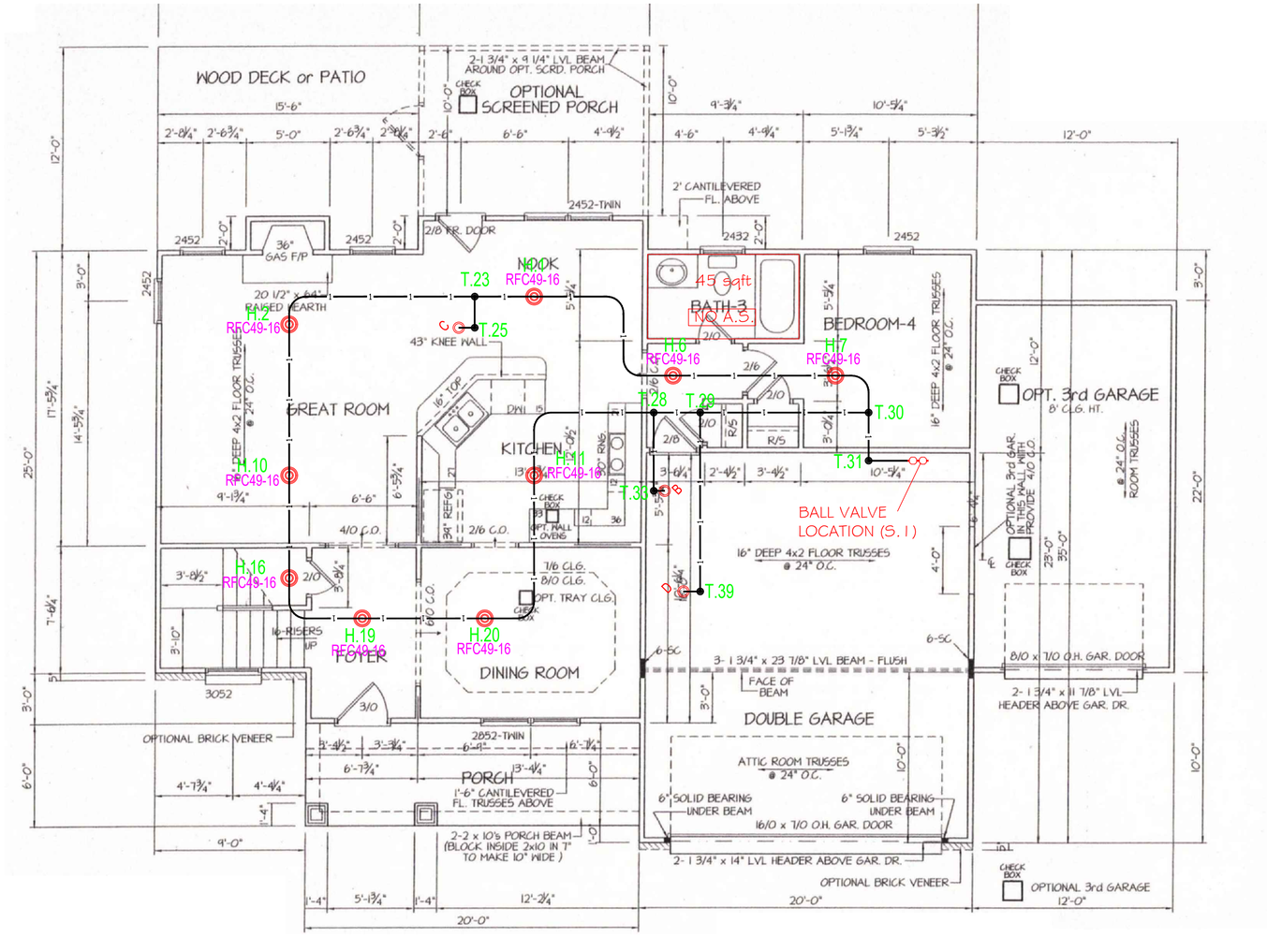
RFC49-16 - - - 21

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 - - - 1

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

SPRINKLER DESCRIPTIONS



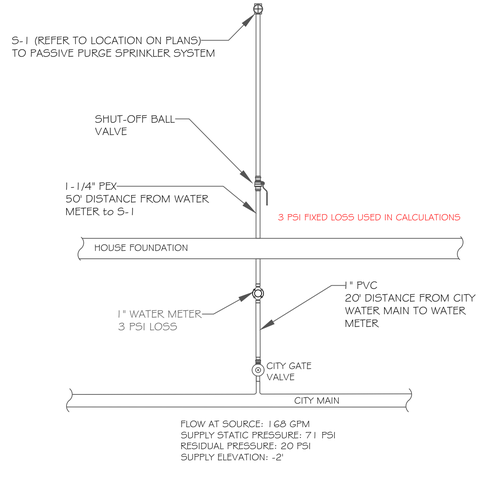
1st Floor 9 Sprinklers

Most Demanding Single Head Information	
Information	Results
Flow Required at Head (GPM):	17
Source Pressure at Head (PSI):	12.03
Maximum Spacing (length):	18
Maximum Spacing (Width):	18
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)	17
Pressure Required at Source (psi)	38.38
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)	26.3032
Pressure Required at Source (psi)	51.74
Source Reference Point:	At Ref Pt STR
C-Factor of Sprinkler Pipe	150
C-Factor of Service Line	150
Head Reference Point:	H.9 & H.12

