

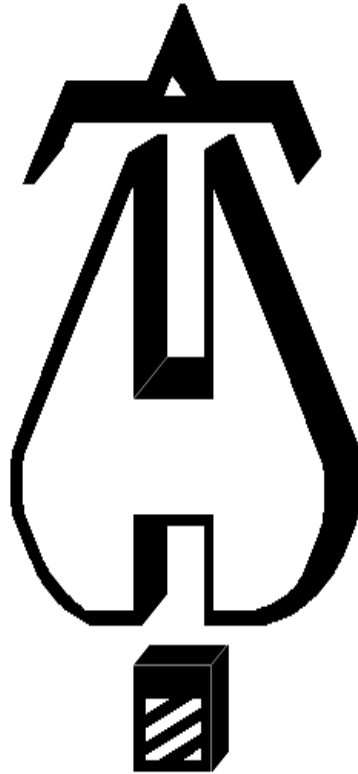


1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • www.flsamerica.com

OAKHAVEN LOT 16

HYDRAULIC CALCULATIONS

8/30/2021



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 16- Master Bedroom
Drawing : FP1
Location : 301 Oakhaven Drive
Remote Area : RA1
Contract : 21NC1534
Data File : RA1- Master Bedroom.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oakhaven Lot 16
Location: 301 Oakhaven Drive
Drawing no: FP1
Date: 8/30/2021

Design

Remote area number: RA1
Remote area location: Master Bedroom
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: 225 - 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 @ 28.33 - 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.)

