



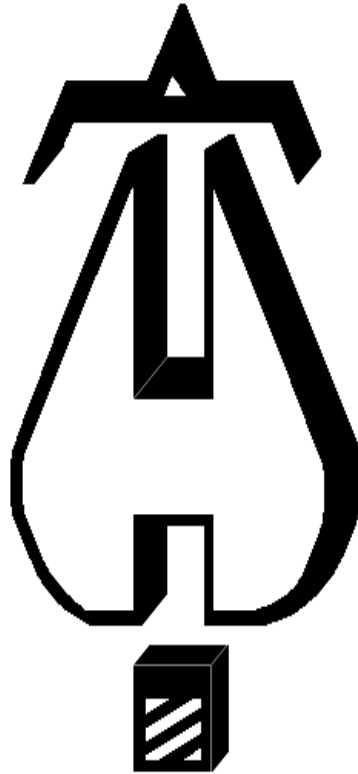
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1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • [www.flsamerica.com](http://www.flsamerica.com)

# OAKHAVEN LOT 18

## HYDRAULIC CALCULATIONS

5/25/2021



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 18  
Drawing : FP1  
Location : 265 Oakhaven Drive  
Remote Area : RA1  
Contract : 21NC1522  
Data File : RA1- 2nd Floor Bedroom #2.WXF

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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oakhaven Lot 18  
**Location:** 265 Oakhaven Drive  
**Drawing no:** FP1  
**Date:** 5/24/2021

**Design**

**Remote area number:** RA1  
**Remote area location:** 2ND FLOOR - BEDROOM #2  
**Occupancy classification:** RESIDENTIAL  
**Density:** .05 - Gpm/SqFt  
**Area of application:** 166 - 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 @ 34.18 - 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.)**