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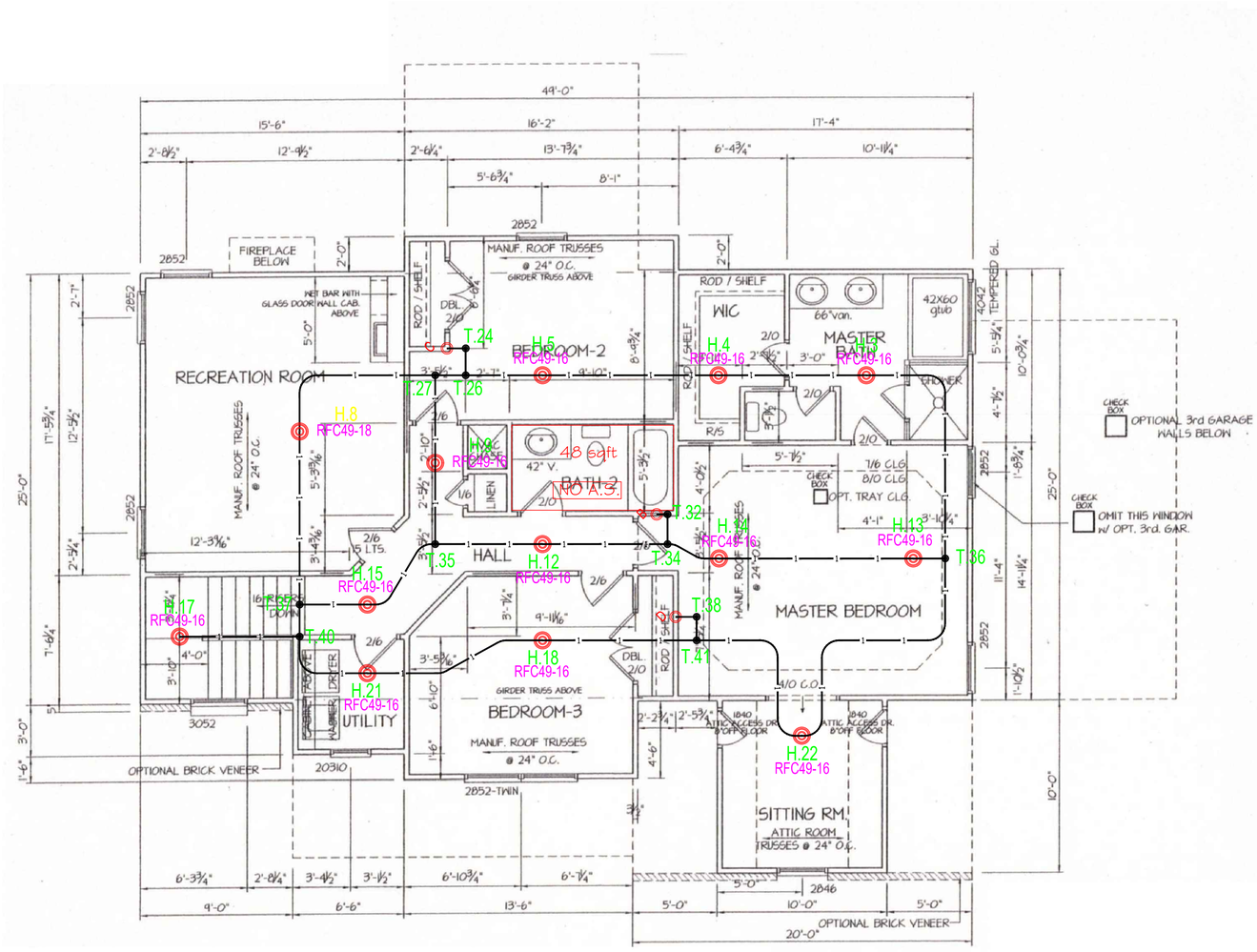
Design Services Department
1900 Southwood Drive - Nashua, NH 03063
Tel: 877-843-4262 x 351 Fax: 316-425-8466

Project:
200 OAKHAVEN DRIVE, LOT 3
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 1

Title:
FIRST FLOOR PLAN

Quotation no.:	FPNM2102-016 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	2/26/2021
Scale:	1/4" = 1'
Revision No:	Revision Date:



2nd Floor 13 Sprinklers

viega

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

Project:
200 OAKHAVEN DRIVE, LOT 3
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 2

Title:
SECOND FLOOR PLAN

Quotation no.:	FPNM2102-016 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	2/26/2021
Scale:	1/4" = 1'
Revision No:	Revision Date:

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.

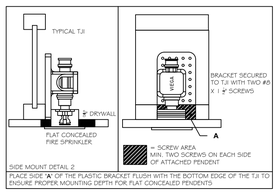
DRAWING AND DESIGN NOTES:

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:

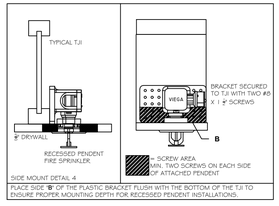
1. SERVICE ENTRANCE MATERIALS FROM WATER MAIN CONNECTION TO DISTRIBUTION MANIFOLD ARE EXCLUDED.
2. SPRINKLERS AND ASSOCIATED ESCUTCHEONS OR COVER PLATES ARE NOT SUPPLIED BY VIEGA.
3. MATERIAL LIST IS SUGGESTED ONLY. CONTRACTOR SHALL CONFIRM REQUIRED MATERIALS PRIOR TO PLACEMENT OF ORDER.

INSTALLATION NOTES



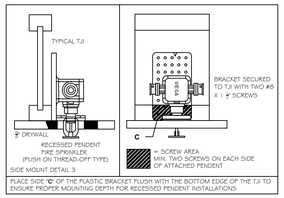
SIDE MOUNT DETAIL 2

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



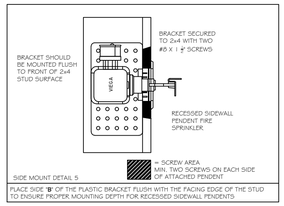
SIDE MOUNT DETAIL 4

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

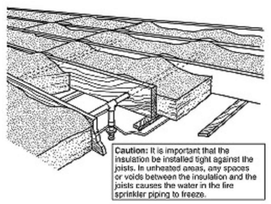


FIGURE A.9.1.1(a) Insulation Recommendations — Arrangement 1.

