

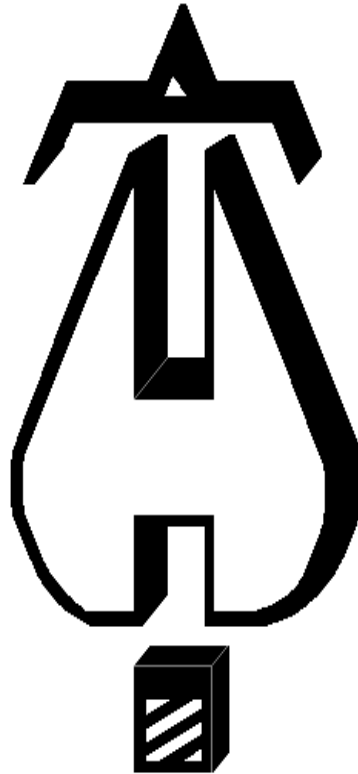


1731 Round Rock Drive, Raleigh, NC 27615 • (919) 872-3250 • fax (919) 877-5775 • www.flsamerica.com

OAK HAVEN LOT 23

HYDRAULIC CALCULATIONS

12/20/2021



Hydraulic calculations using HydraCALC

FIRE & LIFE SAFETY AMERICA
1731 ROUND ROCK DRIVE
RALEIGH, NC 27615
919-872-3250

Job Name : Oak Haven Lot 23 - RA1
Drawing : FP1
Location : 86 BUCKHAVEN DR.
Remote Area : RA1
Contract : 22NC1554
Data File : RA1.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oak Haven Lot 23
Location: 86 BUCKHAVEN DR.
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: 241 - 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): 23.024 - GPM @ 24.333 - 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 23 - RA1

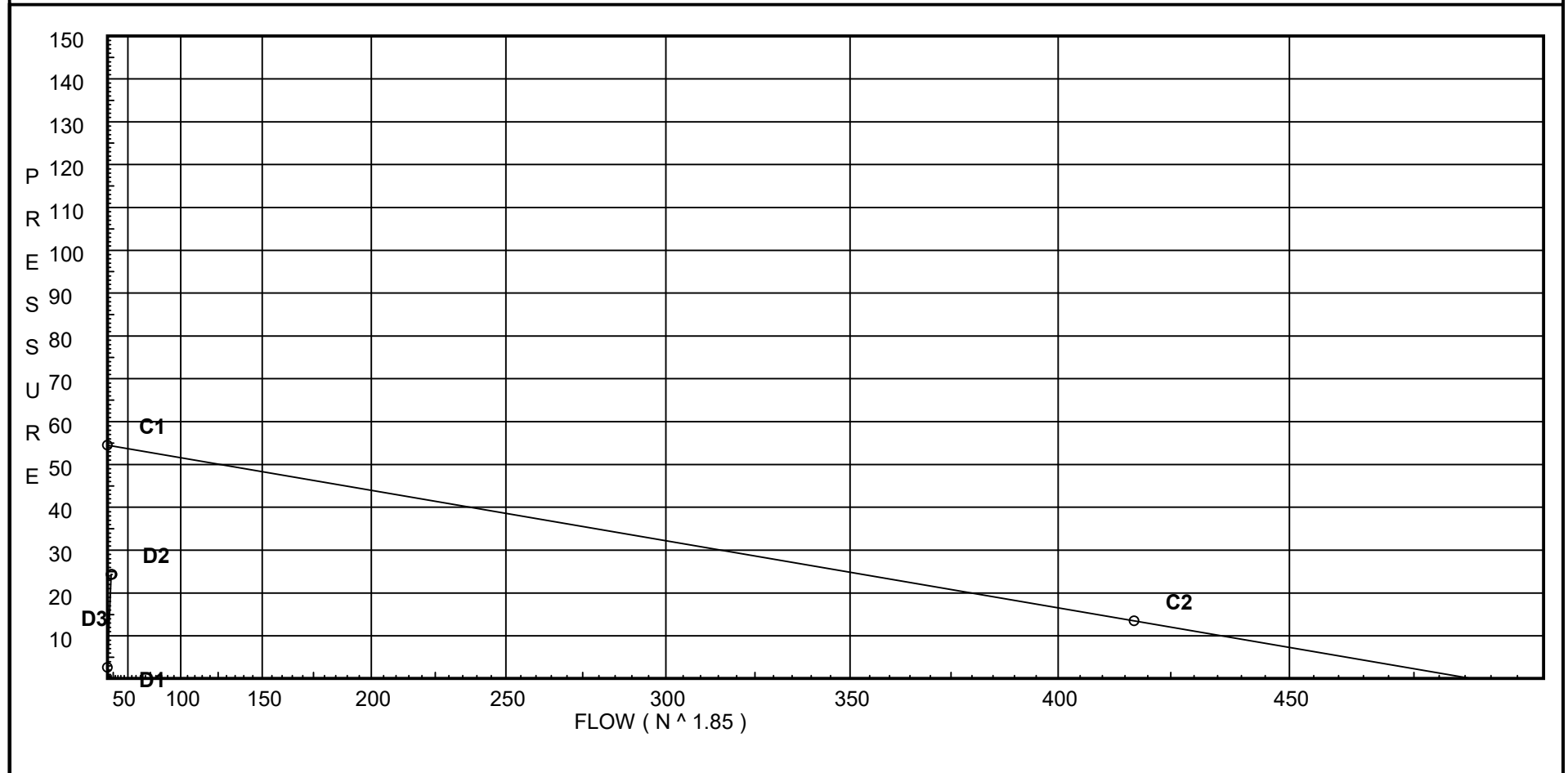
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City Water Supply:

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 : 24.333
Hose (Demand) : 3
D3 - System Demand : 23.024
Safety Margin : 29.974



Fittings Used Summary

FIRE & LIFE SAFETY AMERICA
Oak Haven Lot 23 - 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'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.

Flow Summary - NFPA

FIRE & LIFE SAFETY AMERICA
Oak Haven Lot 23 - 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	24.333

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		16.68		
M202	10.0		17.07		
M203	10.0		17.08		
M205	10.0		17.06		
M206	10.0		17.0		
M204	10.0		17.1		
TOR	8.0		18.22		
BOR	3.0		21.41		
UG1	3.0		22.2	3.0	
UG2	-3.0		26.87		
UG3	-3.0		26.88		
UG4	-3.0		26.91		
TEST	3.0		24.33		

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
Oak Haven Lot 23 - RA1

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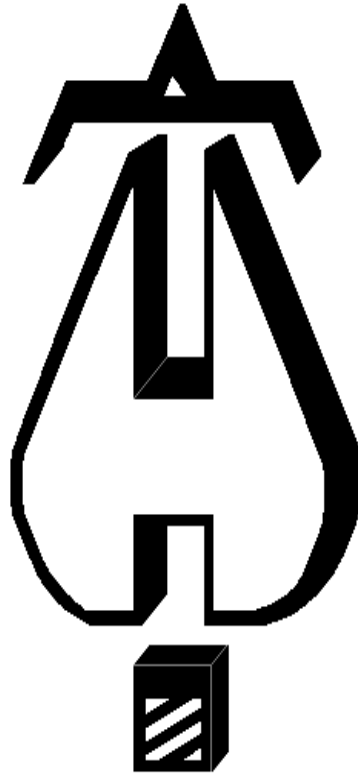
Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
S101 to 101	9 10	4.90	20.02 20.02	1 1.101	O	5.0 0.0 0.0	1.000 5.000 6.000	150	16.700 -0.433 0.409		Vel = 6.75	
101			0.0 20.02						16.676		K Factor = 4.90	
101 to M206	10 10		7.41 7.41	1 1.101	N	7.0 0.0	23.333 7.000 30.333	150	16.676 0.0 0.329		Vel = 2.50	
M206			0.0 7.41						17.005		K Factor = 1.80	
M202 to M203	10 10		2.34 2.34	1.25 1.394	N	8.0 0.0	18.917 8.000 26.917	150	17.071 0.0 0.011		Vel = 0.49	
M203 to M204	10 10		0.0 2.34	1.25 1.394	O	6.0 0.0	26.750 6.000 32.750	150	17.082 0.0 0.013		Vel = 0.49	
M204			0.0 2.34						17.095		K Factor = 0.57	
M202 to M205	10 10		-2.34 -2.34	1.25 1.394	2O	12.0 0.0	16.000 12.000 28.000	150	17.071 0.0 -0.012		Vel = 0.49	
M205 to M206	10 10		0.0 -2.34	1.25 1.394	3N O	24.0 6.0	103.417 30.000 133.417	150	17.059 0.0 -0.054		Vel = 0.49	
M206 to M204	10 10		7.41 5.07	1.25 1.394	N	8.0 0.0	44.917 8.000 52.917	150	17.005 0.0 0.090		Vel = 1.07	
M204 to TOR	10 8		14.95 20.02	1.25 1.394	N	8.0 0.0	3.917 8.000 11.917	150	17.095 0.866 0.258		Vel = 4.21	
TOR			0.0 20.02						18.219		K Factor = 4.69	
M204 to 101	10 10		-12.61 -12.61	1.25 1.394	3N	24.0 0.0	21.587 24.000 45.587	150	17.095 0.0 -0.419		Vel = 2.65	
101			0.0 -12.61						16.676		K Factor = -3.09	
TOR to BOR	8 3		20.02 20.02	1 1.101	N	7.0 0.0	8.000 7.000 15.000	150	18.219 2.166 1.022		Vel = 6.75	
BOR to UG1	3 3		0.0 20.02	1 1.101	2E	7.65 0.0	4.000 7.650 11.650	150	21.407 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	55.000 19.046 74.046	150	22.202 2.599 2.071		Vel = 4.84	
UG2 to UG3	-3 -3		0.0 23.02	6 6.09	3E 2F	64.749 21.583	482.000 86.332 568.332	150	26.872 0.0 0.012		Vel = 0.25	