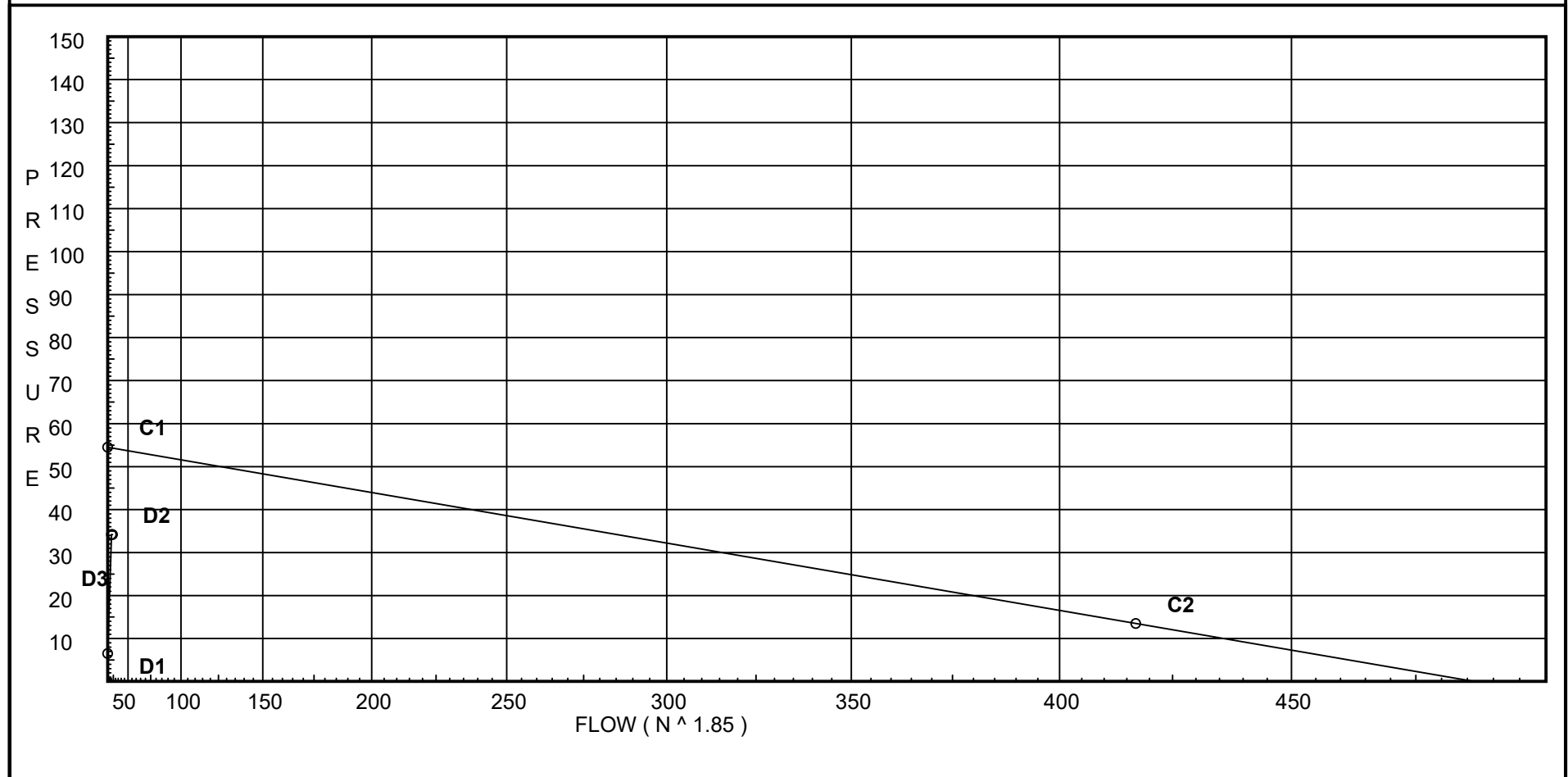
# Water Supply Curve C

Fire & Life Safety America  
Oakhaven Lot 18

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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 : 20.024  
D2 - System Pressure : 34.183  
Hose ( Demand ) : 3  
D3 - System Demand : 23.024  
Safety Margin : 20.124



# Fittings Used Summary

Fire & Life Safety America  
Oakhaven Lot 18

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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	54.307	23.02	34.183

**NODE ANALYSIS**

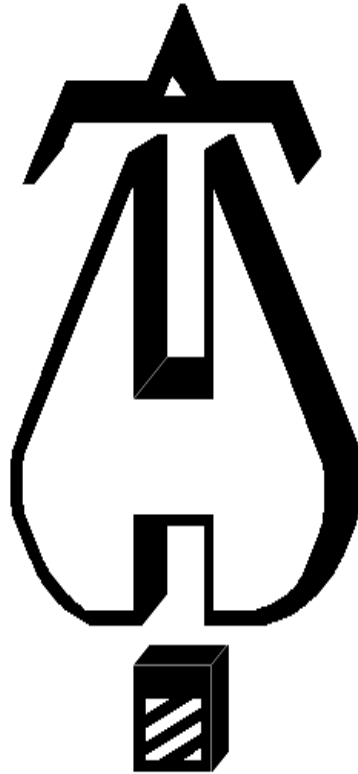
<b>Node Tag</b>	<b>Elevation</b>	<b>Node Type</b>	<b>Pressure at Node</b>	<b>Discharge at Node</b>	<b>Notes</b>
S101	18.0	4.9	16.7	20.02	
101	19.0		16.81		
M101	19.0		18.18		
M102	10.0		23.06		
M103	10.0		24.17		
TOR	8.0		28.07		
BOR	3.0		31.26		
UG1	3.0		32.05	3.0	
UG2	-3.0		36.73		
UG3	-3.0		36.76		
TEST	3.0		34.18		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oakhaven Lot 18

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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	18 19	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	19 19		20.02 20.02	1 1.101	N O	7.0 5.0 0.0	8.000 12.000 20.000	150 0.0682	16.812 0.0 1.364			Vel = 6.75
M101 to M102	19 10		0.0 20.02	1 1.101	O	5.0 0.0 0.0	9.500 5.000 14.500	150 0.0682	18.176 3.898 0.989			Vel = 6.75
M102 to M103	10 10		0.0 20.02	1 1.101	O	5.0 0.0 0.0	11.167 5.000 16.167	150 0.0682	23.063 0.0 1.103			Vel = 6.75
M103 to TOR	10 8		0.0 20.02	1 1.101	2N	14.0 0.0 0.0	30.583 14.000 44.583	150 0.0682	24.166 0.866 3.040			Vel = 6.75
TOR			0.0 20.02						28.072			K Factor = 3.78
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	28.072 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	31.260 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	32.055 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	1511.000 95.581 1606.581	150 0	36.725 0.0 0.034			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	36.759 -2.599 0.023			Vel = 0.25
TEST			0.0 23.02						34.183			K Factor = 3.94