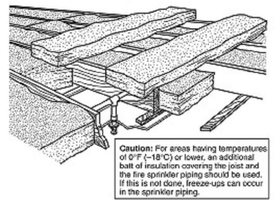


FIGURE A.9.1.1(b) Insulation Recommendations — Arrangement 2.

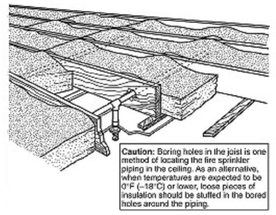


FIGURE A.9.1.1(c) Insulation Recommendations — Arrangement 3.

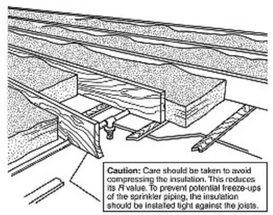


FIGURE A.9.1.1(d) Insulation Recommendations — Arrangement 4.

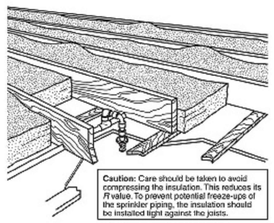


FIGURE A.9.1.1(e) Insulation Recommendations — Arrangement 5.

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

Project:
200 OAKHAVEN DRIVE, LOT 3
HOLLY SPRINGS, NC 27540

Dwg no.:
FP 3

Title:
NOTES & DETAILS

Quotation no.:	FPNM2102-016 NC
Drawn by:	N.M.
Approv. by:	
Date Submitted:	2/26/2021
Scale:	N/A
Revision No:	Revision Date:

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

Job Name : 200 OAKHAVEN DRIVE, LOT 3 - One Head Calculation (H.8)
Building : SINGLE FAMILY RESIDENCE
Location : HOLLY SPRINGS NC 27540
System : NFPA 13D
Contract : FPNM2102-016 NC
Data File : FPNM2102-016 NC (200 Oakhaven Drive).wx1

HYDRAULIC DESIGN INFORMATION SHEET

Name - 200 OAKHAVEN DRIVE LOT 3 Date - 2/26/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPNM2102-016 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2102-016 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 - 17 Gpm System Type
Listed Pres. at Start Point - 12.03Psi (X) Wet ( ) Dry
D MAXIMUM LISTED SPACING 18 x 18 ( ) 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

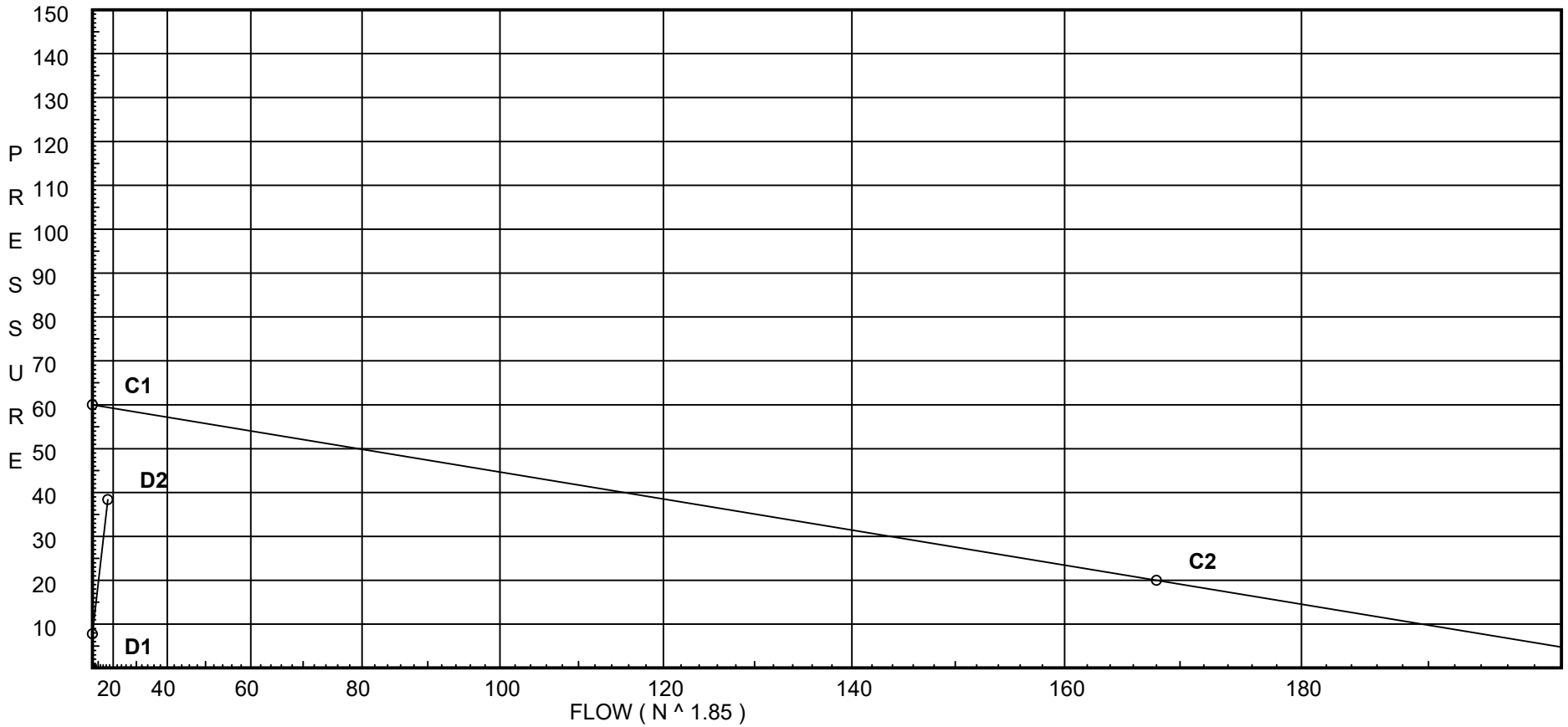
Calculation Gpm Required 17 Psi Required 38.38 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