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
Oak Haven Lot 23 - 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	*****
UG3 to UG4	-3 -3		0.0 23.02	6 6.09	2G 3F	9.25 32.374	1149.000 41.623	150	26.884 0.0		Vel = 0.25	
UG4 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	26.910 -2.599 0.022		Vel = 0.25	
TEST			0.0 23.02						24.333		K Factor = 4.67	



Hydraulic calculations using HydraCALC

FIRE & LIFE SAFETY AMERICA
1731 ROUND ROCK DRIVE
RALEIGH, NC 27615
919-872-3250

Job Name : OAKHAVEN LOT 23 - RA2
Drawing : FP1
Location : 86 BUCKHAVEN DR.
Remote Area : RA2
Contract : 22NC1554
Data File : RA2- Bonus Room.WXF

HYDRAULIC CALCULATIONS
for

Project name: Oakhaven Lot 23
Location: 86 BUCKHAVEN DR.
Drawing no: FP1
Date: 12/20/2021

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): 37.545 - GPM @ 46.468 - 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: R. COLLINS
Authority having jurisdiction: Harnett County
Notes: (Include peaking information or gridded systems here.)

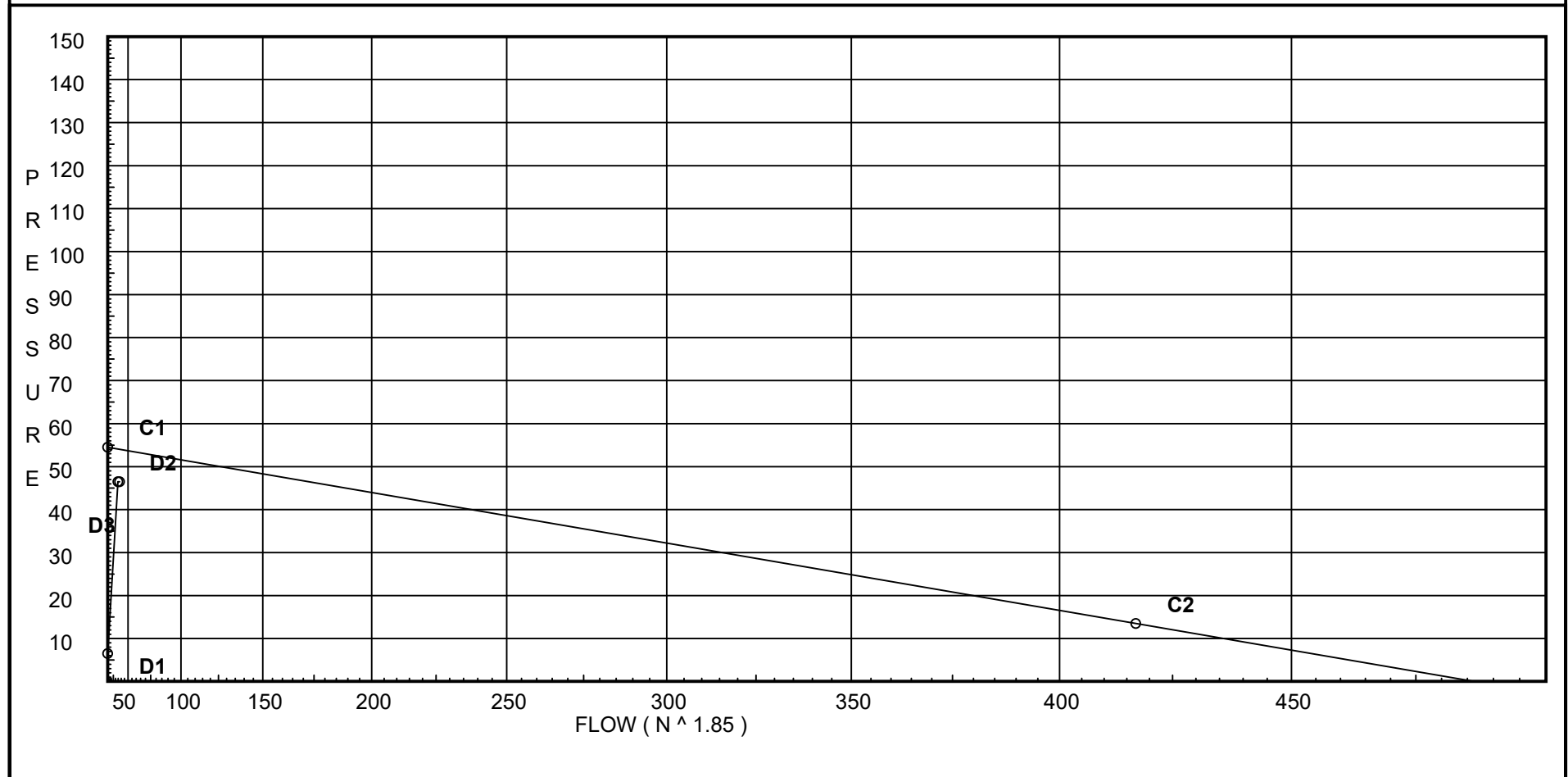
Water Supply Curve C

FIRE & LIFE SAFETY AMERICA
OAKHAVEN LOT 23 - RA2

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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 : 46.468
Hose (Demand) : 3
D3 - System Demand : 37.545
Safety Margin : 7.555



