



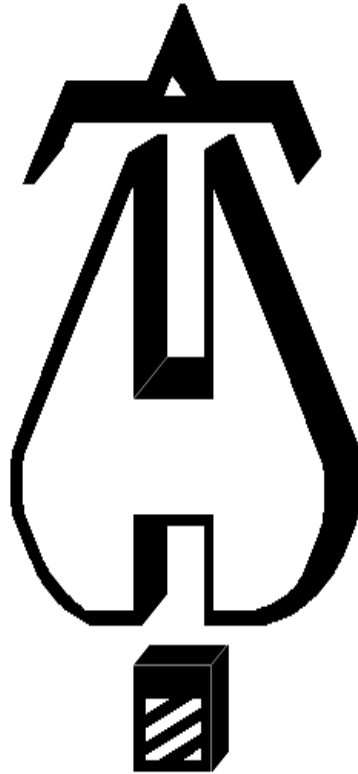
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1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • [www.flsamerica.com](http://www.flsamerica.com)

# OAKHAVEN LOT 19

## HYDRAULIC CALCULATIONS

5/27/2021



Hydraulic calculations using HydraCALC

Fire & Life Safety America  
1731 Roundrock Drive  
Raleigh, NC 27615  
P: (919) 872-3250  
F: (919) 877-5775

Job Name : Oakhaven Lot 19  
Drawing : FP1  
Location : 245 Oakhaven Drive  
Remote Area : RA1  
Contract : 21NC1523  
Data File : RA1- 1st Floor - Bedroom #3.WXF

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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oakhaven Lot 19  
**Location:** 245 Oakhaven Drive  
**Drawing no:** FP1  
**Date:** 5/27/2021

**Design**

**Remote area number:** RA1  
**Remote area location:** 1st Floor- Bedroom #3  
**Occupancy classification:** Residential  
**Density:** .05 - Gpm/SqFt  
**Area of application:** 160 - SqFt  
**Coverage per sprinkler:** 400 - SqFt  
**Type of sprinklers calculated:** VK494  
**No. of sprinklers calculated:** 1  
**In-rack demand:** N/A - GPM  
**Hose streams:** 3 - GPM  
**Total water required (including hose streams):** 23.03 - GPM @ 30.48 - Psi  
**Type of system:** WET  
**Volume of dry or preaction system:** N/A - Gal

**Water supply information**

**Date:** 4/21/2021  
**Location:** NC 42, NC 27540  
**Source:** Fire & Life Safety America

**Name of contractor:** Fire & Life Safety America  
**Address:** 1731 Roundrock Drive / Raleigh, NC 27615 / P: (919) 872-3250  
**Phone number:** F: (919) 877-57  
**Name of designer:** H. WEYANT  
**Authority having jurisdiction:** HARNETT COUNTY  
**Notes: (Include peaking information or gridded systems here.)**