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 : 7.796
- D2 - System Flow : 16.995
- D2 - System Pressure : 38.381
- Hose (Demand) : _____
- D3 - System Demand : 16.995
- Safety Margin : 21.042



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	59.423	17.0	38.381

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.8	118.0	4.9	12.03	17.0	
T.27	118.0		12.85		
T.26	118.0		13.07		
T.24	118.0		14.02		
T.25	108.0		19.08		
T.23	108.0		19.59		
H.1	108.0		19.87		
H.6	108.0		20.52		
H.7	108.0		21.06		
T.30	108.0		21.38		
T.31	108.0		21.87		
S.1	94.0		32.66		
MTR	100.0		36.34		
STR	100.0		38.38		
T.37	118.0		12.62		
H.15	118.0		12.81		
T.35	118.0		12.91		
H.12	118.0		13.07		
T.34	118.0		13.25		
T.32	118.0		14.02		
T.33	108.0		18.96		
T.28	108.0		19.44		
T.29	108.0		19.52		
T.40	118.0		12.71		
H.21	118.0		12.86		
H.18	118.0		13.05		
T.41	118.0		13.24		
T.38	118.0		14.0		
T.39	108.0		18.92		
H.9	118.0		12.88		
H.5	118.0		13.1		
H.4	118.0		13.13		
H.3	118.0		13.17		
T.36	118.0		13.22		
H.22	118.0		13.23		
H.13	118.0		13.23		
H.14	118.0		13.24		
H.11	108.0		19.46		
H.20	108.0		19.49		
H.19	108.0		19.5		
H.16	108.0		19.52		
H.10	108.0		19.54		

NODE ANALYSIS (cont.)

Node Tag	*Elevation*	*Node Type*	*Pressure at Node*	*Discharge at Node*	*Notes*
H.2	108.0		19.56		

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	9.07	0.863	Vprt	3.8	12.000	12.030		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
T.27	9.07	0.0516		0.0	15.800	0.816		Vel = 4.97
T.27	-1.22	0.863	Vprt	3.8	2.000	12.846		
to		150.0		0.0	3.800	0.0		
T.26	7.85	0.0393		0.0	5.800	0.228		Vel = 4.31
T.26	-1.75	0.863	Vptb	18.4	2.000	13.074		
to		150.0	Vpel	17.7	36.100	0.0		
T.24	6.1	0.0248		0.0	38.100	0.944		Vel = 3.35
T.24	0.0	0.863	Vpel	17.7	12.000	14.018		
to		150.0		0.0	17.700	4.331		
T.25	6.1	0.0248		0.0	29.700	0.736		Vel = 3.35
T.25	0.0	0.863	Vptb	18.4	2.000	19.085		
to		150.0		0.0	18.400	0.0		
T.23	6.1	0.0248		0.0	20.400	0.505		Vel = 3.35
T.23	1.41	0.863	Vprt	3.8	4.000	19.590		
to		150.0		0.0	3.800	0.0		
H.1	7.51	0.0364		0.0	7.800	0.284		Vel = 4.12
H.1	0.0	0.863	Vprt	3.8	14.000	19.874		
to		150.0		0.0	3.800	0.0		
H.6	7.51	0.0363		0.0	17.800	0.647		Vel = 4.12
H.6	0.0	0.863	Vprt	3.8	11.000	20.521		
to		150.0		0.0	3.800	0.0		
H.7	7.51	0.0364		0.0	14.800	0.538		Vel = 4.12
H.7	0.0	0.863	Vprt	3.8	5.000	21.059		
to		150.0		0.0	3.800	0.0		
T.30	7.51	0.0364		0.0	8.800	0.320		Vel = 4.12
T.30	9.49	0.863		0.0	3.000	21.379		
to		150.0		0.0	0.0	0.0		
T.31	17.0	0.1650		0.0	3.000	0.495		Vel = 9.32
T.31	0.0	0.863	Vpel	17.7	8.000	21.874		
to		150.0	T	2.92	20.620	6.063		
S.1	17.0	0.1648		0.0	28.620	4.718		Vel = 9.32
S.1	0.0	1.053	2E	2.429	50.000	32.655		
to		150.0		0.0	2.429	0.401		* * Fixed Loss = 3
MTR	17.0	0.0626		0.0	52.429	3.280		Vel = 6.26
MTR	0.0	1.049	E	3.022	20.000	36.336		
to		150.0	T	7.555	12.089	0.0		
STR	17.0	0.0637	G	1.511	32.089	2.045		Vel = 6.31
	0.0							
	17.00					38.381		K Factor = 2.74
H.8	7.92	0.863	Vprt	3.8	11.000	12.030		
to		150.0		0.0	3.800	0.0		
T.37	7.92	0.0401		0.0	14.800	0.594		Vel = 4.34
T.37	-4.52	0.863	Vptb	18.4	4.000	12.624		
to		150.0		0.0	18.400	0.0		
H.15	3.4	0.0084		0.0	22.400	0.188		Vel = 1.86
H.15	0.0	0.863	Vprt	3.8	8.000	12.812		
to		150.0		0.0	3.800	0.0		
T.35	3.4	0.0084		0.0	11.800	0.099		Vel = 1.86

