	36.100	0.0		
T.23	12.39	0.0919		0.0	37.100	3.408		Vel = 6.80
T.23	0.0	0.863	Vpel	17.7	15.000	15.130		
to		150.0		0.0	17.700	4.764		
T.24	12.39	0.0919		0.0	32.700	3.004		Vel = 6.80
T.24	0.0	0.863	Vptb	18.4	3.000	22.898		
to		150.0		0.0	18.400	0.0		
T.22	12.39	0.0919		0.0	21.400	1.966		Vel = 6.80
T.22	1.52	0.863	Vprt	3.8	3.000	24.864		
to		150.0		0.0	3.800	0.0		
H.1	13.91	0.1138		0.0	6.800	0.774		Vel = 7.63
H.1	0.0	0.863	Vprt	3.8	33.000	25.638		
to		150.0		0.0	3.800	0.0		
T.27	13.91	0.1138		0.0	36.800	4.189		Vel = 7.63
	0.0							
	13.91					29.827		K Factor = 2.55
T.26	6.45	0.863	Vprt	3.8	5.000	9.715		
to		150.0		0.0	3.800	0.0		
H.9	6.45	0.0275		0.0	8.800	0.242		Vel = 3.54
H.9	0.0	0.863	Vprt	3.8	7.000	9.957		
to		150.0		0.0	3.800	0.0		
T.32	6.45	0.0274		0.0	10.800	0.296		Vel = 3.54
T.32	0.0	0.863		0.0	8.000	10.253		
to		150.0		0.0	0.0	0.0		
H.14	6.45	0.0275		0.0	8.000	0.220		Vel = 3.54
H.14	0.0	0.863	Vprt	3.8	12.000	10.473		
to		150.0		0.0	3.800	0.0		
H.13	6.45	0.0275		0.0	15.800	0.434		Vel = 3.54
H.13	0.0	0.863	Vprt	3.8	8.000	10.907		
to		150.0		0.0	3.800	0.0		
T.31	6.45	0.0275		0.0	11.800	0.325		Vel = 3.54
T.31	-2.45	0.863	Vptb	18.4	8.000	11.232		
to		150.0		0.0	18.400	0.0		
H.8	4.0	0.0114		0.0	26.400	0.300		Vel = 2.19
H.8	0.0	0.863	Vprt	3.8	13.000	11.532		
to		150.0		0.0	3.800	0.0		
T.25	4.0	0.0113		0.0	16.800	0.190		Vel = 2.19
	0.0							

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
	4.00					11.722		K Factor = 1.17		
T.31	2.45	0.863	Vprt	3.8	9.000	11.232				
to		150.0		0.0	3.800	0.0				
H.17	2.45	0.0045		0.0	12.800	0.058		Vel = 1.34		
H.17	0.0	0.863	Vprt	3.8	10.000	11.290				
to		150.0		0.0	3.800	0.0				
H.19	2.45	0.0046		0.0	13.800	0.063		Vel = 1.34		
H.19	0.0	0.863		0.0	9.000	11.353				
to		150.0		0.0	0.0	0.0				
H.20	2.45	0.0046		0.0	9.000	0.041		Vel = 1.34		
H.20	0.0	0.863	Vprt	3.8	10.000	11.394				
to		150.0		0.0	3.800	0.0				
T.36	2.45	0.0046		0.0	13.800	0.064		Vel = 1.34		
	0.0									
	2.45					11.458		K Factor = 0.72		
T.33	3.27	0.863	Vprt	3.8	11.000	24.304				
to		150.0		0.0	3.800	0.0				
H.21	3.27	0.0078		0.0	14.800	0.116		Vel = 1.79		
H.21	0.0	0.863		0.0	14.000	24.420				
to		150.0		0.0	0.0	0.0				
H.18	3.27	0.0078		0.0	14.000	0.109		Vel = 1.79		
H.18	0.0	0.863	Vptb	18.4	12.000	24.529				
to		150.0	Vprt	3.8	22.200	0.0				
T.30	3.27	0.0078		0.0	34.200	0.267		Vel = 1.79		
T.30	-1.53	0.863	Vprt	3.8	11.000	24.796				
to		150.0		0.0	3.800	0.0				
H.11	1.74	0.0024		0.0	14.800	0.036		Vel = 0.95		
H.11	0.0	0.863	Vptb	18.4	4.000	24.832				
to		150.0		0.0	18.400	0.0				
T.29	1.74	0.0025		0.0	22.400	0.055		Vel = 0.95		
	0.0									
	1.74					24.887		K Factor = 0.35		
T.30	1.52	0.863		0.0	4.000	24.796				
to		150.0		0.0	0.0	0.0				
H.12	1.52	0.0018		0.0	4.000	0.007		Vel = 0.83		
H.12	0.0	0.863	Vprt	3.8	11.000	24.803				
to		150.0		0.0	3.800	0.0				
H.2	1.52	0.0020		0.0	14.800	0.029		Vel = 0.83		
H.2	0.0	0.863	Vprt	3.8	13.000	24.832				
to		150.0		0.0	3.800	0.0				
T.22	1.52	0.0019		0.0	16.800	0.032		Vel = 0.83		
	0.0									
	1.52					24.864		K Factor = 0.30		