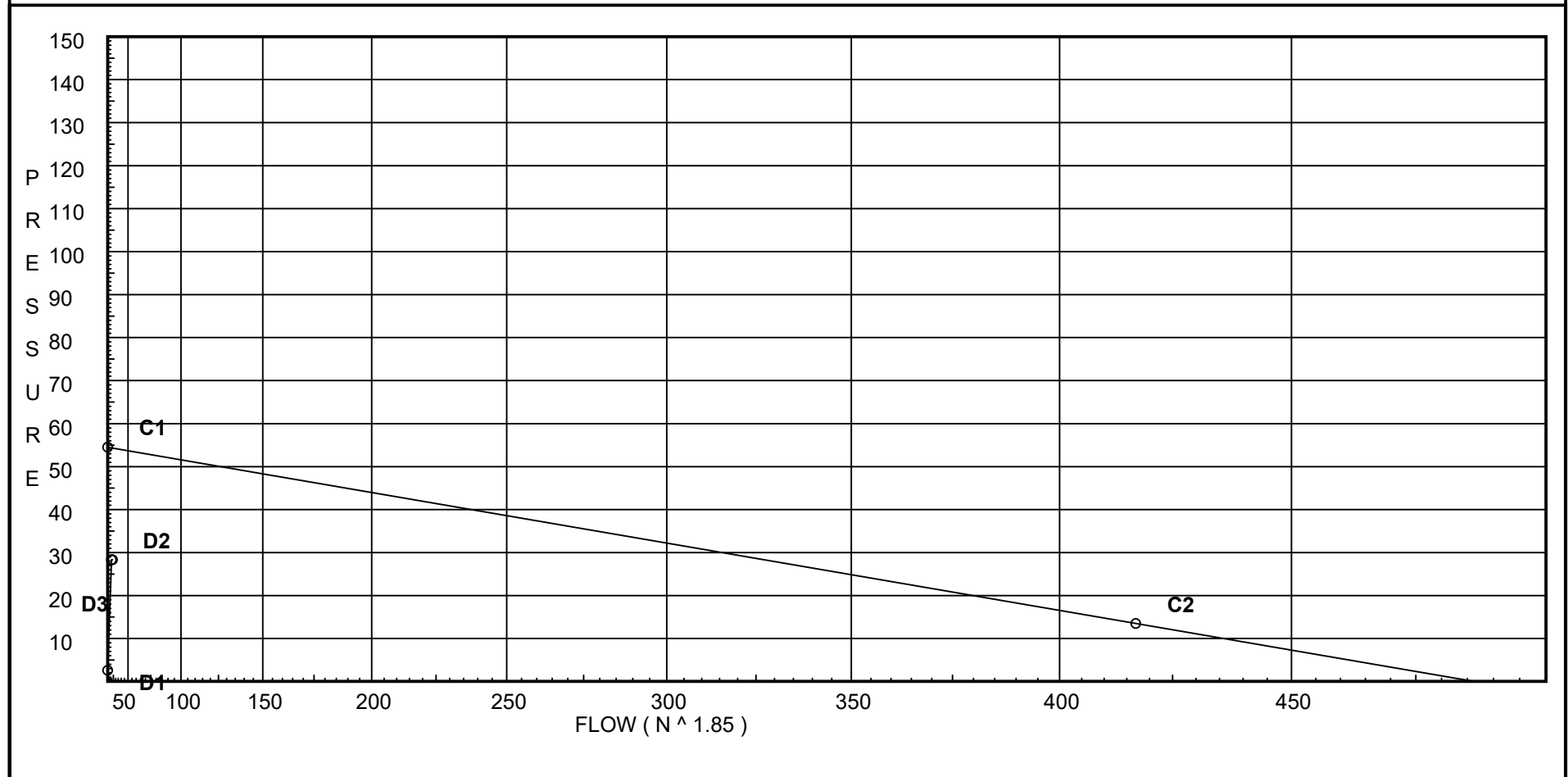
Water Supply Curve C

Fire & Life Safety America
Oakhaven Lot 16- Master Bedroom

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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 : 28.331
Hose (Demand) : 3
D3 - System Demand : 23.024
Safety Margin : 25.976



Fittings Used Summary

Fire & Life Safety America
Oakhaven Lot 16- Master Bedroom

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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
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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'Ell 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
Oakhaven Lot 16- Master Bedroom

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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	28.331

NODE ANALYSIS

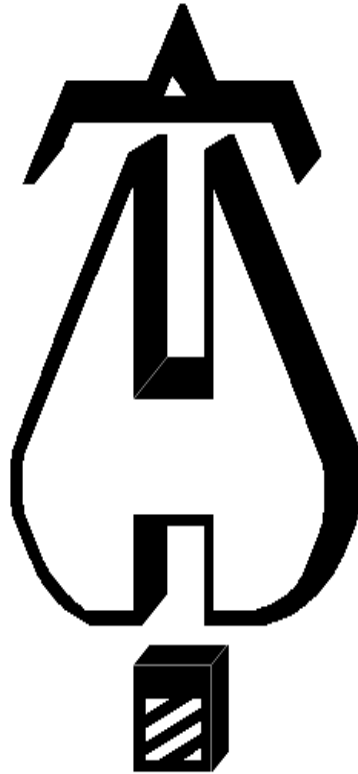
<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
S101	9.0	4.9	16.7	20.02	
101	10.0		16.81		
M101	10.0		17.43		
M203	10.0		18.37		
M102	10.0		18.71		
TOR	8.0		21.92		
BOR	3.0		25.4		
UG1	3.0		26.2	3.0	
UG2	-3.0		30.87		
UG3	-3.0		30.91		
TEST	3.0		28.33		

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 16- Master Bedroom

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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	O	5.0 0.0 0.0	4.000 5.000 9.000	150 0.0682	16.812 0.0 0.614		Vel = 6.75	
M101 to M203	10 10		-10.95 9.07	1 1.101	2O N	10.0 7.0 0.0	42.917 17.000 59.917	150 0.0158	17.426 0.0 0.945		Vel = 3.06	
M203 to M102	10 10		0.0 9.07	1 1.101	O	5.0 0.0 0.0	16.500 5.000 21.500	150 0.0158	18.371 0.0 0.339		Vel = 3.06	
M102			0.0 9.07						18.710		K Factor = 2.10	
M101 to M102	10 10		10.95 10.95	1 1.101	N 2O	7.0 10.0 0.0	40.500 17.000 57.500	150 0.0223	17.426 0.0 1.284		Vel = 3.69	
M102 to TOR	10 8		9.07 20.02	1 1.101	3N	21.0 0.0 0.0	13.417 21.000 34.417	150 0.0682	18.710 0.866 2.347		Vel = 6.75	
TOR			0.0 20.02						21.923		K Factor = 4.28	
TOR to BOR	8 3		20.02 20.02	1 1.101	N Ball	7.0 4.303 0.0	8.000 11.303 19.303	150 0.0682	21.923 2.166 1.316		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	25.405 0.0 0.794		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	26.199 2.599 2.072		Vel = 4.84	
UG2 to UG3	-3 -3		0.0 23.02	6 6.09	2G 3E 2F	9.25 64.749 21.583	1684.917 95.581 1780.498	150 0	30.870 0.0 0.038		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	30.908 -2.599 0.022		Vel = 0.25	
TEST			0.0 23.02						28.331		K Factor = 4.32	



