

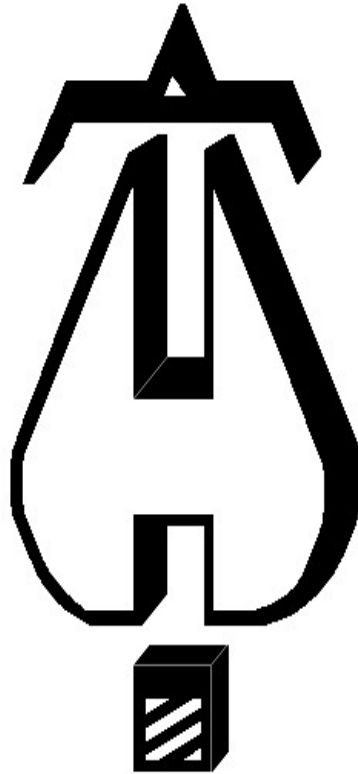


1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • www.flsamerica.com

OAKHAVEN LOT 41

HYDRAULIC CALCULATIONS

6/1/2021



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 41
Drawing : FP2
Location : 83 Oakhaven Dr.
Remote Area : RA1
Contract : 21NC1524
Data File : RA1- Master Bedroom.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oakhaven Lot 41

Location: 83 Oakhaven Dr.

Drawing no: FP2

Date: 6/1/2021

Design

Remote area number: RA1

Remote area location: Master Bedroom

Occupancy classification: Residential

Density: .05 - Gpm/SqFt

Area of application: 221 - 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 @ 29.25 - 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 41

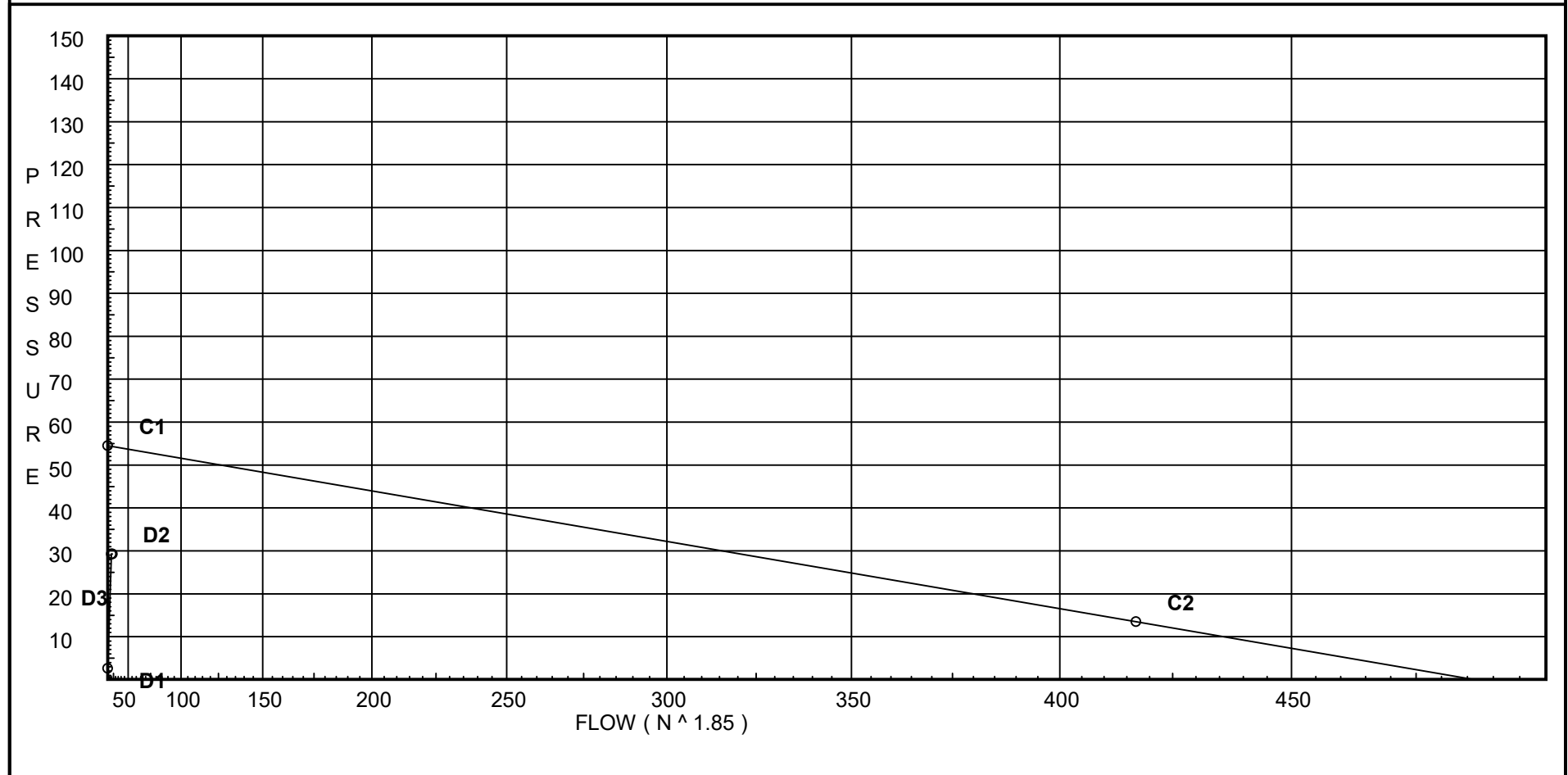
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City Water Supply:

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 : 29.254
Hose (Demand) : 3
D3 - System Demand : 23.024
Safety Margin : 25.053



Fittings Used Summary

Fire & Life Safety America
Oakhaven Lot 41

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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

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	54.5	13.5	417.0	54.307	23.02	29.254

NODE ANALYSIS

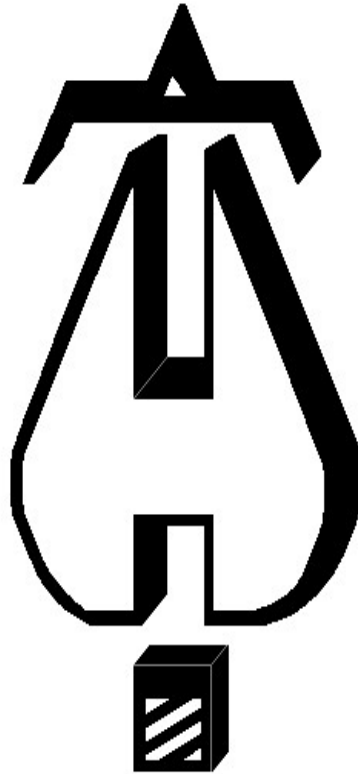
Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
S101	9.0	4.9	16.7	20.02	
101	10.0		16.81		
M101	10.0		18.93		
M102	10.0		20.11		
TOR	8.0		23.17		
BOR	3.0		26.35		
UG1	3.0		27.15	3.0	
UG2	-3.0		31.82		
UG3	-3.0		31.83		
TEST	3.0		29.25		

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 41

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Date 6/1/2021

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	*****
S101 to 101	9 10	4.90	20.02	1	N	7.0 0.0	1.000 7.000	150	16.700 -0.433			
			20.02	1.101		0.0	8.000	0.0681	0.545		Vel = 6.75	
			0.0									
101			20.02						16.812		K Factor = 4.88	
101 to M101	10 10		20.02	1	N O	7.0 5.0	19.125 12.000	150	16.812 0.0			
			20.02	1.101		0.0	31.125	0.0682	2.123		Vel = 6.75	
M101 to M102	10 10		0.0	1	O	5.0 0.0	12.292 5.000	150	18.935 0.0			
			20.02	1.101		0.0	17.292	0.0682	1.179		Vel = 6.75	
M102 to TOR	10 8		0.0	1	O 2N	5.0 14.0	13.042 19.000	150	20.114 0.866			
			20.02	1.101		0.0	32.042	0.0682	2.185		Vel = 6.75	
			0.0									
TOR			20.02						23.165		K Factor = 4.16	
TOR to BOR	8 3		20.02	1	N	7.0 0.0	8.000 7.000	150	23.165 2.166			
			20.02	1.101		0.0	15.000	0.0682	1.023		Vel = 6.75	
BOR to UG1	3 3		0.0	1	2E	7.65 0.0	4.000 7.650	150	26.354 0.0			
			20.02	1.101		0.0	11.650	0.0682	0.794		Vel = 6.75	
UG1 to UG2	3 -3	H3	3.00	1.25	T 2E	9.523 9.523	55.000 19.046	150	27.148 2.599			
			23.02	1.394		0.0	74.046	0.0280	2.072		Vel = 4.84	
UG2 to UG3	-3 -3		0.0	6	2G 3E	9.25 64.749	470.250 95.581	150	31.819 0.0			
			23.02	6.09	2F	21.583	565.831	0	0.012		Vel = 0.25	
UG3 to TEST	-3 3		0.0	6	T 2E	48.896 45.637	1000.000 99.422	150	31.831 -2.599			
			23.02	6.16	G	4.89	1099.422	0	0.022		Vel = 0.25	
			0.0									
TEST			23.02						29.254		K Factor = 4.26	