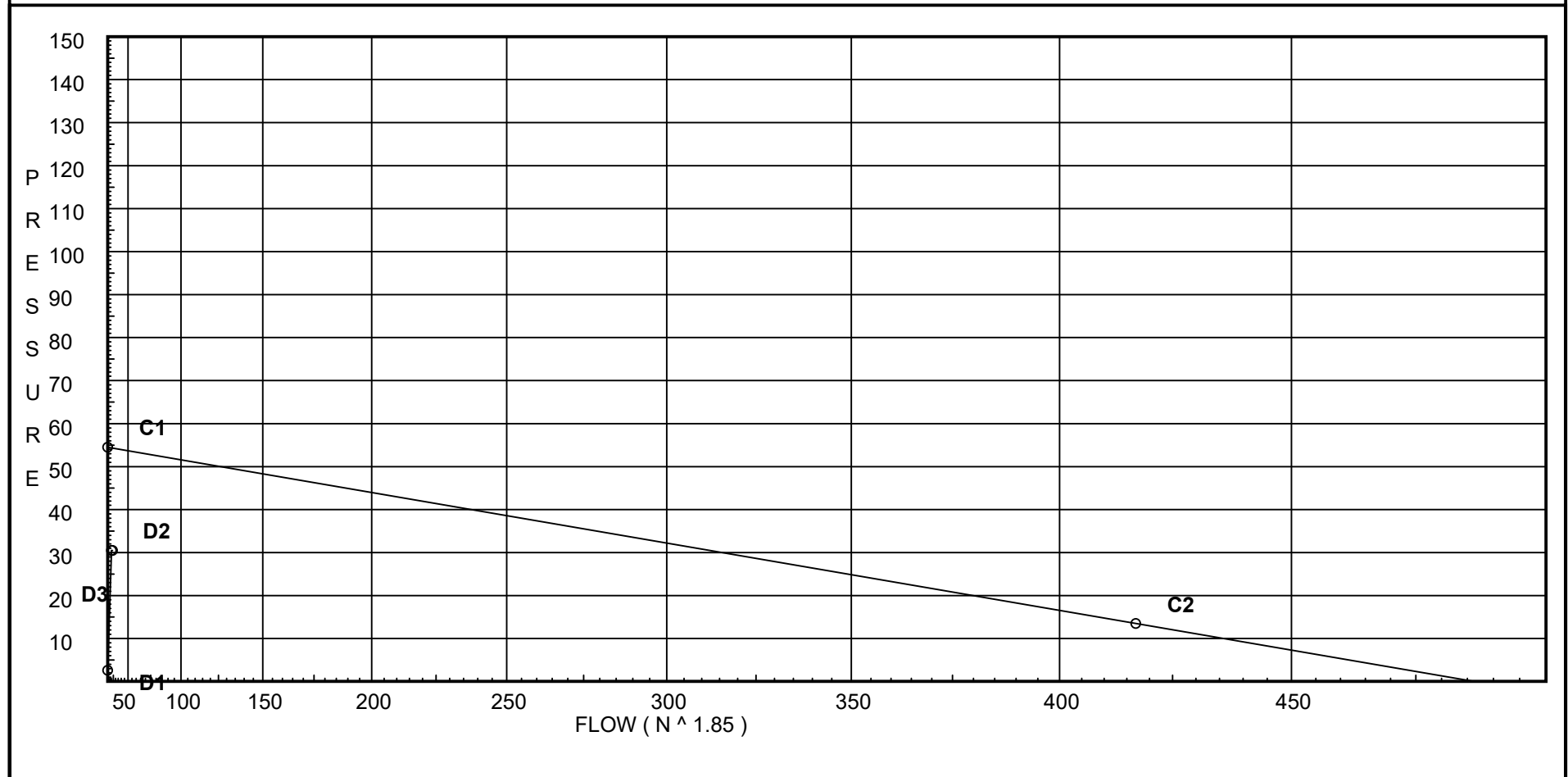
# Water Supply Curve C

Fire & Life Safety America  
Oakhaven Lot 19

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City Water Supply:  
C1 - Static Pressure : 54.5  
C2 - Residual Pressure: 13.5  
C2 - Residual Flow : 417

Demand:  
D1 - Elevation : 2.599  
D2 - System Flow : 20.024  
D2 - System Pressure : 30.477  
Hose ( Demand ) : 3  
D3 - System Demand : 23.024  
Safety Margin : 23.830



# Fittings Used Summary

Fire & Life Safety America  
Oakhaven Lot 19

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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	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'El Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

## Units Summary

Diameter Units                      Inches  
 Length Units                         Feet  
 Flow Units                            US Gallons per Minute  
 Pressure Units                       Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with \*. The fittings marked with a \* show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a \* will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