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 16 - Bonus Room
Drawing : FP1
Location : 301 Oakhaven Dr.
Remote Area : RA2
Contract : 21NC1534
Data File : RA2- loop.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oakhaven Lot 16
Location: 301 Oakhaven Dr.
Drawing no: FP1
Date: 8/30/2021

Design

Remote area number: RA2
Remote area location: Bonus Room
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: 361 - 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): 37.55 - GPM @ 47.27 - 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
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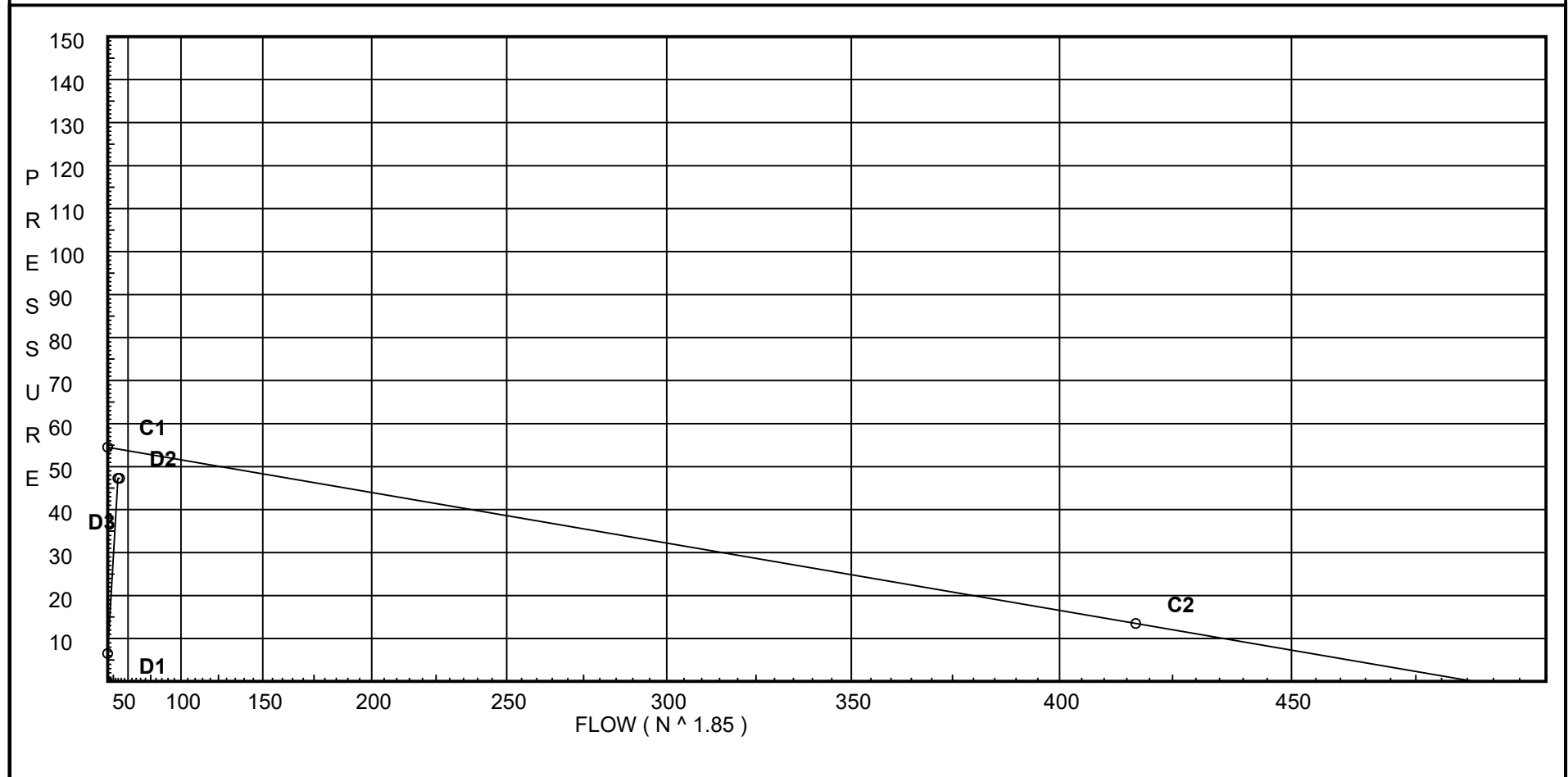
Water Supply Curve C