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	1.22	0.863	Vprt	3.8	7.000	12.911		
to		150.0		0.0	3.800	0.0		
H.12	4.62	0.0149		0.0	10.800	0.161		Vel = 2.53
H.12	0.0	0.863	Vprt	3.8	8.000	13.072		
to		150.0		0.0	3.800	0.0		
T.34	4.62	0.0148		0.0	11.800	0.175		Vel = 2.53
T.34	0.87	0.863	Vptb	18.4	2.000	13.247		
to		150.0	Vpel	17.7	36.100	0.0		
T.32	5.49	0.0204		0.0	38.100	0.777		Vel = 3.01
T.32	0.0	0.863	Vpel	17.7	12.000	14.024		
to		150.0		0.0	17.700	4.331		
T.33	5.49	0.0204		0.0	29.700	0.605		Vel = 3.01
T.33	0.0	0.863	Vptb	18.4	5.000	18.960		
to		150.0		0.0	18.400	0.0		
T.28	5.49	0.0204		0.0	23.400	0.477		Vel = 3.01
T.28	-1.41	0.863	Vprt	3.8	3.000	19.437		
to		150.0		0.0	3.800	0.0		
T.29	4.08	0.0118		0.0	6.800	0.080		Vel = 2.24
T.29	5.41	0.863	Vptb	18.4	11.000	19.517		
to		150.0	Vprt	3.8	22.200	0.0		
T.30	9.49	0.0561		0.0	33.200	1.862		Vel = 5.21
	0.0							
	9.49					21.379		K Factor = 2.05
T.37	4.52	0.863	Vprt	3.8	2.000	12.624		
to		150.0		0.0	3.800	0.0		
T.40	4.52	0.0143		0.0	5.800	0.083		Vel = 2.48
T.40	0.0	0.863	Vprt	3.8	7.000	12.707		
to		150.0		0.0	3.800	0.0		
H.21	4.52	0.0143		0.0	10.800	0.154		Vel = 2.48
H.21	0.0	0.863		0.0	13.000	12.861		
to		150.0		0.0	0.0	0.0		
H.18	4.52	0.0142		0.0	13.000	0.185		Vel = 2.48
H.18	0.0	0.863	Vprt	3.8	10.000	13.046		
to		150.0		0.0	3.800	0.0		
T.41	4.52	0.0143		0.0	13.800	0.197		Vel = 2.48
T.41	0.88	0.863	Vptb	18.4	2.000	13.243		
to		150.0	Vpel	17.7	36.100	0.0		
T.38	5.4	0.0198		0.0	38.100	0.754		Vel = 2.96
T.38	0.0	0.863	Vpel	17.7	12.000	13.997		
to		150.0		0.0	17.700	4.331		
T.39	5.4	0.0198		0.0	29.700	0.588		Vel = 2.96
T.39	0.0	0.863	Vptb	18.4	12.000	18.916		
to		150.0		0.0	18.400	0.0		
T.29	5.4	0.0198		0.0	30.400	0.601		Vel = 2.96
	0.0							
	5.40					19.517		K Factor = 1.22
T.27	1.23	0.863	Vptb	18.4	6.000	12.846		
to		150.0	Vprt	3.8	22.200	0.0		
H.9	1.23	0.0013		0.0	28.200	0.036		Vel = 0.67

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.9	0.0	0.863	Vptb	18.4	5.000	12.882		
to		150.0		0.0	18.400	0.0		
T.35	1.23	0.0012		0.0	23.400	0.029		Vel = 0.67
	0.0							
	1.23					12.911		K Factor = 0.34
T.26	1.74	0.863	Vprt	3.8	5.000	13.074		
to		150.0		0.0	3.800	0.0		
H.5	1.74	0.0025		0.0	8.800	0.022		Vel = 0.95
H.5	0.0	0.863	Vprt	3.8	11.000	13.096		
to		150.0		0.0	3.800	0.0		
H.4	1.74	0.0024		0.0	14.800	0.036		Vel = 0.95
H.4	0.0	0.863	Vprt	3.8	10.000	13.132		
to		150.0		0.0	3.800	0.0		
H.3	1.74	0.0025		0.0	13.800	0.034		Vel = 0.95
H.3	0.0	0.863	Vprt	3.8	17.000	13.166		
to		150.0		0.0	3.800	0.0		
T.36	1.74	0.0025		0.0	20.800	0.051		Vel = 0.95
T.36	-0.86	0.863	Vprt	3.8	21.000	13.217		
to		150.0		0.0	3.800	0.0		
H.22	0.88	0.0007		0.0	24.800	0.017		Vel = 0.48
H.22	0.0	0.863		0.0	13.000	13.234		
to		150.0		0.0	0.0	0.0		
T.41	0.88	0.0007		0.0	13.000	0.009		Vel = 0.48
	0.0							
	0.88					13.243		K Factor = 0.24
T.36	0.86	0.863	Vptb	18.4	2.000	13.217		
to		150.0	Vprt	3.8	22.200	0.0		
H.13	0.86	0.0007		0.0	24.200	0.016		Vel = 0.47
H.13	0.0	0.863		0.0	13.000	13.233		
to		150.0		0.0	0.0	0.0		
H.14	0.86	0.0007		0.0	13.000	0.009		Vel = 0.47
H.14	0.0	0.863	Vprt	3.8	4.000	13.242		
to		150.0		0.0	3.800	0.0		
T.34	0.86	0.0006		0.0	7.800	0.005		Vel = 0.47
	0.0							
	0.86					13.247		K Factor = 0.24
T.28	1.40	0.863	Vprt	3.8	12.000	19.437		
to		150.0		0.0	3.800	0.0		
H.11	1.4	0.0016		0.0	15.800	0.026		Vel = 0.77
H.11	0.0	0.863	Vprt	3.8	13.000	19.463		
to		150.0		0.0	3.800	0.0		
H.20	1.4	0.0016		0.0	16.800	0.027		Vel = 0.77
H.20	0.0	0.863		0.0	8.000	19.490		
to		150.0		0.0	0.0	0.0		
H.19	1.4	0.0016		0.0	8.000	0.013		Vel = 0.77
H.19	0.0	0.863	Vprt	3.8	7.000	19.503		
to		150.0		0.0	3.800	0.0		
H.16	1.4	0.0017		0.0	10.800	0.018		Vel = 0.77