**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>
TEST	54.5	13.5	417.0	54.307	23.02	30.477

**NODE ANALYSIS**

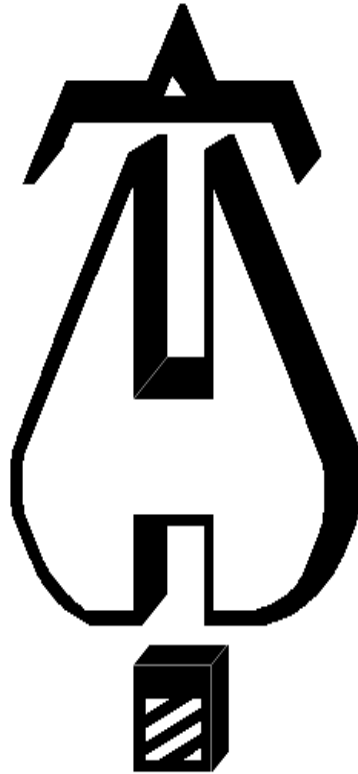
<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
S101	9.0	4.9	16.7	20.02	
101	10.0		16.81		
M101	10.0		18.19		
M102	10.0		21.82		
TOR	8.0		24.37		
BOR	3.0		27.56		
UG1	3.0		28.35	3.0	
UG2	-3.0		33.02		
UG3	-3.0		33.05		
TEST	3.0		30.48		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oakhaven Lot 19

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
S101 to 101	9 10	4.90	20.02 20.02	1 1.101	N	7.0 0.0 0.0	1.000 7.000 8.000	150 0.0681	16.700 -0.433 0.545		Vel = 6.75	
101			0.0 20.02						16.812		K Factor = 4.88	
101 to M101	10 10		20.02 20.02	1 1.101	N O	7.0 5.0 0.0	8.208 12.000 20.208	150 0.0682	16.812 0.0 1.378		Vel = 6.75	
M101 to M102	10 10		0.0 20.02	1 1.101	N	7.0 0.0 0.0	46.167 7.000 53.167	150 0.0682	18.190 0.0 3.626		Vel = 6.75	
M102 to TOR	10 8		0.0 20.02	1 1.101	N	7.0 0.0 0.0	17.750 7.000 24.750	150 0.0682	21.816 0.866 1.688		Vel = 6.75	
TOR			0.0 20.02						24.370		K Factor = 4.06	
TOR to BOR	8 3		20.02 20.02	1 1.101	N	7.0 0.0 0.0	8.000 7.000 15.000	150 0.0681	24.370 2.166 1.022		Vel = 6.75	
BOR to UG1	3 3		0.0 20.02	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.0682	27.558 0.0 0.795		Vel = 6.75	
UG1 to UG2	3 -3	H3	3.00 23.02	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0280	28.353 2.599 2.071		Vel = 4.84	
UG2 to UG3	-3 -3		0.0 23.02	6 6.09	2G 3E 2F	9.25 64.749 21.583	1314.167 95.581 1409.748	150 0	33.023 0.0 0.030		Vel = 0.25	
UG3 to TEST	-3 3		0.0 23.02	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150 0	33.053 -2.599 0.023		Vel = 0.25	
TEST			0.0 23.02						30.477		K Factor = 4.17	



Hydraulic calculations using HydraCALC

Fire & Life Safety America  
1731 Roundrock Drive  
Raleigh, NC 27615  
P: (919) 872-3250  
F: (919) 877-5775

Job Name : Oakhaven Lot 19  
Drawing : FP1  
Location : 245 Oakhaven Drive  
Remote Area : RA2  
Contract : 21NC1523  
Data File : RA2- 2nd Floor Bonus Room.WXF



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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oakhaven Lot 19  
**Location:** 245 Oakhaven Drive  
**Drawing no:** FP1  
**Date:** 5/27/2021

**Design**

**Remote area number:** RA2  
**Remote area location:** 2ND FLOOR- BONUS ROOM  
**Occupancy classification:** RESIDENTIAL  
**Density:** .05 - Gpm/SqFt  
**Area of application:** 263 - SqFt  
**Coverage per sprinkler:** 196 - SqFt  
**Type of sprinklers calculated:** VK494  
**No. of sprinklers calculated:** 2  
**In-rack demand:** N/A - GPM  
**Hose streams:** 3 - GPM  
**Total water required (including hose streams):** 29.31 - GPM @ 29.12 - Psi  
**Type of system:** WET  
**Volume of dry or preaction system:** N/A - Gal