Hydraulic calculations using HydraCALC

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1731 Roundrock Drive  
Raleigh, NC 27615  
P: (919) 872-3250  
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Job Name : Oakhaven Lot 18  
Drawing : FP1  
Location : 265 Oakhaven Drive  
Remote Area : RA2  
Contract : 21NC1522  
Data File : RA2- 2nd Floor Bonus Room.WXF



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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oakhaven Lot 18  
**Location:** 265 Oakhaven Drive  
**Drawing no:** FP1  
**Date:** 5/24/2021

**Design**

**Remote area number:** RA2  
**Remote area location:** 2ND FLOOR- BONUS ROOM  
**Occupancy classification:** RESIDENTIAL  
**Density:** .05 - Gpm/SqFt  
**Area of application:** 276 - 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):** 29.27 - GPM @ 28.87 - 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  
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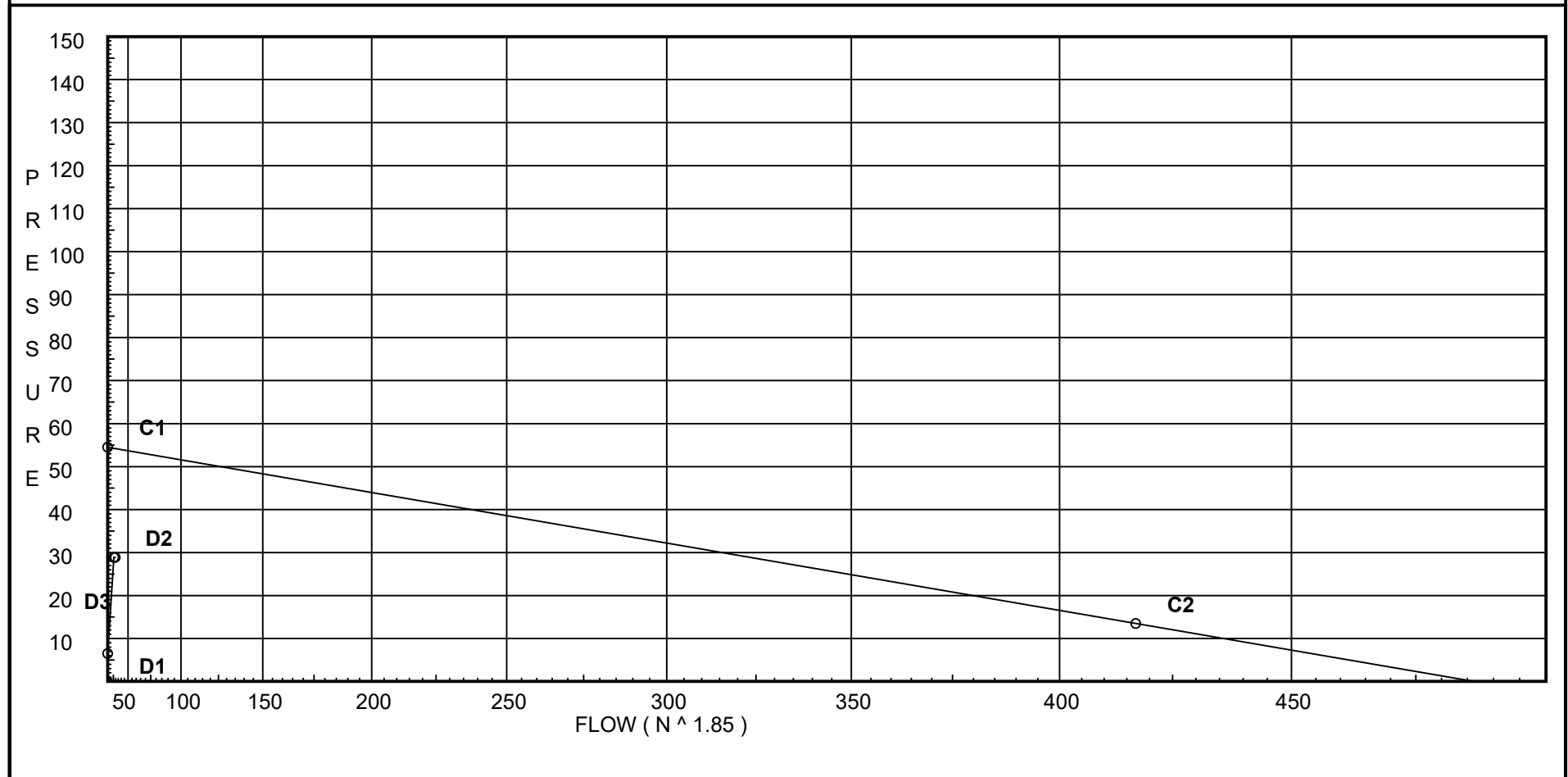
# Water Supply Curve C