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	0.0	0.863	Vprt	3.8	7.000	19.521		
to		150.0		0.0	3.800	0.0		
H.10	1.4	0.0017		0.0	10.800	0.018		Vel = 0.77
H.10	0.0	0.863	Vprt	3.8	10.000	19.539		
to		150.0		0.0	3.800	0.0		
H.2	1.4	0.0016		0.0	13.800	0.022		Vel = 0.77
H.2	0.0	0.863	Vprt	3.8	14.000	19.561		
to		150.0		0.0	3.800	0.0		
T.23	1.4	0.0016		0.0	17.800	0.029		Vel = 0.77
	0.0							
	1.40					19.590		K Factor = 0.32

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

Job Name	:	200 OAKHAVEN DRIVE, LOT 3 - Two Head Calculation (H.9 & H.12)
Building	:	SINGLE FAMILY RESIDENCE
Location	:	HOLLY SPRINGS NC 27540
System	:	NFPA 13D
Contract	:	FPNM2102-016 NC
Data File	:	FPNM2102-016 NC (200 Oakhaven Drive).wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - 200 OAKHAVEN DRIVE LOT 3 Date - 2/26/2021
Location -
Building - SINGLE FAMILY RESIDENCE System No. - NFPA 13D
Contractor - x Contract No. - FPNM2102-016 NC
Calculated By - VIEGA LLC Drawing No. - FPNM2102-016 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

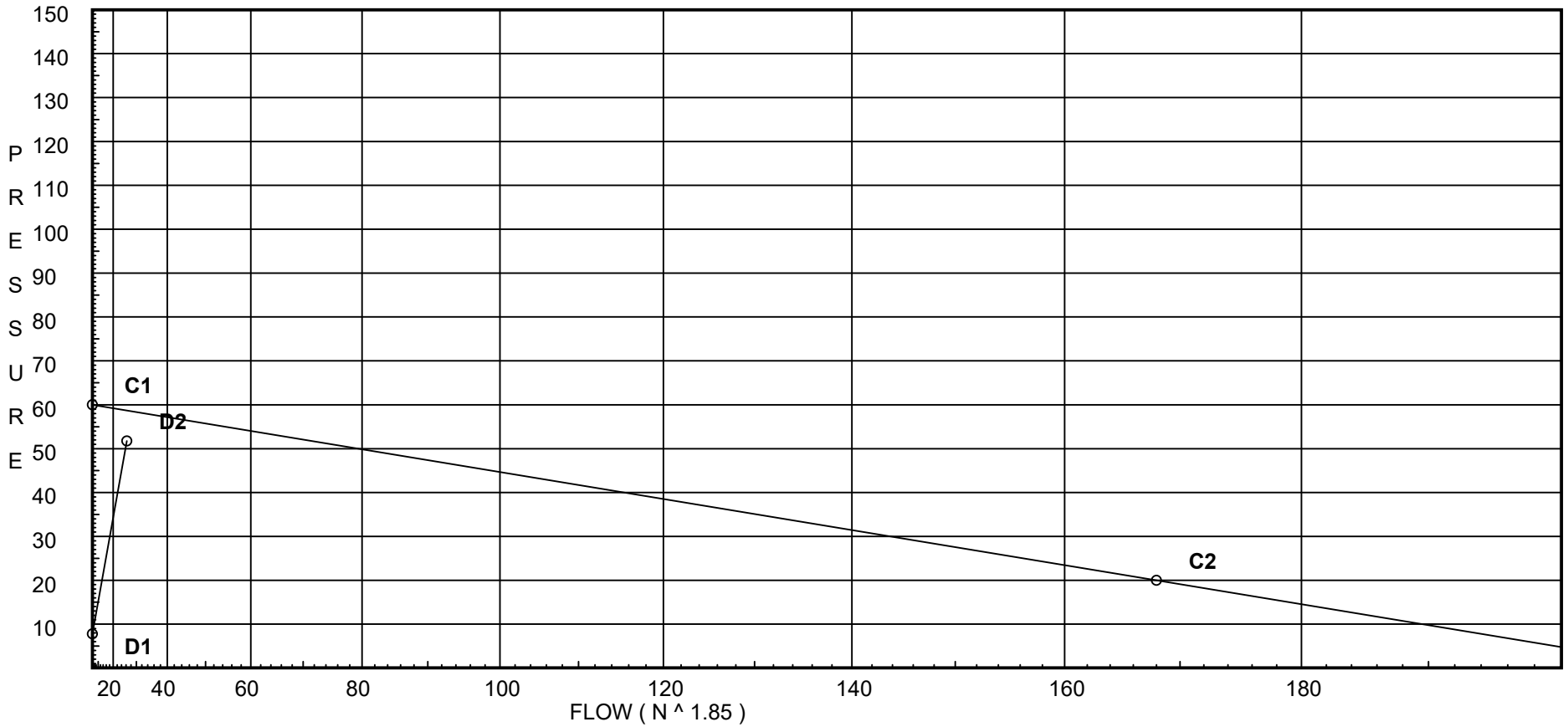
Calculation Gpm Required 26.3032 Psi Required 51.74 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

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 : 7.796
- D2 - System Flow : 26.303
- D2 - System Pressure : 51.745
- Hose (Demand) : _____
- D3 - System Demand : 26.303
- Safety Margin : 6.960