**Water supply information**

**Date:** 4/21/2021  
**Location:** NC 42, NC 27540  
**Source:** Fire & Life Safety America

**Name of contractor:** Fire & Life Safety America  
**Address:** 1731 Roundrock Drive / Raleigh, NC 27615 / P: (919) 872-3250  
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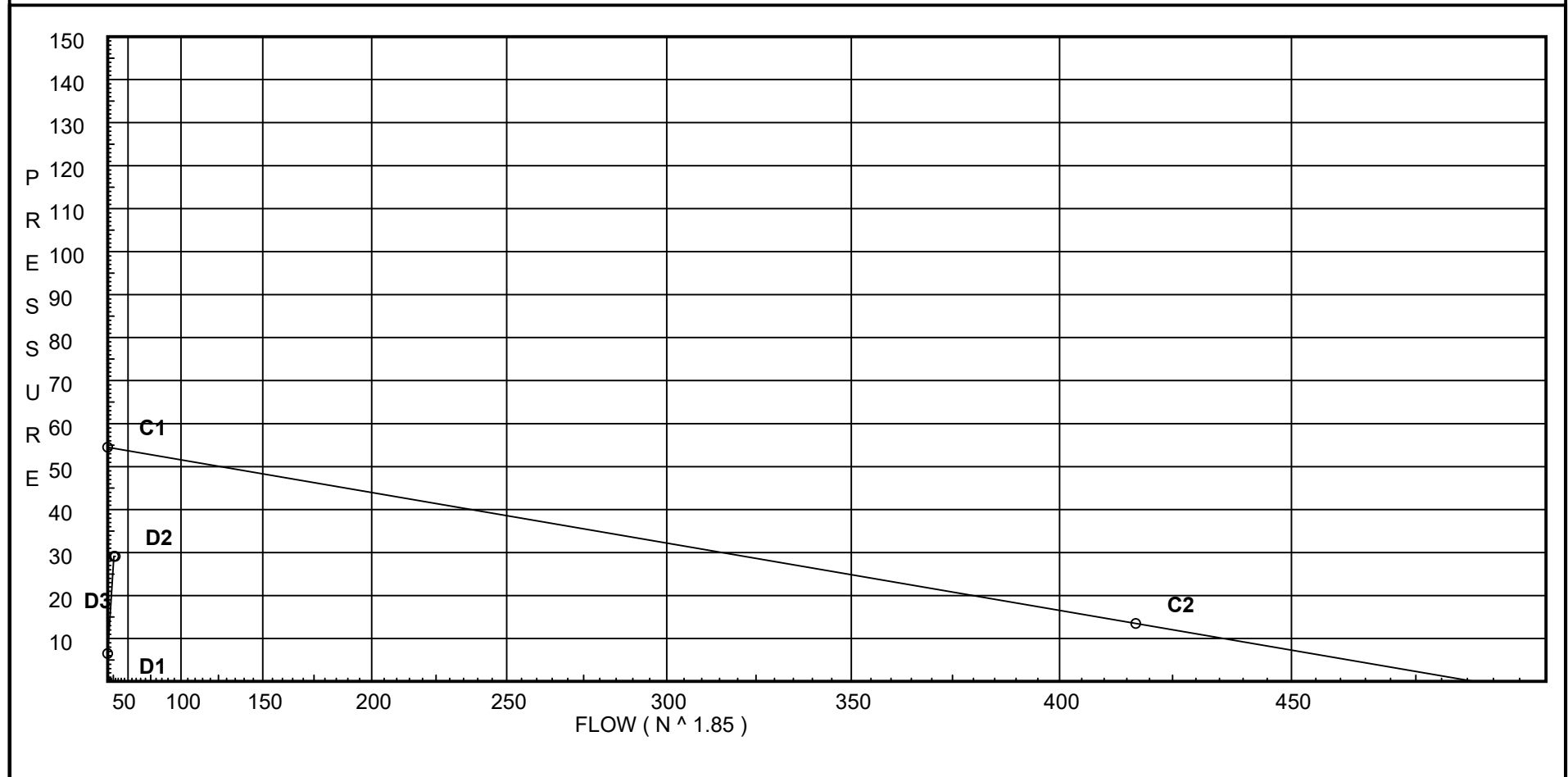
# Water Supply Curve C

Fire & Life Safety America  
Oakhaven Lot 19

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Date 5/27/2021

City Water Supply:  
C1 - Static Pressure : 54.5  
C2 - Residual Pressure: 13.5  
C2 - Residual Flow : 417