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 41
Drawing : FP2
Location : 83 Oakhaven Dr.
Remote Area : RA2
Contract : 21NC1524
Data File : RA2- Kitchen.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oakhaven Lot 41
Location: 83 Oakhaven Dr.
Drawing no: FP2
Date: 6/1/2021

Design

Remote area number: RA2
Remote area location: Kitchen
Occupancy classification: Residential
Density: .05 - Gpm/SqFt
Area of application: 314 - SqFt
Coverage per sprinkler: 256 - 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): 29.05 - GPM @ 25.85 - 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 41

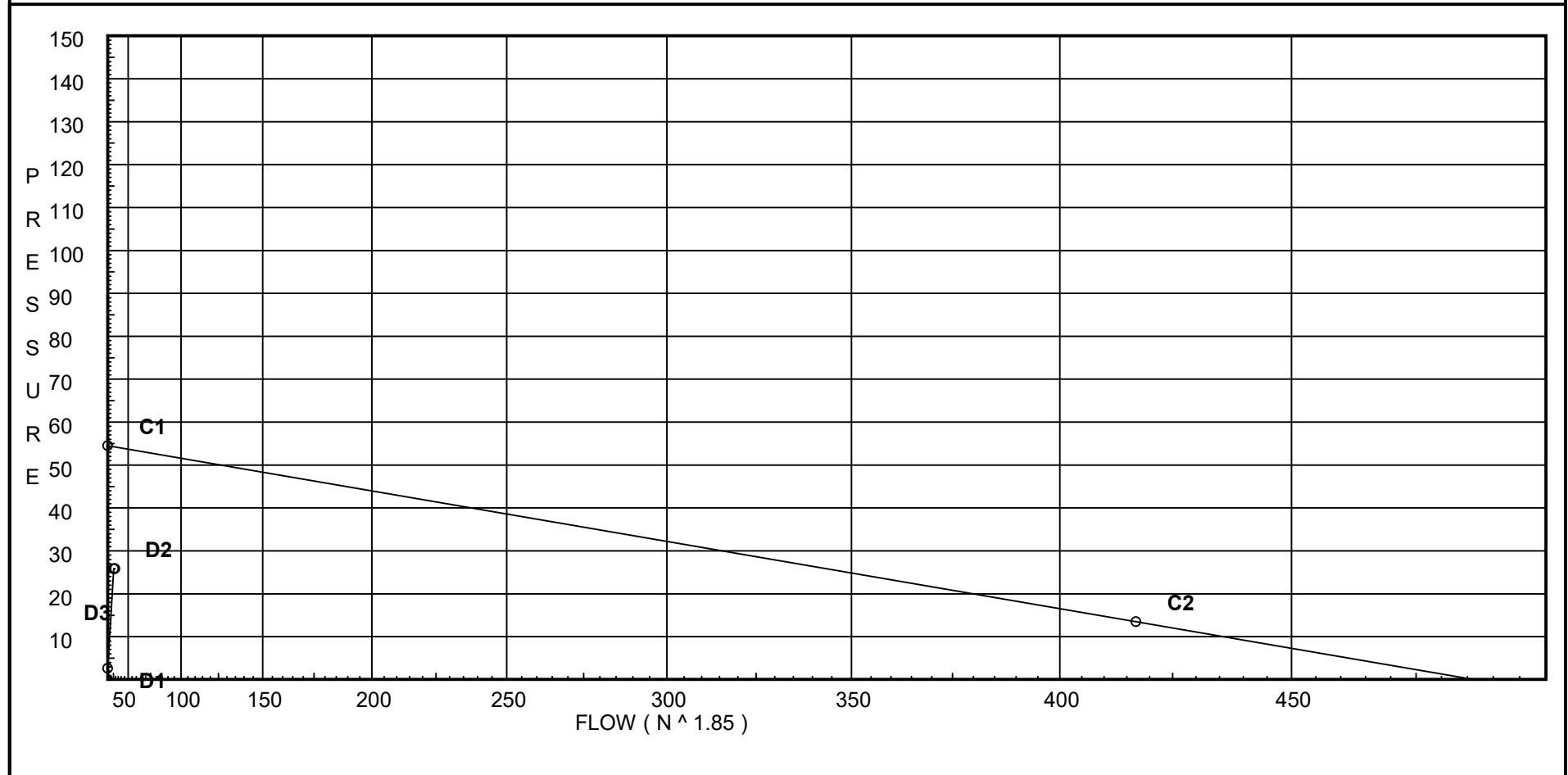
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City Water Supply:

C1 - Static Pressure : 54.5
C2 - Residual Pressure: 13.5
C2 - Residual Flow : 417

Demand:

D1 - Elevation : 2.599
D2 - System Flow : 26.05
D2 - System Pressure : 25.848
Hose (Demand) : 3
D3 - System Demand : 29.05
Safety Margin : 28.355



Fittings Used Summary

Fire & Life Safety America
Oakhaven Lot 41

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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'EI 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	54.203	29.05	25.848

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	7.13	13.09	
201	10.0		6.81		
202	10.0		6.95		
M201	10.0		7.31		
M202	10.0		8.83		
M101	10.0		11.15		
M102	10.0		13.07		
TOR	8.0		17.49		
BOR	3.0		21.32		
UG1	3.0		22.61	3.0	
UG2	-3.0		28.39		
UG3	-3.0		28.41		
TEST	3.0		25.85		

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 41

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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	7.0 0.0 0.0	1.000 7.000 8.000	150	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	13.09 13.09	1 1.101	N	7.0 0.0 0.0	1.000 7.000 8.000	150	7.132 -0.433 0.248		Vel = 4.41	
202			0.0 13.09						6.947		K Factor = 4.97	
201 to M201	10 10		12.96 12.96	1 1.101	N	7.0 0.0 0.0	9.417 7.000 16.417	150	6.811 0.0 0.501		Vel = 4.37	
M201			0.0 12.96						7.312		K Factor = 4.79	
202 to M201	10 10		13.09 13.09	1 1.101	O	5.0 0.0 0.0	6.750 5.000 11.750	150	6.947 0.0 0.365		Vel = 4.41	
M201			0.0 13.09						7.312		K Factor = 4.84	
M201 to M202	10 10		26.05 26.05	1 1.101	O	5.0 0.0 0.0	8.667 5.000 13.667	150	7.312 0.0 1.516		Vel = 8.78	
M202 to M101	10 10		0.0 26.05	1 1.101	O	5.0 0.0 0.0	15.917 5.000 20.917	150	8.828 0.0 2.321		Vel = 8.78	
M101 to M102	10 10		0.0 26.05	1 1.101	O	5.0 0.0 0.0	12.292 5.000 17.292	150	11.149 0.0 1.918		Vel = 8.78	
M102 to TOR	10 8		0.0 26.05	1 1.101	O 2N	5.0 14.0 0.0	13.042 19.000 32.042	150	13.067 0.866 3.555		Vel = 8.78	
TOR			0.0 26.05						17.488		K Factor = 6.23	
TOR to BOR	8 3		26.05 26.05	1 1.101	N	7.0 0.0 0.0	8.000 7.000 15.000	150	17.488 2.166 1.664		Vel = 8.78	
BOR to UG1	3 3		0.0 26.05	1 1.101	2E	7.65 0.0 0.0	4.000 7.650 11.650	150	21.318 0.0 1.292		Vel = 8.78	
UG1 to UG2	3 -3	H3	3.00 29.05	1.25 1.394	T 2E	9.523 9.523 0.0	55.000 19.046 74.046	150	22.610 2.599 3.185		Vel = 6.11	
UG2 to UG3	-3 -3		0.0 29.05	6 6.09	2G 3E 2F	9.25 64.749 21.583	470.250 95.581 565.831	150	28.394 0.0 0.019		Vel = 0.32	
UG3 to TEST	-3 3		0.0 29.05	6 6.16	T 2E G	48.896 45.637 4.89	1000.000 99.422 1099.422	150	28.413 -2.599 0.034		Vel = 0.31	

Final Calculations : Hazen-Williams

Fire & Life Safety America
Oakhaven Lot 41

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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			
			0.0									
TEST			29.05						25.848		K Factor =	5.71