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	58.705	26.3	51.745

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.9	118.0	4.9	7.04	13.0	
T.27	118.0		8.29		
T.26	118.0		8.63		
T.24	118.0		10.66		
T.25	108.0		16.57		
T.23	108.0		17.65		
H.1	108.0		18.28		
H.6	108.0		19.73		
H.7	108.0		20.93		
T.30	108.0		21.64		
T.31	108.0		22.75		
S.1	94.0		39.4		
MTR	100.0		47.16		
STR	100.0		51.74		
T.35	118.0		7.39		
H.15	118.0		7.68		
T.37	118.0		8.25		
T.40	118.0		8.34		
H.21	118.0		8.51		
H.18	118.0		8.72		
T.41	118.0		8.94		
T.38	118.0		10.56		
T.39	108.0		16.15		
T.29	108.0		17.44		
H.12	118.0	4.9	7.37	13.3	
T.34	118.0		8.36		
T.32	118.0		10.27		
T.33	108.0		16.08		
T.28	108.0		17.25		
H.8	118.0		8.27		
H.14	118.0		8.41		
H.13	118.0		8.49		
T.36	118.0		8.64		
H.22	118.0		8.84		
H.5	118.0		8.63		
H.4	118.0		8.63		
H.3	118.0		8.64		
H.11	108.0		17.32		
H.20	108.0		17.39		
H.19	108.0		17.42		
H.16	108.0		17.47		
H.10	108.0		17.52		

NODE ANALYSIS (cont.)

Node Tag	*Elevation*	*Node Type*	*Pressure at Node*	*Discharge at Node*	*Notes*
H.2	108.0		17.58		

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.9	8.36	0.863	Vptb	18.4	6.000	7.040		K Factor = 4.90
to		150.0	Vprt	3.8	22.200	0.0		
T.27	8.36	0.0444		0.0	28.200	1.251		Vel = 4.59
T.27	1.31	0.863	Vprt	3.8	2.000	8.291		
to		150.0		0.0	3.800	0.0		
T.26	9.67	0.0581		0.0	5.800	0.337		Vel = 5.30
T.26	-0.45	0.863	Vptb	18.4	2.000	8.628		
to		150.0	Vpel	17.7	36.100	0.0		
T.24	9.22	0.0532		0.0	38.100	2.027		Vel = 5.06
T.24	0.0	0.863	Vpel	17.7	12.000	10.655		
to		150.0		0.0	17.700	4.331		
T.25	9.22	0.0532		0.0	29.700	1.581		Vel = 5.06
T.25	0.0	0.863	Vptb	18.4	2.000	16.567		
to		150.0		0.0	18.400	0.0		
T.23	9.22	0.0532		0.0	20.400	1.085		Vel = 5.06
T.23	2.36	0.863	Vprt	3.8	4.000	17.652		
to		150.0		0.0	3.800	0.0		
H.1	11.58	0.0810		0.0	7.800	0.632		Vel = 6.35
H.1	0.0	0.863	Vprt	3.8	14.000	18.284		
to		150.0		0.0	3.800	0.0		
H.6	11.58	0.0811		0.0	17.800	1.444		Vel = 6.35
H.6	0.0	0.863	Vprt	3.8	11.000	19.728		
to		150.0		0.0	3.800	0.0		
H.7	11.58	0.0811		0.0	14.800	1.200		Vel = 6.35
H.7	0.0	0.863	Vprt	3.8	5.000	20.928		
to		150.0		0.0	3.800	0.0		
T.30	11.58	0.0810		0.0	8.800	0.713		Vel = 6.35
T.30	14.72	0.863		0.0	3.000	21.641		
to		150.0		0.0	0.0	0.0		
T.31	26.3	0.3700		0.0	3.000	1.110		Vel = 14.43
T.31	0.0	0.863	Vpel	17.7	8.000	22.751		
to		150.0	T	2.92	20.620	6.063		
S.1	26.3	0.3698		0.0	28.620	10.585		Vel = 14.43
S.1	0.0	1.053	2E	2.429	50.000	39.399		
to		150.0		0.0	2.429	0.401		* * Fixed Loss = 3
MTR	26.3	0.1403		0.0	52.429	7.358		Vel = 9.69
MTR	0.0	1.049	E	3.022	20.000	47.158		
to		150.0	T	7.555	12.089	0.0		
STR	26.3	0.1429	G	1.511	32.089	4.587		Vel = 9.76
	0.0							
	26.30					51.745		K Factor = 3.66
H.9	4.64	0.863	Vptb	18.4	5.000	7.040		
to		150.0		0.0	18.400	0.0		
T.35	4.64	0.0150		0.0	23.400	0.350		Vel = 2.54
T.35	1.50	0.863	Vprt	3.8	8.000	7.390		
to		150.0		0.0	3.800	0.0		
H.15	6.14	0.0250		0.0	11.800	0.295		Vel = 3.37
H.15	0.0	0.863	Vptb	18.4	4.000	7.685		
to		150.0		0.0	18.400	0.0		
T.37	6.14	0.0251		0.0	22.400	0.562		Vel = 3.37

