

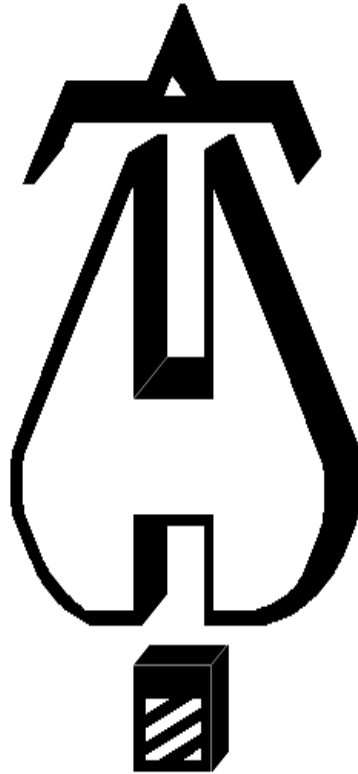


1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • www.flsamerica.com

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

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.)

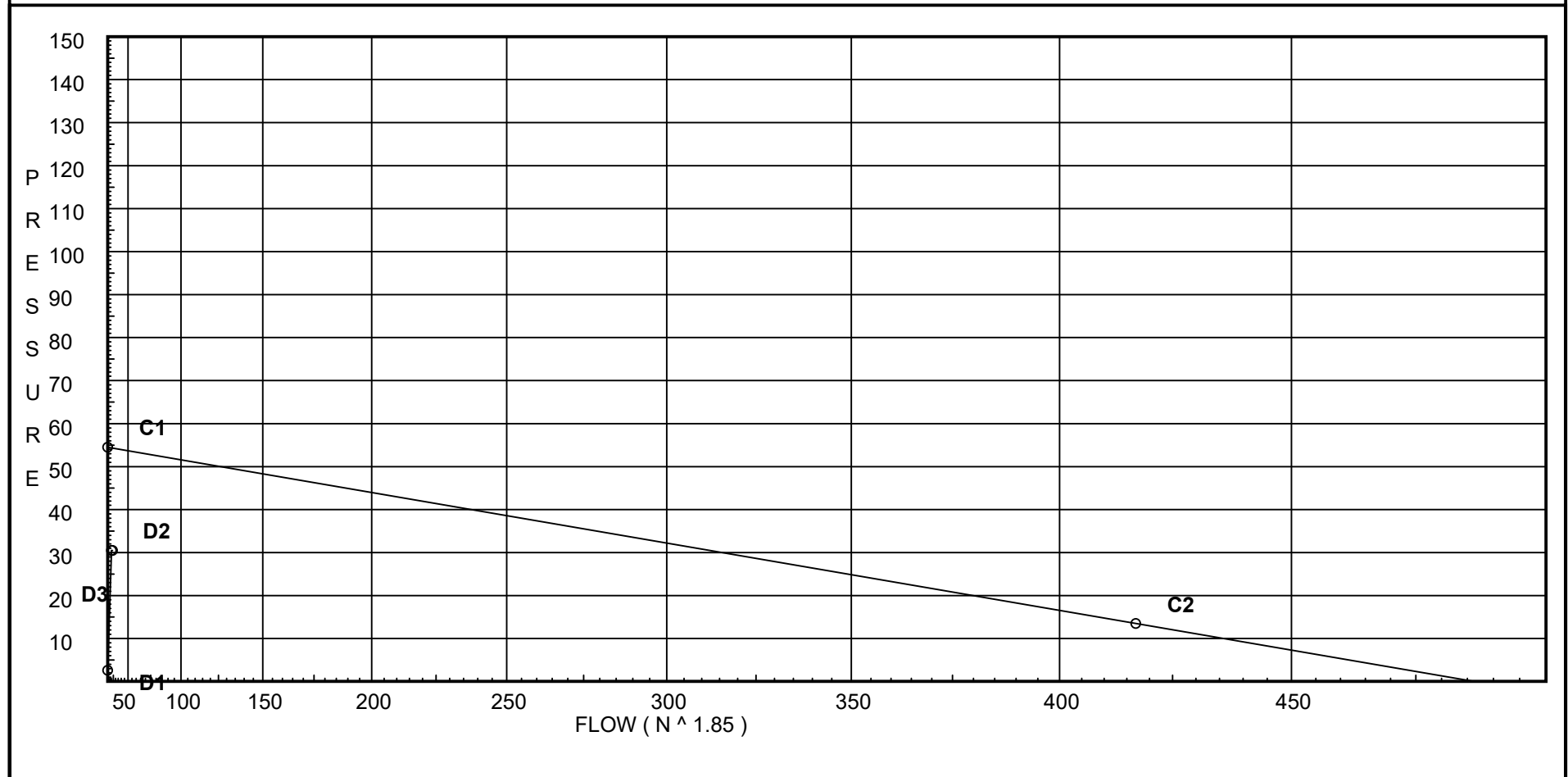
Water Supply Curve C

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

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	30.477

NODE ANALYSIS

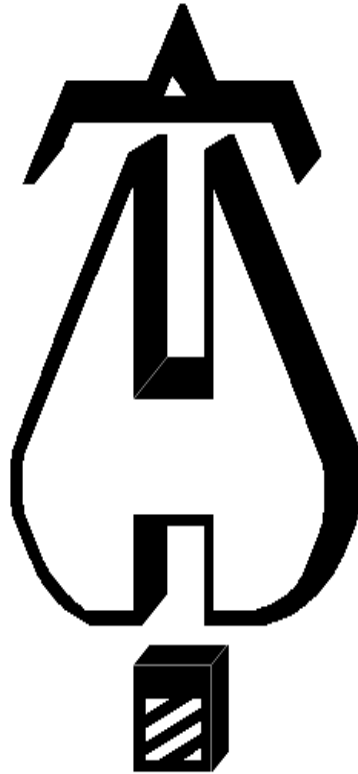
Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
S101	9.0	4.9	16.7	20.02	
101	10.0		16.81		
M101	10.0		18.19		
M102	10.0		21.82		
TOR	8.0		24.37		
BOR	3.0		27.56		
UG1	3.0		28.35	3.0	
UG2	-3.0		33.02		
UG3	-3.0		33.05		
TEST	3.0		30.48		