Fire & Life Safety America  
Oakhaven Lot 18

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Date 5/24/2021

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 : 26.268  
D2 - System Pressure : 28.868  
Hose ( Demand ) : 3  
D3 - System Demand : 29.268  
Safety Margin : 25.332



# Fittings Used Summary

Fire & Life Safety America  
Oakhaven Lot 18

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## Fitting Legend

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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	54.199	29.27	28.868

**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>
S201	18.0	4.9	7.0	12.96	
S202	18.0	4.9	7.37	13.3	
201	19.0		7.02		
202	19.0		7.36		
M201	19.0		9.86		
M202	10.0		15.62		
TOR	8.0		20.38		
BOR	3.0		24.24		
UG1	3.0		25.55	3.0	
UG2	-3.0		31.38		
UG3	-3.0		31.43		
TEST	3.0		28.87		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oakhaven Lot 18

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Date 5/24/2021

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	1.000 14.000 15.000	150 0.0305	7.000 -0.433 0.458		Vel = 4.37	
201			0.0 12.96						7.025		K Factor = 4.89	
S202 to 202	18 19	4.90	13.30 13.3	1 1.101	N O	7.0 5.0 0.0	1.000 12.000 13.000	150 0.0320	7.372 -0.433 0.416		Vel = 4.48	
202			0.0 13.30						7.355		K Factor = 4.90	
201 to 202	19 19		12.96 12.96	1 1.101		0.0 0.0 0.0	10.833 0.0 10.833	150 0.0305	7.025 0.0 0.330		Vel = 4.37	
202			0.0 12.96						7.355		K Factor = 4.78	
202 to M201	19 19		26.27 26.27	1 1.101	O N	5.0 7.0 0.0	10.250 12.000 22.250	150 0.1127	7.355 0.0 2.507		Vel = 8.85	
M201 to M202	19 10		0.0 26.27	1 1.101	N	7.0 0.0 0.0	9.500 7.000 16.500	150 0.1127	9.862 3.898 1.859		Vel = 8.85	
M202 to TOR	10 8		0.0 26.27	1 1.101	2N O	14.0 5.0 0.0	15.583 19.000 34.583	150 0.1127	15.619 0.866 3.897		Vel = 8.85	
TOR			0.0 26.27						20.382		K Factor = 5.82	
TOR to BOR	8 3		26.27 26.27	1 1.101	N	7.0 0.0 0.0	8.000 7.000 15.000	150 0.1126	20.382 2.166 1.689		Vel = 8.85	
BOR to UG1	3 3		0.0 26.27	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.1127	24.237 0.0 1.313		Vel = 8.85	
UG1 to UG2	3 -3	H3	3.00 29.27	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0436	25.550 2.599 3.229		Vel = 6.15	
UG2 to UG3	-3 -3		0.0 29.27	6 6.09	2G 3E 2F	9.25 64.749 21.583	1511.000 95.581 1606.581	150 0	31.378 0.0 0.054		Vel = 0.32	
UG3 to TEST	-3 3		0.0 29.27	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150 0	31.432 -2.599 0.035		Vel = 0.32	
TEST			0.0 29.27						28.868		K Factor = 5.45	