



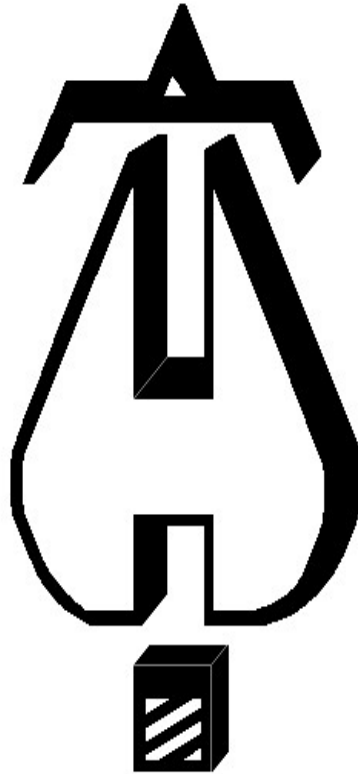
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1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • [www.flsamerica.com](http://www.flsamerica.com)

# OAKHAVEN LOT 21

## HYDRAULIC CALCULATIONS

12/20/2021



Hydraulic calculations using HydraCALC

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

Job Name : Oak Haven Lot 21 - RA1  
Drawing : FP1  
Location : 54 Buckhaven Drive  
Remote Area : RA1  
Contract : 22NC1552  
Data File : RA1.WXF

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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oak Haven Lot 21  
**Location:** 54 Buckhaven Drive  
**Drawing no:** FP1  
**Date:** 12/20/2021

**Design**

**Remote area number:** RA1  
**Remote area location:** Master Bedroom  
**Occupancy classification:** Residential  
**Density:** .05 - Gpm/SqFt  
**Area of application:** 230 - 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):** 23.02 - GPM @ 29.54 - 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  
Oak Haven Lot 21 - RA1

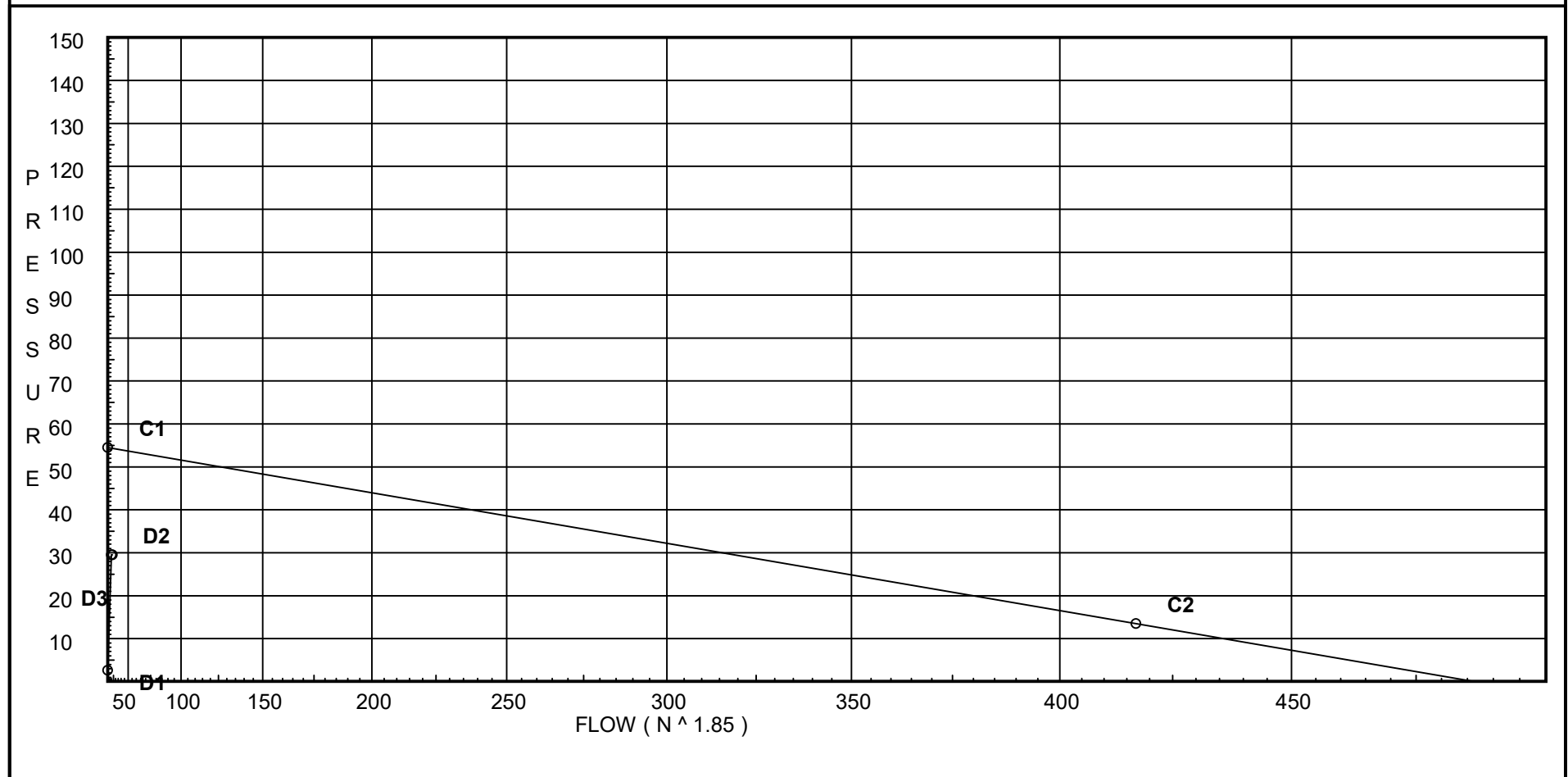
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### City Water Supply:

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 : 29.537  
Hose ( Demand ) : 3  
D3 - System Demand : 23.024  
Safety Margin : 24.770



# Fittings Used Summary

Fire & Life Safety America  
Oak Haven Lot 21 - RA1

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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.

# Flow Summary - NFPA

Fire & Life Safety America  
Oak Haven Lot 21 - RA1

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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>
TEST	54.5	13.5	417.0	54.307	23.02	29.537

## NODE ANALYSIS

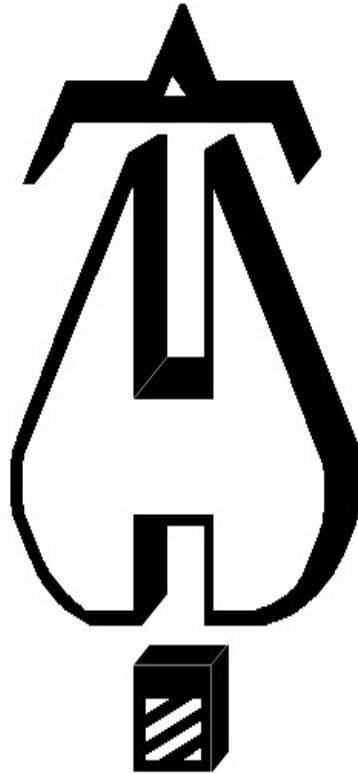
<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
S101	9.0	4.9	16.7	20.02	
101	10.0		17.32		
M101	10.0		18.16		
M102	10.0		19.28		
M103	10.0		20.77		
TOR	8.0		23.42		
BOR	3.0		26.61		
UG1	3.0		27.41	3.0	
UG2	-3.0		32.08		
UG3	-3.0		32.11		
TEST	3.0		29.54		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oak Haven Lot 21 - RA1

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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	1	2N	14.0 0.0	1.500 14.000	150	16.700 -0.433			
			20.02	1.101		0.0	15.500	0.0682	1.057		Vel = 6.75	
			0.0									
101			20.02						17.324		K Factor = 4.81	
101 to M101	10 10		20.02	1	O	5.0 0.0	7.250 5.000	150	17.324 0.0			
			20.02	1.101		0.0	12.250	0.0682	0.835		Vel = 6.75	
			0.0									
M101			20.02						18.159		K Factor = 4.70	
M101 to M102	10 10		20.02	1	O	5.0 0.0	11.375 5.000	150	18.159 0.0			
			20.02	1.101		0.0	16.375	0.0682	1.117		Vel = 6.75	
M102 to M103	10 10		0.0	1	O	5.0 0.0	16.917 5.000	150	19.276 0.0			
			20.02	1.101		0.0	21.917	0.0682	1.494		Vel = 6.75	
M103 to TOR	10 8		0.0	1	2O	10.0 0.0	16.208 10.000	150	20.770 0.866			
			20.02	1.101		0.0	26.208	0.0682	1.788		Vel = 6.75	
			0.0									
TOR			20.02						23.424		K Factor = 4.14	
TOR to BOR	8 3		20.02	1	N	7.0 0.0	8.000 7.000	150	23.424 2.166			
			20.02	1.101		0.0	15.000	0.0681	1.022		Vel = 6.75	
BOR to UG1	3 3		0.0	1	2E	7.65 0.0	4.000 7.650	150	26.612 0.0			
			20.02	1.101		0.0	11.650	0.0682	0.795		Vel = 6.75	
UG1 to UG2	3 -3	H3	3.00	1.25	T 2E	9.523 9.523	55.000 19.046	150	27.407 2.599			
			23.02	1.394		0.0	74.046	0.0280	2.071		Vel = 4.84	
UG2 to UG3	-3 -3		0.0	6	2G 3E	9.25 64.749	1486.417 95.581	150	32.077 0.0			
			23.02	6.09	2F	21.583	1581.998	0	0.034		Vel = 0.25	
UG3 to TEST	-3 3		0.0	6	T 2E	43.037 40.168	1000.000 87.509	140	32.111 -2.599			
			23.02	6.16	G	4.304	1087.509	0	0.025		Vel = 0.25	
			0.0									
TEST			23.02						29.537		K Factor = 4.24	