Demand:  
D1 - Elevation : 6.496  
D2 - System Flow : 26.311  
D2 - System Pressure : 29.121  
Hose ( Demand ) : 3  
D3 - System Demand : 29.311  
Safety Margin : 25.078



# Fittings Used Summary

Fire & Life Safety America  
Oakhaven Lot 19

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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	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
N *	CPVC 90'El Harvel-Spears		7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121

## Units Summary

Diameter Units                   Inches  
Length Units                       Feet  
Flow Units                         US Gallons per Minute  
Pressure Units                   Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with \*. The fittings marked with a \* show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a \* will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

**SUPPLY ANALYSIS**

<b>Node at Source</b>	<b>Static Pressure</b>	<b>Residual Pressure</b>	<b>Flow</b>	<b>Available Pressure</b>	<b>Total Demand</b>	<b>Required Pressure</b>
TEST	54.5	13.5	417.0	54.198	29.31	29.121

**NODE ANALYSIS**

<b>Node Tag</b>	<b>Elevation</b>	<b>Node Type</b>	<b>Pressure at Node</b>	<b>Discharge at Node</b>	<b>Notes</b>
S201	18.0	4.9	7.0	12.96	
S202	18.0	4.9	7.42	13.35	
201	19.0		7.06		
202	19.0		7.44		
M201	19.0		10.25		
M202	10.0		16.01		
TOR	8.0		20.62		
BOR	3.0		24.48		
UG1	3.0		25.8	3.0	
UG2	-3.0		31.63		
UG3	-3.0		31.68		
TEST	3.0		29.12		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oakhaven Lot 19

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Date 5/27/2021

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
S201 to 201	18 19	4.90	12.96 12.96	1 1.101	2N	14.0 0.0 0.0	2.000 14.000 16.000	150 0.0305	7.000 -0.433 0.488		Vel = 4.37	
201			0.0 12.96						7.055		K Factor = 4.88	
S202 to 202	18 19	4.90	13.35 13.35	1 1.101	N O	7.0 5.0 0.0	2.000 12.000 14.000	150 0.0321	7.419 -0.433 0.450		Vel = 4.50	
202			0.0 13.35						7.436		K Factor = 4.90	
201 to 202	19 19		12.96 12.96	1 1.101		0.0 0.0 0.0	12.500 0.0 12.500	150 0.0305	7.055 0.0 0.381		Vel = 4.37	
202			0.0 12.96						7.436		K Factor = 4.75	
202 to M201	19 19		26.31 26.31	1 1.101	2N	14.0 0.0 0.0	10.917 14.000 24.917	150 0.1130	7.436 0.0 2.816		Vel = 8.87	
M201 to M202	19 10		0.0 26.31	1 1.101	N	7.0 0.0 0.0	9.500 7.000 16.500	150 0.1130	10.252 3.898 1.865		Vel = 8.87	
M202 to TOR	10 8		0.0 26.31	1 1.101	2N O	14.0 5.0 0.0	14.083 19.000 33.083	150 0.1130	16.015 0.866 3.739		Vel = 8.87	
TOR			0.0 26.31						20.620		K Factor = 5.79	
TOR to BOR	8 3		26.31 26.31	1 1.101	N	7.0 0.0 0.0	8.000 7.000 15.000	150 0.1129	20.620 2.166 1.694		Vel = 8.87	
BOR to UG1	3 3		0.0 26.31	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.1130	24.480 0.0 1.317		Vel = 8.87	
UG1 to UG2	3 -3	H3	3.00 29.31	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0437	25.797 2.599 3.238		Vel = 6.16	
UG2 to UG3	-3 -3		0.0 29.31	6 6.09	2G 3E 2F	9.25 64.749 21.583	1314.167 95.581 1409.748	150 0	31.634 0.0 0.046		Vel = 0.32	
UG3 to TEST	-3 3		0.0 29.31	6 6.16	T 2E G	43.037 40.168 4.304	1000.000 87.509 1087.509	140 0	31.680 -2.599 0.040		Vel = 0.32	
TEST			0.0 29.31						29.121		K Factor = 5.43	