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

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
Phone number: F: (919) 877-57
Name of designer: H. WEYANT
Authority having jurisdiction: HARNETT COUNTY
Notes: (Include peaking information or gridded systems here.)

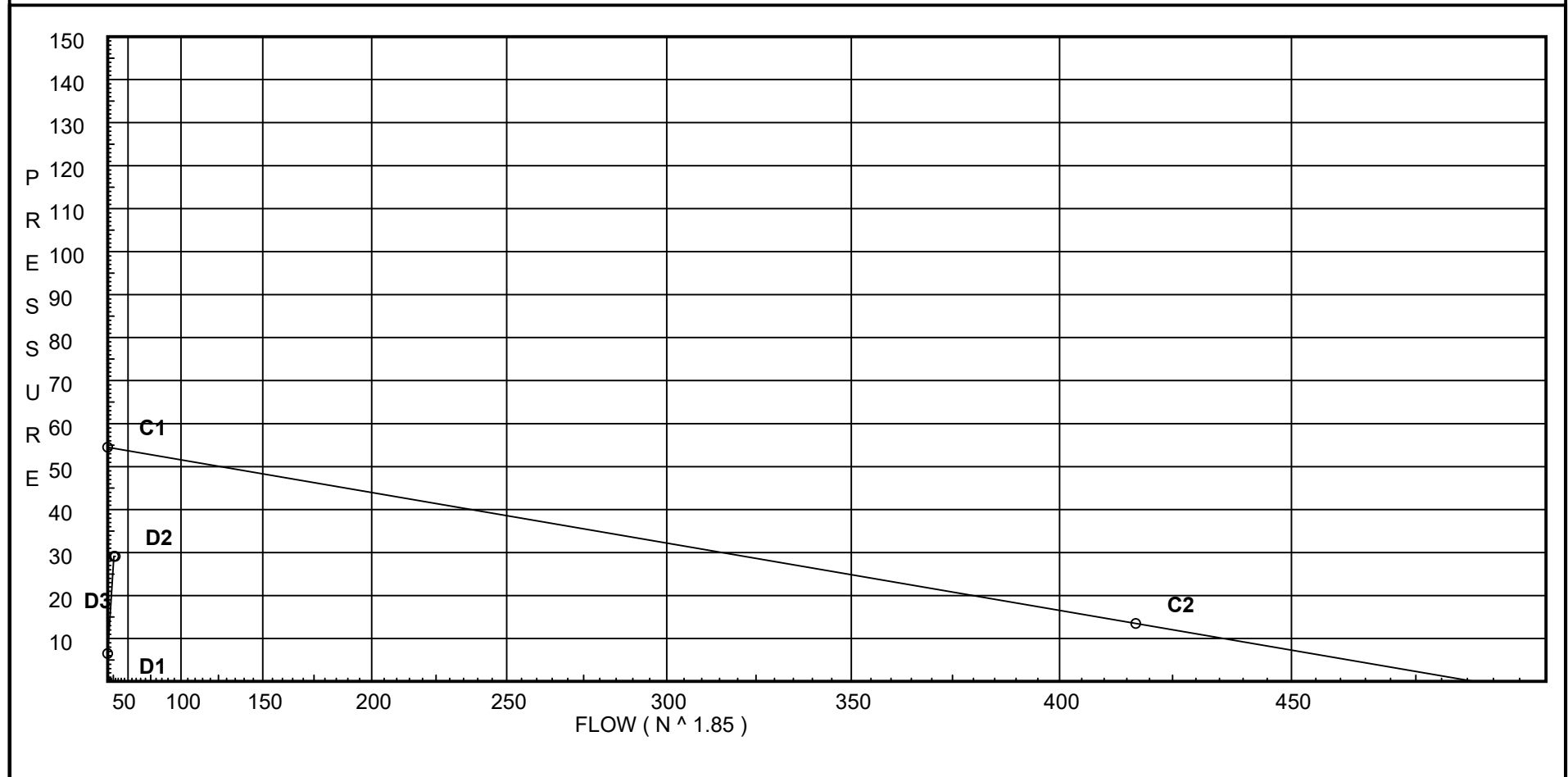
Water Supply Curve C

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 : 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

<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	54.198	29.31	29.121

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	7.42	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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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	