Hydraulic calculations using HydraCALC

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

Job Name : Oak Haven Lot 21 - RA2  
Drawing : FP1  
Location : 54 BUCKHAVEN DR  
Remote Area : RA2  
Contract : 22NC1552  
Data File : RA2.WXF



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**HYDRAULIC CALCULATIONS**  
**for**

**Project name:** Oak Haven Lot 21

**Location:** 54 BUCKHAVEN DR

**Drawing no:** FP1

**Date:** 4/22/2021

**Design**

**Remote area number:** RA2

**Remote area location:** KITCHEN/NOOK

**Occupancy classification:** Residential

**Density:** .05 - Gpm/SqFt

**Area of application:** 333 - SqFt

**Coverage per sprinkler:** 256 - 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):** 28.99 - GPM @ 23.88 - 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  
Oak Haven Lot 21 - RA2

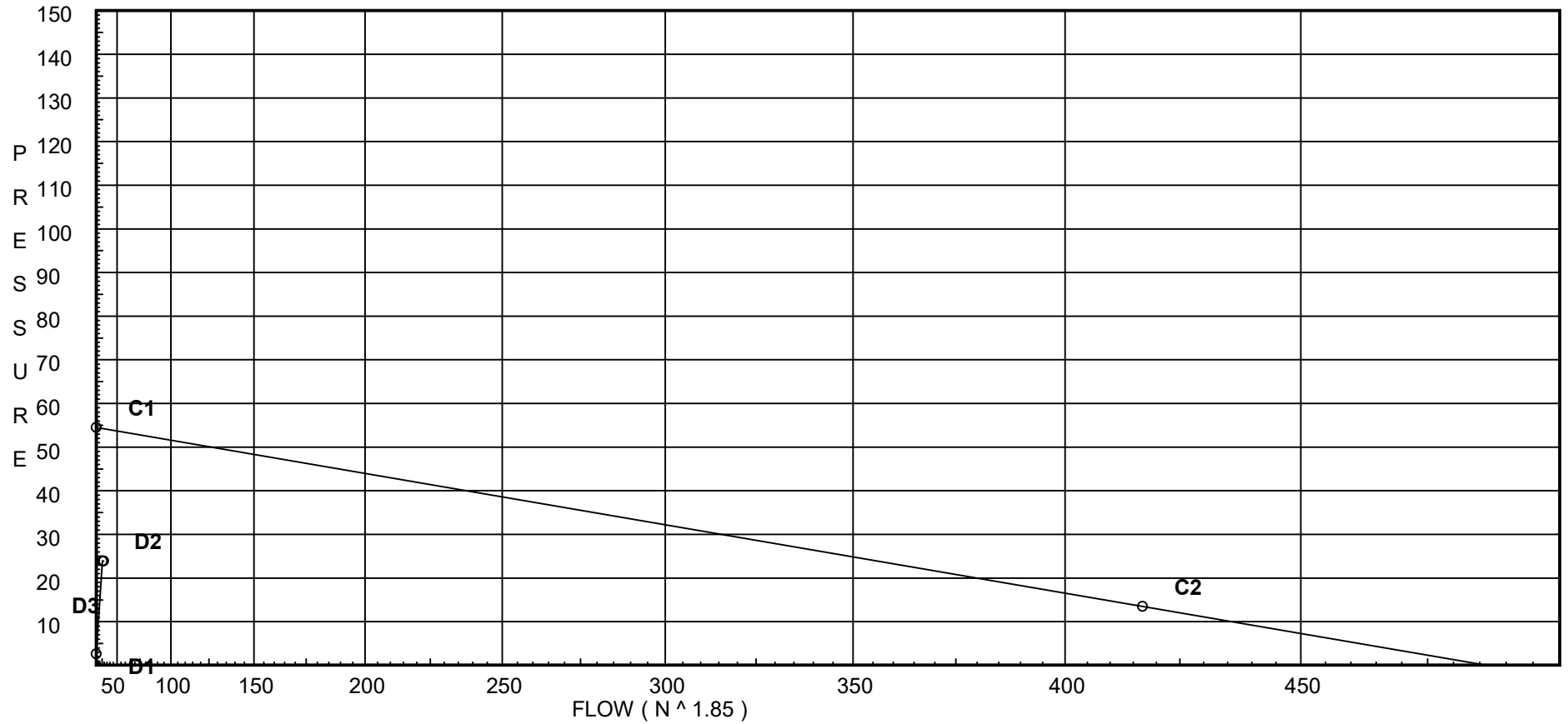
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Date 4/22/2021