Fittings Used Summary

FIRE & LIFE SAFETY AMERICA
OAKHAVEN LOT 23 - 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
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
OAKHAVEN LOT 23 - RA2

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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	46.468

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		39.02		
UG1	3.0		41.2	3.0	
UG2	-3.0		48.92		
UG3	-3.0		48.95		
UG4	-3.0		49.01		
TEST	3.0		46.47		

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
OAKHAVEN LOT 23 - 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	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	7.0 0.0 0.0	8.000 7.000 15.000	150 0.1869	34.052 2.166 2.804			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	39.022 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	41.201 2.599 5.119			Vel = 7.89

Final Calculations : Hazen-Williams

FIRE & LIFE SAFETY AMERICA
OAKHAVEN LOT 23 - 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	*****
UG2 to UG3	-3 -3		0.0 37.55	6 6.09	3E 2F	64.749 21.583 86.332	150	48.919 0.0		Vel = 0.41	
UG3 to UG4	-3 -3		0.0 37.55	6 6.09	2G 3F	9.25 32.374 41.623	150	48.949 0.0		Vel = 0.41	
UG4 to TEST	-3 3		0.0 37.55	6 6.16	T 2E G	48.896 45.637 99.422 4.89 1099.422	150	49.012 -2.599		Vel = 0.40	
TEST			0.0 37.55					46.468		K Factor = 5.51	