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.37	-1.31	0.863	Vprt	3.8	2.000	8.247		
to		150.0		0.0	3.800	0.0		
T.40	4.83	0.0160		0.0	5.800	0.093		Vel = 2.65
T.40	0.0	0.863	Vprt	3.8	7.000	8.340		
to		150.0		0.0	3.800	0.0		
H.21	4.83	0.0161		0.0	10.800	0.174		Vel = 2.65
H.21	0.0	0.863		0.0	13.000	8.514		
to		150.0		0.0	0.0	0.0		
H.18	4.83	0.0161		0.0	13.000	0.209		Vel = 2.65
H.18	0.0	0.863	Vprt	3.8	10.000	8.723		
to		150.0		0.0	3.800	0.0		
T.41	4.83	0.0161		0.0	13.800	0.222		Vel = 2.65
T.41	3.33	0.863	Vptb	18.4	2.000	8.945		
to		150.0	Vpel	17.7	36.100	0.0		
T.38	8.16	0.0424		0.0	38.100	1.617		Vel = 4.48
T.38	0.0	0.863	Vpel	17.7	12.000	10.562		
to		150.0		0.0	17.700	4.331		
T.39	8.16	0.0425		0.0	29.700	1.261		Vel = 4.48
T.39	0.0	0.863	Vptb	18.4	12.000	16.154		
to		150.0		0.0	18.400	0.0		
T.29	8.16	0.0424		0.0	30.400	1.290		Vel = 4.48
T.29	6.56	0.863	Vptb	18.4	11.000	17.444		
to		150.0	Vprt	3.8	22.200	0.0		
T.30	14.72	0.1264		0.0	33.200	4.197		Vel = 8.07
	0.0							
	14.72					21.641		K Factor = 3.16
T.35	-1.50	0.863	Vprt	3.8	7.000	7.390		
to		150.0		0.0	3.800	0.0		
H.12	-1.5	-0.0019		0.0	10.800	-0.020		Vel = 0.82
H.12	13.30	0.863	Vprt	3.8	8.000	7.370		K Factor = 4.90
to		150.0		0.0	3.800	0.0		
T.34	11.8	0.0840		0.0	11.800	0.991		Vel = 6.47
T.34	-2.88	0.863	Vptb	18.4	2.000	8.361		
to		150.0	Vpel	17.7	36.100	0.0		
T.32	8.92	0.0500		0.0	38.100	1.905		Vel = 4.89
T.32	0.0	0.863	Vpel	17.7	12.000	10.266		
to		150.0		0.0	17.700	4.331		
T.33	8.92	0.0500		0.0	29.700	1.485		Vel = 4.89
T.33	0.0	0.863	Vptb	18.4	5.000	16.082		
to		150.0		0.0	18.400	0.0		
T.28	8.92	0.0500		0.0	23.400	1.170		Vel = 4.89
T.28	-2.36	0.863	Vprt	3.8	3.000	17.252		
to		150.0		0.0	3.800	0.0		
T.29	6.56	0.0282		0.0	6.800	0.192		Vel = 3.60
	0.0							
	6.56					17.444		K Factor = 1.57
T.37	1.31	0.863	Vprt	3.8	11.000	8.247		
to		150.0		0.0	3.800	0.0		
H.8	1.31	0.0014		0.0	14.800	0.021		Vel = 0.72

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	0.0	0.863	Vprt	3.8	12.000	8.268		
to		150.0		0.0	3.800	0.0		
T.27	1.31	0.0015		0.0	15.800	0.023		Vel = 0.72
	0.0							
	1.31					8.291		K Factor = 0.45
T.34	2.88	0.863	Vprt	3.8	4.000	8.361		
to		150.0		0.0	3.800	0.0		
H.14	2.88	0.0062		0.0	7.800	0.048		Vel = 1.58
H.14	0.0	0.863		0.0	13.000	8.409		
to		150.0		0.0	0.0	0.0		
H.13	2.88	0.0062		0.0	13.000	0.080		Vel = 1.58
H.13	0.0	0.863	Vptb	18.4	2.000	8.489		
to		150.0	Vprt	3.8	22.200	0.0		
T.36	2.88	0.0062		0.0	24.200	0.150		Vel = 1.58
T.36	0.45	0.863	Vprt	3.8	21.000	8.639		
to		150.0		0.0	3.800	0.0		
H.22	3.33	0.0081		0.0	24.800	0.201		Vel = 1.83
H.22	0.0	0.863		0.0	13.000	8.840		
to		150.0		0.0	0.0	0.0		
T.41	3.33	0.0081		0.0	13.000	0.105		Vel = 1.83
	0.0							
	3.33					8.945		K Factor = 1.11
T.26	0.45	0.863	Vprt	3.8	5.000	8.628		
to		150.0		0.0	3.800	0.0		
H.5	0.45	0.0002		0.0	8.800	0.002		Vel = 0.25
H.5	0.0	0.863	Vprt	3.8	11.000	8.630		
to		150.0		0.0	3.800	0.0		
H.4	0.45	0.0002		0.0	14.800	0.003		Vel = 0.25
H.4	0.0	0.863	Vprt	3.8	10.000	8.633		
to		150.0		0.0	3.800	0.0		
H.3	0.45	0.0001		0.0	13.800	0.002		Vel = 0.25
H.3	0.0	0.863	Vprt	3.8	17.000	8.635		
to		150.0		0.0	3.800	0.0		
T.36	0.45	0.0002		0.0	20.800	0.004		Vel = 0.25
	0.0							
	0.45					8.639		K Factor = 0.15
T.28	2.36	0.863	Vprt	3.8	12.000	17.252		
to		150.0		0.0	3.800	0.0		
H.11	2.36	0.0042		0.0	15.800	0.067		Vel = 1.29
H.11	0.0	0.863	Vprt	3.8	13.000	17.319		
to		150.0		0.0	3.800	0.0		
H.20	2.36	0.0043		0.0	16.800	0.072		Vel = 1.29
H.20	0.0	0.863		0.0	8.000	17.391		
to		150.0		0.0	0.0	0.0		
H.19	2.36	0.0042		0.0	8.000	0.034		Vel = 1.29
H.19	0.0	0.863	Vprt	3.8	7.000	17.425		
to		150.0		0.0	3.800	0.0		
H.16	2.36	0.0043		0.0	10.800	0.046		Vel = 1.29

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	0.0	0.863	Vprt	3.8	7.000	17.471		
to		150.0		0.0	3.800	0.0		
H.10	2.36	0.0043		0.0	10.800	0.046		Vel = 1.29
H.10	0.0	0.863	Vprt	3.8	10.000	17.517		
to		150.0		0.0	3.800	0.0		
H.2	2.36	0.0043		0.0	13.800	0.059		Vel = 1.29
H.2	0.0	0.863	Vprt	3.8	14.000	17.576		
to		150.0		0.0	3.800	0.0		
T.23	2.36	0.0043		0.0	17.800	0.076		Vel = 1.29
	0.0							
	2.36					17.652		K Factor = 0.56