## 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 : 25.993  
D2 - System Pressure : 23.877  
Hose ( Demand ) : 3  
D3 - System Demand : 28.993  
Safety Margin : 30.327



# Fittings Used Summary

Fire & Life Safety America  
Oak Haven Lot 21 - RA2

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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
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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	54.204	28.99	23.877

**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	9.0	4.9	7.0	12.96	
S202	9.0	4.9	7.07	13.03	
201	10.0		6.81		
202	10.0		6.88		
M201	10.0		7.09		
M102	10.0		8.88		
M103	10.0		11.3		
TOR	8.0		15.5		
BOR	3.0		19.33		
UG1	3.0		20.61	3.0	
UG2	-3.0		26.39		
UG3	-3.0		26.44		
TEST	3.0		23.88		

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oak Haven Lot 21 - RA2

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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	*****
S201 to 201	9 10	4.90	12.96 12.96	1 1.101	N 0.0	7.0 0.0 8.000	150 0.0305	7.000 -0.433 0.244		Vel = 4.37	
201			0.0 12.96					6.811		K Factor = 4.97	
S202 to 202	9 10	4.90	13.03 13.03	1 1.101	N 0.0	7.0 0.0 8.000	150 0.0308	7.070 -0.433 0.246		Vel = 4.39	
202			0.0 13.03					6.883		K Factor = 4.97	
201 to M201	10 10		12.96 12.96	1 1.101	O 0.0	5.0 0.0 9.208	150 0.0305	6.811 0.0 0.281		Vel = 4.37	
M201			0.0 12.96					7.092		K Factor = 4.87	
202 to M201	10 10		13.03 13.03	1 1.101		0.0 0.0 6.792	150 0.0308	6.883 0.0 0.209		Vel = 4.39	
M201			0.0 13.03					7.092		K Factor = 4.89	
M201 to M102	10 10		25.99 25.99	1 1.101	O 0.0	5.0 0.0 16.167	150 0.1105	7.092 0.0 1.786		Vel = 8.76	
M102 to M103	10 10		0.0 25.99	1 1.101	O 0.0	5.0 0.0 21.917	150 0.1105	8.878 0.0 2.422		Vel = 8.76	
M103 to TOR	10 8		0.0 25.99	1 1.101	2N 0.0	14.0 0.0 30.208	150 0.1105	11.300 0.866 3.338		Vel = 8.76	
TOR			0.0 25.99					15.504		K Factor = 6.60	
TOR to BOR	8 3		25.99 25.99	1 1.101	N 0.0	7.0 0.0 7.000	150 0.1105	15.504 2.166 1.657		Vel = 8.76	
BOR to UG1	3 3		0.0 25.99	1 1.101	2E 0.0	7.65 0.0 7.650	150 0.1105	19.327 0.0 1.287		Vel = 8.76	
UG1 to UG2	3 -3	H3	3.00 28.99	1.25 1.394	T 2E 0.0	9.523 9.523 74.046	150 0.0429	20.614 2.599 3.173		Vel = 6.09	
UG2 to UG3	-3 -3		0.0 28.99	6 6.09	2G 3E 2F	9.25 64.749 21.583	150 0	1486.417 95.581 1581.998		Vel = 0.32	
UG3 to TEST	-3 3		0.0 28.99	6 6.16	T 2E G	43.037 40.168 4.304	1000.000 87.509 1087.509	140 -2.599 0	26.438 -2.599 0.038	Vel = 0.31	
TEST			0.0 28.99					23.877		K Factor = 5.93	

# Final Calculations : Hazen-Williams

Fire & Life Safety America  
Oak Haven Lot 21 - RA2

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Node1	Elev1	K	Qa	Nom	Fitting		Pipe	CFact	Pt			
to					or		Ftngs		Pe	*****	Notes	*****
Node2	Elev2	Fact	Qt	Act	Equiv	Len	Total	Pf/Ft	Pf			

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