Fire & Life Safety America
Oakhaven Lot 16 - Bonus Room

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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 : 34.545
D2 - System Pressure : 47.274
Hose (Demand) : 3
D3 - System Demand : 37.545
Safety Margin : 6.749



Fittings Used Summary

Fire & Life Safety America
Oakhaven Lot 16 - Bonus Room

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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
Ball	B Ball Milw BB-SC100			2.25	2	2.5	2.25	10													
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'Ell 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
Oakhaven Lot 16 - Bonus Room

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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	54.023	37.55	47.274

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	12.0	16.97	
S202	18.0	4.9	12.86	17.57	
201	19.0		12.04		
202	19.0		12.75		
M201	10.0		18.8		
M202	10.0		21.79		
M203	10.0		24.58		
M101	10.0		25.66		
M102	0.0		31.08		
TOR	8.0		34.05		
BOR	3.0		39.83		
UG1	3.0		42.01	3.0	
UG2	-3.0		49.72		
UG3	-3.0		49.82		
TEST	3.0		47.27		

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 16 - Bonus Room

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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	18 19	4.90	16.97 16.97	1 1.101	N	7.0 0.0 0.0	2.500 7.000 9.500	150 0.0502	12.000 -0.433 0.477			Vel = 5.72
201			0.0 16.97						12.044		K Factor = 4.89	
S202 to 202	18 19	4.90	17.57 17.57	1 1.101	O	5.0 0.0 0.0	1.000 5.000 6.000	150 0.0535	12.859 -0.433 0.321			Vel = 5.92
202			0.0 17.57						12.747		K Factor = 4.92	
201 to 202	19 19		16.97 16.97	1 1.101		0.0 0.0 0.0	14.000 0.0 14.000	150 0.0502	12.044 0.0 0.703			Vel = 5.72
202 to M201	19 10		17.58 34.55	1 1.101	N	7.0 0.0 0.0	4.500 7.000 11.500	150 0.1870	12.747 3.898 2.151			Vel = 11.64
M201 to M202	10 10		0.0 34.55	1 1.101	N	7.0 0.0 0.0	9.000 7.000 16.000	150 0.1870	18.796 0.0 2.992			Vel = 11.64
M202 to M203	10 10		0.0 34.55	1 1.101	2O	10.0 0.0 0.0	4.917 10.000 14.917	150 0.1870	21.788 0.0 2.790			Vel = 11.64
M203			0.0 34.55						24.578		K Factor = 6.97	
M203 to M102	10 0		24.76 24.76	1 1.101	O	5.0 0.0 0.0	16.500 5.000 21.500	150 0.1010	24.578 4.331 2.171			Vel = 8.34
M102			0.0 24.76						31.080		K Factor = 4.44	
M203 to M101	10 10		9.79 9.79	1 1.101	N 2O	7.0 10.0 0.0	42.875 17.000 59.875	150 0.0181	24.578 0.0 1.086			Vel = 3.30
M101 to M102	10 0		0.0 9.79	1 1.101	O 2N	5.0 14.0 0.0	40.750 19.000 59.750	150 0.0182	25.664 4.331 1.085			Vel = 3.30
M102 to TOR	0 8		24.76 34.55	1 1.101	3N	21.0 0.0 0.0	13.417 21.000 34.417	150 0.1870	31.080 -3.465 6.437			Vel = 11.64
TOR			0.0 34.55						34.052		K Factor = 5.92	
TOR to BOR	8 3		34.55 34.55	1 1.101	N Ball	7.0 4.303 0.0	8.000 11.303 19.303	150 0.1870	34.052 2.166 3.609			Vel = 11.64
BOR to UG1	3 3		0.0 34.55	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150 0.1870	39.827 0.0 2.179			Vel = 11.64
UG1 to UG2	3 -3	H3	3.00 37.55	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150 0.0691	42.006 2.599 5.119			Vel = 7.89

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 16 - Bonus Room

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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	*****
UG2 to UG3	-3 -3		0.0 37.55	6 6.09	2G 3E 2F	9.25 64.749 21.583	1684.917 95.581 1780.498	150 0.0001	49.724 0.0 0.094		Vel = 0.41	
UG3 to TEST	-3 3		0.0 37.55	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150 0.0001	49.818 -2.599 0.055		Vel = 0.40	
TEST			0.0 37.55						47.274		K Factor = 5.46	